

TEXAS MARINE RESOURCES

THE INDUSTRIAL VIEW

TEXAS A&M UNIVERSITY  SEA GRANT PROGRAM

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A Consensus Report of
"MARINE RESOURCES: THE INDUSTRIAL VIEW"
A Workshop for Texas Industry

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FOREWORD

This booklet represents a summary statement of the first Texas A&M University Sea Grant Workshop, "Marine Resources: The Industrial View." The meeting marked the beginning of a series of working sessions designed to find out the views of various user groups concerned with marine resource development in Texas. Similar workshops have been held with educators, recreation and tourism developers, and attorneys. Others are planned for port development, coastal land use, banking and commerce, and fisheries.

The statement issued here is one of consensus. It reflects the concern of each participant for a well-managed coastal zone for the state. It should not be assumed that all the ideas were unanimously voiced by all participants or that each individual subscribes to every detail. Key ideas and recommendations are given in bold-faced type at appropriate places in the manuscript.

The Sea Grant Program of Texas A&M University is jointly sponsored by the National Science Foundation Sea Grant Program and the university and is directed toward practical development of marine resources.

It is the intention of the Sea Grant Program that this statement may stimulate the growth of marine resources in the state. Comments and discussion on the material presented here are welcome. Please address remarks to the Sea Grant Program Office, Texas A&M University, College Station, Texas.

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INTRODUCTION

The Sea Grant Program of Texas A&M University serves the Texas Gulf coastal region by focusing academic strength upon problems and educational activities related to the understanding and use of the sea. "Marine Resources: The Industrial View" represents the first in a series of working sessions, sponsored by the Program, to serve as communications mechanism among the industrial, educational, and governmental communities. Their purpose is to achieve a better understanding of the needs of the Texas Gulf coast region and the manner in which the Sea Grant Program can serve those needs.

Other workshops have been scheduled as companion sessions to the first workshop, which was directed toward Texas coastal zone marine related industries. Later meetings will be concerned with coastal land management, recreation and tourism, university and junior college educational programs, law, fisheries, and seafood technology.

Held at the Royal Coach Inn in Houston November 13-14, 1969, the industrial workshop was attended by 31 selected representatives from the Texas coastal industry community, 11 representatives from State and Federal agencies, and 9 from the Texas A&M University staff. Mr. Robert Abel, Director of the Sea Grant Program, National Science Foundation, was present throughout the entire meeting.

The discussions and conclusions of the 51 workshop participants have applicability in four immediate uses of the information obtained.

- (1) The discussions serve as a reference point for the future planning and direction of the Sea Grant Program, both at the national level through the National Science Foundation, and at the regional level through the Texas A&M University;

- (2) The opinions of the participants offer sound advice for the Office of the Governor and State agency representatives charged with the responsibility of determining priorities in State marine resources development;

- (3) The information gleaned from the workshop serves as a contribution to public bodies such as the State's Committee on Oceanography, an interim study committee of the Texas House of Representatives directed toward determining the educational needs of the state in oceanographic programs, and the Joint Interim Committee to Study Texas Beaches.

- (4) The discussions alert industry to a national and regional program on which industry can draw for basic information and in which industry can participate.

The overall purpose of the industrial workshop was essentially one of information gathering and of identifying needed actions. Participants were asked to formulate consensus opinions relating to the future goals of marine resource development from an industrial point of view and to the methods by which these goals could best be obtained.

To prepare for the two-day session, workshop participants were provided with a packet of background information including material on the National Science Foundation Sea Grant Program, the Inter-agency Natural Resources Council of Texas, selected recommendations from the panel reports of the President's Commission on Marine Science, Engineering, and Resources, and the President's Panel on Oil Spills, and other readings in marine resource development.

The participants also received a list of proposed questions for consideration at the meeting. Four broad categories of questions were presented to the workshop attendees:

- (1) Where is industry going in marine resource development?
- (2) What are the current needs of industry that can be served by the Sea Grant Program?
- (3) How can advice and support to the Sea Grant Program from industry best be achieved?
- (4) What actions by the State of Texas would be most helpful to industry or the development of marine resources?

Four keynote speakers presented background information to stimulate the discussion of the participants: John C. Calhoun, Jr., Vice President for Programs, Texas A&M University, and Director of the Sea Grant Program; Robert B. Abel, Director of the National Science Foundation Office of Sea Grant Programs; William H. Stoll, Division of Planning and Coordination, Office of the Governor, State of Texas; and James R. Bradley, Director, Industrial Economics Research Division, Texas A&M.

Dr. Calhoun challenged the group to "move beyond generalities about the riches of the sea and wealth of the oceans" and to come up with specific statements regarding priority areas of development in Texas Gulf coastal resources.

"It is time to develop specific goals for marine development and it is fundamental that industrial groups should be consulted before goals are determined," he said.

In describing Texas A&M's various programs related to the marine environment, Dr. Calhoun pointed out that the Sea Grant Program is funded by the Nation-

al Science Foundation at the rate of \$750,000 for the current academic year and is matched by \$350,000 or more in university contributions. The program involves more than 70 professional staff members of the university from 14 departments. In addition, 57 graduate students are partially supported by Sea Grant activities.

Describing the Sea Grant Program as "one of the broadest mandates ever to come out of the Federal government," Mr. Abel explained the concepts behind the Pell-Rogers Act of 1966 which created the National Sea Grant Program.

"The Sea Grant idea is aimed at public-private partnerships. Under the act, the government puts up some of the money (two-thirds) to reduce industrial risk. The program encourages partnership arrangements between private industry — which needs a source of risk capital — and universities — where talent is available to conduct research and investigate potential sources of economic gain," Mr. Abel remarked.

He pointed out that during the recent period of re-evaluating national oceanographic goals, the Sea Grant Program was the only ocean study program formed by Congress. It is aimed toward applied research, encouraging development of marine programs in law, economics, biomedicine, administration, and other social sciences. He warned that the supply of physical oceanographers is catching up with the demand and pointed out the need for program managers, engineers, and technicians trained to deal with ocean environment.

The newly-created Interagency Natural Resources Council of Texas was explained by Mr. Stoll. He explained that the State needed to get industry's views and recommendations and use them for the basis of legislative action in coastal zone and ocean resource management.

He pointed out that Texas state government is organizing itself in order to attack the problems of marine resources and coastal zone management. The 60th Legislature did several things to expedite marine programs: (a) declared a four-year moratorium on sales and leases of tidal lands and beaches; (b) established a joint House and Senate beach study committee; (c) set up an Interim House committee for the study of an Institute of Oceanography; and (d) approved a comprehensive coastal planning study.

"The Governor's office is organizing in order to create a focus for the State's marine activities," Mr. Stoll said. "The Interagency Natural Resources Council, made up of ten state agencies, has been designated by the Governor as the coordinating group for State-Federal activity relating to estuarine protection."

The Council has recognized the desirability of meshing together the long-range planning efforts and field operations of the various agencies and has established a coastal planning program to guide the development

of marine resources. This effort will be undertaken by the Council and coordinated by the Governor's Office. The Council will provide continuous guidance to the coastal program and plans have been made to appoint a Governor's Advisory Committee made up of laymen who will assist in formulating policy and setting priorities.

"What is needed now is direction from industry and other users of the coastal zone," Mr. Stoll said. "We need to take your recommendations and take appropriate Legislative action based on them."

Mr. Bradley explained the organization and working methods of the Industrial Economics Research Division of Texas A&M University and briefly reviewed the Division's efforts in compiling "Marine Resources Activities in Texas," a comprehensive inventory of the state's involvement in marine affairs. "There is a considerable level of economic activity in Texas in the marine environment," he said "and our ambition in preparing this report was to identify the major contributors to this sector."

"One of the disappointments of the study was our inability to obtain specific figures from the various state agencies for funds directed to marine related activities. As I understand it, however, this shortcoming can be overcome in the near future, thanks to the efforts of the Interagency Natural Resources Council."

Through the Texas A&M University Sea Grant Program, the Industrial Economics Research Division has begun work on a follow-on study which will delineate the nature and significance of economic factors comprising the marine resources sector of Texas. Emphasis will be placed on the future growth and development of these activities.

After hearing background statements the workshop participants met in three panels to exchange views and consider the questions posed. Each panel developed its own theme under the guidance of a chairman.

After two half days of intensive group discussion, the participants met again in a general session to review consensus statements which had been formulated by the session chairmen and recorders. The statements which came out of the sessions indicated enthusiastic interest in the total spectrum of coastal zone activities — from recreation to fresh water conversion techniques, from supertankers to county park development. The resume which follows reflects the participants' dedication to the concept of a well-managed coastal zone and to the idea that the State of Texas has much to offer its citizens and the nation in marine resources. Because the statement is one of consensus, it should not be assumed that the ideas were accepted unanimously by all participants, or that each individual participant subscribes to every detail. The entire written statement was provided to each participant before it was printed in final form to make certain there were no major objections.

DISCUSSION AND CONSENSUS

WHERE IS INDUSTRY GOING IN MARINE RESOURCE DEVELOPMENT?

The decision to participate in ocean development is not a difficult one for industry to make. The hard part is to decide what areas to go into and in what order. Industry must base its decision to enter into or to expand its programs in ocean development upon the economic potential of the proposed venture, and industry will put its emphasis where the economic return seems to be the highest, commensurate with risk.

In assessing the specific areas to which this logic leads, however, one must differentiate between the role of the large company and that of the small company. One must also consider the short-term as well as the long-term view. Industry's major short-term effort is most likely to be where the dollars are currently being spent. Its major long-term effort will be dependent upon other factors.

Other than ocean shipping, off-shore oil and gas seems to be the only industry that has structured a truly viable effort in the oceans, and in the short-term look, the oil industry is dominant. Even in this industry, Texas lags behind Louisiana, California, and Alaska in production. Sharp increases in labor and material costs in the Gulf of Mexico plus public attitude and legislation are causing some companies to develop foreign leases first. These factors could endanger the ability of Texas marine resources to compete in domestic and foreign markets.

Little is known about minerals in the offshore areas, which have the potential for rapid development in the next century. The dredging industry is apparently one of declining interest in the Texas coastal zone. The production of bromine from sea water is also on the decline in Texas. The Dow Chemical plant in Freeport is reported to be closing its bromine operation in the near future due to the economic infeasibility of operation.

The most effective investment of sea grant funds for advancing economic development of marine resources will probably be in those areas where the current dollar volume of activity is greatest, at least in the short term. Efficiencies in current programs are as important as development of new programs, as for example in the areas of marine transportation, offshore production of oil and gas, and recreation. The consensus seemed to hold that industry will put its effort where the economic advantage is greatest, and this is likely to be where current dollars are being invested.

Most rapid development along the Texas Gulf Coast is expected to be in the areas of recreation, tourism and land development. Texas lags far behind such states as California and Florida in the realization of these potentials. Texas has a very small share of the giant but diverse marine recreation market, which is reported to produce total U. S. gross revenues in 1964 of about \$3.9 billion, more than twice as much as the oil and gas industry.

Population trends as shown in Figure 1, suggest that a long, thin city is developing along the Texas coast with the resultant problems of metropolitan coastal regions such as developed along the east coast, west coast and the Great Lakes. Some of these problems center on the concern for supporting resources such as fresh water supply, public recreational regions, hotel and resort facilities and appropriately planned marinas. The sea as a resource for waste disposal also becomes important along with this development.

The improvement of maritime shipping facilities is a high priority item for the Texas coastal zone. The recent authorization for the deepening of the Corpus Christi channel to 45 feet is a significant move, and other major ports may take similar action to provide deeper traffic lanes even though there is little current justification for super tankers of 90-foot draft to have ports of call in the Gulf of Mexico. The declining tonnage figures at many Texas ports (Figure 2) seem to indicate that great changes are being made in all phases of transportation. Technological forecasting is vital to good planning studies, especially in terms of harbor development and port design and the roles they play in the total transportation system.

The Texas shrimping industry (Figure 3) is the largest commercial fishery in the United States, even though it constitutes a minor part of the marine economy. Fishing technology must be improved if fishing is to compete for a place as a major

The key factors relative to the development of Texas coastal marine resources are those associated with the advent of coastal strip cities—land development practices; estuarine protection; tourism development; recreation facilities development; water supplies; marine transportation; waste disposal problems; and standards for use of the coastal region. Industry recognizes the challenge and potential inherent within the growth of a coastal metropolitan strip. The consensus is that solution of these problems should have the highest priority, so that Texas avoids the pitfalls of coastal development which have shown up in East and West coastal regions.

coastal zone industry for the simple reason that no hunter and game industry can expect to survive in the coming decades. With greater technological advances producing economically feasible methods of raising seafood, the fisheries industry can become a greater part of the marine resources spectrum.

There are many industries which support marine resource development which should not be overlooked. These include many Texas-based industries which have their marine resources impacts in other geographical areas. Geophysical surveying, instrumentation, ship building and repairs, pipeline laying, insurance, fabrication of offshore structures and offshore drilling are examples of major contributors to the marine resources industries in Texas.

Texas marine industry is quite versatile in its make-up and in its patterns of service. As contrasted with the large oil companies with a capability for carrying out a great deal of their own research and development, there are many small companies which could receive assistance for technological development. However, there is a strong industrial base on which the future in marine resources can be built. There is a sufficiently large marine resources investment in Texas that one should look first at the market which already exists—in transportation, commerce, recreation, oil and gas, ocean engineering, ship building, fabrication and fishing.

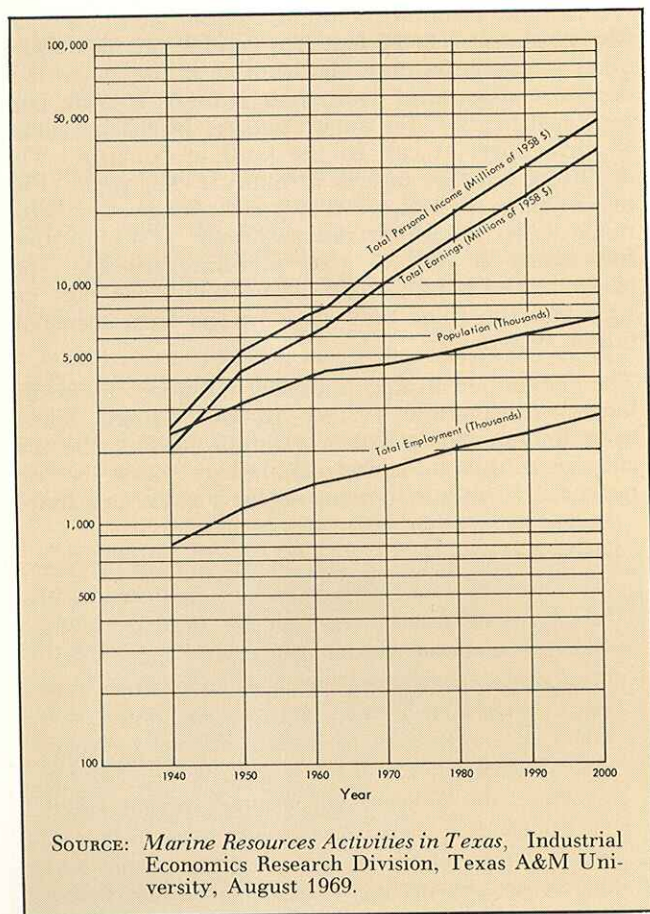


FIGURE 1 Actual and Projected Growth Trends for the Study Area

WHAT ARE THE CURRENT NEEDS OF INDUSTRY THAT CAN BE SERVED BY THE SEA GRANT PROGRAM?

The needs seen by industry to assist them in meeting the challenges of marine resource development depend in part upon whether the industry is large or small. Even the large oil industry with its dynamic attention to technological problems offshore sees need for help.

Texas offshore Federal lease history from 1954-1968 is presented in Table 1. Notable changes reflected in the table are that acreage leased in 1968 more than doubled the cumulative total for the previous years and lease value appreciated at an even greater rate.

It is estimated that between now and 1985, the major new reserves of petroleum will include 25 billion barrels in the continental shelf offshore. There is currently no production in depths greater than 340 feet of water, yet discoveries exist in depths up to 1200 feet off California. In water depths greater than 600 feet or in certain isolated instances, it is possible that production operations will need to be carried on below the surface of the sea. Although some 100 underwater completions have been made to date, emphasis is needed on reliable maintenance techniques operable beyond practical limits of divers.

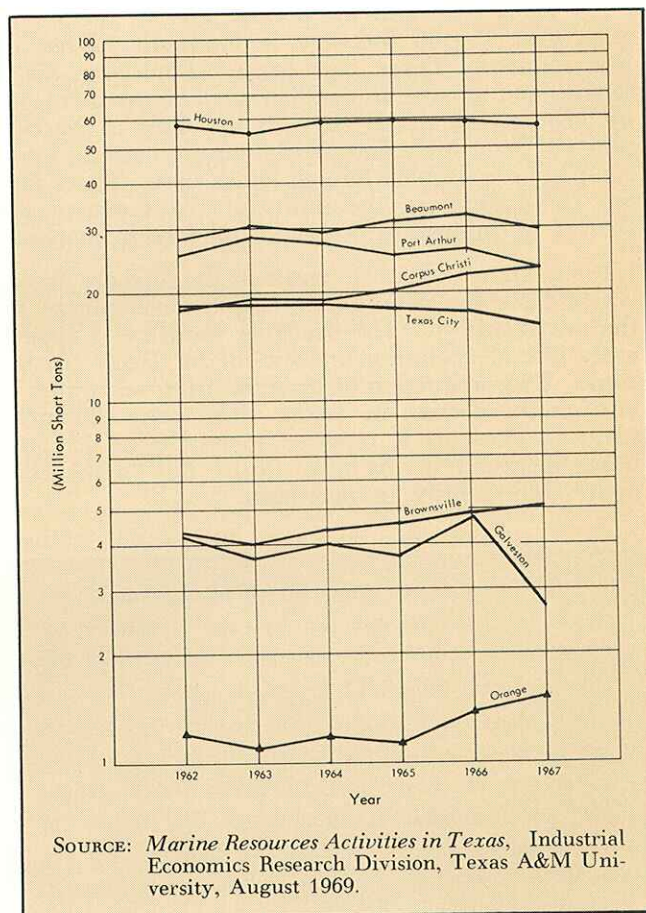


FIGURE 2 Comparative Trends in Waterborne Commerce at Major Ports in Texas

Table 1
TEXAS OFFSHORE FEDERAL LEASE HISTORY

Lease Year	Acres Leased (Thousands)	Dollar Value (Millions)	Number of Leases
1954	67.1	\$ 23.4	19
1955	149.8	8.4	27
1960	240.5	35.7	48
1962	28.8	0.6	10
1968	584.6	593.9	110
TOTAL	1,070.8	\$662.0	214

SOURCE: 1954-62 data from *Petroleum Engineer*, January, 1969, pp. 55 and 1968 data from *Offshore*, June 1968, p. 17.

Offshore oil fields must be larger than on-shore oil fields to be economically productive with present technology. About one-half of oil reserves occur in areas composing about five percent of the oil fields. These are the ones that are now commercially economically productive offshore. Since only the very largest fields can now be economically produced, there is a challenge in developing technology to improve efficiency and reduce cost so that the other 95% of known fields can be developed offshore on other than a marginal basis.

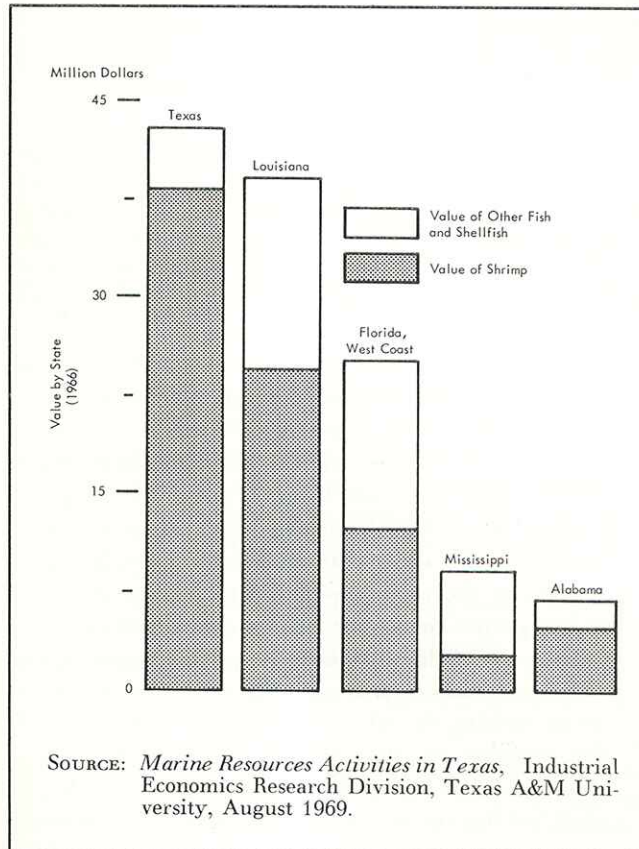


FIGURE 3 Value of Catch by Gulf

The overall scientific and economic needs of the oil and gas industry include a greater knowledge of the ocean environment, better instrumentation systems, hardware for sub-surface development, synoptic measurements, positioning at sea and the design and construction of offshore structures. Research and development must continue to provide design information for structures in deeper water.

The fabrication of offshore structures has not yet been brought to a systems-like concept with each structure utilizing modular components to fit the particular problem. There is a future in major offshore structural systems, both surface and underwater systems, manned or un-manned. Safety factors will probably demand that drilling continue from the surface of the water in most instances, at least for the near future. Offshore structures and production systems some day may be handled as component entities much like the space program systems.

The need for improved environmental data and environmental forecasting is an ever-present problem, not only for offshore oil and gas operations, but for virtually every aspect of marine resource and coastal development. Synoptic data gathering and the continuing analysis of available environmental data are often cited as critical needs. The use of environmental data in the planning and development of marinas, harbors and ship channels was suggested as being required to obtain more effective use of coastal areas. Information on currents, both lateral and perpendicular to the shore, and sediment movement, which is necessary for successful design, is not available for many locations. Another need that was identified is the lack of good design parameters for bulkheads for beach and coastal land development.

Planning is another area which needs upgrading and attention. Industry has a need to know planning efforts across a broad front in order to assess their own developments. Technological forecasting

Although industry is self sufficient in developing technology for most areas of marine resources, it recognizes the possibility for assistance in developing certain aspects of technology related to marine resources, such as structures and techniques for oil production operations in water depths greater than 600 feet; a systems approach to the design and fabrication of offshore structures; better instrumentation systems; engineering design for bulkheads; marina development parameters; and facilities for testing marine hardware. The interests of industry cover the broadest spectrum of marine related activities, including such things as fabrication of hardware for marine development in other places. There is a general consensus that tools and hardware to work in the marine environment have high priority but there is not unanimity on how deeply the universities or the Sea Grant Program should get into this development.

is a particular long-range planning activity that would fill a current need. In this respect, importance was directed toward such decisions as those to build bridges with limited clearance heights across water channels, to dredge channels to a new depth, width, or location, or to forecast a particular new technological device or instrument that could change technological systems.

Planning needs also include the need for collection and analysis of environmental data in order that the interaction of new parameters can be correctly understood. It also includes the planning of improved design in areas where coastal development is needed. The maintenance and efficiency of boat handling, for instance, might be improved by better design of marinas to take into account all kinds of environmental factors as well as human factors.

Overall, there is an expressed need to foresee the total socio-economic development for the State of Texas, including such elements as demands for transportation and port outlets, recreation facilities, food and mineral resources so that good planning studies can be undertaken and the relative importance of marine resources can be compared to each other and to all other elements of the state's economy.

Throughout the total discussion of the specific needs related to the development of marine resources, two threads appeared again and again. One related to communication and exchange of information; the other related to manpower.

The need for improved communication seems to cover all aspects of the marine resources development question; better communication from university to industry as well as better communication from industry to university. Many participants in the discussions commented that a principal benefit from the meeting was an opportunity to learn about programs of the state government, the federal government and the universities. It is equally clear, however, that much is taking place within industry

There is a great need for more and better communications about marine resources. This need seems to cover every portion of the spectrum—existing resource developments; activities of industry; research and educational programs; federal programs in progress or planned; environmental data available; manpower needs; state agency involvement and responsibilities; problems faced by resource developers; public understanding—to name some of the specific areas that were identified. Although consensus exists on the need for more and better communication, consensus vanishes on the question of how to achieve better communication. Agreement does exist, however, on the Sea Grant program playing a key role in stimulating the development of communication and techniques for improving the situation.

that ought to be known by the university and government people. Another facet of the communication question was a recognition that action on the part of the state government involved an understanding of the problems of marine resources by the people who lived in Texas away from the coast.

There is a general need to inform the citizens of every region of the State about the marine resource opportunities for Texas. Texas has a large population oriented away from the coast, which does not ordinarily think of coastal problems as having high importance. A program to bring an awareness of this subject to all the state is badly needed.

In the area of facilities, one need received considerable discussion. This is the stated need for a model test facility to accommodate the offshore industry of the Gulf of Mexico region. Another aspect of this same problem was expressed as a need for an instrument test range.

Statements relative to manpower needs also covered a wide range—from special training for sea-going laborers, to graduate oceanographers and ocean engineers.

Industry would like to see more graduates from universities with a knowledge about the marine environment. The supply of professional oceanographers is not an issue. What is needed are courses which give all types of graduates an appreciation for the value of marine resources and the problems which industry will face in developing the field.

There is an expressed need, however, for a graduate known as an ocean engineer. Without arguing the merits of curricula requirements for such a program, industry seems to feel the same need for the ocean engineer as it has felt for the space engineer or the petroleum engineer. If such a graduate were available, there seems to be little doubt that he would fill a need.

Training and educational programs are not sufficient for the marine resources job ahead of us. The concern expressed was not for oceanographers and other graduate specialists, as much as for educational programs to provide familiarity with the ocean environment and with ocean problems. Nevertheless, the concern did cover a wide spectrum of needs, including general courses for the average bachelors graduate in any field; programs in ocean engineering; business forecasters and technological planners; and special training for laborers who go to work at sea. The consensus was that education and training are a primary role of universities and the Sea Grant Program, but that the need to be met would require other than traditional approaches.

HOW CAN ADVICE AND SUPPORT TO THE SEA GRANT PROGRAM FROM INDUSTRY BE BEST ACHIEVED?

The group was interested in learning that Sea Grant funds might be available to industry and that matching arrangements could be made with university sea grant programs. Some concern was expressed that universities go too far in programs of a "proprietary" type. Nevertheless, there were a number of possible cooperative activities discussed. For example, most of the industry representatives spoke with enthusiasm about potential industrial cooperation in a model testing facility.

In some instances, there appears to be data available to universities from industrial sources, and there was a feeling expressed that the Sea Grant Program could make use of much environmental data now available from industry. In this and other discussions, it was suggested that various engineering and professional organizations with chapters in Texas provide a good source of industry information for the Sea Grant Program. It was specifically suggested that the Sea Grant Office make contact with the Offshore Technology Conference.

An Industrial Advisory Committee to the Sea Grant Program was also suggested as a working mechanism to obtain input from industry. Some felt, however, that an informal advising system would work much better.

With this area of discussion, it was apparent that industry is only partly aware of the potential of the Sea Grant Program. It is clear that industry is willing to assist wherever possible. It is also clear that advising mechanisms will need to be worked out for each area of need.

Industry is anxious to advise and is interested in cooperative ventures where specific details can be worked out. Mechanisms to promote and advance industry-university cooperation are needed. The Sea Grant Program can play a key role in this area. An Advisory Board or other continuing mechanism for relationships between the Sea Grant Program and industry was suggested. Possible cooperative projects include an industry supported test facility, synoptic environmental data gatherings, analysis of environmental data, and information exchange programs. There was consensus that cooperation could not be advanced in abstract terms, but needed to focus on specific devices.

WHAT ACTIONS BY THE STATE OF TEXAS WOULD BE MOST HELPFUL TO INDUSTRY FOR THE DEVELOPMENT OF MARINE RESOURCES?

A general view expressed was to the effect that the State had not deterred development of marine industry. There was a companion view expressed, however, that in some areas the State needed to be more dynamic in its approach and action.

Much could be done by the state through such programs as development of coastal parks, beach improvements and patrol, revision of fishing regulations, improved navigation facilities for small craft, and legislation to encourage sensible investment in coastal real estate. A specific source of funds should be identified by the State for development of recreation and tourism. Currently the State spends only \$300,000 a year for tourism promotion.

The State should institute means by which tidal lands and estuaries can be leased for commercial mariculture. With greater technological advances and economically feasible methods of "raising" seafood, the fisheries industry can become a more important industry to the State.

Long-range planning by governmental agencies is imperative for good coastal zone use. The State needs to encourage multiple uses of the coastal zone resources. It should continue to stress pollution control by developing stringent controls, applying them equally, and enforcing them. Improved federal-state partnerships, a mechanism for advice to the Governor's Office from industry, and an early look at things needed to be done by the Legislature before the four-year moratorium runs out, are also needed. The State should move to more fully develop recreation and tourism and to provide planning for creating resources for the coastal zone, such as fresh water supplies. Specific suggestions for State action include: a cooperatively-run freezer network along the Texas coast, for handling sport fish; revised Legislation on sport fishing laws; aquaculture leasing authorizations; control of beaches; recreation boating regulations; hurricane proofing of key coastal areas; and architectural designs for coastal real estate development.

Among items mentioned for immediate state attention were: development of codes and standards and policing of public beaches and facilities. The primary thrust of the discussion seemed to be that the State had to take the lead before local governments and private developers would fall in line.

There was also a recognition that the State of Texas would have to take the lead in planning for and providing many of the services needed to develop the coastal marine resources, i.e. fresh water, access to beaches, beach patrols and pollution regulation. At the same time, all expressed the view that State regulation should be kept to a minimum.

The State should exercise leadership for marine resources development in several ways—long range planning; coastal zoning; pollution control; beach patrols and control of quality of beaches; aquaculture leasing authorizations; architectural guidelines for coastal development; and the development of state recreational areas. There was consensus that the State's recent steps relative to a coastal zone study and declaring a moratorium on leasing were in the right direction, but that the State should take a more active role in establishing the principle that coastal zone equality should be maintained and improved.

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