

Special Report and Recommendations
for
Rep. Ray Lemmon's Interim Committee
on
Oceanographic Development for the State of Texas

COMMENTS AND RECOMMENDATIONS REGARDING THE
ORGANIZATION OF MARINE RESOURCE ACTIVITIES IN TEXAS

Galveston Chamber of Commerce
Galveston, Texas

There is hardly a human enterprise that does not benefit in some way from our use of the ocean and its resources. From transportation through fisheries into futuristic studies of weather modifications, the capabilities of a nation in utilizing the ocean establish its viability in the world of community of nations. In much the same way, the economic position of individual coastal states within our country is determined by the level of its activities in the marine environment.

This circumstance will become even more apparent in the decade of the 70's. Pressures from a growing population will place extreme demands on coastal zones for living and playing room, food (both from the sea and land), mineral and water products, and transportation.

Present evaluations of our capabilities to meet these pressures with rational, beneficial decisions bring the stern realization that we really know little about the interactions of the many ocean environments. In facing this knowledge gap, we must establish sound organizations, both State and Federal, that coordinate education, research, and technology to form the linking bridge between basic research and practical application. If this effort is satisfactorily mounted and led by suitably trained and motivated professionals, then man will soon realize his first opportunity to use, manipulate, and manage the ocean -- efficiently and beneficially.

When evaluating the requirements for an oceanographic organization for the State of Texas, consideration must be given to the national goals of the United States, the geo-political significance of a strong oceanographic effort and community, and the part that each state must play in the national program. The rapid progress by the USSR in all fields of marine activities is clearly an effort to establish a favorable position in the world community. Many respected Soviet scientists and politicians have continuously noted the unique opportunities for "exploiting the world ocean" and the consequent significant "advantage to the national economy."

It is certain, therefore, that the USSR is pursuing as a national goal the development of every system possible to study and "exploit the resources of our planet." The recent signing of fishing treaties with every country surrounding the Indian Ocean, and with Mexico, through Russia's Cuban satellite, is startling evidence of the Soviet's application of oceanography as a political, as well as an economic, tool.

Texas can meet this challenge and add significantly to the stability of the marine-resource efforts of the United States by undertaking the development of:

1. A Commission of Marine Resources, composed of professional men from educational, industrial, and governmental groups, to provide guidance to the State's program.
2. A state organization which will provide the focus for all marine resource efforts in Texas.
3. A Texas Oceanographic Institution, on the coast, which would house the basic academic and research groups, and the technological institutes.
4. An educational program designed to train (a) professional scientists, (b) science administrators and supervisors and (c) technicians, and to introduce to the lay community through early teaching the impact of marine environments on all peoples, and
5. A marine-resource concept that will emphasize beneficial activities of an economic and public nature.

Regardless of the manner of sequence by which marine activities are implemented as a coordinated state function, a fundamental concern of the developmental commission must be to establish suitable funding so as to assure continuity and to meet the changing and foreseeable needs of the future -- not only of the State of Texas, but of the nation as well.

FRAMEWORK OF MARINE RESOURCE ACTIVITIES IN TEXAS

Any state effort must concentrate on those problems of most direct importance to the public interests, and that are susceptible to solution within a reasonable time frame. In Texas, as in all coastal states, these problems are overwhelmingly concentrated in the coastal zone and over the adjacent continental shelf. Further, the direct and visible benefits to be derived from marine resource studies are equally concentrated in the bays, estuaries, lagoons, and the continental shelf. The optimum use of the state's resources would be, therefore, to focus its efforts in the coastal-continental shelf waters, leaving the far offshore and the deep ocean as prime responsibilities of the Federal Government.

Education is a critical need in the field of marine sciences. A suitable, rational effort in marine-resource growth must include experts in marine geology, biology, coastal engineering, physical and chemical processes of the ocean, water pollution, economics, and law of the sea. A satisfactory number of such experts does not exist, either in the State of Texas or the nation. They must be trained. Education purely on the university level will not, however, solve all of the problems or the needs of Texas. Education must be introduced at grade school level and carried on through high school, community and state colleges, and the university system.

No effective control and management of coastal waters can be carried out without coordination with adjacent states and with the Federal Government. Texas is not an entity within itself. Interstate coordination and cooperative mechanisms are necessary if optimum control and management procedures are to be achieved. Further, Texas is in a unique position in that it must effect coordination with a foreign nation; Mexico. Particularly in the exploitation of offshore mineral and fishery resources, cooperative efforts must be undertaken with Mexico so as to assure that the rights of Texans are protected in any international treaty.

The integration of a state program with the Federal Government is imperative. The high cost of marine resources, studies, research, and technological development, requires that Federal funds be acquired along with those from state and local communities to assure significant progress. Continuity can only be assured, however, when a solid base of state funds is provided. Federal "dollars" have historically fluctuated on political, international, and congressional emotions.

APPLIED ACTIVITIES IN THE COASTAL ZONE

One of the prime responsibilities of any marine resource activity, research as well as education, must be to provide for the efficient and beneficial use of the contiguous marine environment by the citizens of the state. Some pertinent examples of "areas" that must be studied and evaluated are included here.

Pollution

Once marine or fresh waters have reached the level where undesirable pollution can be detected, the rehabilitation of the environment requires a monumental effort. It is imperative, therefore, we learn in detail the effects, magnitude, and type of waste material that can be placed in the various coastal waters.

It is incumbent upon any society that the need for multiple use of any public area be recognized and plans be so made. Once such a level of knowledge is reached, and waste disposal in one environment is known to be detrimental, then other disposal sites must be sought. It is clear that short of total reclamation, a practice for which we are not philosophically prepared, disposal of wastes will be necessary and sites must be found.

Efforts to ameliorate pollution problems along the Texas Coast should include:

1. Studies of possible deepwater waste disposal systems to reduce the ever-increasing pollution load of the coastal zone.

2. Development of systems for monitoring both sewage and industrial wastes in coastal regions and the streams flowing into the coast.
3. Conduct basic studies on stability, interaction and biological effects of common industrial wastes in estuarine and marine environments. This information is vital to form the framework of reasonable, effective water quality standards.
4. Develop mechanism for coordination of pollution control activities at all levels.

Conservation

Conservation is a practice that has been advocated by concerned public servants since the beginning of society. The most vibrant proponent in this century was Theodore Roosevelt, who managed to establish a program whereby unwarranted utilization was halted in selected areas. No systematic, planned approach has yet been established, however, and conservation where practiced at all is piecemeal. The consequence is that really successful conservation efforts do not exist and because of the lack of knowledge regarding environmental interactions, certain conservation attempts damage more than they benefit.

Conservation in the "systems sense" must be seriously studied, and practiced, if society is to survive. Some prime areas for study are:

1. Development of measures to eliminate or reduce shore and beach erosion.
2. Stabilizing coastal areas from recreation, housing, industry and wildlife.
3. Maintenance of suitable habitats for marine life and associated species.
4. Determination of methods for improving habitat and feasibility of setting aside estuarine preserves.
5. Minimizing deleterious effect of man's alteration of the coastal zones.
6. Foster a public awareness of needs and benefits to be derived from the wise and proper management, not necessarily preservation, of our marine resources.

Mariculture

Consumption of food from the sea is increasing each year, but U. S. landings are unable to meet this demand. As a result, considerable interest has been expressed in the possibilities of farming high-value species, such as oysters and shrimp (mariculture). The development of techniques in this field will create new industries that will utilize coastal areas which, with the exception of underground minerals, are not now of significant economic value. Many new jobs can thus be created for skilled and unskilled workers.

Research should be conducted in the following areas:

1. Basic studies on the physiology, food requirements, diseases and parasites of marine species suitable for mariculture. This information is essential for effective, efficient, farming practices.
2. Develop techniques that will permit multi-level and multi-species farming in a single enclosure, i. e., utilization of the entire water column.
3. Complete genetic studies in order to develop fast-growing strains of marine organisms that are disease resistant and hardy.

Education

Elementary School

A two-week unit of teaching should be established in the 4th-5th grade general science course.

Junior High School

A month-long unit of teaching can expand on the role of man in the conservation and use of marine resources, and the impact of the ocean and seas of the world on man's every-day affairs.

High School

An elective one-semester course, along with a second semester expansion, to fit within the earth-science curriculum, should be organized to establish the basic actions of the sea with the atmosphere;

the land; and the major marine animals and plants. One prime responsibility here would be to initiate the student into the fundamental educational requirements for careers in professional and technical oceanography.

College

Technical, terminal, career courses should be established in appropriate community and state colleges. Students interested in professional careers can be guided into the basic sciences and mathematics necessary for advanced and graduate education.

University-Undergraduate

A sincere, concerted evaluation should be made by the State University Curriculum Committee as to the desirability of an undergraduate degree in the various fields of oceanography. The pros and cons are well established, but it seems that the University of Washington's undergraduate degree program is making an extremely favorable impact on the technical and professional oceanographic community. Texas could well follow Washington's gallant and fine example.

University-Graduate

A full-coverage of the basic oceanographic fields, patterned after the program now being carried out by Texas A & M University, is a clear and continuing necessity.

Port Facilities

Port development is one of the major factors accounting for the rapid economic growth of the Texas Coastal Plains Area. It could be said without exaggeration that what is good for the ports of Texas is good for Texas. Texas has three of the top 10 ports of the nation, and five of the top 18 ports.

Shipping in the ports of Texas dates back to the days of the Spanish galleon. However, there is a technological revolution now taking place in the marine industry. Ships are now provided speeds faster than ever before, have extremely sophisticated cargo handling equipment, and are being constructed in a rather specialized category to carry "high turn around" cargoes, as for example, the containerized vessels, barge carrying vessels, and various types of bulk carriers, including chemicals.

Port facilities are involved of necessity, in this maritime revolution in that if the ports cannot meet the complex developments of the industry, shipping will be attracted to ports with the capability of meeting the challenge. Even at present many ports of Texas are in need of technical assistance to place them into the competitive field of the maritime revolution. The assistance should be of a non-regulatory nature. Rather, it should help to redesign and reorganize their present facilities and capabilities and should envision and encompass further future developments of the maritime resolution.

Assistance in the way of port planning might be developed if the universities, colleges, and other institutions capable of such projects were given grants to work on the problems involved. In addition, the whole water front areas of ports might be studied from the aspect of tourist attraction and slum removal to place the port areas in a higher category of desirability. In fact, there are innumerable type studies that could be made in connection with our ports not only to make them highly competitive but to make them a more welcome part of the community.

If our ports are not given some help in the near future in meeting the present technological trends of the maritime industry, the Spanish galleon might again typify their capability of operation.

THE TEXAS MARINE RESOURCE ORGANIZATION

Before establishing a fundamental organizational structure for Texas, it is desirable that those of other coastal states be examined and the best qualities taken from each.

Three states are considered to having outstanding marine organizational structures that have established them as leaders in the field. These are California, Rhode Island, and Orgeon. Each has chosen certain features that are suitable to their circumstances, but of the three, California has the organization that seems most applicable for a major effort in the fields of marine sciences.

Four other states have organizations that warrant examination; three because they are good and forward looking, the fourth because it has led to an undesirable, nearly untenable, position. Washington and Massachusetts are sound and well-suited to the needs of the states. Massachusetts is the newer of the two, but it is unique in that it has drawn together a number of private and public institutions. Mississippi's activities are new and their impact is unknown. It is of interest primarily because of its proximity.

The organization structure in Florida has led that state's efforts through its university system nearly to a point of disaster. Despite great publicity, and loud claims, the lack of a basic unit for focusing the state's efforts has led to severe inter-institutional competition

and rivalry to the point where Federal funds and aid are either withdrawn or are minimal.

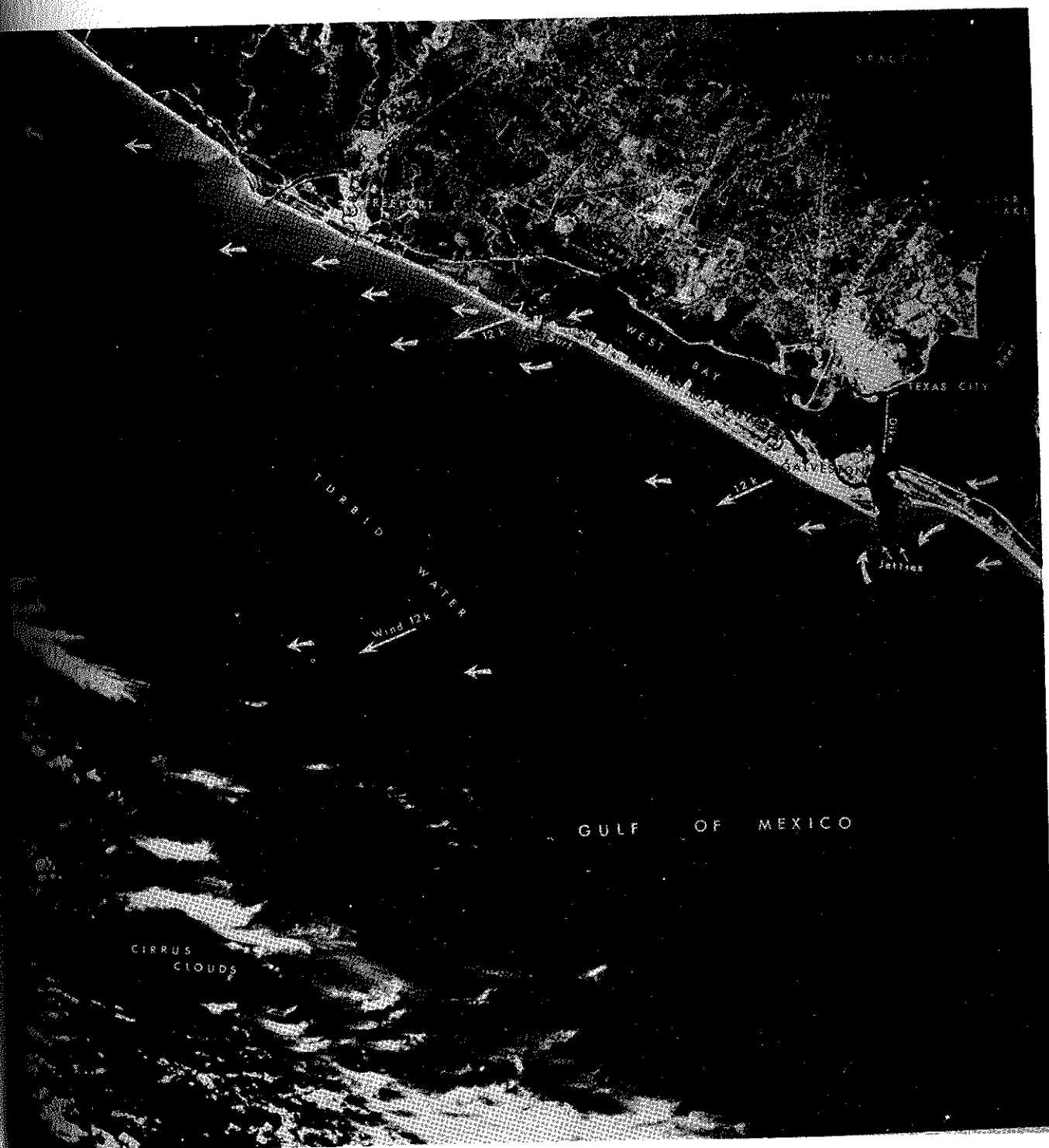
Although it is not implied that major expeditions be made outside the United States, it would be to the benefit of the committee to evaluate the marine organizations of a few pertinent foreign countries. Those that have the most viable and active oceanographic efforts, excluding the Soviet's which is too complex to unravel, are, in the order of importance, (a) West Germany, (b) Japan, (c) France, (d) Norway, (e) Netherlands, (f) England, and (g) Canada.

RECOMMENDATIONS BY THE GALVESTON CHAMBER OF COMMERCE
FOR IMPLEMENTATION AND DEVELOPMENT OF THE
TEXAS OCEANOGRAPHIC INSTITUTION

Because of the multi-use of waters surrounding Galveston Island, and adjacent bay, and coastal waters, it is realistic to assume that the solution of the prevailing coastal management problems would serve as a model for all the nation. In the water surrounding this "island laboratory," the state could plan and manage the diversification of interests which includes waste disposal, mariculture, shipping, seafood production, recreation, mineral resource development, port activities and marine transportation, desalination, marine biomedical investigations, housing and commercial development on the shores, offshore petroleum exploitation and educational offers.

At the present time, Texas A & M University, along with Gulf Universities Research Corporation, are developing an oceanographic facility on Pelican Island in Galveston Harbor. The city and private interests have cooperated in the donation of some hundred acres on Pelican Island for this development.

The City of Galveston has indicated its interest in oceanographic development and made sure that oceanographic facilities were included in the master plan development of Pelican Island.



Galveston Island, the adjacent coast, a portion of Galveston Bay, and the near-
 shore waters of the Gulf of Mexico were photographed at 2:00 PM, local time, March 8,
 1969, from the Apollo 9 spacecraft. The sediment-laden water along the shore was
 being blown seaward by the north winds which began 12 hours before.

Photography was by the Apollo 9 Astronauts. The interpretation and annotation
 of the photograph were by Dr. Robert E. Stevenson, Bureau of Commercial Fisheries,
 Galveston, Texas.

The Mayor and City Council have strongly affirmed their continuous support of this newly developing field which already has a firm base in Galveston. Their continuing interest is indicated through the developing activities of the Galveston Chamber of Commerce Oceanography Committee and Coordinating Committee. Under the leadership of capable professionals, this group will hold confidences and help in many ways to assist firms and/or institutions in locating their activities in the city.

Galveston College has established a new, multi-purpose marine technology department. Galveston's philanthropic foundations, The Moody Foundation, The Sealy-Smith Foundation, and the Harris and Liza Kempner Foundation, have already shown their interest in oceanographic development by their grants in this field.

In the Appendix is a profile of Galveston's oceanographic brochure.

Since January of this year the following oceanographic firms have located in Galveston.

Western Geophysical, Division of Litton Industries, moved all of its instrumentation and repair activities from Los Angeles to Galveston. This firm provides complete offshore geophysical services for industrial companies. At the present time, this firm is located at Kelso's Industrial Park in new facilities with 110 employees. Part of their shop operations will remain at this industrial district and the major research activities will move to new facilities now being constructed on Pelican Island, immediately adjacent to Texas A&M-Mitchell Campus (Oceanographic Center).

The H. C. Price Company of Bartlesville, Oklahoma, has established a new plant on 75 acres on the Galveston Ship Channel. The Coating Division of H. C. Price Company, already the world's largest applicator of yard coatings, handled virtually all of the coating for the incredible SEA ROBIN offshore pipeline project. This firm will play an increasing role in the development of the nation's offshore petroleum resources and is now an important part of the Houston-Galveston oil industry complex.

Southwestern Industries, a Division of Ingersoll-Rand, has completed its first phase operation on a Pelican Island site. The main purpose of this plant is to assemble compressors for offshore operations.

Shell Petroleum has located their offshore services center on Pelican Island which will basically serve the Upper Texas Gulf Coast.

In the state's plan, it is clear that efforts should be made to establish Coastal-Zone Management Headquarters and Coastal-Zone Laboratories on Pelican Island. It is felt that these should be coordinated with the state's total-zone management program and that a State Commission should be appointed to guide the development.

This coastal-zone laboratory should be organized in line with the new directives issued by Vice President Spiro T. Agnew, Chairman of the National Council on Marine Resources and Engineering Development, requesting the establishment of such facilities to accelerate the environmental research needed to suitably manage coastal activities.

Once the facilities and a program are in existence, later grants from the Federal Government would be made, contingent upon the State of Texas demonstrating a capability to prepare plans that provide for:

Balanced use of the coastal margin, both land and water, that considers viewpoints of all potential users;

Access to management-oriented research, including coastal ecology studies;

Basic authority as needed -- such as zoning, easement, license, or permit arrangements -- to insure that development is consistent with state plans;

Consideration of the interests of adjacent states;

Land acquisition and power of eminent domain as necessary for implementation of the plan; and

Review of proposed Federal, Federal-assisted, state and local projects to insure consistency with plans.

The Galveston community has shown, through the existing, firm oceanographic base of activities that it is the natural center for the State's Oceanographic Institution.

Without specifying a time-frame in the development of an oceanographic institution for the State of Texas, the accompanying schedule is recommended.

DEVELOPMENT SCHEDULE FOR THE TEXAS OCEANOGRAPHIC INSTITUTION

Four steps seem to fall logically into a scheduling plan for the development of TOI.

Phase I.

The first event should be to establish the commission on Marine Resources as a permanent state function, and which would guide the development of the state's marine resource organization. Serious planning, integration, and interaction should be completed before major construction and implementation are initiated.

Phase II.

Construction of the basic facilities on the Mitchell Campus, Pelican Island, Galveston, begins in this phase. Except for short summer courses and typical field station activities, all education and research would continue at the parent campus of the university system.

Phase III.

As the facilities enlarge, more research and teaching can be transferred to the Mitchell Campus. Even so, degree-granting responsibility and the major research function would remain at the parent campus.

At this time, an Institute (or Marine Resources) should be organized within the institution to handle applied research, grants for practical studies, and implementation of the efforts required by such contracts.

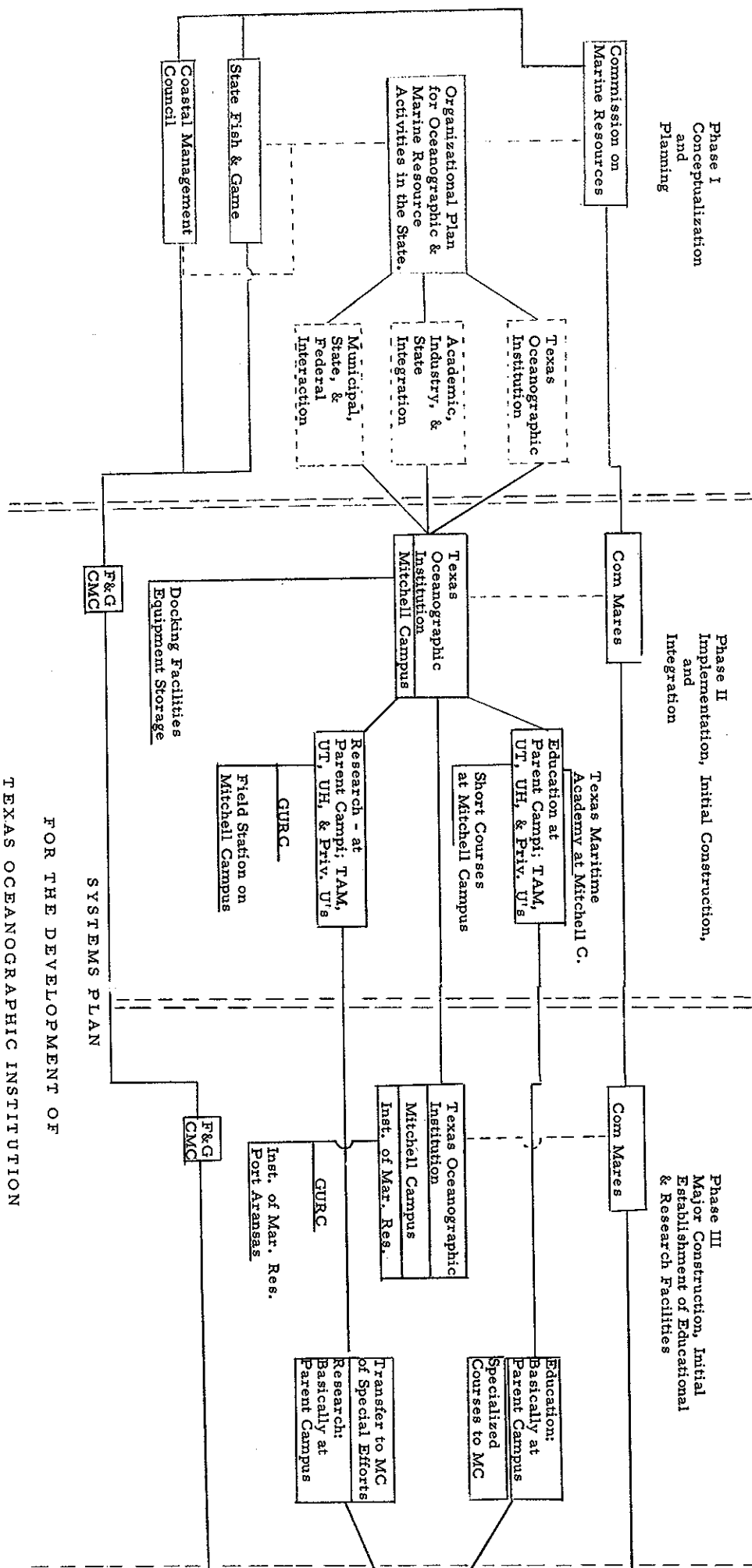
(This must not be confused with the Institute of Marine Sciences at Port Aransas.)

Such activities should be separated from the basic research and education of TOI.

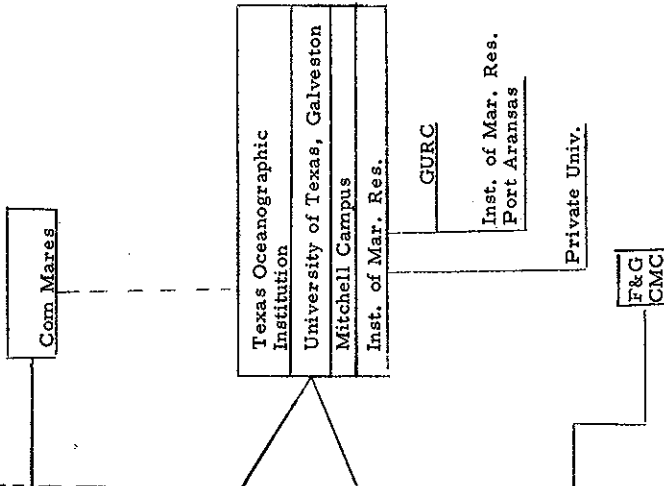
Phase IV.

The TOI becomes a full-founded organization in this phase with the total responsibility for education, research and technology established with the Mitchell Campus staff. At this time, the facility should become a branch of the state's university system.

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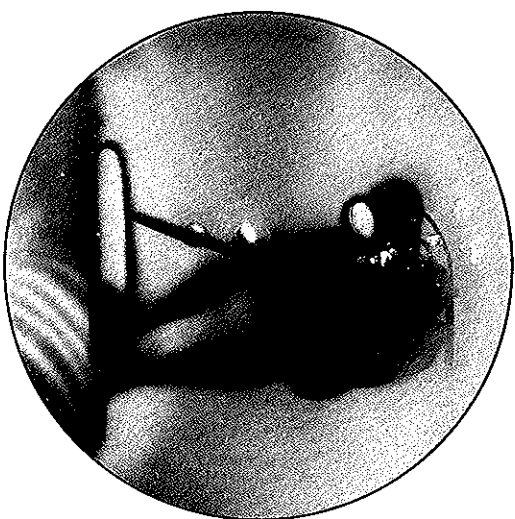
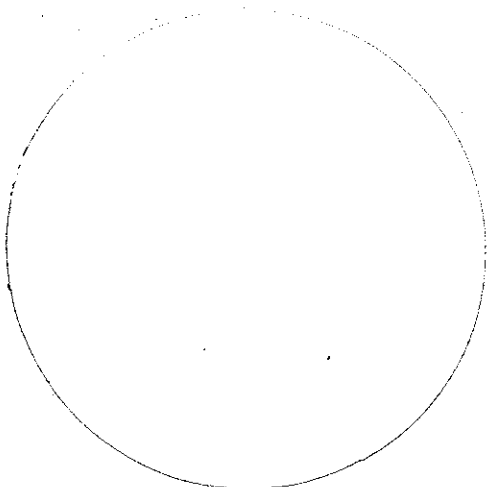


Phase IV
Basic Establishment
Completed - Major
Academic & Research Facilities.





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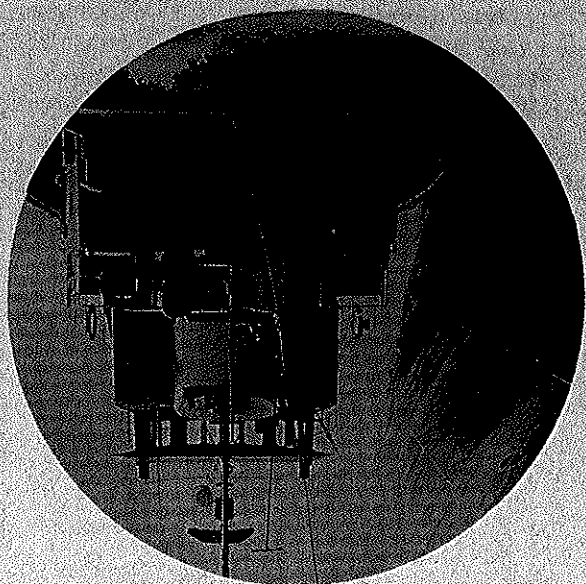


GALVESTON, TEXAS OCEANOGRAPHIC CENTER ON THE GULF OF MEXICO

A unique aggregate of marine science and technology facilities backed by the tremendous scientific, economic, and industrial base in the Greater Houston area makes Galveston one of the leading and fastest growing oceanographic centers in the nation. Diligent and progressive community leaders are fostering this expansion by providing those interested in the general field of marine science and technology with detailed information. The following is a brief resume of Galveston's posture in oceanography.

Port

The Port of Galveston facilities lie on the north side of the island. The maintained depth of Galveston Channel is 36 feet, and its width at the narrowest point is 1,200 ft. Distance from the farthest pier to the open sea is ten miles or about 40 minutes steaming time. Galveston is the oldest port on the Gulf of Mexico west of New Orleans. The activities and operations of all docks and shipside warehouses, the 50-mile terminal railroad and switching, car loading and unloading, port crating and packing, and port-oriented industrial development are performed by Galveston Wharves, the municipally owned port authority. Bulkheaded waterfrontage of Galveston Wharves totals six miles including dockage space for 38 deep-water vessels simultaneously, 31 at shedded piers and seven at open ship's berths. The port has warehouse and transit sheds with a total storage capacity of 4,600,000 sq. ft. all located on port property. In addition, there are shipside, open, paved areas totaling one million sq. ft. and 18 acres of open, unpaved space owned by the port. A new multimillion dollar containerization facilities are being developed. ■ Galveston enjoys regular steamship service on practically every important trade route of the world. Galveston currently is being served by nearly 100 steamship lines.



Location and General Description

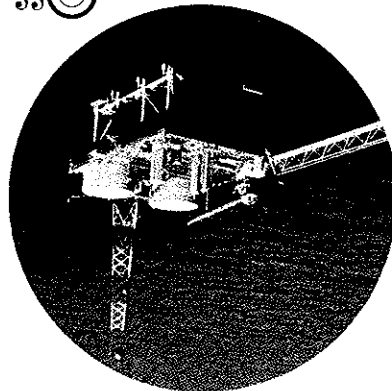
Two miles off the Coast of Texas in the Gulf of Mexico and less than 50 miles from downtown Houston, Galveston is a major city on a natural island. Some 30 miles long and from one to two miles wide, the island is bounded on the south by the Gulf of Mexico and is separated from the mainland by two large bodies of water, Galveston and West Bays. The Gulf side is a smooth beach extending for the length of the island, while the Bay side is heavily indented with smaller bays, bayous, and coves. A six-lane seawall boulevard, 17 feet high and over 10 miles long, protects the city from the open Gulf of Mexico. The island is connected with the mainland of Texas at three major points: North to Houston, by a causeway system that carries six lanes of automotive traffic and provides for six of the nation's leading railway systems; west, by the new San Luis Pass-Vacek Bridge to the South Texas Area; east, by a ferry system connecting Bolivar Peninsula and the Beaumont-Port Arthur Area. ■ Pelican Island, the site of a 3,675 acre marine science and technology center is located across the ship channel from Galveston and is connected by a \$6 million causeway.



Gulf Intracoastal Waterway

The Gulf Intracoastal Waterway, on which Galveston is located, extends from Brownsville on the Mexican Border to St. Marks River, Florida and connects the Mississippi River Basin System and the Great Lakes. The Gulf Intracoastal Waterway is 12 to 14 feet deep along all of its 1,177 miles.

Offshore Operations



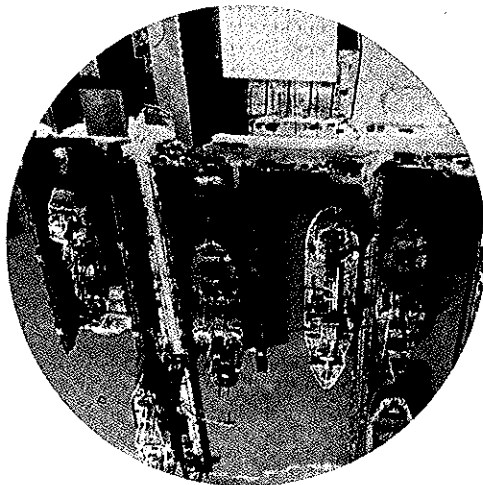
The offshore petroleum industry will provide the major thrust in marine science and technology for the next few years. ■ The facilities in Galveston are ideally situated to support these activities. Off Galveston Island, in the Gulf of Mexico, are several oil fields. Over \$6 million in oil leases were consummated in June, 1968. Presently, several major corporations, including Shell Oil, are engaged in industrial activities relating to these fields.

Texas A&M University--Oceanographic Center

Mitchell Campus

Texas A & M University plans an overall multi-million dollar oceanographic center on a 100-acre tract of land on Pelican Island, Galveston. Its Maritime Academy and the Marine Science Laboratory, both now at Fort Crockett, will be part of the new complex. Their vessels, the training ship "Texas Clipper" and the research vessel "Alaminos," will shift from municipal docks to water-front facilities on the site at Pelican Island. Plans include providing two new research vessels, 165 ft. in length, by the Navy's

Todd Shipyard's Corporation Division



Oceanographic Division in the early 1970's. A Sea Grant Institutional Program also is planned to be a part of the new Oceanographic Center. ■ The Texas Maritime Academy has a grant of \$1 million from the Moody Foundation for construction and also has \$500,000 from the State of Texas for water-front facilities on Pelican Island. The funds for the operation of the Texas Maritime Academy including those for the training ship "Texas Clipper" are provided by the State of Texas and the United States Maritime Administration. The funds for the operation of the research vessel "Alaminos" are provided by the Office of Naval Research, The National Science Foundation, and the State of Texas. The Sea Grant Institutional Program will derive its funds from the National Science Foundation and the State of Texas.

One of the largest ship builders and repairers on the Gulf Coast, Todd's presently is engaged in adding two new drydocks to its facilities, making a total of four drydocks. This firm is capable of doing complete repair work on any type of commercial vessel. At the Galveston yard is Todd's Nuclear Division which serves as the refueling facility for the N/S Savannah.

The University of Texas Medical Branch

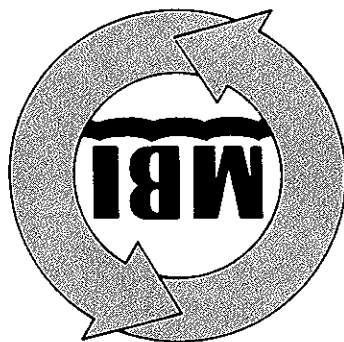
Established in Galveston in 1891, The University of Texas Medical Branch is one of the nation's outstanding medical-educational institutions and affiliated hospitals. Student enrollment is approximately 1,000. Employees at the college and related Medical Branch facilities number 3,064. Annual payroll is approximately \$15 million. The institution's bed capacity is 1,000. Physicians and research students from throughout the nation and many from foreign countries take postgraduate and refresher courses here. At the present time an expansion program is underway at the Medical Branch in excess of \$30 million. ■ *Other hospitals located in Galveston are St. Mary's Hospital, U. S. Public Health Service Hospital, and the Shriners Burns Institute.*

Galveston Community College

Galveston's first junior college opened for its first semester of operations on September 18, 1967. Several grants from The Moody Foundation, a Federal grant, a Federal loan, and the support of the Galveston taxpayers allowed the college to begin its first semester in the newly renovated St. Mary's Orphanage Building with an enrollment of 729. The enrollment is now over 1,000. This college is naturally marine oriented. For example, a unique course sponsored by Texas A&M's Sea Grant Institutional Program, entitled "Marine Organisms of Commerce," is being given by the staff of The Marine Science Laboratory. The Community College provides university parallel course work as well as technical and occupational programs. A \$1 million grant from The Moody Foundation on June 21, 1968, will allow construction of additional facilities on the present land site.

Kelso Marine, Inc.

Operators of service boats to offshore rigs, marine research vessels, and geophysical boats working the Gulf Coast are only a short distance from Kelso Marine, Inc. Just 30 minutes from deep water and nearby the mouth of the Houston ship Channel, Kelso Marine fronts Galveston Bay at Intracoastal Canal Mile 355. The modern boat and barge construction and repair yard is well equipped to handle repair or renovation projects with its synchro-lift and lateral transfer system that gives gentle treatment to valuable instrumentation, a 100-ton mobile crane, a 140-ton gantry crane, a metal fabrication complex, and a complete engineering division.



The Marine Biological Institute

The Marine Biological Institute will provide biomedical support to the ever-growing national effort in marine science and technology. The capabilities of the Institute's joint sponsors, The University of Texas Medical Branch and Texas A&M University, will be combined in a multimillion dollar program of research and education in the marine biomedical sciences. Its unique multi-disciplinary approach will include marine medicine, marine biology, marine physical science, and education. It will also provide an opportunity for selected institutions in the Gulf of Mexico area to work in the marine biomedical field through a Marine Study Center.

United States Public Health Service Hospital

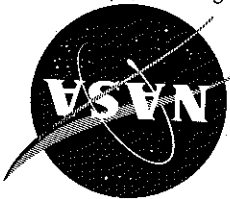
The USPHS Hospital is the primary admitting agency for all marine casualties. These casualties normally are evacuated to the USPHS Hospital by the U. S. Coast Guard. Plans are now underway to construct a \$9 million first-phase facility for the USPHS Hospital on The University of Texas Medical Branch Campus. Extensive facilities are planned for medical treatment and research in the field of hyperbarism, better known as the diver's bends. The USPHS Hospital also is planning to establish a Poison Venom Center with particular interest in poisonous marine animals, fish, plants, and other poisonous substances.



United States Coast Guard

The Galveston contingent of the U. S. Coast Guard is based at Fort Point on Galveston Island. It has men and facilities for every mission of the Guard, including search and rescue, aids to navigation, law enforcement, mobile boarding teams, marine inspection, air surveillance, the Long Range Aid to Navigation (LORANS), port security, and an industrial base. There are six boats (two 210-footers, two 40-footers, and two 30-footers) based in Galveston for search and rescue missions, along with two 180-foot buoy tenders and two small construction tenders. ■ Approximately 450 guardsmen and officers are stationed at Fort Point. Together with their dependents, they comprise a population of over 1,000.

Manned Spacecraft Center



The National Aeronautics and Space Administration's Manned Spacecraft Center, located just 30 minutes from Galveston Island, represents the largest single aggregate of scientific and technological capability in the Gulf region. In addition to the Manned Spacecraft Program, NASA's Manned Spacecraft Center is studying the feasibility of making oceanographic measurements from space, using Apollo and Gemini photography and aircraft equipped with potential space instruments. Many aerospace industrial firms are located in this area.

United States Weather Bureau



The Galveston Weather Bureau recently entered into an agreement with NASA to acquire offshore weather information on a 24-hour basis from an oil rig 25 miles south of Galveston. From this rig, the continuous flow of information concerns wind, waves, sea conditions, sea temperature, and weather temperature. The Galveston Weather Bureau has the unique distinction of having as one of its primary functions the use of the most powerful surveillance weather radar in the area. This radar covers a 250-mile radius of the Gulf of Mexico, and its primary function is for hurricane and severe weather protection. The Galveston Weather Bureau has continuous weather information available to the public on a local telephone hook-up and also 24-hour weather information on FM Radio (162.55 MCZ). The Galveston office is the headquarters for all bureaus in the Gulf Coast Area. It also is the headquarters weather information station for the four coastal counties of Galveston, Chambers, Matagorda, and Brazoria.

Gulf Universities Research Corporation (GURC)

The Gulf Universities Research Corporation is a consortium of 16 universities and two research institutes representing the five Gulf Coast states and Mexico. The corporation performs marine and estuarine research which is of major significance in the Gulf area and which involves participation of scientists from several member institutions. The corporation supports and conducts educational activities, symposia, and technical conferences on subjects concerning the understanding and development of the Gulf of Mexico. The Gulf Universities Research Corporation has an option to use 15 acres of the Texas A & M University's Mitchell Campus on Pelican Island. Plans are being made for the utilization of this area at some future date. The Gulf Universities Research Corporation has established an office in Galveston which will serve the needs of scientific and management personnel of the Corporation.

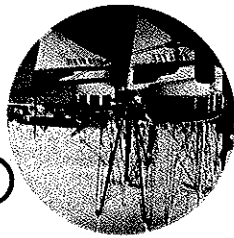
U.S. Army Corps of Engineers Galveston

Since its establishment in 1880, the Galveston District has had responsibility for construction, maintenance, and operation of the navigable channels and harbors along the entire Texas Coast. With Federal acceptance of responsibility for flood control in 1936 and hurricane flood protection in 1954, these functions were added to the District mission. More recently, its activities have expanded to related areas of water resources development, including dissemination of flood plan information, recreation, pollution surveys, and others. Prior to congressional authorization of a project, the Corps of Engineers conducts extensive examinations and surveys of improvements under consideration. These investigations are coordinated with other Federal, state, and local agencies to determine the justification of the projects and the most effective means of accomplishing the de-

sired results. Today the completed or under construction projects of the District include a network of nearly 1,000 miles of shallow and deep-draft navigable channels extending along the Texas Coast from the Sabine River to the Mexican Border, and about \$235 million worth of flood control and hurricane flood protection projects, either completed or under construction.

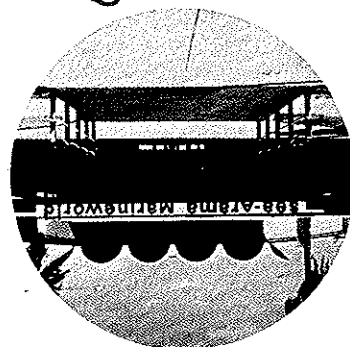
Bureau of Commercial Fisheries Biological Laboratories

The facilities of the Bureau of Commercial Fisheries Biological Laboratories provide for research in Gulf oceanography, shrimp dynamics, estuarine research and shrimp aquaculture. There are 70 staff members of whom 60 are professional or technical. Facilities include a fully equipped chemistry laboratory, controlled temperature rooms, constant-flow and recirculating sea water systems, culture rooms, physiological apparatus, and modern oceanographic equipment for field sampling.



Commercial Fishing

For more than 100 years, Galveston has been famous for fishing, and for the past 30 years, for commercial shrimping. Galveston is presently host to 721 fishing craft landing shrimp, fish, oysters, and crabs throughout the year. In 1967, for example, fishing craft from Galveston landed about 12 million pounds of edible shellfish and fish valued at more than \$5 1/4 million. An additional million pounds of live bait shrimp valued at over \$1 million are landed annually. ■ A large number of ocean-going vessels in the fishing fleet are available on a charter basis for oceanographic purposes.



Sea Arama Marine World

Located on west beach in multi-million dollar facilities, Sea Arama Marine World is one of the finest and most complete marine attractions in the world. Sea Arama has offered its assistance in working with any oceanographic institution.

Recreational Aspects

Galveston Island is known as a major ocean recreational center on the Gulf of Mexico. The recreational aspects of the island are growing continually. On the island there are several yachton Yacht Basin, a \$5 million project claimed by many to be the finest facility of its type in the Southern United States. Sport fishing, water skiing, sailing, surfing, and swimming are examples of water recreation available.

All of these facilities working in close conjunction with each other form a vital industrial and scientific base on which to start new endeavors in the fast-growing field of oceanography. May we suggest that your new effort be located in Galveston. For further information contact the:



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Galveston Chamber of Commerce
315 Tremont
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