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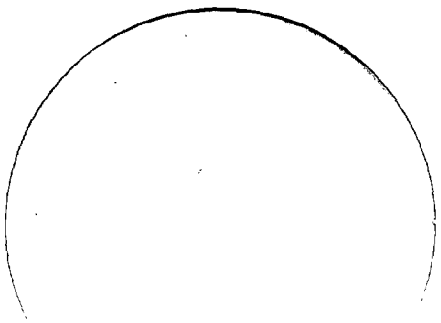


THE COVER EMBLEM

The logo symbolizing the Coastal Resources Management Program represents the objectives of responsible coastal resource management. The circle is the perfect geometric design within which the dark land mass is balanced against the blue water mass. The balance between light and dark, land and water, is also symbolic of a balance between man and nature leading to a balance between preservation and development. The live oak and olive branches surrounding the circle are from the State Seal and represent both strength and compassion, while the hands holding the circle represent management by man to meet the foregoing objectives.

COASTAL ZONE
INFORMATION CENTER

Texas Coastal Resources Management Program:

SEP 16 1974

A Comprehensive Report

to the 63rd Texas Legislature

by

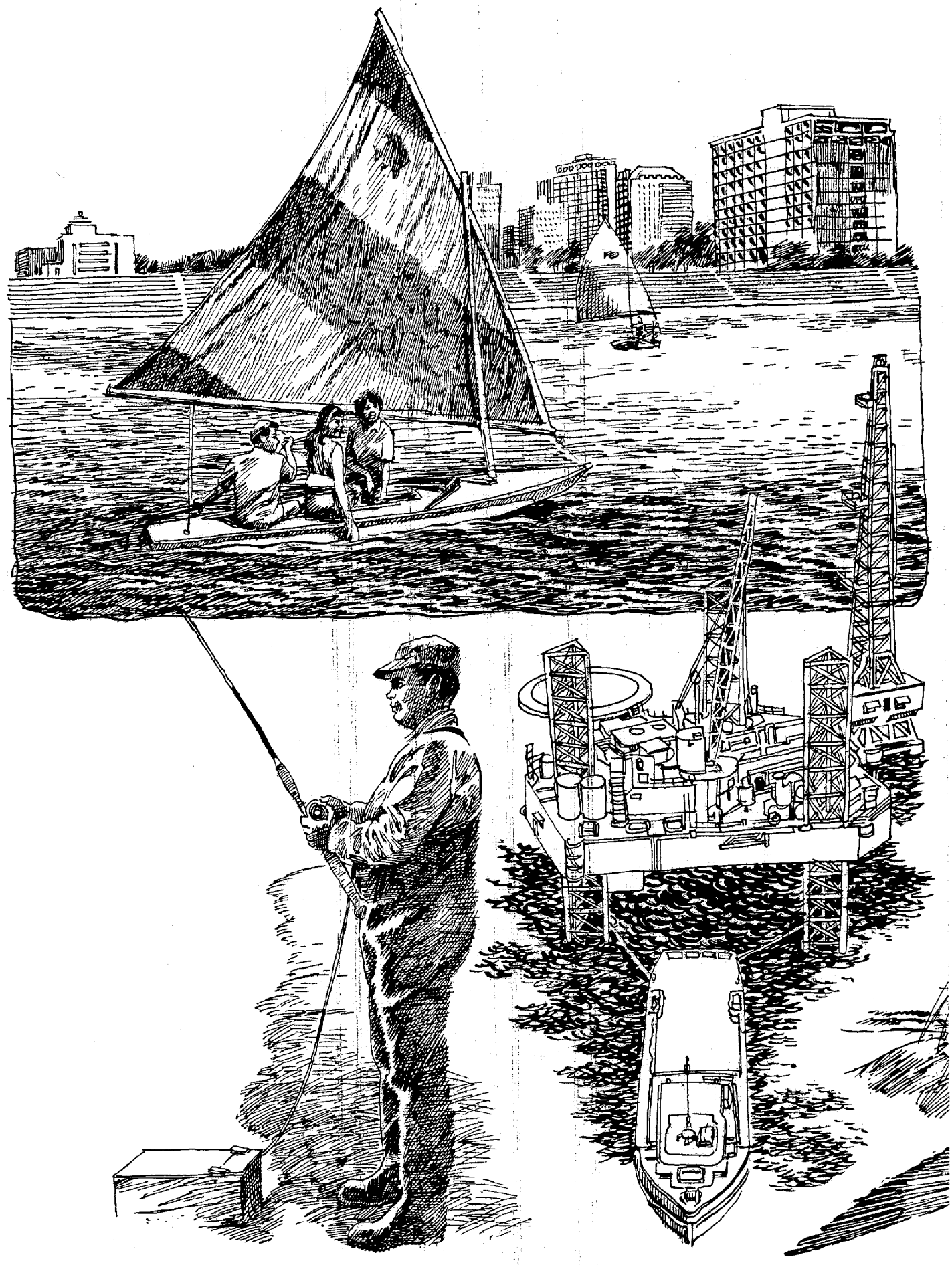
The Interagency Council on

Natural Resources and the Environment

Prepared by:
**The Governor's Office,
Division of Planning
Coordination**

DECEMBER, 1972

1493 Coastal Resources Management Program.

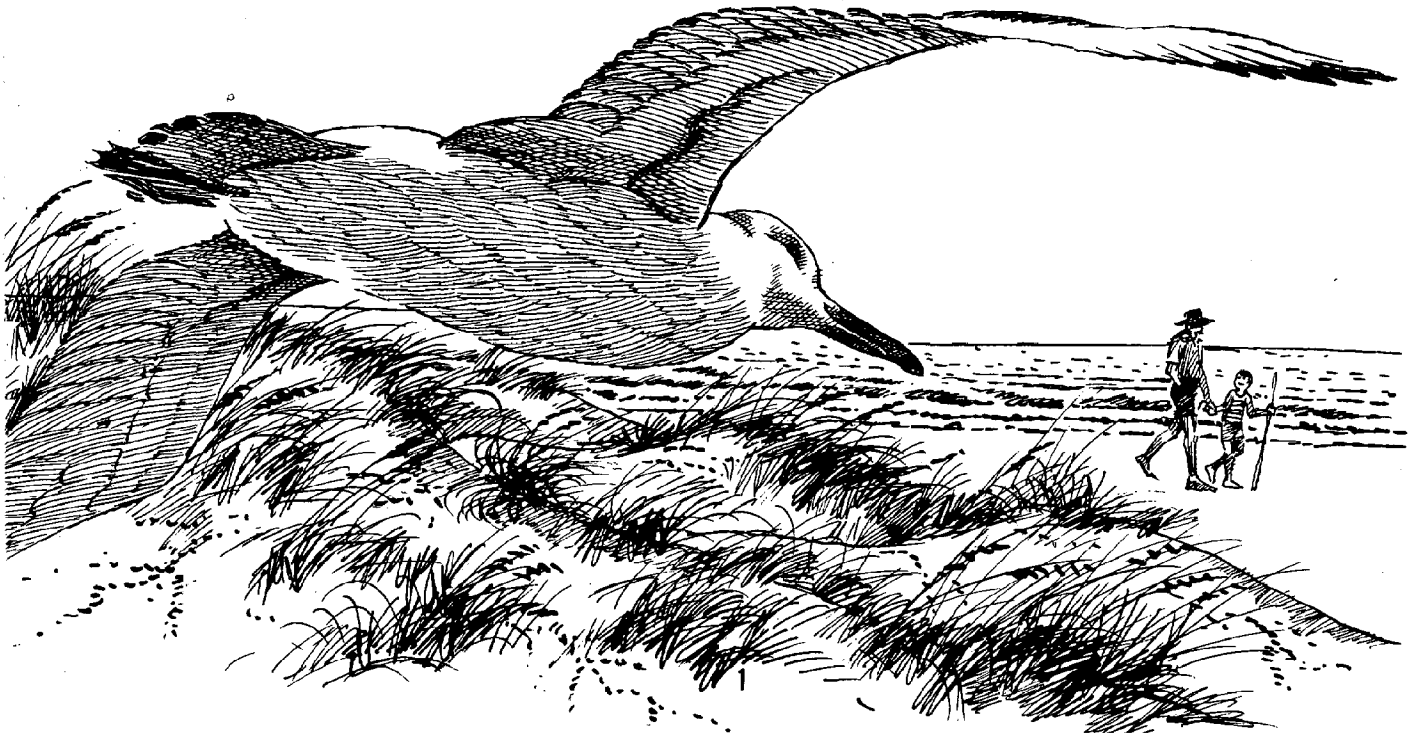


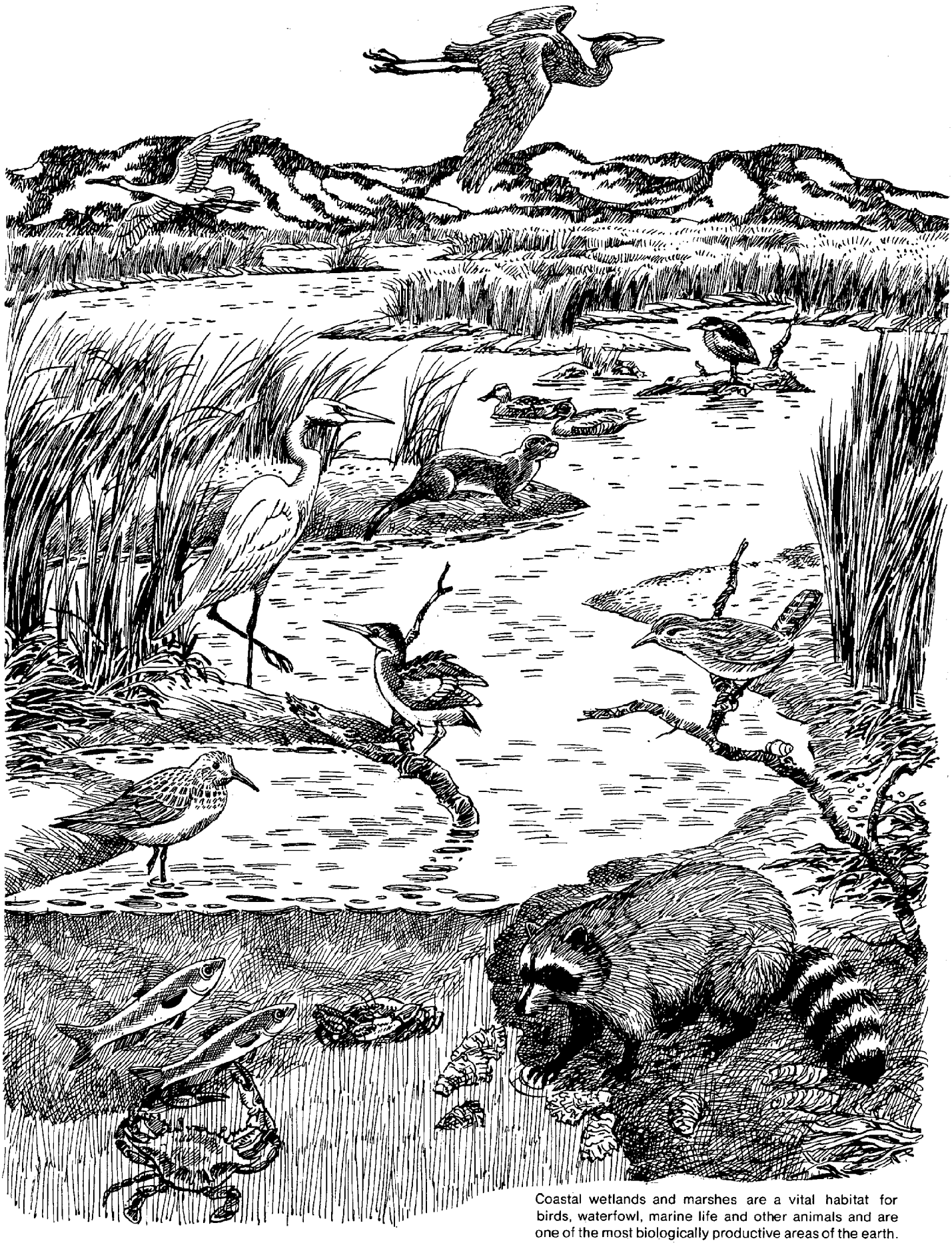
To make the Texas coastal zone a better place to live, work and play was the intention of the far-sighted legislators who instigated the Coastal Resources Management Program.

The 61st Legislature directed the Interagency Council on Natural Resources and the Environment to conduct a comprehensive investigation of the coastal zone. The lawmakers' goal was to take necessary actions to improve and maintain the quality of life on Texas' 400-mile coastline, including more than 1000 miles of shoreline, for present and future generations. They realized study and analysis of the coastal zone to insure its continuing health and productivity was necessary, not only for the inhabitants of the 36-county area, but for all Texans. The coastal zone is economically, environmentally and esthetically important to them all.

Staff support was provided the council by the Governor's Office, Division of Planning Coordination. This summary report represents the major findings of a combination of efforts and activities including legislative committee meetings, congressional hearings, university research, public hearings and interagency input and review. Documentary and scientific research totals more than 1500 pages.

These efforts show that the physical, biological, institutional, social, economic and political complexities of the coastal zone defy precise definition. However, there are several eminent problems that warrant immediate legislative attention and action including more stringent practices concerning the sale or lease of State-owned lands, better beach maintenance and a comprehensive system for effective groundwater management. Other recommendations recognize the need for new policies concerning coastal growth and development to insure economic prosperity and better environmental protection policies. The report also stresses a need for a continuing mechanism for coastal zone management. These specific legislative recommendations are summarized in the first chapter and detailed in the last chapter of the report. The first chapter also gives some additional history and background. The second chapter gives a broad overview of the land areas and man's main activities in the coastal zone, defining values, outlining problems and making suggestions for ultimate implementation.





Coastal wetlands and marshes are a vital habitat for birds, waterfowl, marine life and other animals and are one of the most biologically productive areas of the earth.

CHAPTER I

Summary of Recommendations and History

The Interagency Council on Natural Resources and the Environment upon completion of the Coastal Resources Management Program study recommends the Legislature take special consideration of six major topics. These topics include State-owned submerged lands, beach management, fresh water inflows to estuaries, dumping at sea, groundwater management, a continuing mechanism for coastal resources management and future fact-finding activities.

This chapter briefly outlines these topics. Chapter III goes into a more detailed explanation. Recommendations include:

SALE OR LEASING OF STATE-OWNED SUBMERGED LANDS AND ISLANDS

ICNRE recommends the State retain title to its submerged lands because they are a valuable and irreplaceable public resource.

However, the council realizes the necessity for continued navigation and related development. Therefore, ICNRE recommends that the Legislature:

- Repeal Section 61.116 of the Texas Water Code allowing the sale of State-owned submerged lands to navigation districts for $1 per acre. As an alternative for providing the necessary submerged lands for navigation and related development the council suggests: a) submerged lands be leased on a long-term basis with the State retaining the title, b) terms of the lease such as price, amount of land, location, use restrictions, cancellation and renewal clauses be subject to the approval of the School Land Board with the advice of the Submerged Lands Advisory Committee and the Interagency Council on Natural Resources and the Environment, c) public hearings be held, and d) a procedure be implemented to insure minimal environmental damage after the land is leased.

- Amend or repeal the Reagan-de la Garza Act to constitute a comprehensive coastal public lands management act with the provisions that: a) a procedure for coping with and ultimately eliminating illegal uses of State-owned property such as "squatter shacks" be implemented, b) the "industrial purposes only" clause be broadened to include such ventures as wildlife and estuarine management areas and recreational enterprises, and c) all terms of any lease be discretionary with the land commissioner and the School Land Board.

MODIFICATION OF BEACH-RELATED LAWS

Existing beach laws should be modified to provide better sanitary, traffic and police control by increasing the State's share of maintenance grants from 50-50 State-local to 75-25 State-local. The current maximum and minimum requirements should be eliminated, and the administering State agency should be directed to set guidelines for the maintenance and protection of the beaches.

DUMPING AT SEA

The Interagency Council on Natural Resources and the Environment recommends the Water Quality Act be amended to empower the Water Quality Board to regulate all dumping at sea if the wastes or vessels originate in or pass through Texas. Recent passage of a national Ocean Dumping Bill emphasizes the importance of meaningful State leadership in coastal zone management including the issue of dumping at sea.

FRESH WATER INFLOWS TO ESTUARIES

ICNRE agrees with the contention that fresh water inflows are vital to the estuaries, and that strong legal and technical steps must be taken to insure their protection. The council strongly recommends that the Legislature give the issue of providing fresh water inflows special and deliberate consideration by establishing an interim study committee or possibly designating some other body to study the issue in depth and report back by January, 1975, with specific recommendations for State action.

This entity should consider: a) revision of present water rights law including modification of use priorities, b) complex technical questions including estuarine requirements, alternatives and costs, c) cost sharing, and d) devising methods to cope with probable litigation facing all new water projects.

GROUNDWATER MANAGEMENT

The problem of subsidence and the need for groundwater management are realized by the Interagency Council on Natural Resources and the Environment. Severe subsidence in certain coastal areas can only be stopped by the curtailment of groundwater withdrawals.

However, groundwater and associated problems in other parts of the state indicate that any groundwater management system needs to be flexible in order to cope with widely separated localities and quite different problems.

Groundwater legislation should include the provisions: a) operational control be implemented at the local level with limited State assistance and supervision, b) if a majority votes to establish a management entity, it be mandatory for all those within the boundaries to comply, c) if the designated state entity, after conducting the appropriate investigations, determines that the aquifer will suffer irreparable damage due to overpumpage, the State be able to require the establishment of local management entities, d) a mechanism be included to insure the equitable distribution of added costs among current users, and e) the resultant not be applicable to domestic household and livestock supplies.

A CONTINUING COASTAL MANAGEMENT INSTITUTIONAL ARRANGEMENT

ICNRE is committed to the opinion that a coastal resources management effort should be continued.

The council believes the most desirable form of a coastal management effort would involve continuation of current program development activities coupled with strong coordinated action by existing regulatory agencies.

A coastal resource management mechanism should develop and maintain analyses and inventories of coastal resources, delineate critical environments, develop suggested guidelines and criteria for coastal resource use and development, and make legislative recommendations.

FUTURE FACT-FINDING ACTIVITIES

ICNRE believes the State of Texas should stay abreast of and make policy decisions on topics of coastal and statewide concern.

Inclusive in future fact-finding activities and policy formulation should be the topics of land resource management, detailed resource analyses of areas such as East-Northeast Texas, energy resources and needs, a deep draft terminal for Texas, and a natural resources information system.

The coastal zone is one of the most desirable sites in Texas for man to live, work and play.

History of the Coastal Program

Texas State government has taken many steps during this century to encourage the orderly development and wise use of its valuable coastal resources for the betterment of mankind while simultaneously taking steps to insure protection of certain elements of the natural environment from exploitative development or extensive pollution.

The State of Texas has provided a healthy climate for development and resource use. The State encouraged the establishment of the present port and waterway transportation system, supported the coastal and offshore production of petroleum, and through a long and arduous battle in the halls of Congress and the federal courts, retained mineral rights out in the Gulf to 10.35 miles.

At the same time, the State has taken substantial steps to protect its limited coastal resources for succeeding generations. The Texas Open Beaches Act, passed by the 56th Texas Legislature in 1959, insured that all citizens would be able to enjoy the beaches of the state. While there are limited areas subjected to excessive industrial and municipal pollution, the majority of the coastal zone is free from such degradation.

The current wave of interest in insuring adequate protection of the state's coastal resources, commensurate with beneficial use and development, was instigated in the 1960s along with the general awakening of public awareness on all environmental matters.

In 1967, the 60th Texas Legislature, realizing some of the new difficulties and problems which were arising concerning the proper management of the state's coastal resources, established a special interim committee, composed of both Senate and House members, to evaluate recent developments and report back to the 61st Legislature on what legislative actions should be taken.

This committee made twelve specific recommendations, eight of which the Legislature positively acted on in 1969. New legislation was enacted to accomplish several items related to beach management and protection including such things as beach cleaning, additional steps to insure public access, regulation of beach commerce, and control of wanton sand excavation.

In addition, the 61st Legislature took some farsighted steps to begin to pave the way for the coordinated, comprehensive management of all the state's coastal and related resources. Recognizing that the current practice of selling submerged lands at $1 per acre and other leasing arrangements as provided for by statute might not be in the best interest of the state, both from the standpoint of the Public Free School Fund and

the protection of coastal environment, the 61st Legislature placed a moratorium on the sale or leasing of such lands.

Also, the Legislature realized that certain development of these lands was absolutely necessary to the state's future economic health, and thus made the moratorium an interim step until all related problems could be evaluated and futher permanent action be taken.

Being aware of the magnitude and potential implications of such actions, the Legislature directed the Interagency Council on Natural Resources and the Environment, a consortium of 13 natural resource oriented State agencies, to develop a comprehensive set of recommendations on how these public lands and related resources should be managed prior to the gathering of the 63rd Legislature in January, 1973. This resolution was SCR No. 38 co-authored by then State Rep. Bob Armstrong, now land commissioner, and Sen. A. R. (Babe) Schwartz. The Legislature and State agencies concurred that an interagency approach was the most logical for conducting such a study.

An interim report was submitted to the 62nd Legislature in December, 1970. Taking the recommendations of the council, the 62nd Legislature passed two additional concurrent resolutions, SCR No. 8 and No. 9, which provided additional, specific direction to the council.

This document, along with numerous supplemental reports and model legislation, constitutes the fulfillment of that directive.

CHAPTER II

Land and Water Units and Man's Activities in the Coastal Zone

Most of the study and technical backup material of the Coastal Resources Management Program and what is summarized in this chapter deals with economic and environmental considerations. The interagency council realizes, however, that social implications should also be an essential consideration in management of the coastal zone.

A need exists for analysis not only of man's impact on the environment, but also the environment's influence over man and his actions. Besides the aspects of environmental and economic stability, sociological aspects such as population growth and distribution, educational opportunities, and cultural and historical factors must also be considered. The coastal zone must provide a healthy climate for man's vitality.

Population growth and distribution is an essential consideration in the coastal zone, both because of tremendous growth pressures in certain areas and the need to retain some areas for low population density because of activities such as recreation or wildlife habitats that may be conducted there.

Many institutions of higher learning are located in the coastal area which draw not only inhabitants of the coastal zone, but students from outside the area as well. It's essential to the entire state, especially for those in proximity, to be guaranteed continued educational opportunities in the coastal zone. Institutions of higher learning and public school systems must expand and develop as the population increases.

The coastal zone is steeped in colorful history and culture. Sites such as the town of Old Velasco where the first Stephen F. Austin's colonists landed in 1821, the Bishop's Palace in Galveston and sunken Spanish galleons off Padre Island are just some of the better known historical locations. Development proposals must take into account man's need to retain historical and cultural sites.

Environmental Capability Units

Prudent management of the Texas coastal zone is dependent on an adequate understanding of the characteristics and distribution of natural environments, man's activities, and the impact of these activities on the natural environment. Knowledge of the tolerance or capability of these basic land and water bodies to withstand man's impact and, yet serve him, is essential.

Extensive work and study of the resource capabilities of the land and water units along the Texas Gulf Coast has led to the outlining of 34 environmental capability units.

Resource capability units are defined by the main environmental factors which reflect the nature and degree of activity the unit can withstand without a significant environmental change. A specified activity may have relatively little impact on one unit, but if practiced on another unit might cause substantial and irreversible damage.

For example, solid waste disposal can be conducted on many upland areas without causing water pollution or having any other undesirable effects. However, if it were conducted in a coastal wetland the result would be water pollution, an adverse impact on the fish or wildlife inhabitants and an esthetic nuisance.

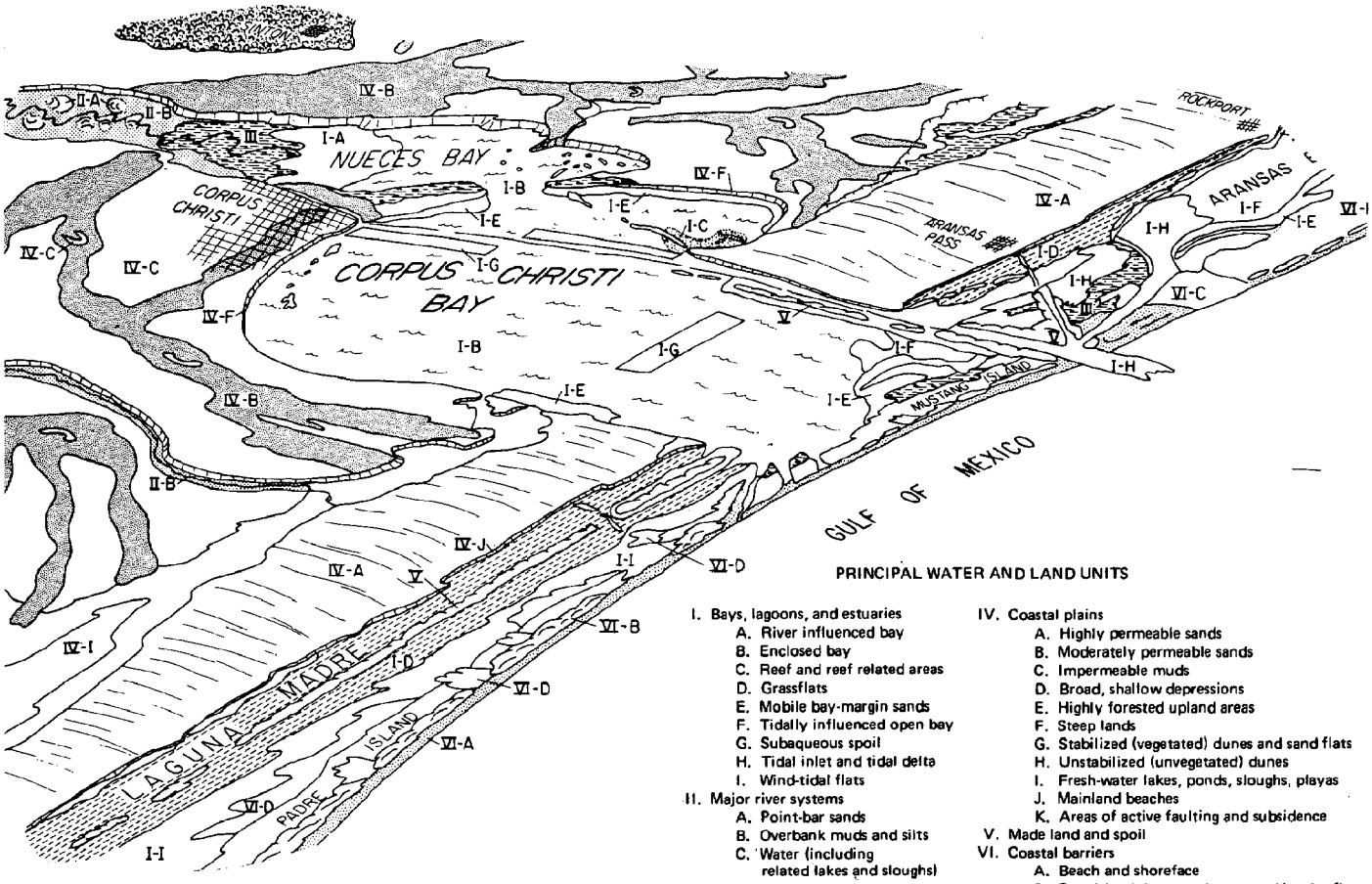
The principal land resource capability units are physical units, biologic units, process units and man-made units. Physical units include geologic subsurface and soil where physical properties including the ability to support foundations for large structures are of primary importance. Biologic units include reefs, marshes, swamps and grassflats where biologic activity and habitation are paramount factors which must be considered before they are irreversibly destroyed or committed to other uses.

Process units such as beaches, washover channels, floodplains, escarpments and dunes are units in which active physical processes are dominant factors and any potential use may be severely impacted or affected by natural processes. Man-made units such as spoil heaps, dredged channels, canals and made land are units in which man's activity has resulted in important environmental modification depending upon the manner in which it is done and its extent. A man-made unit may have either beneficial or detrimental overall impacts.

Capability of water units is defined by the nature and distribution of sediment substrate, overall salinity patterns, circulation, tidal influence, depth variations, turbidity, fresh water influx, distribution of biologic communities and water chemistry.

Unlike land resource capability units which are relatively constant over time in any given place, the water capability at a given point can change rapidly with sudden changes in salinity, circulation, the addition of pollutants or heavy sediment loads. Also, unlike land units, some water units can recover if given the proper conditions.

The principal factors that determine capability of natural resource units have been identified. These factors include, for example, physical properties of soils and substrates such as shrink-swell conditions, corrosion tendency



Thirty-four major environmental capability units have been defined in the coastal zone and should serve as a useful aid in planning and developing coastal resources.

and degree of permeability; flooding; biologic tolerances; vegetation stabilization; erosional and depositional processes by water and wind; and slope and relief.

These properties and other relevant factors of natural resource units have been evaluated in terms of existing and potential land and water uses in the coastal zone. These uses include waste disposal, construction, mining, land reclamation, damming and water impounding, agriculture, devegetation and irrigation.

At present, characterization of resource capability units is mainly qualitative, being mostly in the form of constraints. Adequate application of this concept to assist in coastal resources management requires quantitative characterization of the physical and hydrologic paramenters of the units, three-dimensional delineation of basic resource units in cases where more than surface use is involved, and documentation of natural and man-induced changes in the dynamic units along the coastline.

Current efforts are being supported by the Interagency Council on Natural Resources and the Environment to undertake the quantitative description of the capability units and to expand the effort throughout the state.

Coastal Resources Management Program backup material Supplement A, "Preliminary Environmental Assessment of the Effects of Man's Activities on Coastal Environmental Units," and the "Coastal Environmental Atlas" by the Bureau of Economic Geology give specific details of the capability unit concept.

The accompanying figure shows a typical section of the Gulf Coast with the major capability units indicated. The associated table list the 34 major coastal environmental units.

Land and Water Areas

Barrier Island Systems

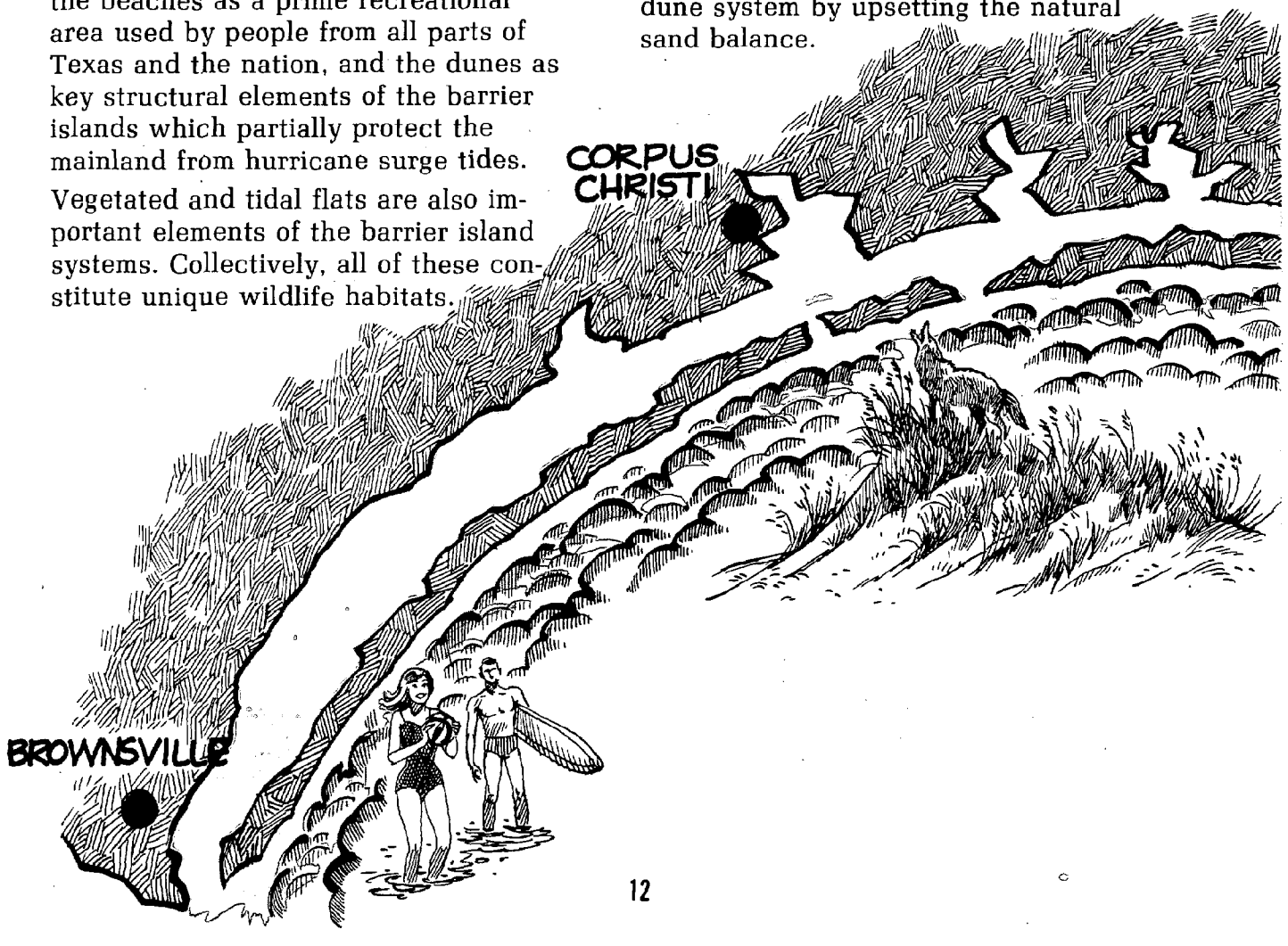
The barrier islands and island-like peninsulas extending more than 400 miles from the Sabine River to the Rio Grande consist of beaches, dunes, vegetated flats and tidal flats. These islands and peninsulas provide a natural hurricane protection system to the adjacent mainland. Any major loss or destruction of the barrier islands would cause drastic changes of the water bodies on the landward side.

The islands themselves are subjected to extreme natural forces, and man-made developments must exist under precarious conditions.

The beaches and dunes of Texas are invaluable resources to the state—the beaches as a prime recreational area used by people from all parts of Texas and the nation, and the dunes as key structural elements of the barrier islands which partially protect the mainland from hurricane surge tides. Vegetated and tidal flats are also important elements of the barrier island systems. Collectively, all of these constitute unique wildlife habitats.

Substantial development has taken place on the islands and is continuing in the form of recreation, seasonal homes, shipping, fishing and related activities. Major existing developments, such as the City of Galveston, must be protected by extensive man-made works or be subject to loss of lives and destruction of property when hurricanes periodically strike.

The barrier islands have reached a point of criticality because there are presently no effective controls for their protection and preservation. The unregulated excavation of sand in certain areas and destruction of vegetation can substantially impair the fragile beach-dune system by upsetting the natural sand balance.

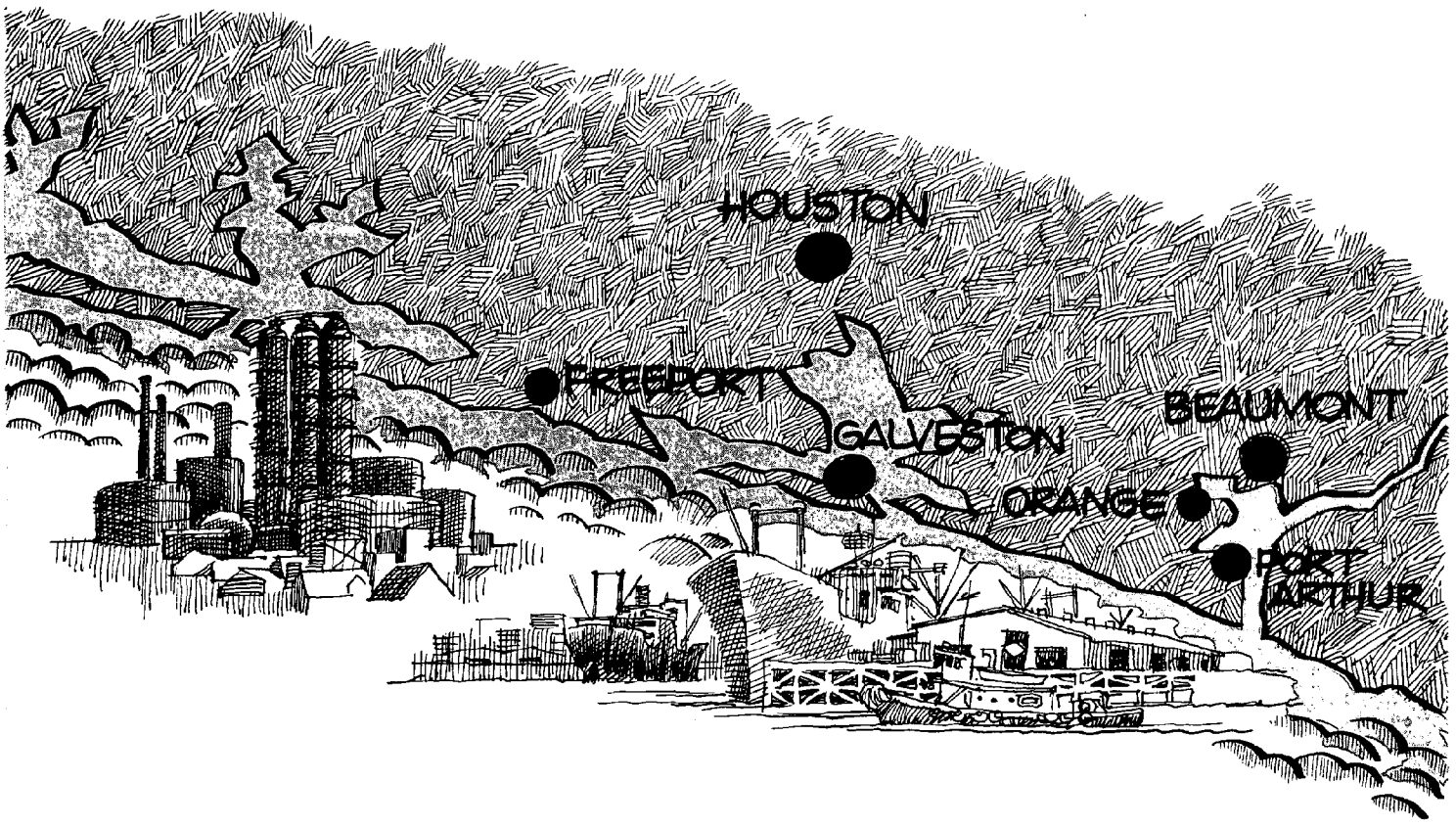


The lack of adequate sanitary and police control over the open beaches of Texas is endangering both public health and safety. Irresponsible littering and inadequate regulation of liquor and drugs are becoming increasingly serious problems.

Because of the value of the beaches, dunes and associated flats to all Texans and the many problems resulting from their use by people from all parts of the state and nation, it is unreasonable to expect the quasi-rural or rural counties, beachfront property owners or small coastal communities to assume all or most of the responsibility for providing adequate sanitary and police control. These entities lack either sufficient financial resources or administrative authority or both.

A comprehensive long-range management program for the barrier islands must be formulated that considers all significant activities on and around the islands such as recreation, construction of buildings and roads, devegetation, dredging and filling, bulkheading, construction of groins, jetties and seawalls, spoil disposal and canalization.

A major cause of many beach related problems is the lack of adequate access and parking areas, requiring users to drive considerable distances down the beach and to park either near the water's edge or the dunes. This generates much high-speed, relatively uncontrolled vehicular traffic, a substantial safety hazard, especially to families with children, as well as a serious threat to the integrity of the beach-dune system.



Therefore, it is recommended that the State of Texas and its citizens:

- Adopt and implement a definite policy and program to protect and maintain the coastal barrier island systems so that they may, in perpetuity, continue to be a valuable recreational, environmental and economic resource, and fulfill their natural role as hurricane protection for the mainland.

- Re-emphasize and maintain a policy of public usage of Gulf beaches as set forth in the Texas Open Beaches Act.

- Provide adequate facilities and administrative maintenance to assure islands as recreational areas and wildlife habitats.

- Permit regulated growth and development of economic enterprises in the vicinity of existing development. Such enterprises and developments should be compatible with the capability of the land and water use units and should not substantially interfere with the natural role of the islands as storm protection entities and wildlife habitats. Pollution control regulations should be strictly set and rigidly enforced. Whenever possible all such regulatory measures should be individual in nature, kept at the lowest effective governmental level, and follow the performance standard approach.

- Encourage, through special legislation if necessary, local government units to take the lead in assuring proper protection of the barrier island systems and beaches under their respective jurisdictions. If they cannot or will not the State should be prepared to take action.

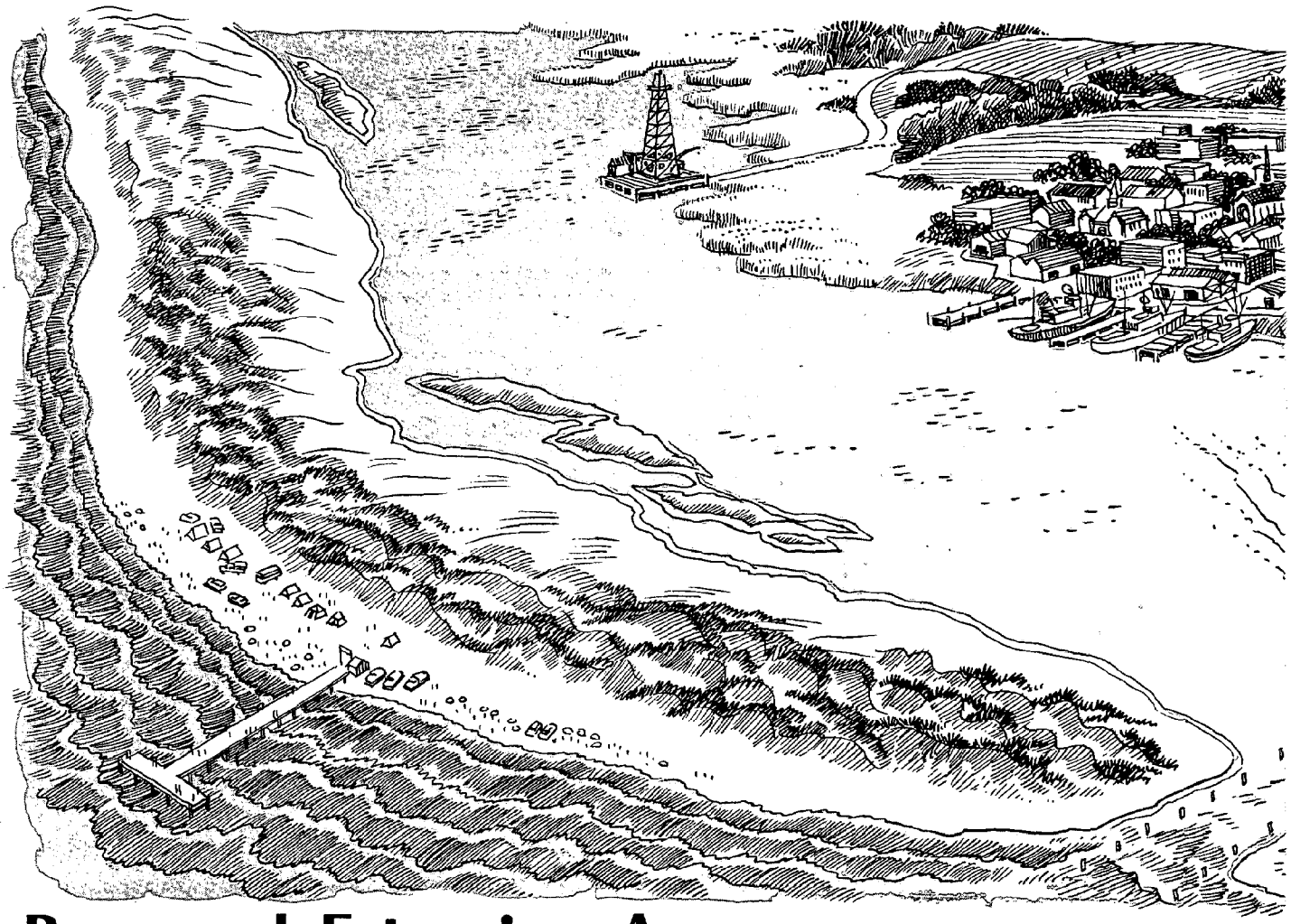
- Encourage local entities to regulate or ban motor vehicular beach traffic in critical areas for public safety and to totally prohibit vehicles in vegetated dune areas. Wherever vehicular traffic is excluded from the beaches provision must be made for off-beach parking and access. Both parking areas and means of access must be located, designed, constructed and maintained so as not to endanger the dune areas.

- Assume responsibility for providing adequate sanitary and police control over beaches where local entities cannot or will not.

- Develop a mechanism to equitably distribute the financial responsibility between beach users, local residents and the citizens of Texas.

  rather than the approaches of zoning and sweeping prohibitions.

- Establish active dune stabilization programs in areas where significant damage has occurred or is occurring.



Bays and Estuarine Areas

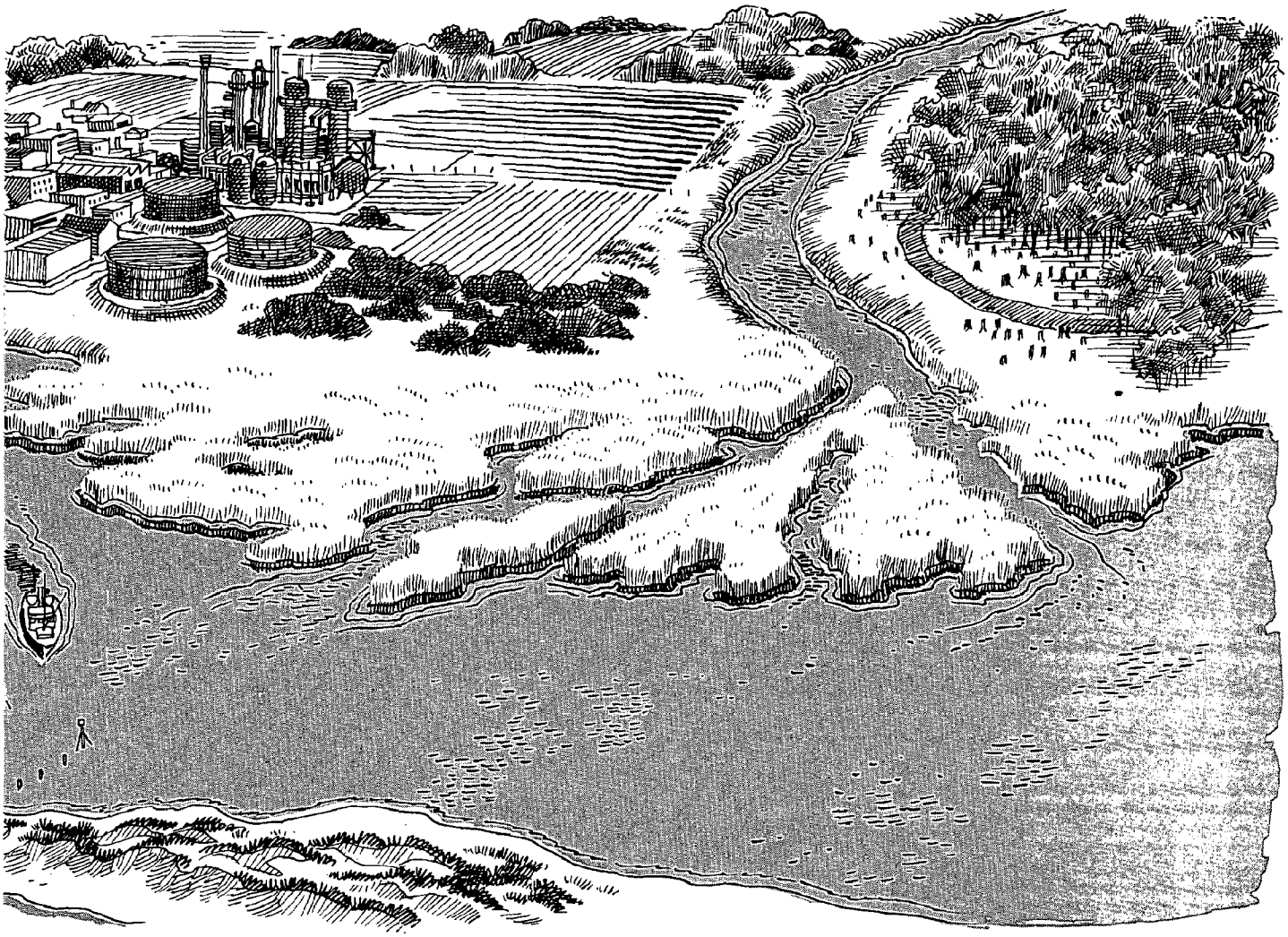
Bays, estuaries and lagoons including shorelines, flats and shallows, passes and inlets and river influenced areas comprise the vital link between Gulf marine and fresh water systems. Bays and estuarine areas are irreplaceable resources essential to more than 70 percent of all marine organisms.

More than 2,100 square miles of open, relatively shallow bays will continue to be valuable for fish and shellfish production, navigation, mineral production, recreation and esthetic enjoyment as long as proper control measures are taken, and the level of human activity does not exceed the natural carrying capabilities of the estuarine areas.

However, the health and utility of many bays as vital fisheries and recreational assets are now being destroyed or threatened by growth pressures and associated activities such as dredging and disposal of spoil, draining and filling of marshes and filling of grassflats, disposal of inadequately treated wastes, and runoff from urban and agricultural areas.

Upstream water supply development and stream diversions have reduced fresh water inflows to estuaries. Also, the related waste disposal has increased the pollutant load in those inflows which are available. Fresh water inflows of adequate quantity, quality and timing are absolutely necessary if these bays and estuarine areas are to continue their present functions and the entire estuarine system is to be protected and maintained.

Oyster reefs and their surrounding flanks, both living and dead, are found within the bays. Activities such as dredging, construction or spoil disposal



on or near live reefs can cause their destruction.

Grassflats, located predominately on the southern coast, are the most productive element of the entire marine ecosystem with the exception of the marshes. Bulkheading, filling and associated activities on grassflats or marsh areas are potentially harmful to the biological health and productivity of the estuarine system.

Inlets and passes are areas of strong currents and heavy transport of sediments and other materials which provide the necessary flushing action for estuaries. Because of the dynamic character of the many forces acting on any opening through the barrier islands, any proposal to create additional openings should be considered with extreme caution. If improperly located or poorly engineered, they can have substantial detrimental effects such as causing extreme beach erosion, significant alteration of bay circulation patterns and possibly causing other major passes to close.

The influent rivers affect to some degree the entire bay system, but have an especially pronounced impact upon the low salinity areas immediately adjacent to the mouth. These areas along with the usually adjacent marshes and grassflats are a valuable nursery area high in biological activity and rich in nutrients.

Scientific and technological methods for conducting man's activities within the estuaries in an environmentally sound fashion are being developed. If properly implemented they can protect and increase the beneficial utilization of these systems.

Therefore, it is recommended that the State of Texas and its citizens:

- Continue the multi-purpose use of bays, but in doing so insure that any activity in the bays and estuarine areas is carried on so as not to substantially interfere with any other use or with the natural ecosystems.

- Prohibit sale or lease of the State's submerged lands unless detailed studies have determined that it will have no significant adverse impact or that no other feasible alternative exists. Substantive and binding agreements need to be worked out between the State and other parties involved where such lands are sold or leased to insure that proper performance standards will be enforced.

- Establish technical, institutional and financial mechanisms to insure that the bay and estuarine systems will receive adequate high quality fresh water inflows even as the rest of the state grows and requires additional water supplies.

- Prohibit additional bay filling except when or where absolutely necessary if no feasible alternative exists. When filling does occur it should be undertaken, if possible, on mud or sandflats and not on grassflats or marshes, taking all precautions to minimize environmental impact.

- Establish and enforce effective waste disposal regulations, especially for toxic and biostimulatory and persistent materials.

- Prohibit any modification affecting existing inlets and passes unless determined to be essential, possible impacts have been carefully evaluated, and the design incorporates all feasible measures to mitigate adverse impacts.

- Carefully analyze any proposed structures or activities which may alter the circulation patterns of a bay system to determine if they would have a substantial adverse impact. Those that would should be prohibited or modified so as to have minimal impact.

Coastal Plains and Uplands

The coastal plains and uplands, running inland 50-60 miles along the entire Texas coast, are the most desirable locations in the coastal zone from an environmental standpoint for development where direct access to waterways is not essential. There is generally a sufficient supply of such lands to meet all growth and development needs throughout the foreseeable future, although a few land types may be short.

The plains range in elevation up to 100-150 feet above sea level with most areas being above hurricane flood reaches. Relatively stable and inexpensive foundation conditions are present.

However, such areas are cut with stream beds and watercourses which may, if improperly developed, present substantial flood and pollution hazards.

There are certain ecologically and environmentally significant areas of the coastal plains and uplands, such as the active dune fields of South Texas and the inland fresh water swamps in the east, which must receive consideration because of their value and sensitivity to man's activities.

The coastal plains and uplands are also valuable for grazing, farming and hunting as well as for intensive development.

Therefore, it is recommended that the State of Texas and its citizens:

- Identify the critical environmental areas and take measures to protect and maintain such areas.

- Encourage development of the coast to take place in the coastal plains and uplands where possible, taking all necessary steps to safeguard the environment and to minimize the flood hazards to life and property.

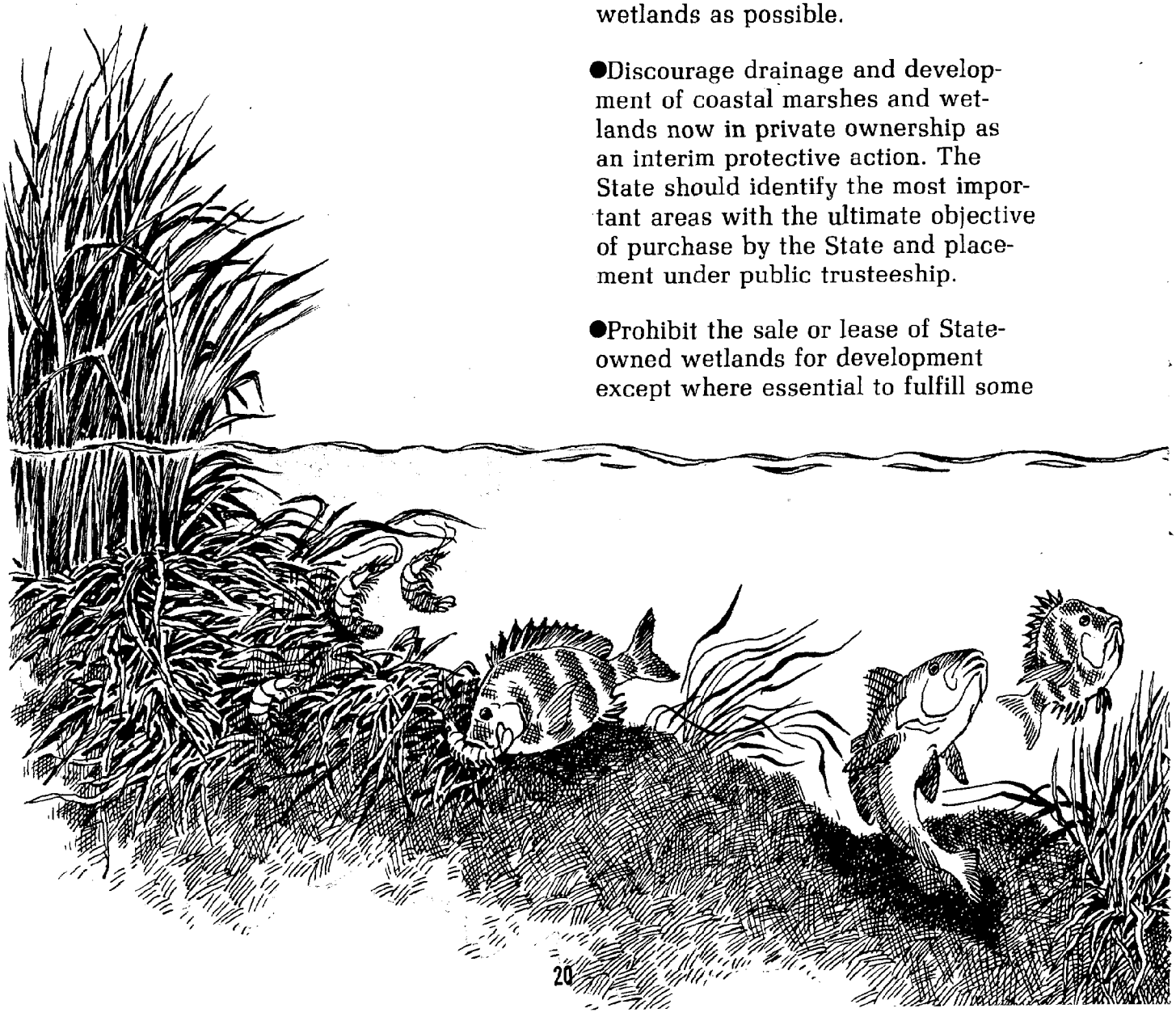
Coastal Wetlands

Coastal wetlands, once considered wastelands, are a vital and irreplaceable component of the estuarine system. These sites of complex biological, chemical and physical interactions provide the nutrients and organic matter essential to all estuarine organisms and much of the Gulf's marine life, a substantial amount of which spend some portion of their life cycle in the estuaries and wetlands. They are also an important waterfowl habitat and duck hunting site.

Approximately 15 percent or 60,000 acres of Texas coastal marshes, which some authorities consider to be more than 10 times as biologically productive in total organic materials as the best farmland, have been developed in response to society's demands for coastal land.

Therefore, it is recommended that the State of Texas and its citizens:

- Take every possible step to preserve as much of the remaining wetlands as possible.
- Discourage drainage and development of coastal marshes and wetlands now in private ownership as an interim protective action. The State should identify the most important areas with the ultimate objective of purchase by the State and placement under public trusteeship.
- Prohibit the sale or lease of State-owned wetlands for development except where essential to fulfill some



Open Gulf

The open Gulf of Mexico, out to and beyond the State's 3-league jurisdiction, provides a valuable asset to the state and nation as a minerals producing area, an irreplaceable fisheries resource, an esthetic amenity, a recreational site and a transportation artery.

The Gulf is ideally suited for multi-purpose use as long as each activity is carried on with proper respect for the needs and requirements of others and with adequate environmental safeguards.

Currently, the Gulf is a relatively unpolluted body. However, as pressures increase, both from direct uses and related land development, environmental danger will also increase. Proper precautions have not been taken in many instances to wisely use and protect the Gulf of Mexico.

Therefore, it is recommended that the State of Texas and its citizens:

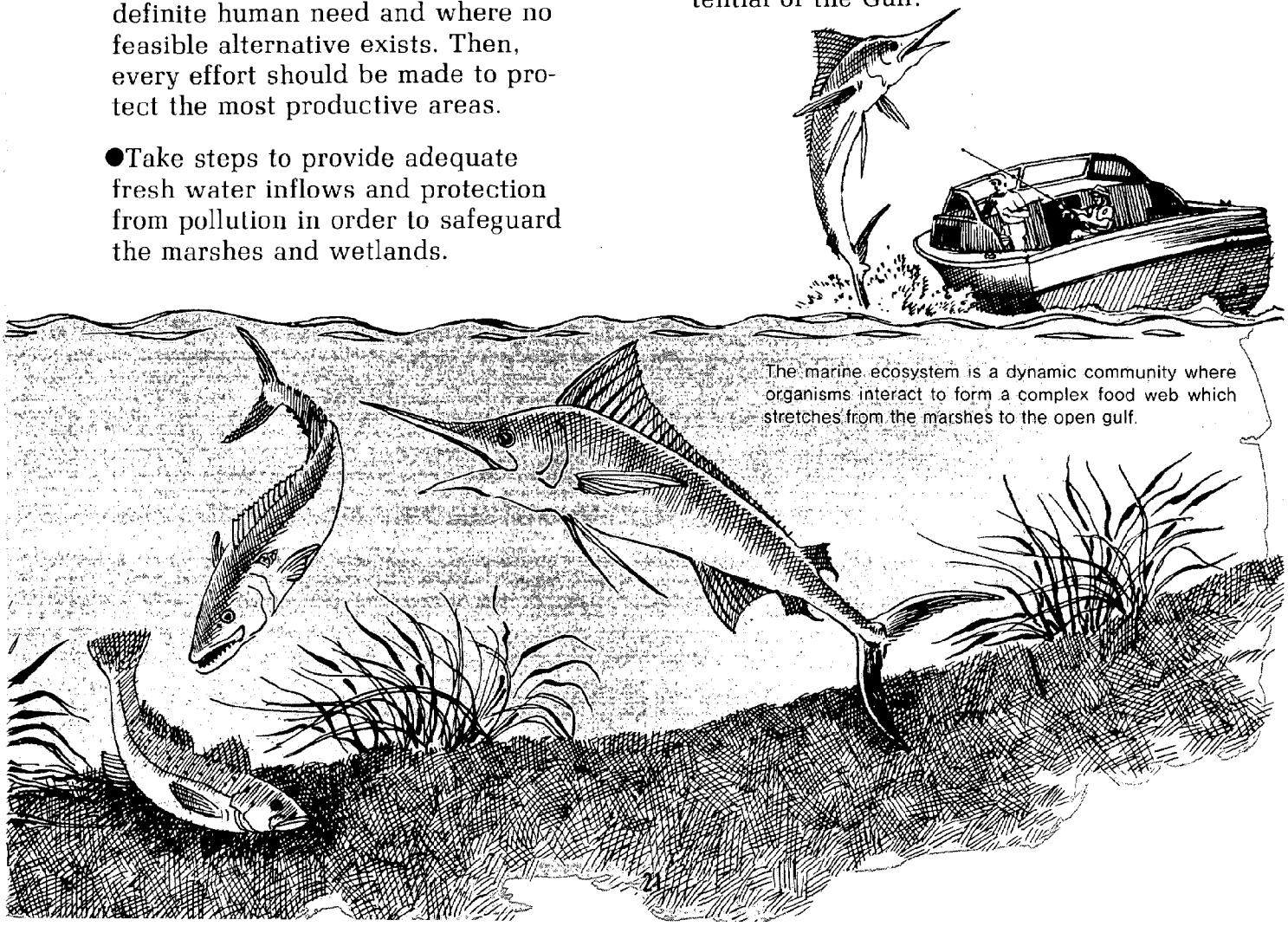
- Encourage compatible multi-purpose uses of the Gulf.

- Protect the natural biological and physical systems which comprise the Gulf by requiring that resource development and usage and activities be carried out within an adequate set of environmental constraints and guidelines.

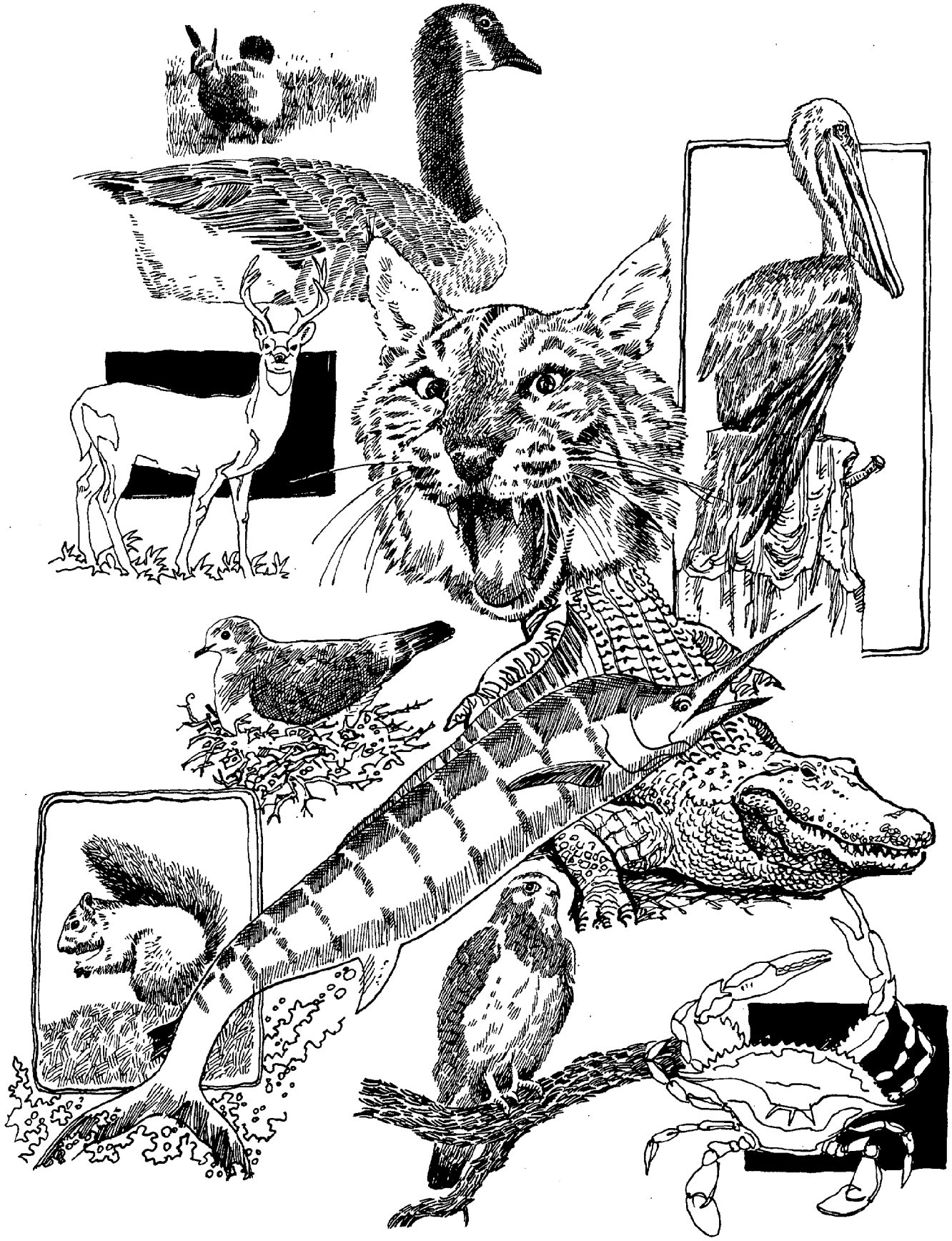
- Emphasize the resources and potential of the Gulf.

definite human need and where no feasible alternative exists. Then, every effort should be made to protect the most productive areas.

- Take steps to provide adequate fresh water inflows and protection from pollution in order to safeguard the marshes and wetlands.



The marine ecosystem is a dynamic community where organisms interact to form a complex food web which stretches from the marshes to the open gulf.



Man's Activities

Fish and Wildlife Protection

Fish and wildlife resources represent an invaluable and irreplaceable asset to the entire state and nation.

These resources are threatened by the uncontrolled growth pressures of encroachment, destruction of habitat, pollution, and hunting and fishing demands, and must receive special consideration and protection. Bays, estuaries and the associated marshes are the most critical elements in the maintenance of these fragile resources.

Obviously, the dollar values directly derived from fish and wildlife resources are less than those resulting from intensive development and mineral production. However, the need to preserve and protect these critical and irreplaceable resources is essential if their use and enjoyment by future generations is to be insured.

Three to five different geographical areas have been identified by biologists along the Texas coast. These range from the extensive salt water marshes found on the upper coast to the relatively barren flats of Laguna Madre. Each area contains a different type of biological community. Collectively, these represent the overall biological spectrum of the coastal zone.

Therefore, it is recommended that the State of Texas and its citizens:

- Take every possible step to maintain, protect and conserve its fish and wildlife resources, including the following actions:
  a. Pollution control and other regulatory agencies must pay particular attention to protecting the coastal environments, especially from the many long-term, persistent toxic materials.
  b. Mineral production must be properly monitored and regulated to insure that all parties comply with proper rules and regulations.
  c. The General Land Office should take all feasible actions to insure State-owned lands are not illegally encroached upon. When violations occur, the land commissioner should work with the attorney general to vigorously prosecute violators.

- Establish and maintain estuarine santuaries, utilizing submerged lands already owned by the State as a key element. One of each of the geographical areas should be designated, established and maintained. These should be considered supplementary to, not competitive with, existing federal refuges.

- Delineate, protect and maintain, and where feasible, expand present wildlife habitats.

- Take all possible measures to protect all endangered species, including provision of sanctuaries.

- Reserve or provide sufficient fresh water supplies.

Mineral Production

Annual production of 1.2 billion barrels of oil and 1.3 trillion cubic feet of gas in the coastal area constitutes a major cornerstone of the state's economy, providing $2 billion to the region's income.

This amount is one-third of the state's $6 billion total primary income from oil and gas production, which accounts for 30 percent of the nation's entire domestic petroleum production.

Statewide production and processing of petroleum and related petrochemicals provides more than 190,000 jobs and approximately $2 1/2 billion in wages. These resources also serve as raw materials for the coastal zone's massive refining and petrochemical industry and will help to prevent or mitigate the pending energy gap.

Other valuable minerals of the coastal zone include bromine and magnesium extracted from sea water, underground sulfur, sand, clay and oyster shell used for building materials, and near-infinite reserves of rock salt. These minerals have a gross value of approximately one-fourth that of oil and gas.

Production of any mineral resource, if done unwisely or carelessly, can result in substantial environmental damage. Thus, adequate regulation is necessary.

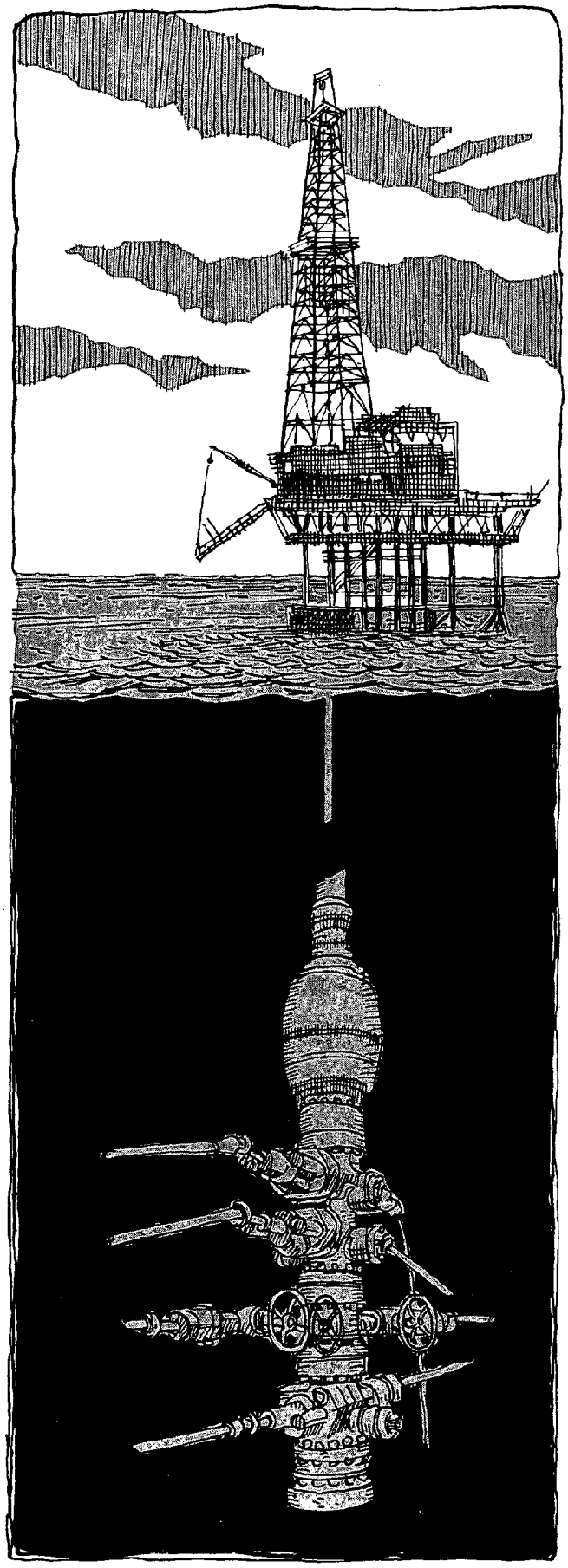
The full impact of damage from oil spills during either production or transport is not fully known. However, it is suspected that the cumulative effect of small, persistent leaks may be more damaging to the environment than major accidents. Careless disposal of brines from oil and gas production may also cause damage. Since the early 1960s industry has been developing technology for dealing with oil spills and protecting the environment.

Development of other mineral products can have a significant impact on the natural environment. But, if proper precautions are taken, including prohibiting surface mining in certain critical areas, these valuable minerals and resources can be tapped without excessive damage.

Because of the anticipated increased demand for energy and the depletion of the non-renewable oil and gas supply, importation of foreign crude, development of existing onshore and offshore domestic reserves, and consideration of new energy sources will be required within the foreseeable future.

Therefore, it is recommended that the State of Texas and its citizens:

- Support continued production of oil and gas in the coastal zone, both on land and in the water, within its territorial limits. This should be done both for the revenue it provides and the necessity of having petroleum to



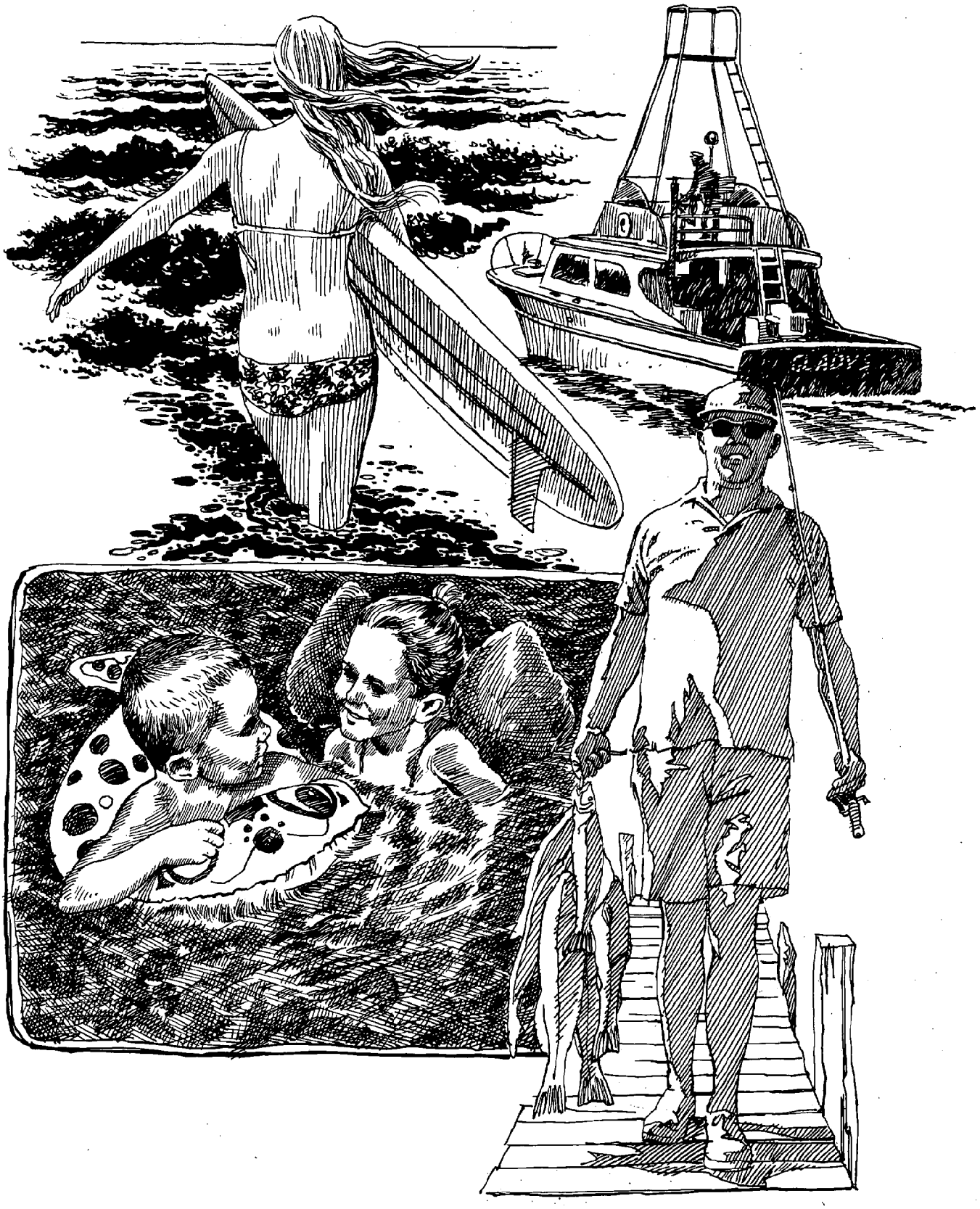
support much of the region's industrial base and help meet growing national energy needs. Adequate regulation is necessary to prevent significant environmental damage.

- Permit continued production of non-petroleum minerals as long as it is done in an environmentally sound manner and the State receives its due payment when minerals are taken from State-owned lands or river beds.

- Take all necessary steps through the appropriate State agencies, in cooperation with the federal government, to insure necessary environmental safeguards are employed on all forms of mineral production and transport, particularly in the critical environmental areas.

- Because of its importance to the state and nation, encourage outer continental shelf petroleum production in the Gulf even though the State has no legal jurisdiction there. The State should work closely with the Department of the Interior and other federal agencies to insure that operations are conducted in a manner that will protect Texas' natural resources.

Mineral production, if done properly with all feasible safeguards including extensive automatic shut-in devises such as the subsurface well-head apparatus, can be extensively practiced in the coastal area in order to satisfy man's growing demand for energy.



Recreation

The Texas Gulf Coast, especially its beaches and estuarine areas and the open Gulf, provides a prime area for recreation for the entire state and nation. Sport fishing, swimming and boating are the most popular recreational activities. The Texas Open Beaches Act guarantees unrestricted access to the state's Gulf beaches.

Recreational pressures are increasing rapidly. Problems such as overcrowding; littering; drug and liquor abuse; traffic congestion and destruction of land forms, vegetation and wildlife are becoming more eminent. Unless these problems are dealt with the state will lose much of the coastal zone's value as a recreational resource.

Developed areas such as Galveston Island, the beaches near Freeport and on Mustang Island and Padre Island will continue to receive increasingly intense recreational use. Other areas are not now extensively used and are essentially virgin.

While there are many recreational areas in the coastal zone, most are far away from major population and urban centers.

Therefore, it is recommended that the State of Texas and its citizens:

- Continue the policy of maintaining its coastline for widespread public use, but take the necessary steps to protect it and insure it for perpetuity.

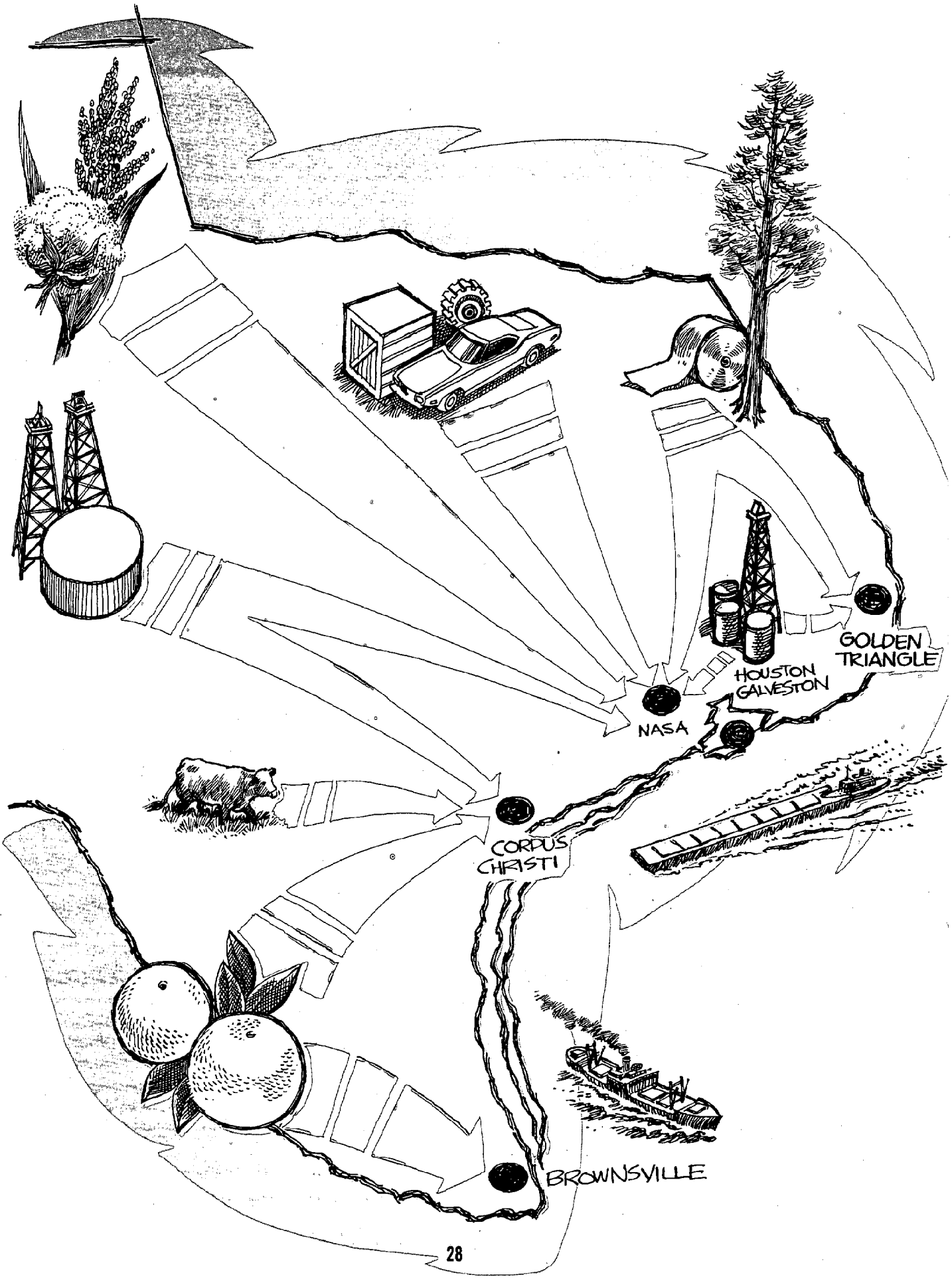
- Re-evaluate the Texas Open Beaches Act and amend as necessary to make the beaches safer and more usable for all Texans now and in the future.

- Take steps to insure that intensive recreational developments such as large-scale resorts, second homes, massive marinas and tourist attractions are located so as to have minimal adverse impacts on the barrier islands, bays and estuarine areas, and other critical environmental areas. Insure that all possible pollution control measures are rigidly enforced and that such developments require a minimum amount of hurricane protection works.

- Take all necessary actions to preserve, protect and enhance coastal fish and wildlife resources.

- Insure that areas not now intensively used or virgin are restricted to minimum development.

- Provide additional State-supported recreational opportunities near major metropolitan areas where urban dwellers currently lack access to such opportunities.


GOLDEN TRIANGLE
HOUSTON GALVESTON
NASA
CORPUS CHRISTI
BROWNSVILLE

Industrial and Commercial Development

The Texas coastal zone has become the vibrant socio-economic complex it is today partially because of the healthy, natural and institutional climate it offers for industrial development and partially because of the availability of many natural resources. Additional population growth and economic development is inevitable, and even desirable within limits, because of the many natural advantages.

The continued maintenance of occupational opportunities is dependent upon development of more kinds of industries as more and more people tend to congregate in the coastal area. Much more diversity in industrial and commercial development will be required in the future as petroleum resources are slowly depleted. Increased growth will probably place more emphasis on various forms of secondary manufacturing and service sectors with a corresponding decline in primary sector activities.

Further industrial and commercial development must be undertaken with a full consideration of environmental impacts if the resources of the coastal zone are to be protected properly. Many techniques or methods exist for regulation or influencing development including tax incentives and zoning. A potentially useful method currently under consideration involves determination of the carrying capacity of land and water units followed by establishment of performance standards for any activity undertaken in these units. This approach permits both the protection of existing resources and their controlled beneficial development and use.

There is sufficient area and resources to absorb foreseeable development by the scientifically sound and rational use of the capability unit approach coupled with strict performance standards.

Therefore, it is recommended that the State of Texas and its citizens:

- Encourage all substantial development be located on land and water units best capable of supporting that type of development.

- When an area is not completely capable of supporting development essential to that area consistent with full environmental protection and no alternative exists, require that all necessary actions be taken to insure the activity is performed in a manner which minimizes adverse impacts.

- Establish and enforce strict pollution controls on existing and new industrial, commercial and municipal activities. Once standards are established and agreed upon by all concerned, they should be regarded as binding contracts by all parties.

- Take steps to insure that developments producing large amounts of liquid, gaseous or solid wastes or that require a large amount of supporting facilities are not located in or immediately adjacent to a critical environmental area.

- Prohibit commercial and industrial development on publically-owned wetlands or other critical environments.

- Discourage new industrial or commercial development on the barrier islands, except in areas where such development already exists and has been provided adequate hurricane protection facilities.

- Encourage industrial development in the coastal plains and uplands where it would have a minimal adverse environmental impact and be best protected naturally from hurricane flooding. Industries requiring immediate access to water for transportation or cooling should be located in areas already partly developed or where a minimum amount of critical environmental areas may be adversely affected and where the hurricane flooding threat is minimal.

- Require that in all regulatory activities over coastal lands the method of pre-determined zoning be used only where essential for protection of critical environmental areas and that the concept of performance standards, compatible with existing sustaining capability of the natural resources, be implemented.

Intergovernmental Relations

The many political subdivisions operating in the coastal zone cause confusion due to lack of coordination and the differing authorities, policies and opinions.

In any political system, it is desirable to keep as much power and subsequently make as many decisions as possible at the lowest feasible level of government in order to insure a maximum amount of input from those being most directly affected.

On the other hand, certain powers and responsibilities must be transferred to higher levels of government because they possess greater resources to take action or because they have broader vision to determine regulatory aspects necessary to insure protection of public welfare. For example, land use controls should be implemented at the city or county level, while the problem of water pollution is best administered subject to statewide standards.

Therefore, it is recommended that the State of Texas and its citizens:

- Permit and encourage, through enabling legislation and financial support, local political entities to assume as large a role in coastal zone management as possible.

- Be prepared and able to take action in those areas where local government cannot or will not.

Hurricane Protection

Hurricanes, which strike the Texas coast on the average of once every two years, inflict millions of dollars of damage and loss of lives. In the last 50 years, more than 450 lives have been claimed, and property damage has totaled more than a billion dollars.

In areas where extensive development presently exists and where severe damage would be wrought by a major hurricane, facilities are necessary to protect lives and property.

Hurricane protection facilities if built in certain areas can and do have major adverse environmental effects. They can destroy critical environments including wetlands and grassflats which are essential to maintenance of the estuaries, causing extensive fresh water flooding of the protected areas due to impoundment of rainfall and runoff. They can also produce locally severe high tides in adjacent areas due to constriction and concentration of the storm surge and restrict circulation of waters by compartmentalizing the bay.

Therefore, it is recommended that the State of Texas and its citizens:

- Encourage expansion and construction of future intensive residential, commercial and industrial development only in areas already highly developed and having existing hurricane protection facilities or where hurricane damage is not a threat.

- Discourage any substantial development which would require hurricane protection facilities in areas where such facilities would inevitably cause destruction of unique, valuable or environmentally critical areas.

- Require that new residential development be planned, financed and regulated so that the cost for supporting basic services and facilities is internalized and passed on to the new residents, thus minimizing the burden on existing local governments.

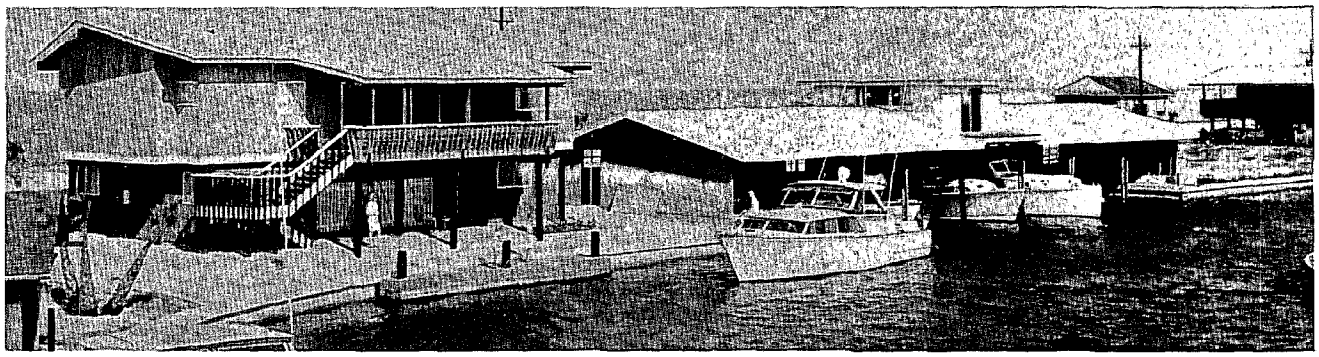
- Require uniform hurricane-resistant building standards in order to reduce potential economic loss from storms and minimize the cost of insurance in high risk areas.

- Encourage waterfront housing developments be kept at a minimum. Essential housing developments requiring canalization and bulkheading should be installed only in sand and mudflat areas. No housing developments or associated facilities such as marinas should be allowed on wetlands and grassflats of high biological productivity.

- Prohibit housing on the barrier island sand dunes except under the most carefully controlled and engineered conditions.

- Require that all new hurricane protection works be constructed within the framework of an overall bay management plan for the particular estuary concerned with adequate measures to insure the least possible environmental detriment.

- Provide hurricane protection works only for those areas already extensively developed or where development is planned to encourage industrial and commercial expansion.



Permanent and second homes on Key Allegro

Hurricane Carla devastation

Residential Housing

Temperate climate and proximity to the beach make the coastal zone a desirable site for both seasonal and permanent residence.

However, problems such as encroachment on environmentally sensitive areas, pollution damage to the estuarine systems and other critical environmental areas, destruction of key natural protective features of the barriers, and increased burden on local governments to provide services such as utilities, fire and police protection are a result of large developments. Waterfront housing which requires bulkheading and channelization has destroyed some valuable wetlands and grassflat areas. Tax income to beach communities often is not adequate to provide services required by weekend residents.

Developments in exposed or low-lying areas are especially susceptible to hurricane destruction. This causes inflated insurance rates for all living in the entire coastal area, thus placing undue financial responsibility on other property owners or requiring government insurance subsidies. It also causes high costs for restoration or provision of costly environmentally damaging hurricane protection works.

Therefore, it is recommended that the State of Texas and its citizens:

- Encourage new residential housing be located so as to minimize adverse environmental impacts on critical areas and in areas requiring minimal hurricane protection. Under no conditions should large-scale housing developments be placed within the probable 100-year hurricane flooding areas as determined by responsible State and federal agencies unless adequate protective steps are taken to prevent the large-scale loss of life and property.

Transportation

The eleven Texas ports, which handle almost 200 million tons of cargo per year, are an invaluable asset to Texas, yet substantial improvements are badly needed for existing facilities including channel deepening, containerization and expanded capabilities for handling dry bulk cargos. Such improvements must be undertaken in a manner so as to provide maximum environmental protection.

The greatly increased size of ships, especially the large liquid bulk carriers, are indicative of future shipping trends. Texas needs and must have one or more deep draft terminals or superports capable of handling ships in the 200 to 500 thousand dead weight tons range. If such a facility is not built the Texas coastal zone faces the probable loss of much of its refining and petrochemical base. Such a situation would mean the loss of many of the 200,000 jobs now provided by these economic activities.

The Gulf Intracoastal Waterway serves to link Texas with the entire central United States. Yet, at this time substantially increased usage is not possible because of capacity constraints imposed by the locks between Sabine Lake and New Orleans.

Improperly conducted transportation activities can have adverse environmental impacts. Disposition of spoil on environmentally critical areas can be detrimental to them. Oil and chemical spills resulting from their transfer and indiscriminate dumping of shipborne wastes can also adversely affect the environment.

An effective land, water and air transportation system has been a major contributing factor to the coastal area's present social and economic structure. It will continue to be a major influence in the future.

Transportation planning should fully recognize the particular environmental features of the coastal zone in order to minimize adverse impacts. Assessment of environmental impacts of a proposed transportation unit must take into account associated development and particular land use patterns which will develop around such facilities.

Transportation planning in the Texas coastal zone must consider present and anticipated recreational activities. The transportation plan is one of the most important elements in determining the region's future and should be an integral part of any overall developmental plan that may be formulated for the coastal zone.

The single family automobile will continue to be the major form of transportation for most urban and intercity passenger movement for decades to come. However, the need for some form of mass transit to accommodate peak-load commuter traffic in the rapidly growing urban areas is becoming apparent. Because of the dispersed, origin-destination characteristics of the metropolitan areas of Texas, any such mass transit system will probably be the flexible-route, rubber-tired variety such as buses.

Therefore, it is recommended that the State of Texas and its citizens:

- Adopt a policy of environmentally sound multi-mode transportation planning fully coordinated with all involved governmental entities. Concentrated efforts should be made to achieve this through better participation and utilization of the Interagency Transportation Council and its members, rather than through a state department of transportation.

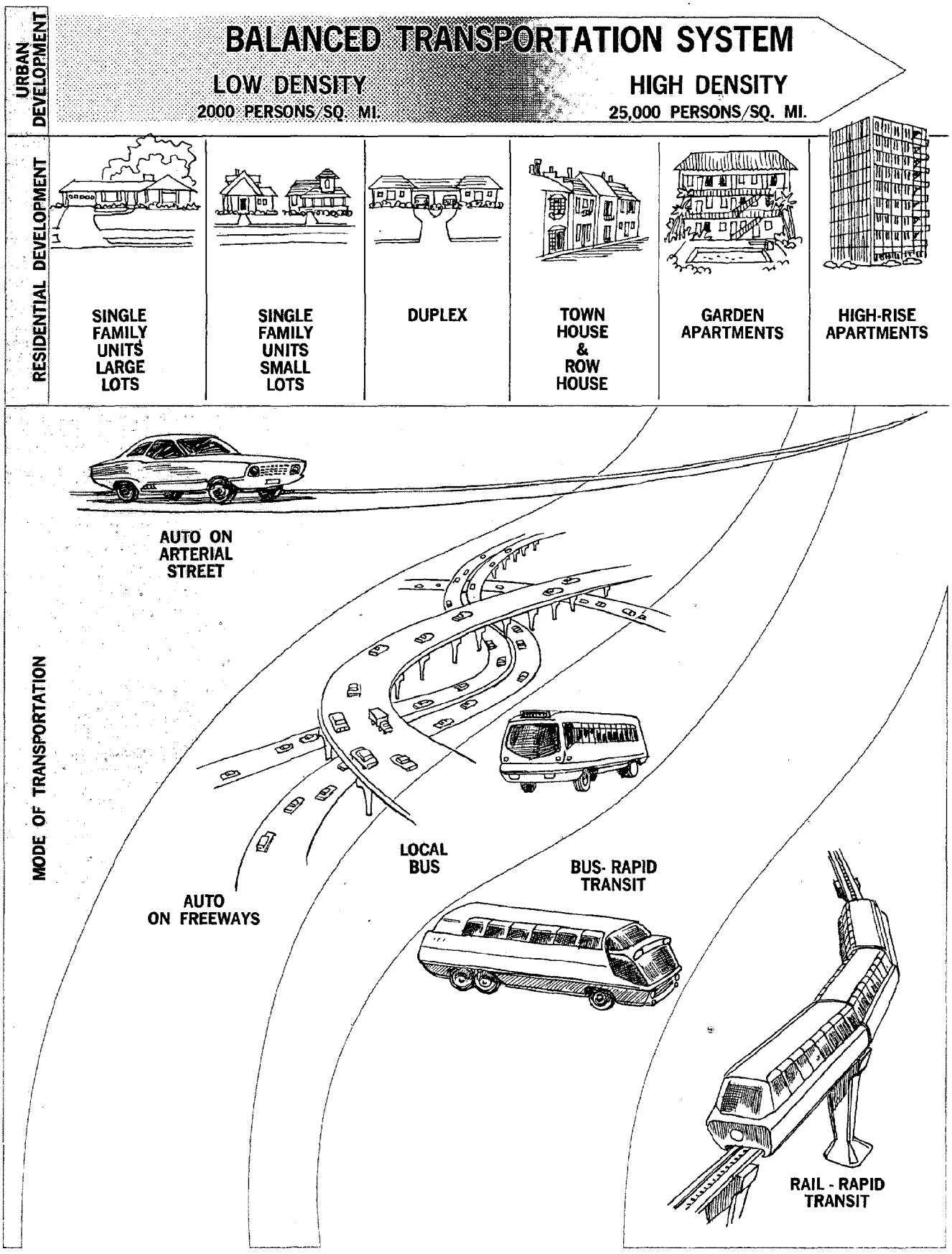
- Actively pursue development of greatly improved water transportation facilities, working through and in concert with the involved parties, both public and private.

- Provide as soon as possible port facilities for handling the giant ships now beginning to traverse the world's oceans. Initial demands will certainly be for bulk liquids, principally crude petroleum. Any such venture must recognize the roles and respective needs of all those involved, including private industry as well as State and federal government. Environmental precautions should be given utmost consideration in development and maintenance.

- Actively support substantial improvements in the Intracoastal Waterway, both in Texas and Louisiana, to effectively increase capacity of this artery to transport Texas products into the Mississippi Valley and the entire midwest.

- Devise regional oil-spill contingency plans for the entire coast. Make public entities such as navigation districts eligible for State waste treatment loans to assist in construction of waste treatment facilities for ship-borne and related port wastes and request Congress to make navigation districts eligible for Environmental Protection Agency construction grants with State involvement, as in other State processed wastewater treatment grants.

- Prohibit deposition of navigation dredging spoil on grassflats, oyster reefs and wetlands or other critical environmental units. Encourage deposition on mud or sandflats which can eventually be built up into valuable and useful real estate or manageable spoil islands while maintaining proper regard for environmental impact under a policy of close management.


URBAN DEVELOPMENT
BALANCED TRANSPORTATION SYSTEM
LOW DENSITY
2000 PERSONS/SQ. MI.
HIGH DENSITY
25,000 PERSONS/SQ. MI.
RESIDENTIAL DEVELOPMENT
SINGLE FAMILY UNITS LARGE LOTS
SINGLE FAMILY UNITS SMALL LOTS
DUPLEX
TOWN HOUSE & ROW HOUSE
GARDEN APARTMENTS
HIGH-RISE APARTMENTS
MODE OF TRANSPORTATION
AUTO ON ARTERIAL STREET
LOCAL BUS
BUS- RAPID TRANSIT
AUTO ON FREEWAYS
RAIL - RAPID TRANSIT

Waste Disposal

Disposal of improperly treated wastewaters and surface runoff has caused harm and destruction to fish and wildlife resources, created esthetic eyesores, and reduced or eliminated recreation potential in certain areas.

Liquid waste disposal includes two distinct categories—point source discharges, generally from industrial or municipal waste collection and treatment systems, and non-point source discharges, which include runoff from urban and agricultural areas. Technology is available, although costly, for treating point source discharges to original quality. However, there are currently no feasible measures to deal with large-scale non-point source discharges.

In attempting to find solutions for municipal and industrial wastes treatment problems, it has been found that the improved technical efficiency of larger plants indicate that a few large treatment plants are economically preferable to many small ones if the waste sources are in reasonable proximity to one another. However, there has been a proliferation of many small package-type plants.

The Gulf Coast Waste Disposal Authority is beginning to implement a regional industrial treatment system. If all goes as currently indicated, this system could serve as a model for other areas.

Another problem is handling and treatment of wastes generated on board ships and small pleasure craft. More unloading facilities and better enforcement are needed to alleviate these difficulties.

Improper location and operation of sanitary landfills has resulted in pollution of both ground and surface water, created esthetic insults and caused public health menaces. At times, open burning has created locally acute air pollution. Technology and adequate land area are available to solve these problems for a relatively small cost increase. Before any site is selected, a careful analysis of local geologic and physiographic conditions must be made to insure no pollution of water resources will result. Unfortunately, there is almost always substantial opposition to the establishment and operation of any new waste disposal sites which must be overcome before implementation begins.

Promiscuous dumping of high-level, toxic chemical wastes at sea and outside Texas' 3-league territorial jurisdiction, has created problems with which the State currently has no legal authority to cope, even though the wastes may originate at industrial plants within Texas.

Septic tanks, if properly installed and maintained in proper soil types, are adequate waste disposal systems for small, low density developments. Unfortunately, many of the soils of the coastal area will not satisfactorily handle septic tanks and their usage in such localities could cause ground water pollution, an esthetic nuisance and possibly a health hazard.

The ambient air of the coastal zone is a valuable natural resource which is currently being threatened and degraded in certain areas. Four air quality control regions, 4, 5, 7 and 10, in the coastal zone exceed maximum allowable levels under the natural air quality standards.

Therefore, it is recommended that the State of Texas and its citizens:

- Encourage development of regionalized treatment systems, reversing the present proliferation of many small package-type treatment plants, under provisions of the Texas Water Quality Act.

- Require placement of waste treatment facilities be in accordance with known land and water use capability and take steps to insure they will not alter substantially or destroy wetlands, grassflats or other critical environments.

- Take immediate steps to minimize problems associated with waste handling on board commercial ships and pleasure boats through more and better on-shore waste receiving and treatment stations and stricter enforcement of existing laws. Also, the State must stay in a position to respond as required to both proposed federal action and pending international agreements on ocean dumping and the handling of ship-related wastes.

- Initiate a permit procedure for both municipal and industrial solid waste disposal sites in Texas. A joint program between the Water Quality Board and the State Health Department should be undertaken. Steps should be taken to insure that both use the same applicable data, criteria and guidelines for regulating all solid waste disposal. Characteristics of wastes and land capabilities and water pollution potentials should be a major consideration in granting or rejecting all permits.

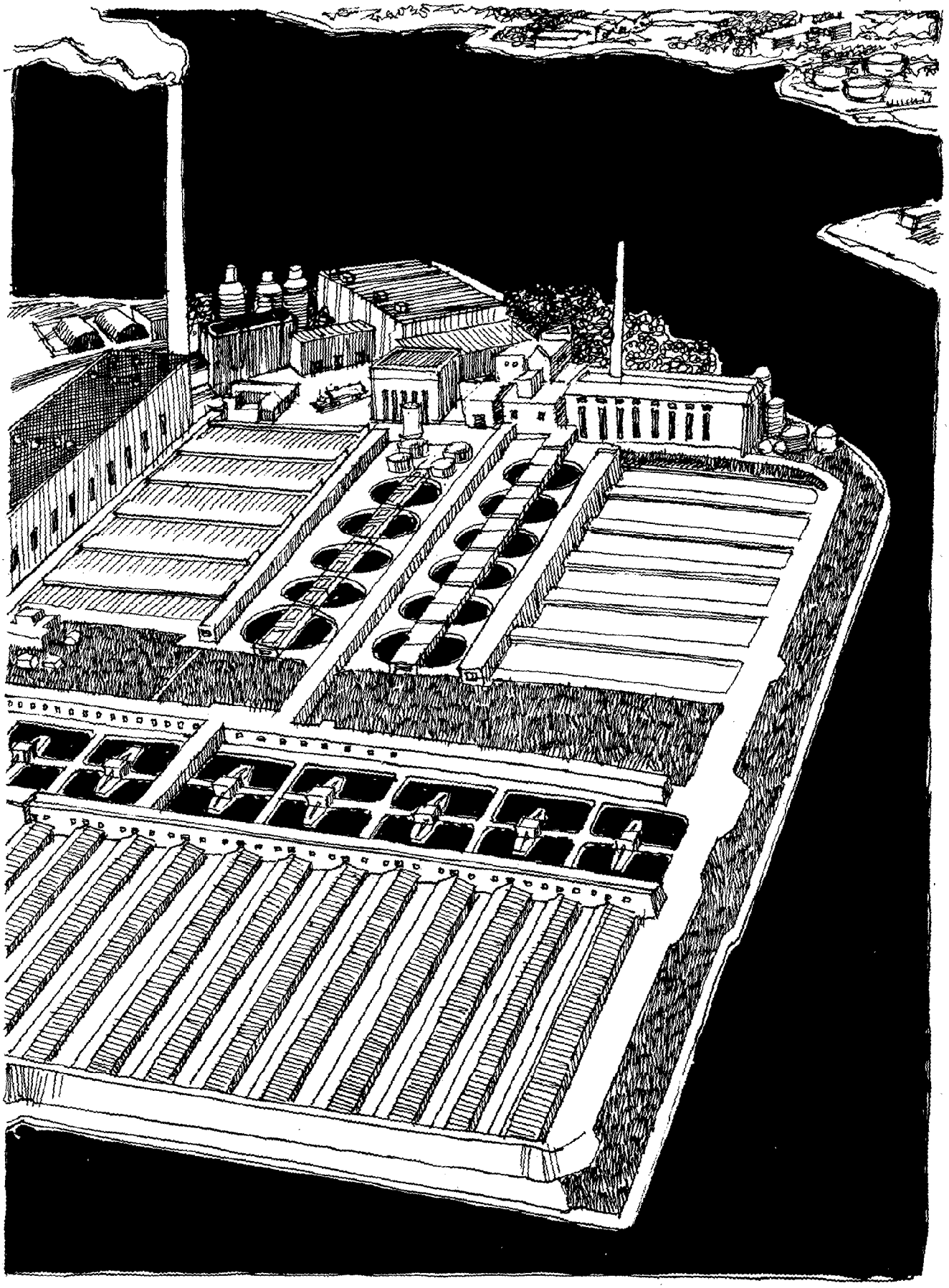
- Encourage reduction of solid waste generation and the development of improved recycling methods. This would not only reduce waste disposal problems, but would also decrease resource demand and consumption.

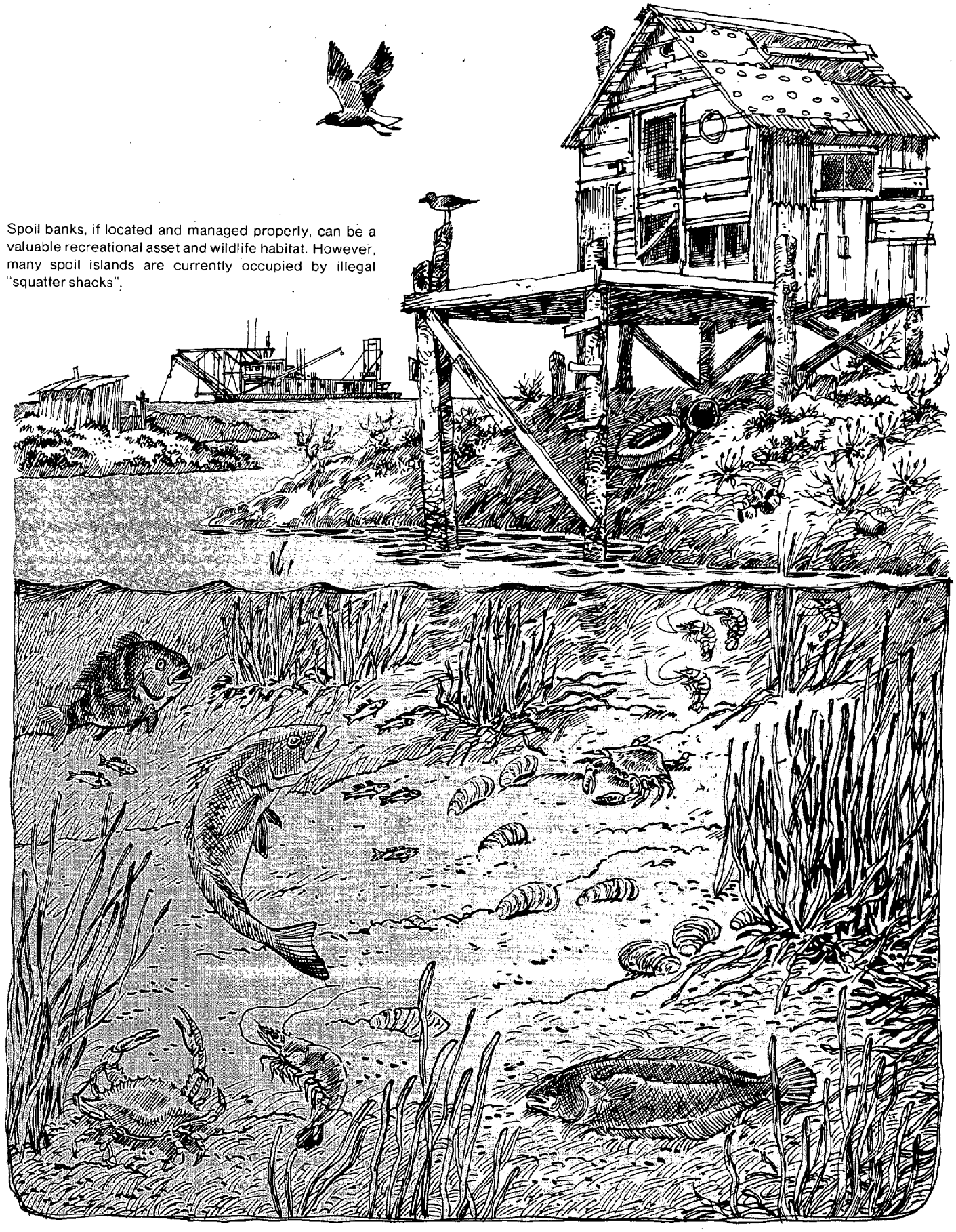
- Develop a better procedure for regulating usage of septic tanks.

- Exercise caution in the disposal of waste sludges resulting from increased treatment of liquid wastes, particularly those resulting from the treatment of high-level or toxic wastes.

- Make every effort, involving all levels of government and the private sector, to improve the air quality in problem regions to at least meet national standards by 1975.

A large industrial waste treatment disposal facility is a complex and expensive system of biological, physical and chemical processes which must be properly designed, operated and located in order to be effective.





Spoil banks, if located and managed properly, can be a valuable recreational asset and wildlife habitat. However, many spoil islands are currently occupied by illegal "squatter shacks".

Spoil Management

More than 5.7 billion cubic yards of spoil material has been removed from its natural resting place in the water bodies and land areas of the coastal zone.

Navigation facilities, both deep-water ports and the intracoastal waterway and related channels, are the major source of spoil materials, originating from both initial construction and periodic maintenance.

Removal of overburden during mining of oyster shell has also generated significant amounts of spoil.

Improper and indiscriminate disposal of dredging spoil from all sources has caused significant damage to certain bay systems by covering highly productive areas with silt and by substantially altering circulation patterns. When new navigation developments such as new channels or substantial deepening occurs, spoil islands are created which may displace productive bay bottoms. This spoil is eventually reworked through erosion processes and may produce detrimental environmental impacts. By using currently available information and technology, however, such undesirable impacts can largely be eliminated.

Existing spoil islands may be used for further deposition of spoil, and under certain conditions, spoil from new developments may be used to create additional spoil islands. These islands become State property and certain of them could be managed as recreational and wildlife assets.

Therefore, it is recommended that the State of Texas and its citizens:

- Develop, adopt and strictly enforce, working through its appropriate agencies and the federal government, a spoil disposal policy and procedure with the following provisions:
  a. It must apply to both navigation and mining activities, although different provisions may apply to each.
  b. The State should set the terms of disposal including location, amount and rate of deposition in order to minimize the environmental impact on the estuarine system.
  c. If at all possible, no navigation maintenance spoil should be deposited within the bays subject to reworking by currents.
  d. Creation of new "spoil islands" should be undertaken only if they will not significantly alter bay circulation patterns and can subsequently be managed as wildlife habitats or recreational facilities.
  e. All feasible efforts must be undertaken to minimize spoil generation during shell mining operations. The resultant spoil must not be placed in or near certain environmentally critical areas.

Water Supply and Resources

An adequate supply of high quality fresh water is vital to the coast, both for man's activities such as municipal supply, industrial uses and irrigation and for maintenance of the bays and estuaries.

The fresh water supply situation varies along the coast, with the upper coast supply plentiful, but farther south developing a rapidly increasing shortage. Corpus Christi and the Rio Grande Valley will soon be facing crucial water shortages or have their growth constrained by lack of adequate fresh water.

Use of both salt and fresh coastal waters for cooling purposes has been a location factor of substantial importance for many industries. Continued use for such purposes is certain, especially as the demand for electricity increases. Methods must be devised to meet these demands, yet protect the bays and estuaries.

As the inevitable upstream development and associated consumptive water uses increase, the amount of water remaining in the state's rivers and ultimately flowing into the estuaries will certainly decrease without corrective measures. If the estuarine inflows are to be adequately maintained, definite action steps must be taken now to protect them.

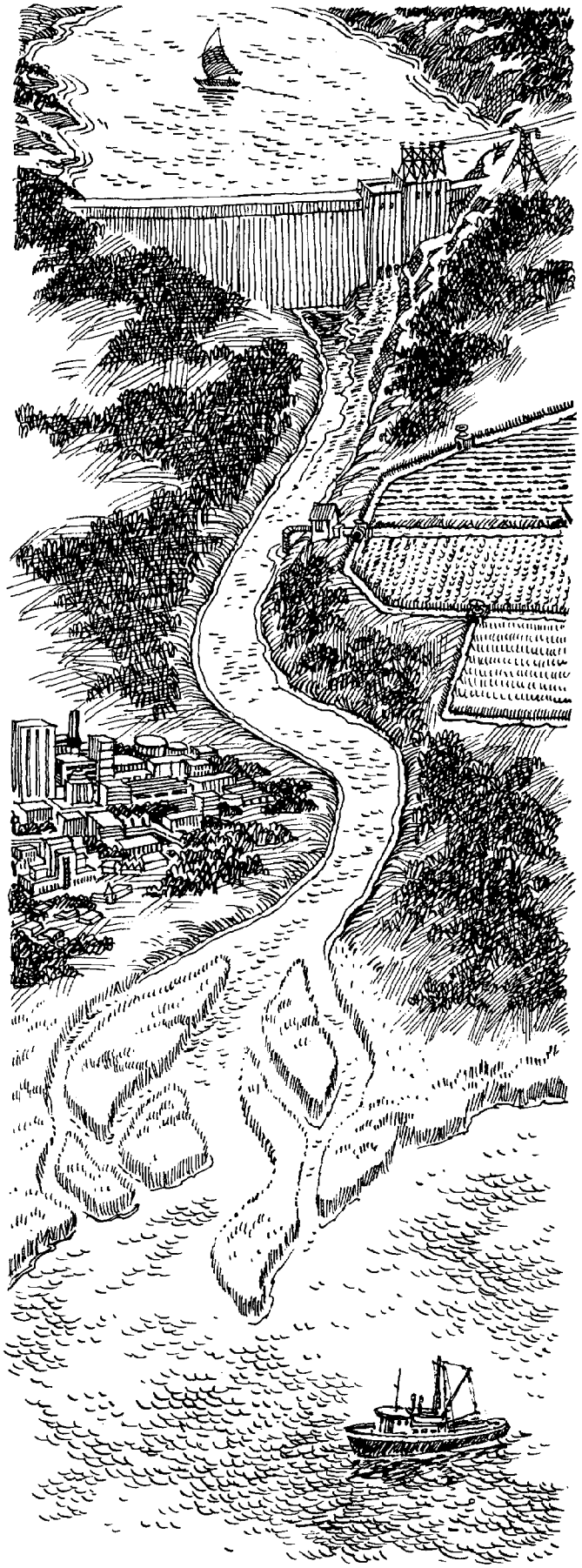
Subsidence and saline water intrusion resulting from massive pumping of ground water aquifers has occurred in the Houston-Baytown-Texas City area. This has partially destroyed the aquifer's recharge ability and has irreversibly decreased its future utility. The problem is continuing and increasing. Since some areas have subsided as much as 6-8 feet, the threat of hurricane flooding has greatly increased, and some structural damage has occurred.

Warm water discharges within certain localities can potentially cause substantial damage to the fragile estuarine marine ecosystem. But, with proper controls waste heat can be put to beneficial use. Little scientific information is presently available concerning the effects of such discharges on many warm water species of the Texas Gulf coast.

Cooling towers and ponds offer an option for minimizing the impact of waste heat, but are not without their limitations. Ponds require large amounts of land, fresh water towers consume massive amounts of water, and salt water towers place large volumes of salt-laden mist in the air.

Therefore, it is recommended that the State of Texas and its citizens:

- Take all possible efforts to insure adequate water supplies are made available to all parts of the Texas coast for all beneficial uses. Such uses must include preservation of the bays and estuaries as well as man's direct needs and requirements.
- Devise an institutional, technical and financial arrangement to insure that required fresh water inflows are provided to the estuaries, and that the costs of providing such inflows are equitably allocated among direct and indirect beneficiaries.



- Encourage development of an institutional mechanism to be implemented on a locally-controlled basis for groundwater management in order to prevent subsidence and groundwater pollution and to insure better utilization of this resource.

- Carefully evaluate all water supply alternatives including desalinization, waste-water renovation and reuse, and inter-basin diversions for their economic feasibility and environmental consequences.

- Adopt a consistent, scientifically rational and logical policy for handling large volumes of cooling water, especially in the siting of power plants as recommended by the Governor's Advisory Committee on Power Plant Siting. Direct use of Gulf waters is preferable to estuarine waters for all major cooling uses. No new major electric power generation facilities using once-through cooling should be permitted on already developed estuaries unless thorough studies have been conducted, and supplemental cooling as required has been incorporated into the plant design so that the discharge is not likely to have an overall detrimental effect. Biological monitoring, both before and after plant operation, should be required to verify the effects of heated water discharges.

- Discourage use of cooling towers with large electrical generating plants for areas with marginal fresh water supplies. Use of cooling ponds would be preferable.

Commercial Fishing

Approximately 48 million pounds of finfish and 98 million pounds of shellfish are caught by commercial fisheries annually. Together this contributes more than $150 million to the state's economy.

If properly managed and protected the state's fishing industry can be a renewable resource for future generations.

The greatest threat to Gulf-based commercial fishing is destruction of the vital estuarine areas. Almost all commercially valuable species are directly dependent upon estuaries and marshes during some point in their life cycle.

Even though still in experimental stages the new field of mariculture, often referred to as fish farming, appears to offer an opportunity for man to directly harvest sea resources.

Therefore, it is recommended that the State of Texas and its citizens:

- Take every possible step to insure that its commercial fishing industry is protected. Particular emphasis should be placed on protection of the bay and estuarine systems.

- Support research and development in the rapidly emerging field of mariculture.

CHAPTER III

Recommendations for Legislative Action

The original directive of the Interagency Council on Natural Resources and the Environment from the 61st Texas Legislature directed the council to "pave the way for constructive legislation."

The purpose of this chapter is to state the legislative actions the council recommends to the 63rd Legislature. These recommendations include the topics:

Sale or Leasing of State-owned Submerged Lands and Islands

Modification of Beach-Related Laws

Dumping at Sea

Fresh Water Inflows for Estuaries

Groundwater Management

Continuing Institutional Arrangement for Coastal Resources Management

Future Fact-Finding Activities

Sale or leasing of State-owned submerged lands and islands

The current moratorium on the sale or leasing of submerged lands should be allowed to expire and subsequently be replaced with a comprehensive amendment to the current law governing the sale or leasing of these lands to navigation districts. Under Sections 61.116 and 61.117 of the Texas Water Code, the land commissioner is directed to sell whatever lands requested by a district at $1 per acre with proceeds going to the Free Public School Fund. More than 130,000 acres of the State's submerged lands have been sold in this manner.

The only limitations or restrictions on these sales are the retention of the State's rights to all minerals under the submerged lands. Navigation districts have had the option to later declare some of the lands "surplus" and resell them to various interests. It has been a common practice for the districts to make considerable investments to improve the property before resale.

Concerning sale and leasing of State-owned submerged lands the council recommends that the Legislature:

- Require the State to retain title to all of its submerged lands. All sales should be prohibited, and Section 61.116 in its present form should be repealed.

- Adopt an alternative method for providing the submerged lands necessary for port development and improvements vital to the state's economy. New statutory measures should incorporate the following provisions:
  a. The State may lease public-owned submerged lands to navigation districts on a long-term basis for navigation purposes. These provisions should apply to all public and private entities operating ports.
  b. When applying for a lease the district shall submit a detailed plan concerning how it plans to utilize the land including a timetable. The application should be accompanied by a draft environmental impact statement.
  c. Upon receipt of the application and environmental impact statement the land commissioner should circulate this material to the School Land Board, which consists of the land commissioner and two gubernatorial appointees, and ICNRE for review and comment.
  d. The commissioner shall determine if adjustments should be made to the application and negotiate with the district concerning the specific terms of the lease agreement. Terms shall include, but not be limited to, cost; cancellation clause; provisions for renewal; and environmental provisions such as specific uses, performance standards and penalties. When establishing the cost terms of the lease, consideration should be given to the depth of the submerged land below the water surface, its proximity to other activities and its proposed use.
  e. After completion and review of the environmental statement, the land commissioner shall hold a public hearing in the county in which the proposed sale is located.
  f. After submission of all evidence the School Land Board shall act upon each application and make their results known within 60 days of the public hearing.
  g. Navigation districts shall be allowed to sublease such lands to third parties for port-related activities, subject to approval by the land commissioner and the School Land Board. The same considerations and criteria should be considered here as in the original lease agreement.
  h. When the State grants a patent by explicit legislative action to any local political subdivision, that patent should be subject to the same environmental conditions as the original lease agreement.
  i. Districts now holding lands purchased from the State under Section 61.116 (formerly Article 8225) shall be prohibited from selling those lands to any third party. They shall be permitted, however, to lease them to third parties for port-related activities subject to approval by the land commissioner and the School Land Board or to re-sell the land to the State for the original purchase price.

The other major act relating to the sale or leasing of the State's coastal submerged lands and surface estate is Article 5415e, commonly known as the Reagan-de la Garza Act. The council believes that this act could form the basis for a comprehensive coastal public lands management act.

There is some divergence of opinion as to whether this could best be accomplished by a comprehensive overhaul of the current statute or by its repeal and substitution of a new piece of legislation. Both approaches have merits and liabilities. Regardless of which course of action the Legislature may choose to follow, ICNRE believes the current act is insufficient and that a comprehensive coastal public lands management act is needed to insure the protection and beneficial use of the State-owned coastal lands and water bottoms. Such an act should contain the following provisions:

1. A comprehensive statement of State policy concerning the conservation, beneficial use and preservation of these limited resources shall be included. In addition to providing the land commissioner with specific policy guidance, the act would also assist a number of agencies, boards and commissions in making decisions which would impact on coastal public lands.
2. It shall provide the State, acting through the General Land Office and the attorney general, with specific policy direction for coping with the problem of illegal, unauthorized "squatter shacks" now existing on spoil islands along the coast. More than 500 such structures are known to exist at present. This policy shall incorporate the following provisions:
   a. Existing structures shall be permitted to

stay, subject to provisions b, c and d below. Each shall, however, obtain a use permit from the State. In turn, the State shall collect an annual lease of $250 from each.

b. No improvements or repairs, except waste disposal systems, shall be permitted for any structure. Thus, when a hurricane or other natural phenomena destroys such a structure it shall not be rebuilt.

c. The lease would be permitted for the life of the current owner or 10 years, whichever is less. At this time the structure would either be removed by the owner or become property of the State and be destroyed.

d. Within 6 months following enactment of the appropriate legislation, all persons claiming such structures on State-owned islands shall apply to the General Land Office for a lease to use such land. A certified check for $250 shall accompany all applications.

e. Legal responsibility for surveilance rests with the General Land Office. However, the small size and limited resources of this agency do not enable it to maintain a large field staff to conduct a continual watch. Thus, game management officers and other field personnel of the Parks and Wildlife Department and any other agencies could assist the General Land Office by reporting to them any apparent irregularities. The General Land Office shall then investigate the suspected infraction.

f. The right to maintain "squatter shacks" shall in no way impair the rights of the general public to access of the islands.

3. Those sections of Article 5415e directing the School Land Board to consider the advice of the Submerged Lands Advisory Committee shall be expanded to include the Interagency Council on Natural Resources and the Environment.

4. Any lands to be leased, except those related to the temporary "squatter shacks," under the provisions of this act as modified, shall have an environmental assessment prepared by the person making the application. This application shall be circulated by the General Land Office to all ICNRE member agencies and the Texas Council on Marine Related Affairs.

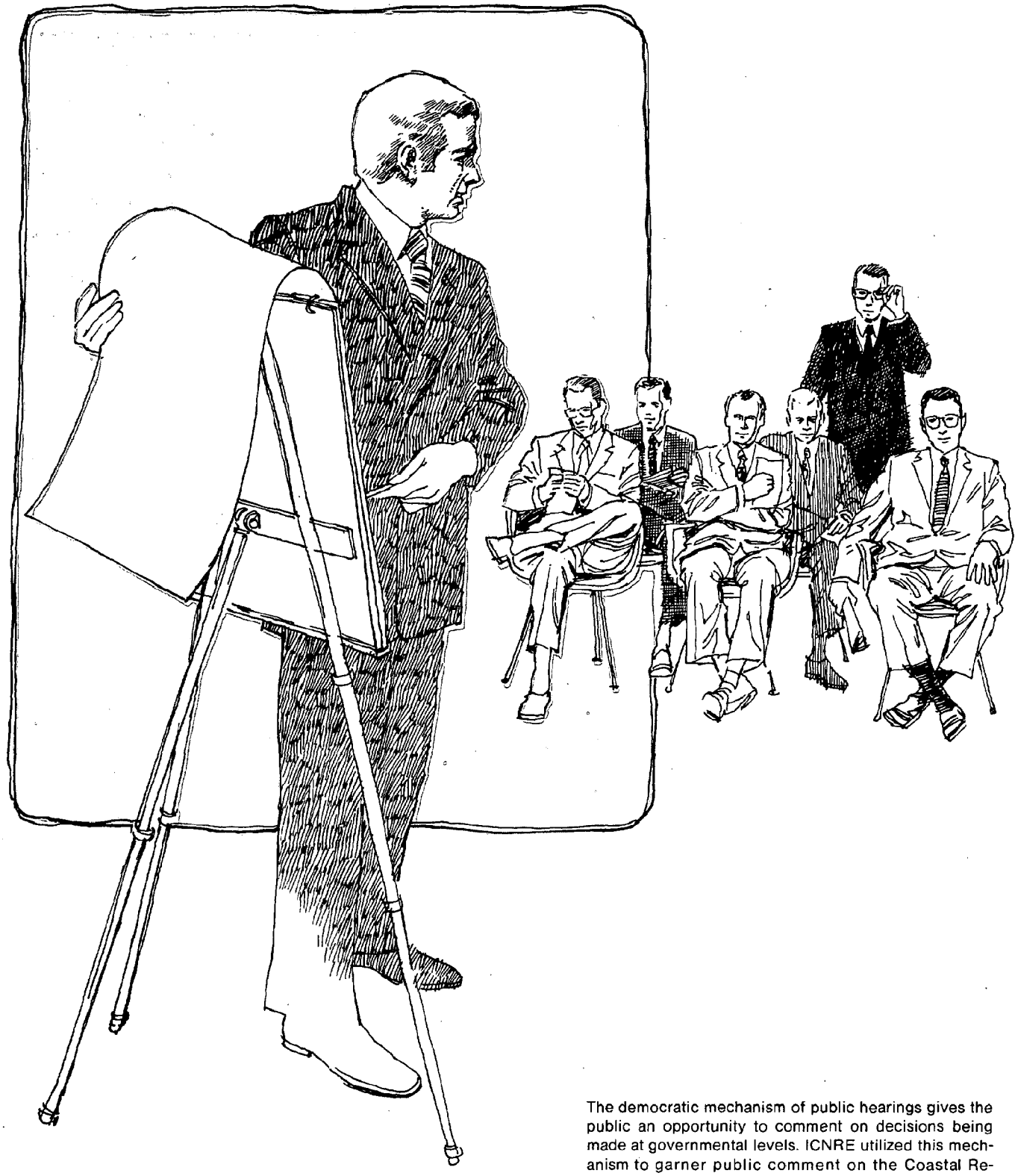
5. The current provision stating that all such lands may be leased for "industrial purposes only" shall be broadened to include estuarine and wildlife preserves, scientific areas, and certain types of recreational activities. As with leases to navigation districts, all final decisions should be the prerogative of the land commissioner in concert with the School Land Board. Specific terms shall be included in the lease to insure maximum environmental protection consistent with beneficial public use. This shall include a provision to enable other political bodies of the State such as State agencies, political subdivisions or academic institutions to lease submerged lands or islands for specific uses such as scientific sanctuaries. The terms of the lease shall, in addition to use and time provisions, include any specific criteria or performance standards which the School Land Board deems desirable for the public benefit.

6. The requirement that any lease originate with the Commissioner's Court or other local governing body shall be eliminated. This provision would be desirable if the modification is made to permit other agencies to lease for special purposes.

7. The provisions authorizing the School Land Board to make the final decision after considering the advice of others and based upon the rights of litteral owners, natural resource conservation, navigation or "any other reason in the public interest" shall be maintained.

8. The School Land Board shall be responsible for specifying the compensation to be received and shall take into consideration the nature of the planned use when setting fees. For example, a private developer proposing a revenue generating project such as a marina should not pay the same fees as the Parks and Wildlife Department would for an estuarine sanctuary or management area.

9. The General Land Office, in fulfillment of its constitutional role as proprietor of State-owned lands, shall devise a strategy for properly managing these public lands. The initial major efforts shall concentrate on precise delineation of the boundaries, location of all such lands, and the development of resource management program and plans encompassing these valuable and irreplaceable public resources. The State shall have a management program including the public resources of each estuarine system, much like the State has programs and plans in other fields such as highways, water, education and economic development. Because of the widespread impact of any such actions, the General Land Office should work closely with other members of ICNRE, local governments, private groups and the general public in development of the plans.



The democratic mechanism of public hearings gives the public an opportunity to comment on decisions being made at governmental levels. ICNRE utilized this mechanism to garner public comment on the Coastal Resources Management Program. The council recommends that this activity be used when application is made to lease State-owned submerged lands and in other areas of importance.

In addition to the specific provisions enumerated any comprehensive coastal public lands act legislation should contain provisions instructing the General Land Office and the School Land Board, after appropriate scientific advice has been garnered, to retain to the greatest extent possible those areas of particularly valuable environmental importance such as grassflats or wetlands. Only those lands whose alteration would have a minimal adverse impact on the entire estuarine system should be sold for development.

Modification of beach-related laws

The Open Beaches Act of 1959, reinforced with three additional pieces of legislation in 1969, provides Texas the basic framework for effective beach management, working mainly through local governments. However, widespread intensive use of these valuable recreational resources has created additional needs and problems which are becoming critical in the areas of sanitary and police control. Concerning modification of beach-related laws it is recommended that the Legislature:

- Amend the Beach Cleaning Bill (VATS Article 5415d-1) to:
  - a. Change financial support from 50-50 State-local to 75-25 State-local. This would be desirable because many of the small coastal towns or counties have no substantial tax base, yet are flooded with thousands of beach seekers from across the state and nation.
  - b. Direct the Parks and Wildlife Department, the administrating agency, to set guidelines and standards for the proper use of these funds.
  - c. Delete the minimum criteria of $20,000 and the maximum of $50,000.
  - d. Perhaps permit small charges to be levied by the appropriate county or municipal government to help defray the cost of beach maintenance with provisions for public facilities which require substantial capital outlay.
- Instigate increased vehicle control due to increased use pressures and proliferation of high-speed automobile traffic on Texas beaches. This should be done by local governmental units. If they fail to act the State should be prepared to take direct action. If action involves elimination of vehicular traffic along the beach, stringent precautions must be taken to insure vehicular banning is done for valid reasons. For example, local subdivision developers and residents might push for banning vehicles for safety reasons when their principal goal is to make public access difficult in order to create semiprivate beaches. Even if access is available, it will be necessary to provide large amounts of off-beach parking.

Dumping at sea

Incidents involving fishermen dragging up 55 gallon barrels of high-level toxic chemicals in their nets off the upper Texas coast has revealed a need to expand the present Water Quality Act to give the Texas Water Quality Board the powers to prevent such actions.

Even though Congress has recently acted on a bill to regulate ocean dumping, it would be desirable for the State of Texas to have explicit duties and powers in this area. Specifically, the Water Quality Act should be amended to direct the Water Quality Board to issue the necessary rules and orders regulating or preventing movement of any liquid or solid wastes generated within or passing through the State out into the Gulf for any purpose. This should apply to all liquid wastes and all industrial and municipal solid wastes.

Fresh water inflows for estuaries

Of all the problems which the Legislature directed the Interagency Council on Natural Resources and the Environment to consider in its coastal studies, none was more complex or critical than that of providing fresh water inflows to the bays and estuaries for the maintenance of fish and wildlife resources. It is generally concluded that some fresh water inflows are vital to the estuaries, and that legal and technical steps must be taken to insure their continued flow.

As the council got involved in this issue, it became apparent that the complex legal and scientific implications could not be solved within the scope and time limitations of the Coastal Resources Management Program. The major questions which ultimately must be resolved include:

1. What are the precise water requirements including quantity, quality and timing for each estuarine system?
2. What are the alternatives and costs for satisfying these needs and how may they be allocated?
3. Who should bear the costs and in what manner?
4. What legislative actions should be taken to insure the provision of adequate inflows?

Texas law presently recognizes three classes of water rights—riparian rights, appropriative rights and groundwater rights of landowners. In addition, Texas law recognizes the public trust doctrine from which estuarine water rights might possibly be derived. Of the three specific types of water rights, only appropriative rights appear to be of significance in relation to the issue of fresh water inflows.

The Texas Water Rights Commission currently issues permits to appropriate surface water to various uses for specific purposes. Conceivably, the commission, acting in its capacity as allocater of water rights, could provide for water to the estuaries in either or both of two ways: 1) Issue a permit to the appropriate entity for a specified amount of water for estuarine maintenance, or 2) Reserve from further appropriation to other users sufficient water to maintain the minimum necessary inflows. Both methods assume that inflow requirements are defined to some degree of accuracy.

An indepth discussion of the alternatives and their associated implications is complicated and will not be presented in this summary report. However, a few of the major issues will be discussed, and some suggestions for resolving current controversies will be presented. A detailed discussion can be found in the Coastal Resources Management Program backup document "Legal Assurance of Adequate Flows of Fresh Water into Texas Bays and Estuaries" by Corwin W. Johnson.

The Water Rights Commission presently takes the position that it has sufficient implied powers to reserve waters from further appropriation under Section 5.133 of the Water Code directing the commission to issue a permit only if the proposed appropriation "is not detrimental to the public welfare." The question of whether the definition of "public welfare" is sufficient to include estuarine protection has not been tested by litigation and thus not upheld by the courts.

Another controversial issue arises if the water is regulated flow rather than unregulated flow. Since 1962, the commission has issued permits for those basins west of the Brazos only when additional storage is provided. Of the major estuaries of the state only Sabine Lake and Galveston Bay fall east of the Brazos. Thus, additional storage can become expensive. So the problem of cost sharing between the direct and indirect estuarine beneficiaries, those providing the additional storage in new projects, existing upstream users and the general citizenry of the State, must be considered.

Certain entities feel that it might be possible to issue permits for estuarine inflows under the "industrial use" provision. The logic here is that 1) commercial fishing is an industry, 2) almost all commercial fisheries depend upon the estuaries, 3) inflows are required to maintain the estuaries, and thus, 4) provision of water for estuarine maintenance constitutes an industrial use purpose. This line of reasoning has not been pursued so its validity is conjectural.

Even though current law grants the commission power to issue permits for "recreation and pleasure," "public parks," "game preserves," and "any other beneficial use," it is still not patently clear that water might be appropriated to maintain minimum flows to estuaries since it has not been attempted and subsequently upheld.

Although the council does not feel sufficiently prepared to make any specific recommendations, it would like to offer the following ideas for further consideration. Conceivably, certain of these could be used alone, or possibly portions of various ones could be combined. They include:

1. A comprehensive estuarine water policy statement should be developed and incorporated into the water code.
2. More explicit statutory direction should be provided to both State and federal agencies involved in water resources development on the inclusion of the costs and benefits related to estuarine inflows.
3. The appropriate entities working together should be provided with sufficient resources and specific directive to undertake the detailed scientific studies required to precisely determine the inflow requirements for each estuarine system.
4. Direction should be given to the appropriate agency or agencies to determine the possible physical alternatives for providing these inflows. Options should include, but not be

limited to, upstream storage and regulation, water reuse-recycling, inter-basin transfers, and curtailment of certain current uses.

5. The Legislature could provide explicit authorization to one or more agencies to acquire water rights for estuarine management purposes.
6. The Water Rights Commission could specifically withhold waters it deems reasonably necessary for the estuaries from appropriations.
7. Formulation of a cost-sharing policy at both the State and federal levels would be desirable.

Based upon current trends, almost any course of action, in whatever direction it may be, is likely to face costly and time-consuming litigation. In order to minimize this and begin to resolve inflow problems, the council recognizes the critical situation of the inflows and urges the Legislature to:

- Give the issue special and deliberate study to insure that all possibilities are properly considered because of the broad policy matters involved. The council suggests the Legislature establish a special interim study committee to carefully investigate the problem and explore all related issues. This committee should draw upon the expertise of the Interagency Council on Natural Resources and the Environment member agencies, the attorney general, local governments and the involved federal parties. The committee should report back to the 64th Legislature in December, 1974, with a specific set of recommendations for legislation. The Legislature might decide to assign this task to some particular entity, such as ICNRE or the Texas Council on Marine Related Affairs. But, the far-reaching policy implications involved strongly suggest that the Legislature should become intimately involved with fact-finding and decision-making.

Groundwater management

Some parts of the coastal zone are undergoing severe land subsidence. The most severe subsidence is centered near the San Jacinto Monument-Baytown area where the land surface has gone down 6-8 feet within the last 25 years.

Subsidence results in problems with utilities and foundations and leads to some saline water intrusion, but the major danger is the greatly increased threat of hurricane flooding. When land that was 10 feet above sea level sinks 6-8 feet, the danger of flooding is greatly increased. While the problem is most severe in this area, it extends northward into Houston and southward beyond Texas City. Localized subsidence also occurs near Sabine Lake.

Subsidence is caused by overpumpage of groundwater. The only way to halt the sinking is by curtailing withdrawal by substantially reducing the current pumpage rates. This means the regulation of groundwater by some governmental entity.

The coastal area is not the only portion of the state beginning to experience severe groundwater management problems, although it is the only one plagued with subsidence. Two principal trouble spots include the depletion of the Ogallala Aquifer in the High Plains and pollution of the Edwards Aquifer and reduction of spring flows in the San Antonio area. These examples illustrate the diverse and spatially separated situations which must be dealt with. Groundwater management must be flexible enough to cope with the wide variety of groundwater related problems in Texas.

The Interagency Council on Natural Resources and the Environment recognizes that some problems are getting worse and that certain corrective actions must be taken. Such actions will need to start with the enactment of new State legislation enabling local entities to adopt effective groundwater management programs. The council recommends any legislation passed on groundwater management consider the following points:

1. The regulatory system should be implemented and controlled at the local level.
2. Management should fall to local underground water districts. The boundaries should approximately conform to the aquifer delineation or the existing corresponding political subdivisions.
3. If the majority of those within a proposed district overlying a given aquifer vote to establish such a management system, then membership and participation for all within the initially delineated area should be compulsory.
4. State enabling legislation should provide (a) policy guidance on establishment and operations of local districts, (b) sufficient power to local districts to effectively deal with prevailing aquifer problems, (c) assistance to and time for local entities to become operational, (d) limited State supervision to prevent discrimination by local boards, (e) a State level entity that has the discre-

tionary powers to determine if a local management entity is needed and what its logical boundaries should be, (f) some mechanism to conduct intensified investigations of groundwater related problems, and (g) if the appropriate State agency or agencies find that irreparable damage to an aquifer is threatened by overpumpage the agencies should have the power to force the local entities to form and implement a management program. Specific statutory provisions should be enacted to encourage the establishment of a few large districts and prohibit proliferation of many small entities.

5. Each district should determine and define the problems facing a particular aquifer and subsequently enact whatever rules and regulations may be needed to cope with these situations.
6. Whatever system is adopted must provide some means to insure the equitable distribution of costs among current water users.
7. The system must recognize that any viable, comprehensive groundwater management program must consider much more than the regulation of withdrawals. Conjunctive use of ground and surface waters, aquifer recharge, protection of water quality, property rights of landowners, beneficial uses of water and cost sharing must be considered in the context of an overall water resources management program.
8. Any such regulatory system should not include domestic household and livestock supplies..

Continuing institutional arrangement for coastal resources management

The range of choice for coastal resources management is varied as is demonstrated by the accompanying table. It ranges from reverting to the past by diminishing or eliminating interagency cooperation (**Option A**) or moving ahead rapidly and establishing a comprehensive statewide land and water use control authority (**Option G**). Neither of these appears to be a desirable or even realistic alternative for Texas. Options the council feels would be reasonable include:

Option B—Continue Coastal Resources Management Program by resolution under the Interagency Council on Natural Resources and the Environment as is presently being done.

Option C—Give the Interagency Council on Natural Resources and the Environment specific statutory direction to continue increased efforts along the same lines.

Option D—Use an existing entity or establish a new body to carry out continued program development and begin initial planning and implementation functions.

Option E—Establish a coastal management authority with certain regulatory powers over certain activities in a specifically defined coastal zone.

Option F—Set up a broad coastal management program with substantial powers and regulatory authority over a wide range of coastal activities in a broadly defined coastal zone.

There are many possibilities for combining the various options.

Almost all of these approaches have been adopted by other states and are meeting with varying degrees of success or failure. Any of these approaches might conceivably be followed in Texas. Because of mounting pressures from the federal government, significant action will be required inevitably.

Congress has recently passed a national Coastal Zone Management Act. This legislation would provide federal matching funds to those states which desired to develop coastal management programs to be administered by the National Oceanographic and Atmospheric Administration in the Commerce Department. Assistance would be available in three phases:

1. **Program Development**—The governor would designate which agency or entity would be responsible for guiding this initial phase which would include activities such as resource inventory, delineation of the coastal zone boundaries, and development of recommendations for the legislative actions required to implement the administrative portions.

2. **Administration**—The state would have to establish a single agency with "land and water use regulatory powers" in the coastal zone.

3. **Estuarine Sanctuary Development**—This provision would provide matching funds to the state for purchasing land surface estate and, if applicable, submerged lands to establish estuarine or marine sanctuaries.

Exactly what would be required of the state in order to comply with each of the provisions is not yet clearly defined. Many of the eligibility requirements have been left to the discretion of the Secretary of Commerce and will not be officially known until he issues the appropriate guidelines.

In addition to the Coastal Resources Management Act, Congress also considered a national land use policy act during the last session. Provisions for land use management resemble portions of the coastal bill, except that the act would be administered by the Interior Department. Certain of the land use legislative proposals contain stiff penalty provisions. For instance, up to 21 percent of a state's highway, airport, and land and water conservation funds would be cut off if that state did not comply with the provisions. Although these penalty provisions had been dropped from the compromise bills being considered when Congress recessed in October, there is substantial reason to expect that they will reappear next session.

At present, it is unclear how these programs would interact if a national land use policy act eventually passes. ICNRE recognizes the similar nature of these acts and realizes the necessity of close cooperation among concerned parties in their implementation.

While there is substantial difference of opinion about how continuing coastal management should be conducted and by whom, there is a concensus that something should be done. At present, the council generally believes that the creation of a coastal management authority, such as Option E or F, by the 63rd Legislature would be a premature move, particularly in view of the current uncertainty concerning federal action. Rather, the council believes that the most desirable form of a coastal management effort involves continuation of current program development activities coupled with strong, coordinated action by existing regulatory agencies. Modifications to existing duties and powers of these agencies, is presented elsewhere in this report, would be helpful in strengthening the state's ability to manage its coastal resources now.

The 62nd Legislature by passing H.B. 483 and creating the Texas Council on Marine Related Affairs, expressed clear legislative intent and desire to increase the input from non-governmental persons, including industry and the public at large, in matters related to coastal and marine affairs.

This 12-member council, which includes one Senate member, one House member and a personal representative of the governor, is an advisory body directed by existing legislation to "assist in the comprehensive assessment and planning of coastal and marine related affairs." The marine council is now getting organized and beginning formal operations, so its specific direction and goals have not yet been fully defined. However, this group in cooperation with ICNRE appears to offer an attractive vehicle for achieving improved coastal resources management for Texas.

Irrespective of which option continues coastal resources management efforts and what the relationship of this group will be to any statewide effort inland resources management mechanism which may evolve, there are a number of specific actions which need to be continued or instigated.

The entity should:

- Develop and maintain analyses and inventories of coastal resources.
- Delineate major issues, critical problems and other important considerations including recommendations to the Legislature concerning needed and desirable legislation related to coastal or marine resources.
- Conduct an active information dissemination program to keep legislators, government officials, business and industrial leaders, and private citizens appraised of recent developments of statewide or national interest.
- Establish and publish suggested guidelines and criteria for conducting activities affecting critical areas and resources of the coastal zone.
- Serve as a single point of contact for those needing or desiring information on or relating to a broad spectrum of coastal and marine affairs.
- Sponsor and conduct research and related fact-finding activities for better coastal and marine resource management.

However, in no way should this entity be a regulatory body or operational agency. Rather, its current functions will be limited to coordination, cooperation, service and advisory measures, while beginning to lay the necessary groundwork for future activities.

Final decision for determining what roles will be played by whom is, of course, the prerogative of the Legislature. It is hoped, however, that any such decision will consider the suggestions made by the Interagency Council on Natural Resources and the Environment.

IMPLICATIONS CONSIDERATIONS / POSSIBLE COURSES OF ACTION	Revert to the past—discontinue present cooperative efforts.	A Continue Coastal Management efforts thru ICNRE, guided by Legislative resolution	B Same as "B" except provide ICNRE with specific statutory directive	C Special entity (existing or new) to carry out intensified coastal program development, planning, assessment.	D Create a coastal management authority with certain powers over a narrowly-defined coastal zone	E Similiar to "E" except over a broader geographical coastal area and more substantial powers.	F Establish a powerful state-wide land and water use regulatory commission	G
What action would be required by the Legislature?	None	Resolution	Minor Statutory Enactment	Minor Statutory Enactment	Significant New Statutes	Significant New Statutes Plus Probable Constitutional Amendment	Significant New Statutes Plus Constitutional Amendment	
Would this significantly affect existing agencies?	No	No	No	No	Some	Yes	Yes	
Would this comply with the recent National Coastal Zone Management bill?								
Initial phases	No	Possible	Yes	Yes				
Completely	No	No	No	No	Maybe	Yes	Yes	
Would this require increased controls over private property?	No	No	No	No	Very Limited	Yes	Yes	

The Possible Range of Choice For a Coastal Resource Management Entity

Future fact-finding activities

During the development of the Coastal Resources Management Program, the Interagency Council on Natural Resources and the Environment identified a number of different problem areas. Some of these, while they do not merit statutory action, nevertheless deserve legislative attention.

Possible future developments, including congressional action, will make it important for Texas to be informed concerning these problem areas in order to be able to take a policy stand on them. For this reason, the Interagency Council on Natural Resources and the Environment recommends the 63rd Legislature consider the following issues:

LAND RESOURCE MANAGEMENT

Knowledgeable Washington observers contend that a comprehensive national land use policy act is inevitable, possibly by 1973, but certainly by 1974 or 1975.

Such an act would provide planning and program development grants to participating states. A land use act might also contain penalty provisions if a state does not comply with criteria determined by the Secretary of the Interior. Because of these possible requirements and implications, ICNRE considers it important for Texas to begin exploring and defining its options for land management problems.

In order to accomplish this, it is recommended that the 63rd Legislature pass a concurrent resolution similar to the one which set up the Coastal Resources Management Program. The directive would instigate a comprehensive study and analysis of the state's needs and options concerning land resource management. Recommendations should be presented to the 64th Legislature.

RESOURCE ANALYSIS

Because of increasing growth pressures and decreasing resource availability, the interagency council recommends the 63rd Legislature undertake a comprehensive interdisciplinary study of all resources, their potential implications and the resultant problems in certain portions of the state. This includes major urban areas, water and timber resource areas of arid West Texas and others. One problem area is the state's major urban complexes, Dallas-Fort Worth and Houston-Galveston, where the state's main population and economic activity are concentrated. It is recommended that this legislation also be modeled after the Coastal Resources Management Program enabling legislation.

ENERGY RESOURCES AND NEEDS

In Texas energy consumption is the cornerstone of our economic growth. Energy is utilized not only in virtually every manufacturing operation but also in transportation, heating, lighting, cooling, in the conversion of energy sources into chemicals, textiles, plastics and many other products. In order to sustain healthy economic growth and improve our quality of life, we must be assured of an adequate future energy supply.

Since 1950, the state's energy consumption has more than doubled, and by 1985 it is expected to double again. In the past, we have been able to meet our expanding energy needs from domestic supplies, and consumers have been able to choose among a variety of low-priced energy sources. Today, this situation has significantly changed. Texas is no longer self-sufficient in energy supply, and the choices available to consumers are becoming limited. The rapid increase in consumption is beginning to outstrip the development of both new and established domestic energy sources with the result that we are becoming increasingly dependent on foreign supplies. The U.S. is now importing nearly one-fourth of its oil. A shortage situation already exists in the case of natural gas, with supplies inadequate to meet new demands. These factors indicate a rapidly developing gap between the state's energy needs and its ability to supply them with domestic supplies.

In order to minimize this gap, Texas must call on all available primary fuels which can be used to power our industrial economy—nuclear energy, coal, natural gas and oil. The extent to which each of these can be expected to contribute to the nation's expanding energy requirements has been a subject of intense study by numerous organizations, including governmental agencies, petroleum and mining organizations, and individual companies.

Nuclear power has not been utilized to date because of the availability of natural gas and lignite. However, coal, natural gas and oil are not available in sufficient quantities to meet the state's electric power demand, and as a result, nuclear energy's share of total demand is estimated to be about 15 percent by 1985.

Although the U.S. has adequate coal reserves, much of it is located in areas far removed from the industrial and electrical generating centers of

Texas. Transportation costs have not made it a competitive fuel to date. Also, air quality regulations restricting use of high-sulfur coals have limited its market availability.

The outlook for only modest increases in these energy fuels places the responsibility for supplying our major energy needs on oil and natural gas. Together these two energy sources must supply about 63 percent of the nation's total energy demand in 1985. However, because of projected limited supplies of natural gas, it can be expected to supply only 19 percent of total energy requirements in 1985 as compared to 33 percent in 1970. Oil will continue to supply almost 45 percent of the demand in 1985, the same proportion as in 1970. But because of the expanded total energy needs over this 15-year period, the volume of oil required is anticipated to increase to 28 million barrels per day in 1985 as compared to 15 million barrels per day in 1970.

In the face of declining reserves and essentially no spare producing capacity, the U.S. has little prospect of supplying these vast quantities of oil from domestic sources under present conditions. Unless there is a change in national energy policy that will permit and encourage intensive exploration for new domestic supplies of both oil and gas and development of other energy fuels, well over half of our petroleum supplies by 1985 will have to come from foreign sources. In fact, recent projections indicate that by 1985, the U.S. will have to import some 62 percent of its petroleum supplies, mostly from the eastern hemisphere.

The Texas coastal zone and offshore areas have historically supplied vast quantities of crude and natural gas for the state and, indeed, much of the nation. The dependence of the rest of the state and nation on these supplies makes the energy question difficult, if not impossible, to assess within the defined geographical coastal zone study area.

It is apparent that the presently developing energy shortages have greater potential to affect the lifestyles and pocketbooks of all our citizens than any other set of circumstances which has faced our nation to date.

Accordingly, the Interagency Council on Natural Resources and the Environment recommends the Governor's Office acting in concert with the Legislature:

- Begin to take positive steps towards articulation of a state energy policy.
- Increase public awareness of the energy problem, the alternatives, potential effects of energy shortages, and relative reliabilities of various alternative energy sources.
- Encourage industry and the federal government to minimize the numerous stumbling blocks to increased oil and gas exploration, both within the state and on the outer continental shelf.
- Provide adequate manpower and equipment to the radiation control section of the State Health Department to protect the public interest as nuclear energy is increasingly utilized.
- Assist in increasing public understanding and acceptance of nuclear power as a safe and desirable energy source.

DEEP DRAFT TERMINAL

The fourth special session of the 62nd Legislature passed a bill creating a Texas Offshore Terminal Commission to develop a plan for an offshore terminal to accommodate supertankers at the earliest possible date, including a recommendation for site location.

The Interagency Council on Natural Resources and the Environment concurs with the Legislature in recognizing the importance of establishing such a facility and offers its willingness to assist the commission in its study.

NATURAL RESOURCES INFORMATION SYSTEM

In recent years there has been a substantial increase in the sharing and mutual collection of data between various agencies. As environmental considerations become more influential in resource-oriented decision and planning, it will be necessary to achieve even better data and cooperation in gathering and organizing it.

For several years the Water-Oriented Data Program Section of ICNRE has been laying the groundwork for an integrated water related data program. The council has recently voted to explore the feasibility and desirability of expanding this program into a comprehensive natural resources information system. However, this will require sizeable amounts of time and money.

Thus, the Interagency Council on Natural Resources and the Environment requests the 63rd Legislature provide future support to this important activity.

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ACKNOWLEDGEMENTS

ICNRE is appreciative of the valuable assistance from the wide variety of sectors who made the Coastal Resources Management Program possible. A project as extensive as this could not have been completed without the aid of numerous people. Space does not permit listing of all those who contributed to the project, however special thanks goes to:

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Wesley P. James and Roy W. Hann Jr.—Environmental Engineering Division, Texas A&M

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Eliezer Ereli and Carol Dinkins—Bates College of Law, University of Houston

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Senate Interim Coastal Zone Study Committee, chaired by A. R. (Babe) Schwartz and staffed by Paul Burka

House Interim Committee, chaired by Rep. Ray Lemmon and staffed by Russell Cummings

LOCAL GOVERNMENTS AND SPECIAL DISTRICTS
Texas Ports Association and its members; river authorities; Texas Water Conservation Association, especially Bill Waddle; local city and county governments and regional councils of government in the coastal zone: Texas Municipal League, especially Richard Brown; Council of State Governments; the National Governors' Conference

FEDERAL ENTITIES
U.S. Corps of Engineers; Department of the Interior; Department of Commerce, especially Robert W. Abel, director of the National Sea Grant Program; Environmental Protection Agency.

PRIVATE INDUSTRY
Texas Utilities; Governor's Committee on Power Plant Siting, Howard Drew, chairman; oil petroleum industry, especially Henry A. Hill of Offshore Operators Commission and Continental Oil Co. and Dana Larsen of Humble Oil Company; Seadock, Inc., especially Jim Arnold; Dow Chemical Co.; Midcontinent Oil and Gas Association; Shell Oil Co.; Bank of the Southwest; Gulf Intercoastal Canal Association; Texas Research League, especially Alvin Burger and Jim Williams.

CONSERVATION ORGANIZATIONS
Friends of the Earth; Sportsmans Clubs of Texas and its affiliates; Audubon Society; Sierra Club; Citizens Environmental Coalition, especially Burgess Griensenbeck; Conservation Foundation.

Harvey O. Banks **GENERAL CONSULTANT AND ADVISOR**, H. O. Banks, Inc.

Printed by the Texas Water Development Board
Art Work by The Art Studio
Photo references: Texas Highway Department, Texas Parks and Wildlife Department, the Marine Science Institute and the Center for Marine Resources.

The Coastal Resources Management Program was managed and prepared by the Office of the Governor, Division of Planning Coordination, Ed Grisham, director.
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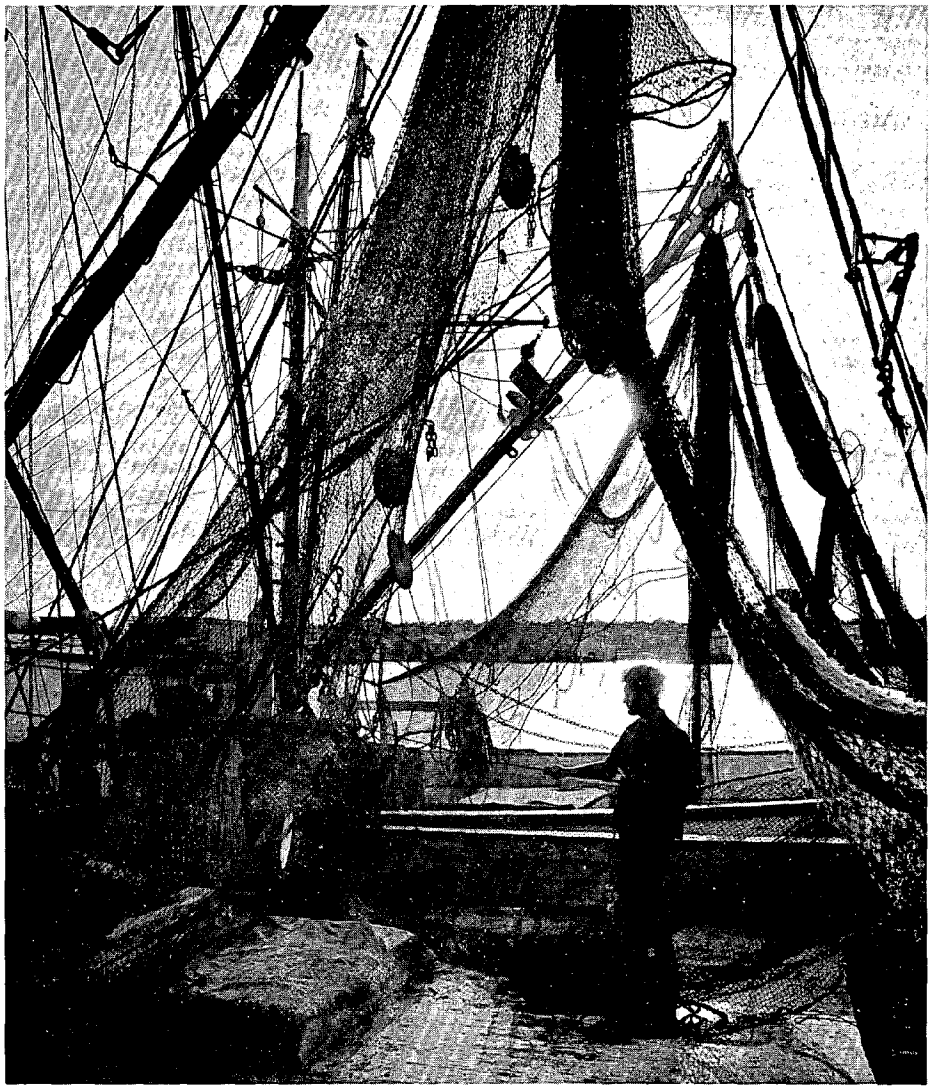

SEA FEVER

I must go down to the seas again, to the lonely sea and the sky,
And all I ask is a tall ship and a star to steer her by;
And the wheel's kick and the wind's song and the white sails shaking,
And a gray mist on the sea's face, and a gray dawn breaking.

I must go down to the seas again, for the call of the running tide
Is a wild call and a clear call that may not be denied;
And all I ask is a windy day with the white clouds flying;
And the flung spray and the blown spume, and the sea gulls crying.

I must go down to the seas again, to the vagrant gipsy life,
To the gull's way and the whale's way where the wind's like a whetted knife;
And all I ask is a merry yarn from a laughing fellow-rover,
And a quiet sleep and a sweet dream when the long trick's over.

John Masefield

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