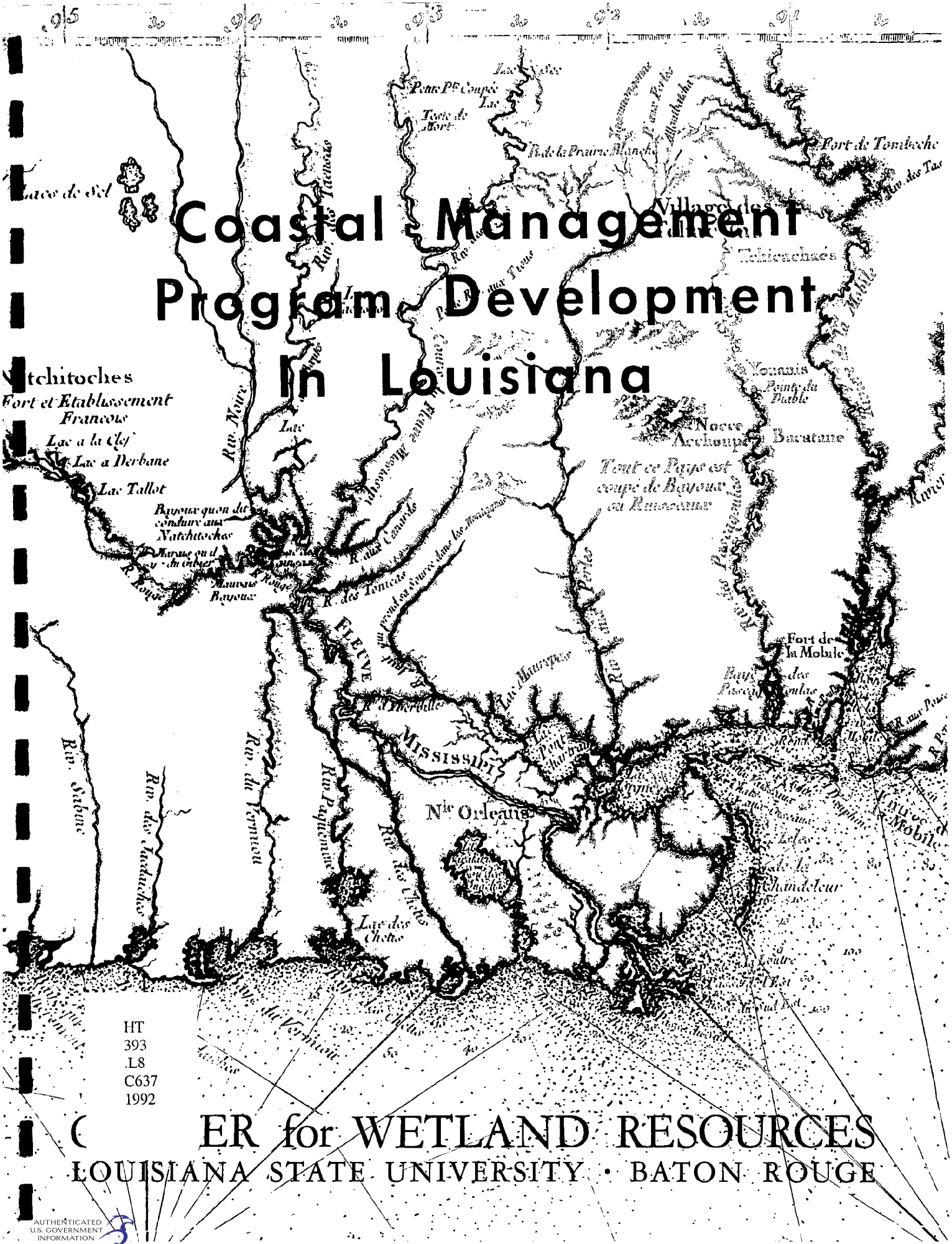

Coastal Management Program Development In Louisiana

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CENTER for WETLAND RESOURCES
LOUISIANA STATE UNIVERSITY • BATON ROUGE

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U.S. GOVERNMENT
INFORMATION
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COASTAL MANAGEMENT PROGRAM DEVELOPMENT

IN LOUISIANA (UNDER P.L. 92-583)

Submitted to

OFFICE OF STATE PLANNING
(Primary Grantor NOAA - OCZM)

by

CENTER FOR WETLAND RESOURCES
LOUISIANA STATE UNIVERSITY

HT393 .L3

Jack R. Van Lopik
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Board of Supervisors
of
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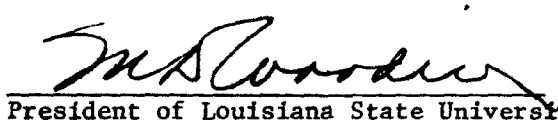
and
Agricultural and Mechanical College
by



President of Louisiana State University
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PROGRAM ORGANIZATION

Proper management of Louisiana's richly endowed wetland resources is a vital concern of the state and nation. Planning is urgently required to cope with conflicts which are occurring at an accelerated rate between conservation practices and commercial encroachment. Planning for multiple use of wetlands requires a system for maintaining a balance between expansion and resource preservation. To accomplish this goal requires a cooperative approach involving state agencies, private industry and universities. This document proposes a coastal zone management program utilizing the capabilities of the Office of State Planning, the Louisiana Wild Life and Fisheries Commission, the Louisiana State University, the Louisiana Sea Grant Program, and the Louisiana Coastal Commission. Utilization of other capabilities is planned as the program develops.

Organization for the Louisiana Coastal Zone Management program is shown in Figure 1. The program is headed by a Study Management Team which is comprised of four individuals. The Office of State Planning (OSP), the Louisiana Wild Life and Fisheries Commission (LWLFC), the Louisiana Sea Grant Program (LSGP), and the Louisiana Coastal Commission (LCC) are each represented by one member of the team. The Project Coordinator is assigned from the Office of State Planning who has the operational responsibility (Task V) for the entire

Figure 1: PROGRAM ORGANIZATION

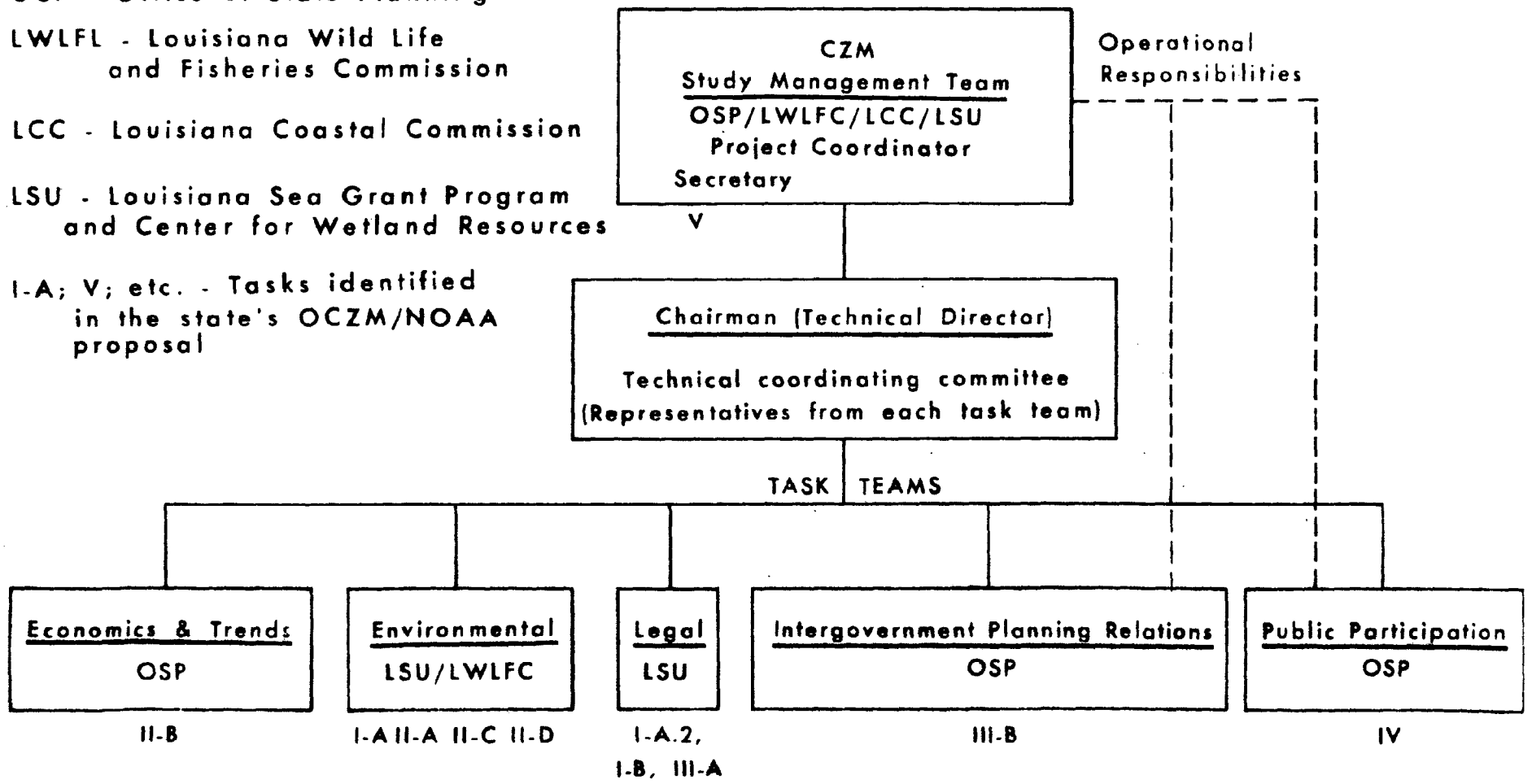
OSP - Office of State Planning

LWLFL - Louisiana Wild Life and Fisheries Commission

LCC - Louisiana Coastal Commission

LSU - Louisiana Sea Grant Program and Center for Wetland Resources

I-A; V; etc. - Tasks identified in the state's OCZM/NOAA proposal



program. This includes overview responsibility for public participation, involvement in intergovernmental planning operations and the conducting of workshops. He reports directly to the CZM Study Management Team and is responsible for coordinating contractual matters with the federal government (National Oceanographic and Atmospheric Administration (NOAA), etc.).

The remainder of the program organization includes representatives from the individual task teams. Five discrete task areas are identified as shown in Figure 1 from which one or more representatives are selected to form the technical coordinating committee. A chairman (Technical Director) is elected from this committee and has the overall technical responsibility for the program.

The organization chart shows both the management structure and the task assignments. The specific subtasks as proposed by the various agencies are identified by Roman numeral/letter designators (I-A, II-B, III-C, etc.). Figure 1 depicts the areas of task and subtask responsibility and correlates with the proposal text. The OSP assumes responsibility for completion of SUBTASK II-B, Economics and Trends; SUBTASK III-B, Intergovernment Planning Relations; and TASK IV, Public Participation. SUBTASK ACTIVITY I-A.2, and SUBTASKS I-B and III-A are assigned the LSU Sea Grant Legal Program. The environmental tasks, including SUBTASKS I-A, II-A, II-C, and II-D, are the cooperative responsibility of the LSU Center for Wetland Resources and the Louisiana Wild Life and Fisheries Commission.

It is recognized that substantial personnel expertise and research facilities exist outside the confines of the Louisiana Sea Grant program at LSU and the LWLFC. It is the intent that the maximum utilization of applicable personnel and facilities be made during the development of the

Coastal Zone Mangement program. Therefore, during Phase I of the program (Fig. 2) a critical analysis of the personnel and facilities of Burk and Associates, Inc., University of Southwestern Louisiana (USL), local academic institutions, and other research facilities and capabilities will be made. The particular projects which make up the overall program will be carefully defined at the same time. Subcontractor selection and optimum matching can then be accomplished to assure that the best personnel and facilities are being used for each project. The overall scheduling and coordination of the environmental and legal activities will be accomplished under the direction of Dr. Wm. G. McIntire, Associate Director of the Center for Wetland Resources.

Following the Phase I definition of effort and subcontractor selection, emphasis will shift to directing the subcontractor activity. Data collection and analysis will, however, begin immediately and extend throughout the initial nine-month effort.

A copy of the Time Schedule and Performance By Task (Fig. 3) is reproduced to show the interrelationships of the major tasks and coherence of the entire program over its three year duration.

Two proposals are included in this submission: 1) Environmental Aspects of Coastal Zone Management Program Development in Louisiana (Figure 4 defines the tasks and subtasks which will be performed by this Task Team); and 2) Legal/Government Aspects of Coastal Zone Management Program Development in Louisiana.

A BUDGET SUMMARY of the two Task Team studies is included in this section. A detailed budget for both Task Team efforts is included at the end of the sections describing respective Task Team studies.

Figure 2: PHASE CHART

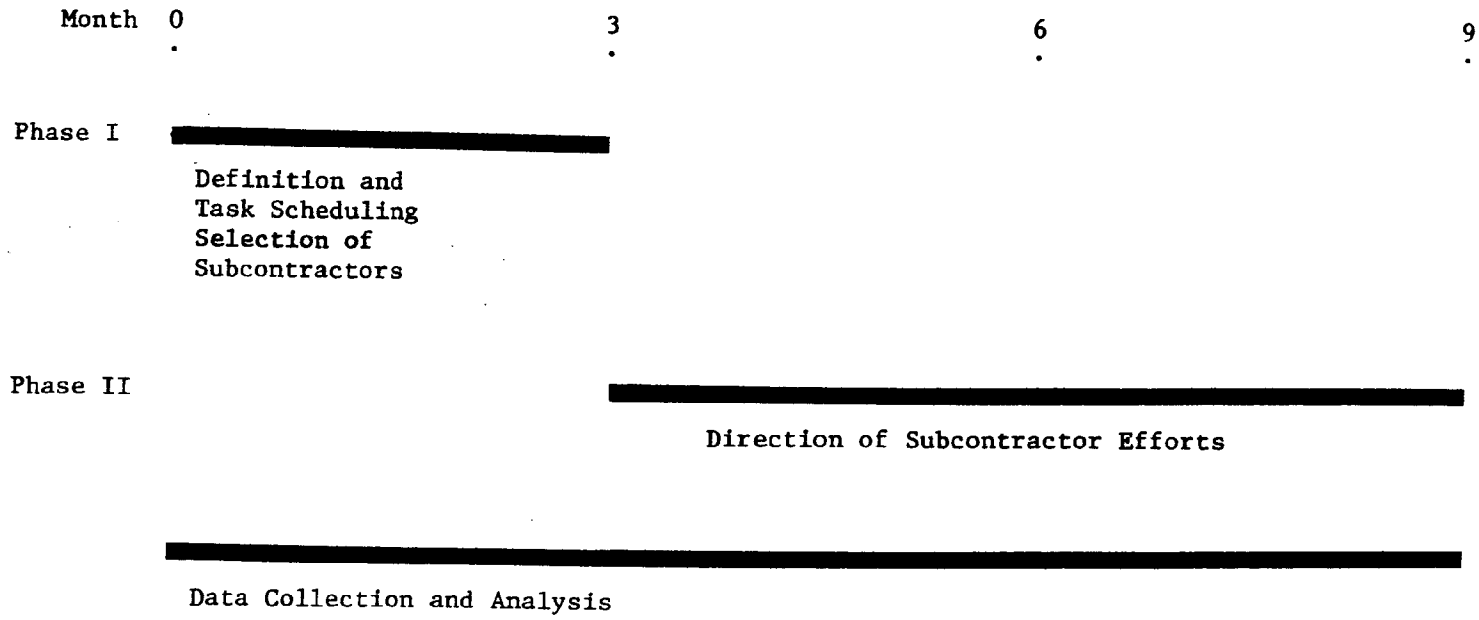


Figure 3: TIME SCHEDULE OF PERFORMANCE BY TASK

TASKS

I. Structuring Program
   A. Defining the Coastal Zone
   B. Study of legal authority
   C. Organization Recommendations

II. Development of Evaluation Procedures
   A. Capacity to inventory, monitor, and analyze ecological indicators
   B. Predictive capacity for resource demand and service levels
   C. Designation of areas of concern
   D. Develop impact assessment procedure

III. Governmental Coordination
   A. Identify governmental agencies and coordination roles
   B. Identify planning activities of government affecting coastal zone and coordination roles
   C. Identify federal land and coordination roles

IV. Public Participation
   A. Conduct hearings, conferences, and seminars
   B. Develop public participation and education techniques

V. Administration
   A. Grant and contract administration
   B. Technical assistance of other groups

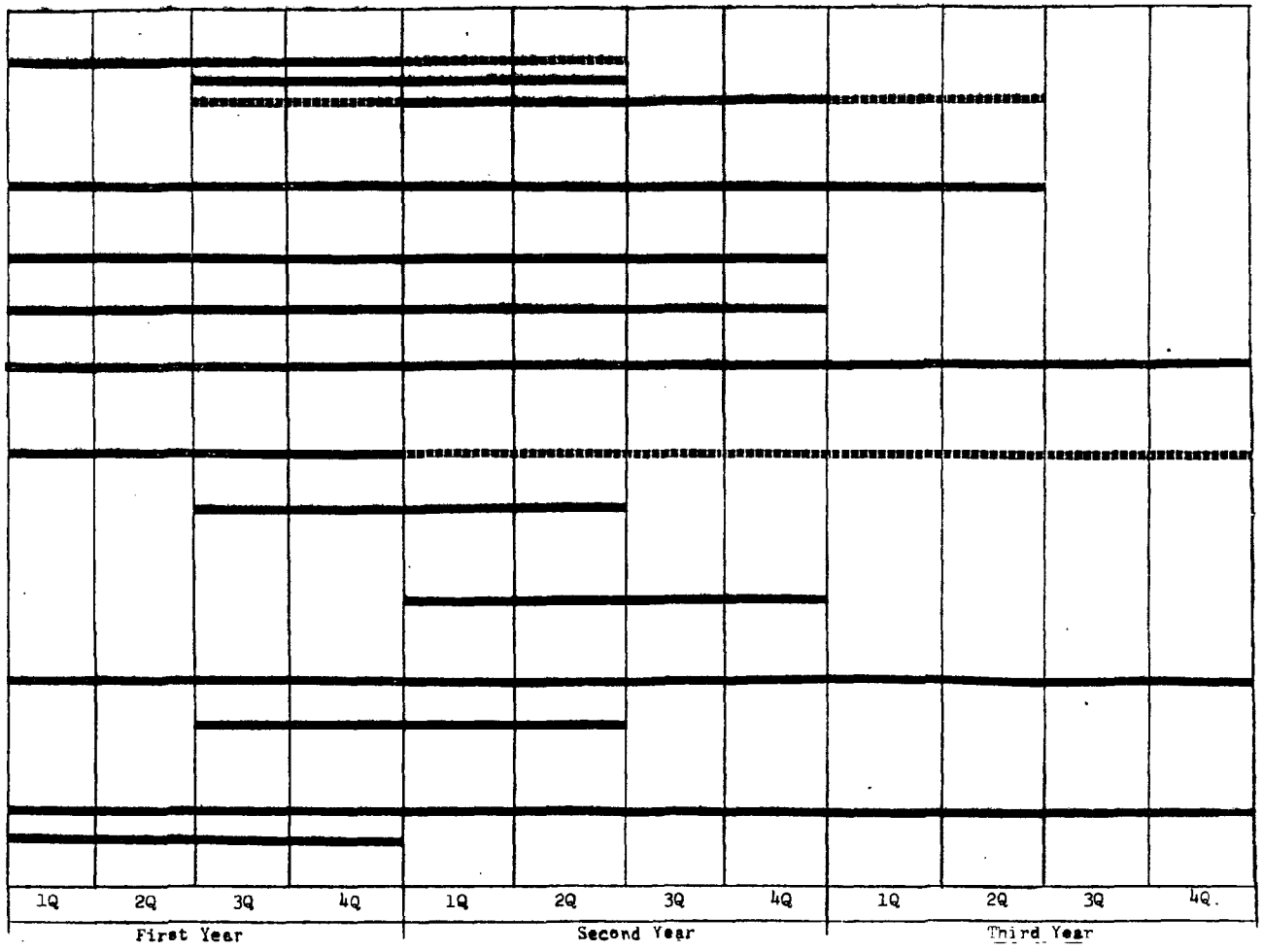
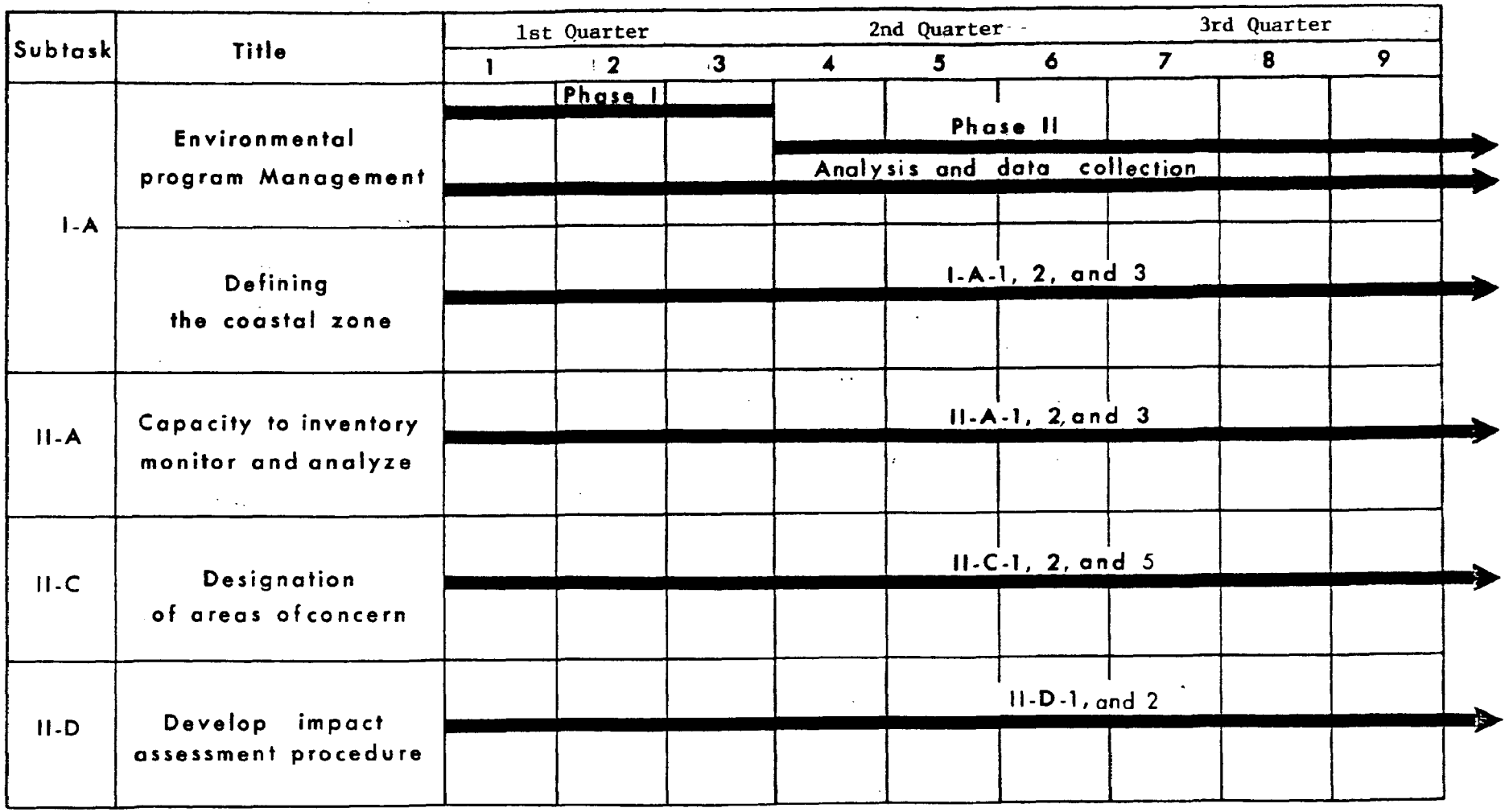


Figure 4: INITIAL ENVIRONMENTAL TASK TEAM SCHEDULE



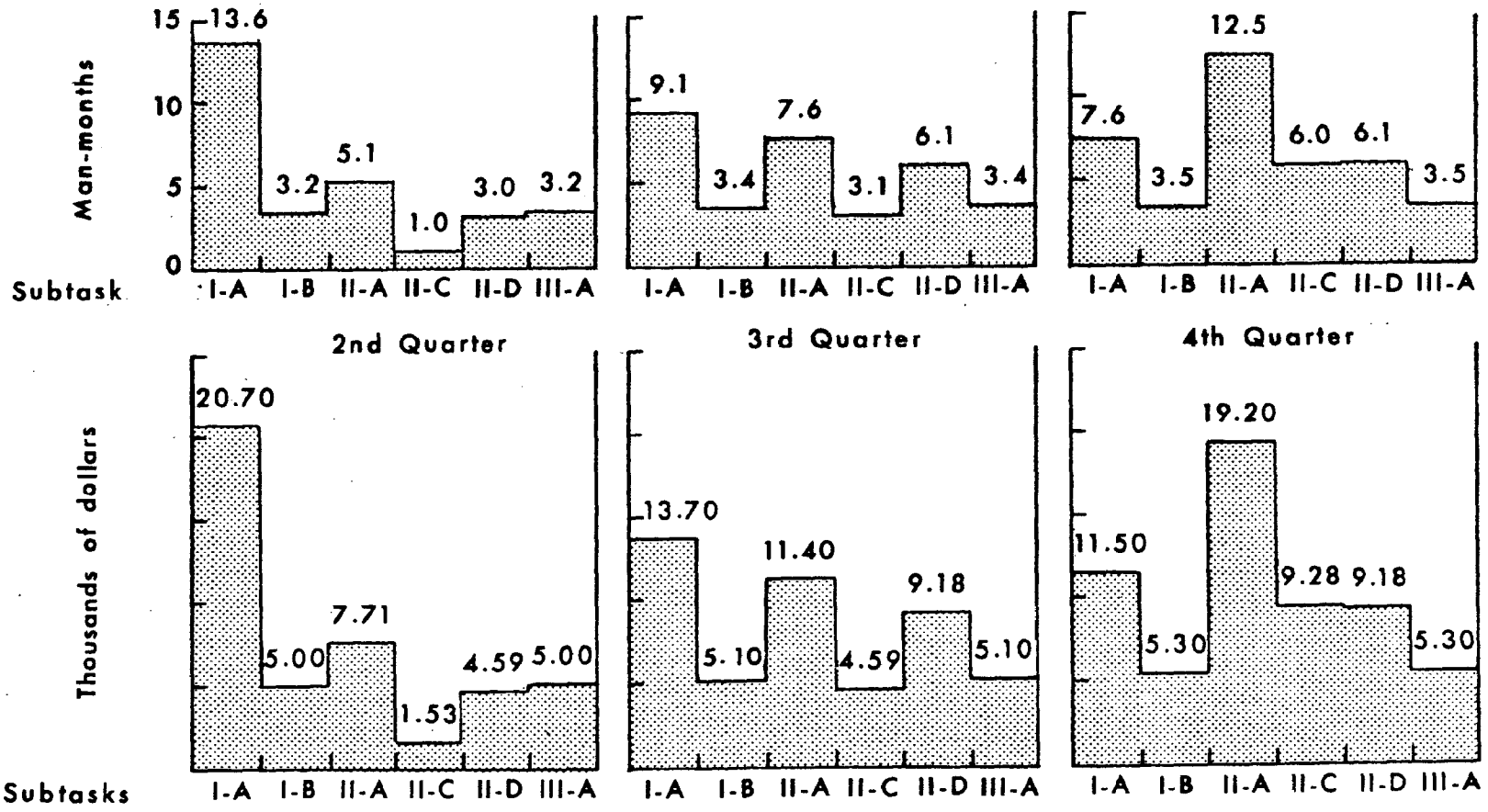
BUDGET SUMMARY

Environmental and Legal/Governmental Aspects of

Coastal Management Development

	Environmental	Legal/ Governmental
Salaries and Wages	$ 84,760	$ 21,107
Indirect Costs @ 22%	18,647	4,644
Employee Benefits @ 13.7%	11,612	2,892
Travel	3,500	1,500
Supplies and Expenses	3,000	1,700
Task Totals	$121,519	$ 31,843
Total Program Budget	$153,362	

Figure 4a: TASK MAN POWER LOADING AND DOLLARS



MM(Q)	29.1	32.7	39.2
Dollars(Q)	44.53	49.07	59.76

Total MM = 101 Total Dollars = 153.362

ENVIRONMENTAL ASPECTS OF COASTAL MANAGEMENT PROGRAM DEVELOPMENT

TASK I: STRUCTURING PROGRAM

INTRODUCTION

It is the particular charge of TASK I to structure the coastal management program. This includes the determination of the biophysical (scientific) and legal boundaries of the Coastal Zone, the legal authority to manage it and the optimum organization of the various agencies involved. A wide variety of biophysical parameters and boundary delimitating considerations will be correlated with legal issues, federal, state and local entities and regional governmental processes to establish definition(s) for the limit of the Coastal Zone. The particular efforts necessary to accomplish this are divided into the three subtasks and listed below:

SUBTASK I-A. Study alternative approaches for defining the coastal zone best suited to the planning and management needs of coastal Louisiana.

SUBTASK I-B. Study, develop, and implement legal authority necessary to meet the requirements of Section 306 (d) and (e) of the Coastal Zone Management Act (CZMA).

SUBTASK I-C. Study and recommend the best procedures in conjunction with I-A and I-B above and with TASKS II and III, for organizing the state, regional and local governmental agencies to implement a coastal management program.

All three subtasks are integral parts of the structuring program. The LSU Sea Grant Legal Program will accomplish part of SUBTASK ACTIVITY I-A.2 and the entire SUBTASKS I-B and I-C (Fig. 1). The Environmental Task Team will accomplish the requirements structured under SUBTASK I-A.

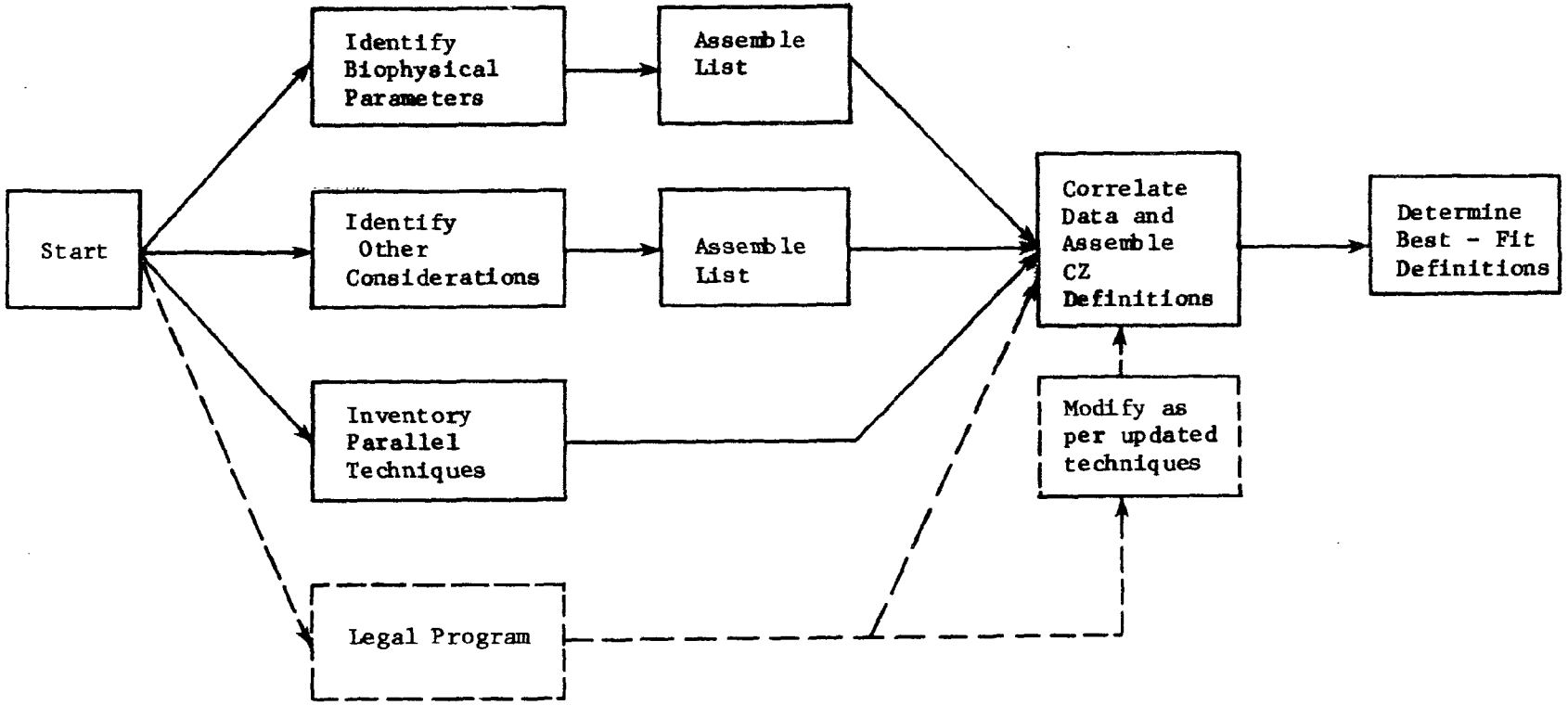
Various biophysical parameters will be assessed for their feasibility to be used as coastal zone delineators. A best-fit coastal zone definition will be derived by correlating the biophysical delineations with other pertinent considerations. The detailed factors involved within SUBTASK I-A are outlined below and shown in Figure 5.

SUBTASK I-A: DEFINING THE COASTAL ZONE - SPECIFIC ACTIVITIES

1. All the biophysical parameters which are important indicators of coastal environments will be identified and considered for their potential use as boundary determinants. Among these are such factors as:

- Normal high tide line,
- Extent of tidal influence,
- Extent of hurricane or stormtide flooding,
- Extent of landward limit of halophytic vegetation,
- Identification of the coastal/non-coastal transition area on the basis of landforms and soil types,
- Extent of marine influence in the respective coastal hydrologic units,
- Extent of upstream marine influence on water quality during low and extreme low river stages,
- Establishment of seaward and lateral boundaries, and
- A detailed search of appropriate literature will be combined with previously used determinants and expert opinion to develop a comprehensive list of biophysical parameters. None will be eliminated during this phase because their possible interrelationships and later correlations may show dependencies important

Figure 5. SUBTASK I-A - DEFINING THE COASTAL ZONE



to the overall definition. This list will be assembled during the first six months of the program.

- A search will be made to determine how Federal agencies and other states have used biophysical parameters to define boundaries. This will be coordinated with legal aspects developed by the LSU Sea Grant Legal Program.
- Preparation of maps and other forms of visual display will be developed as the study progresses.

2. Concurrently, other considerations in the delimitation of the landward limit of the coastal zone will be identified. Among these are:

- Physical considerations such as highways, waterways, etc.,
- Governmental considerations including boundaries, wards and special districts,
- Designation of specific streams and the extent to which floodplains extend upstream,
- The attitudes of state leaders and legislators to see whether each kind of coastal zone is politically feasible,
- Assess the degree to which man-made and natural waterway coincides with biophysical parameters (particularly, the Intracoastal Canal and other dredged canals which extend the marine influence into areas distant from coastal influence),
- Assess the impact of streams and their near-coastal floodplains on delineating the coastal zone, and
- Survey potential impacts on the coastal zone resulting from areas significantly removed with a view toward including in the coastal

zone definition distant areas whose impact on the coast may be significant (this reflects a concept put forth by the Louisiana Advisory Commission on Coastal and Marine Resources).

A detailed examination of available maps (parish, state, regional), hydrological charts, topographical and geological maps, high-altitude aircraft and satellite and photography/imagery will be performed to establish possibly acceptable boundaries. Interviews and consultations with state leaders and legislators will also be conducted in light of the political feasibility of the coastal zone boundaries that emerge. All considerations will be listed with no attempt to limit their scope. This assemblage will also be constructed during the first six months of the program, in preparation for a comparison analysis (Fig. 5).

3. An inventory will be made of the processes used by federal agencies and other state governments (adjacent and distant) to incorporate biophysical parameters and other considerations. This effort will be closely coordinated with the legal aspects developed by the Sea Grant Legal Program. The findings of I-A.1, I-A.2, and I-A.3 will provide the data to define a variety of coastal zone boundaries. The various biophysical parameters will be analyzed to determine their importance to the definition as well as their interrelationship, correlation and interdependence. The other considerations will be likewise analyzed, and finally the interrelations between the factors in the preceding three sections will be correlated to determine the importance of all factors. Interrelated factors such as the degree to which a natural or man-made object, like a stream or a highway, would correlate with a biophysical parameter will be ascertained. The impact on the coastal zone caused by processes distantly

removed will be determined to assure that all significant impact areas are included within the coastal zone definition. All parameters and considerations which were identified will be combined, massaged, correlated and weighed to provide several discrete coastal zone definitions which can be subjected to further feasibility analysis.

A complete feasibility analysis will be performed once the potentially workable coastal zones are defined. Each definition's feasibility will be determined as to its usefulness with respect to the following criteria:

- o Capacity to manage any type of zone,
- o Capacity to determine the degree of impact on areas remote from the coastal waters,
- o Usefulness as a definition for planning the coastal zone management system, and
- o Usefulness as a definition for actual coastal zone management jurisdiction.

The result will be the adoption of one or more definitions of the Coastal Zone best suited to the planning and management needs of coastal Louisiana. This effort will be completed by the end of the first year, but will be continued on a low level basis to assure that necessary modifications are accomplished as the definition(s) are exposed to actual use.

TASK II: UPGRADING THE DECISION-MAKING PROCESS

INTRODUCTION

Goals to be achieved under TASK II include upgrading the decision making process by:

- Assembling data on ecological indicators,
- Assessing available data for quality, resolution and coverage,
- Establishing evaluative procedures for scientific effects, applicable uses and economic assessment,
- Developing techniques for area selection and management principles,
- Establishing principles for area priority uses, and
- Assembling a skilled staff capable of developing principles for guiding growth, conservation and assessment of cumulative impact in the coastal zone.

These goals will be accomplished by the successful completion of the four subtasks listed below:

SUBTASK II-A. Develop the capacity to inventory, monitor and analyze key ecological indicators (biological, physical, chemical and geological) and to detect ecological change and predict the effect of those changes.

SUBTASK II-B. Develop the capacity to predict current and future resource use demands and trends, analyze service and facilities to meet demands, recognize capability of resource to sustain certain uses and to state as clearly as possible human needs and aspirations for coastal resource use.

SUBTASK II-C. Develop criteria for the selection and procedures for depiction of geographic areas of particular concern in the Coastal Zone, and develop specific management principles and priority uses for each geographic area of particular concern.

SUBTASK II-D. Utilize the capabilities developed in II-A, II-B and II-C to develop and standardize techniques for strengthening procedures for assessing impact of proposed individual coastal projects, and develop appropriate and perhaps new procedures for assessing impact on a regional level.

These four subtasks will provide sufficient social, economic and environmental information to the coastal zone decision-making body to allow a proper assessment of the impact of a proposed project or program. They are completely interrelated and must be performed with extremely close liaison between researchers and task teams. Thus, SUBTASKS II-A, II-C and II-D will be conducted by the LSU/LWLFC Environmental Team (Fig. 1), while II-B will be accomplished through the OSP. This organizational structure also provides an excellent opportunity to utilize the capabilities and optimize the contributions from the University of Southwestern Louisiana (USL), Burk and Associates, Inc. and other experts who will be brought to bear on many of the sensitive items within these subtasks. The Office of State Planning is responsible for SUBTASK II-B. Therefore the approach for completion of only SUBTASKS II-A, II-C and II-D are proposed herein.

SUBTASK II-A: CAPACITY TO INVENTORY, MONITOR AND ANALYZE ECOLOGICAL INDICATORS

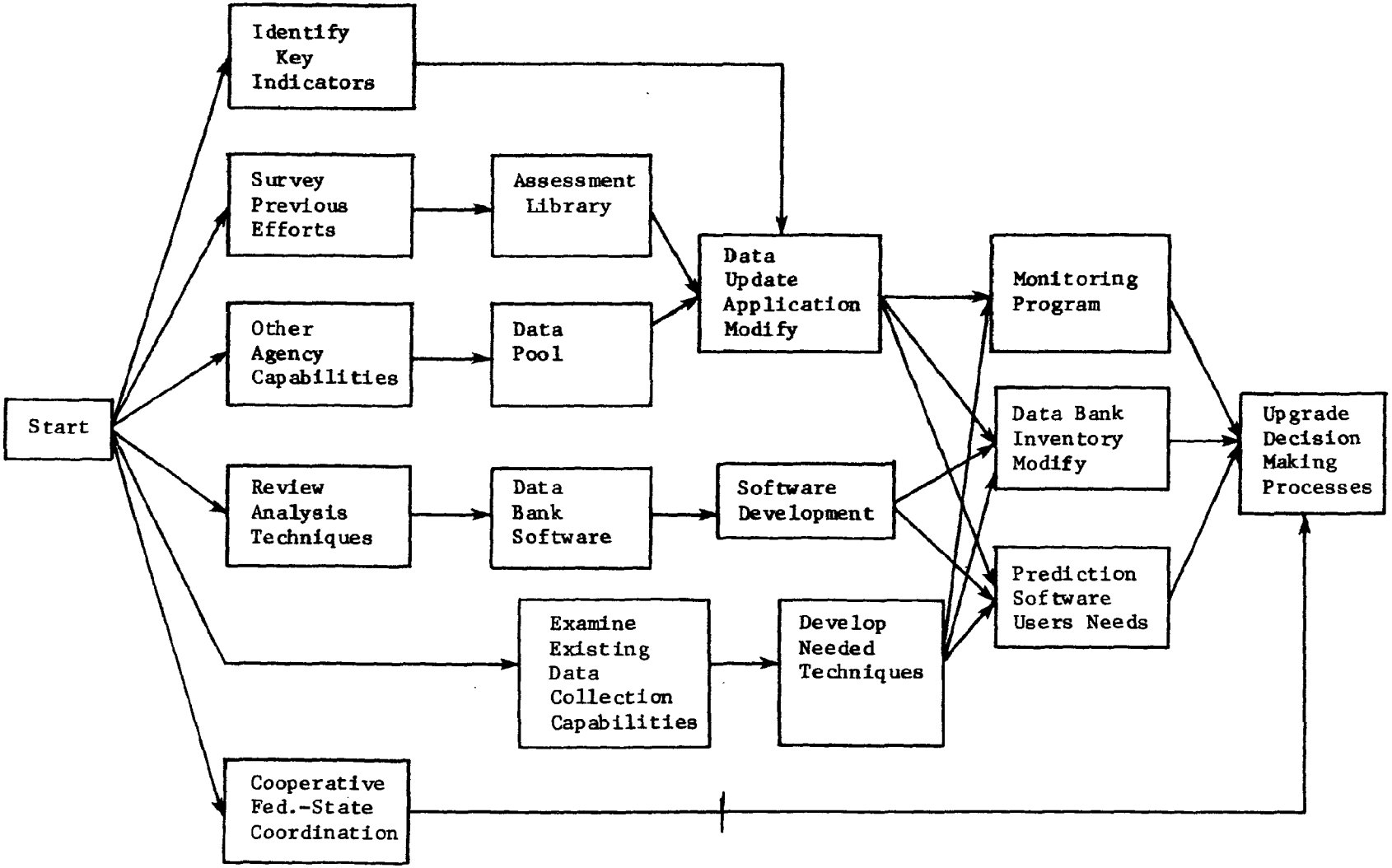
The impact of external forces on the marsh, estuary and nearshore systems and the internal interactions must be understood for proper management and jurisdiction of the Coastal Zone. Assessment of environmental information which is presently available coupled with mathematical analysis techniques for simulating natural conditions provides some measure of predictability in specific areas. Effective design and implementation of field monitoring programs to measure parameter variability under different energy conditions will improve predictive capability. Long term continuous monitoring of significant parameters designed to reveal biological responses in contrasting environments will further enhance prediction. Predictive techniques will greatly upgrade the information base to provide the decision maker a choice of options. Proper execution of the specific efforts outlined below will provide a viable, upgraded body of information on which to base decisions. These are shown in a progressive flow chart in Figure 6.

II-A.1. Identify Indicators

The initial effort will be to identify all key ecological indicators which should be monitored on a regular basis. Indicators which are critical to the measurement and prediction of ecological changes caused by proposed major uses of marsh and estuarine areas (major canals, large scale drainage, fills, dredging, etc.) will be identified. They will include physical, biological, chemical and geological parameters which form the basis for developing a synoptic data program including data collection, handling and development of analysis techniques.

Applicable literature will be studied and indicators evaluated from the standpoint of their importance and ability to be used to assess project

Figure 6: SUBTASK II-A - UPGRADE DECISION MAKING PROCESS



input. Special attention will be paid to frequency, resolution and scale. It is important to compile a complete list which contains only those parameters that are truly indicative of change and are applicable to predictive techniques. This list will be assembled from reports, previous studies and expert opinion and will be evaluated through the efforts outlined below. A study-test area along the Louisiana coast will be selected once the list has been compiled. In cooperation with Louisiana Sea Grant efforts, key indicators will be measured in the study-test area, and an assessment of man's past activities will be made and compared with other assessments (LOOP study, St. Amant dissertation and previous studies conducted by the LWLFC and LSU). Indicator data for the entire coastal zone could then be collected and stored with a high degree of confidence in its use. Assemblage of this list will require the first three months of the program, but indicator evaluation will continue throughout the program.

II-A.2. Survey Previous Efforts - Assessment Library

A survey of available ecological studies will be made to obtain information pertinent to the development of methods for impact assessment. This will serve the dual purpose of bolstering the evaluation of the impact indicators which were chosen and monitored by allowing a collection of historical data, determining their validity, and providing a data base for the development of an impact assessment library. The kind of information stored in the library will be gleaned from completed and prepared projects and would include location, acreage involved, spoil treatment, investment, public controversy, population changes after the project, environmental assessments before, during and after the project's completion, and observations, etc. Data will be completely cross-referenced

by type of activity (e.g. dredging, canalling, leveeing, draining, filling and polluting). It will be continuously updated and maintained to provide the decision-makers case histories (cause and effect) which can be applied to newly proposed coastal projects. It is proposed that this effort start immediately, extend actively throughout the first year, and continue through the entire program on an update and incorporation of new data basis.

II-A.3. Analyze Capabilities of Other Agencies - Data Pool

An analysis of the data collection and handling capabilities of applicable federal, state and regional agencies will be performed to assess the existence of pools of data which could serve the information needs for coastal Louisiana. In cooperation with ongoing projects of the State Planning Office, existing data banks will be evaluated as to their:

- Method of storing key indicator data,
- Compatability of data formats,
- Techniques for allowing ready access,
- Applicability to the needs of the decision makers,
- Utilization of state of the art programming software,
- Ability to search, compare and update, and
- Sensitivity to non-technical users.

One of the results will be the determination of existing capabilities and the emergence of sufficient information to determine the requirements of a centralized data bank. Utilization of existing banks and the feasibility of using the state's central computer system will be investigated. This will facilitate the decision of where the data for the

entire program should be maintained. This is a critical phase as the success of the entire management/jurisdictional planning program rests upon the successful utilization of historical, present and predictive data for proper assessment of proposed project impact. The output should display information sensitive to particular needs that can be used by decision-makers, planners and managers. This phase will commence at the beginning of the program and be carried out during the first year on a full-scale basis. At that time the direction will be determined and the establishment of applicable facilities will be sought.

II-A.4. Develop Analysis Techniques

Coupled closely with the potential data bank are the computational software techniques for analyzing the available data. Appropriate procedures will be developed to match the decision-makers' needs with the data and predicted impact so that options and changes can be rapidly ascertained. Multivariate analysis techniques will be developed to enhance the reliability of the assessed impact while allowing an interface of the output data to maximize interpretation of options. The software developed will have as its underlying objectives the responsibility of:

- Providing data available,
- Interpreting users' needs accurately,
- Interfacing users' needs and data,
- Assessing future impact,
- Outputting for maximum interpretation,
- Providing impact assessment answers, and
- Providing limitations of data reliability.

This development will commence after existing facilities and

techniques have been evaluated and continue as long as it is useful to the decision-making process. It will be initiated at the beginning of the program to provide experience in determining methods for testing the quality of the sample. This will include an analysis of parameter variability under different energy conditions for both short and long-term duration. This activity will begin during the first year and extend through the second and third years when innovative analysis and display techniues for user application will be introduced.

II-A.5. Examine Existing Data Collection Capabilities

A complete survey of applicable data collection and monitoring efforts will be conducted. A log of existing capabilities will be constructed allowing easy reference to historical and present data sources. The capabilities of existing agencies to provide data needs will be determined. This will require the determination of data needs and the capabilities of existing agencies. Data deficiencies will be identified. The feasibility of maintaining a small group of trained personnel to provide short notice response to information requirements and field assessment ("ecological assessment stike force") will be determined. The long-term and short-term data collecting and monitoring requirements will be governed by recognized data deficiencies. This will commence after significant progress has been made in efforts II-A.1 through II-A.4. The effort starts eight months after the beginning of the program, continues actively for six months and then declines during the second year to an advisory function. At that time further testing and data upgrading will occupy the major activities.

II-A.6. Combined Federal-State Program

The potential for a combined federal-state monitoring and inventory program will be investigated and evaluated from an economic and technical standpoint. The intent will be to maximize the usefulness of the data available to the decision-maker while minimizing the expenditures. Predictive capabilities and techniques exchange is especially desirable and full cooperation will be encouraged.

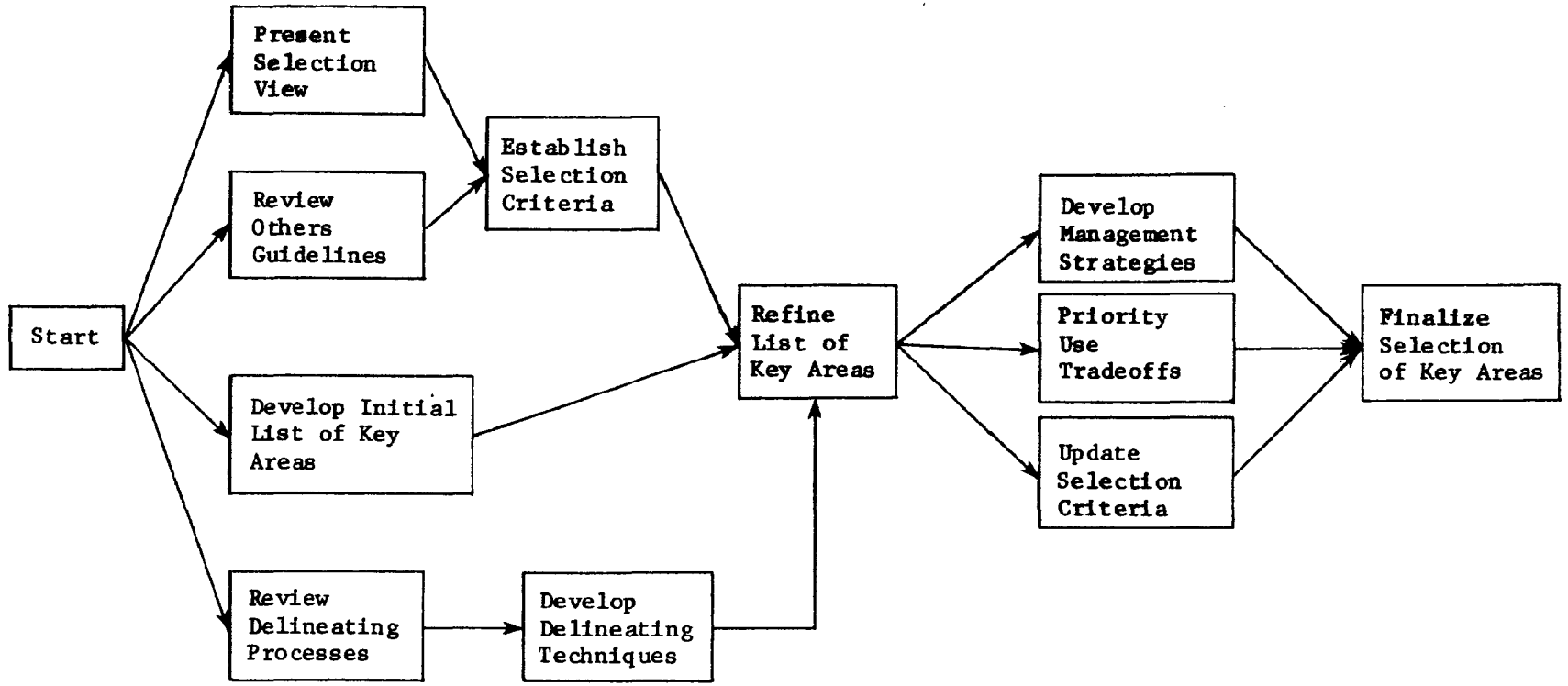
SUBTASK II-B: DEVELOP CAPABILITY TO PREDICT CURRENT AND FUTURE RESOURCE USE DEMAND AND TRENDS

This effort will be conducted entirely through the Office of State Planning with whom close contact will be maintained at all times to insure comprehensive integration of pertinent factors.

SUBTASK II-C: SELECTION OF GEOGRAPHIC AREAS OF PARTICULAR CONCERN

The designation of areas of particular concern is a mechanism useful to the determination of priorities for the management of Louisiana's coastal zone. The selection of these areas is difficult to accomplish due to the diversity and extent of the state's coastal region. A variety of potential criteria exists stretching from the particular concerns of local residents' every day encounters to geological, ecological, archeological, and social development. Historical and cultural enhancement and preservation could also be used to designate areas of particular concern. It is therefore the intent of the efforts under SUBTASK II-C to develop procedures for the selection of key areas, establish specific management principles, and designate use priorities. This will be accomplished through the specific efforts outlined below and shown in Figure 7.

Figure 7: SUBTASK II-C - DEFINE METHODS FOR KEY AREA SELECTION



II-C.1. Present Selection View

A view towards the selection of key areas will be formulated through solicitation of opinion from a wide range of sources (e.g. sports fishermen, commercial fishermen, public officials, scientists, environmentalists, sportsmen, developers, etc.). The uniqueness, vulnerability, and other special characteristics deemed important to the people closely associated with particular areas will be considered while determining whether special management techniques, use limitation or jurisdiction should be considered which differ from coastal Louisiana as a whole. The gathered opinion data will be categorized such that areas of particular concern can be determined and await evaluation in light of other selection criteria. This study will be initialed during the first three months of the program.

While the selection view above is being developed a comprehensive examination of other agencies' guidelines for key area selection will be conducted. Initially, the guidelines of the federal CZM act which lists the categories of areas of particular concern will be organized into a data base. The approaches taken by other states such as Oregon, Washington, Texas, Florida, and Wisconsin will be integrated into the data base. Pertinent historical information from the federal, state and local agencies will be incorporated until the important guidelines are inputted. These data will eventually be used to develop an initial list of key areas of concern. This will be an effort which is also initiated during the first three months of the program.

II-C.2. Develop Initial List

Prior to the emergence of the data from II-C.1 an initial list of

particular areas of concern will be assembled, using previously known criteria. Four particular approaches will be used:

- Select areas in each of three categories:
  - Ecological-geological areas,
  - Archeological-historical-cultural areas, and
  - Development areas.
- Select areas based upon user needs (e.g. would a shrimp fisherman call an area of particular concern?).
- Select areas through expert advice and opinion.
- Select areas which require innovative environmental management.

The results of this endeavor will be the assembly of a variety of areas of particular concern based upon preconceived intuitive criteria. These will be refined later as the selection criteria is updated. This initial list will be developed during the first six months and refined as the program progresses.

II-C.3. Establish Selection Criteria

The results of II-C.1 and some of the factors used in II-C.2 will be combined to generate a comprehensive list of selection criteria. Factors such as rarity of species or habitat, productivity, likelihood of eminent loss, irreplaceability, public awareness, recreation, esthetic and management potential, etc. will be combined with the selection view considerations (Fig. 7). The factors obtained while reviewing other guidelines, and the previously known criteria used to compile the initial list of key areas to generate selection criteria will also be combined. Each criterion will be listed, evaluated, weighed and categorized according to its importance in the area selection process. Correlative trends will be analyzed and

criteria dependence will be ascertained. The results will be the tabulation of a final list of criteria for the selection of key areas of concern. These criteria will then be used to refine the initial list of key areas designated in II-C.2. The establishment of the selection criteria effort will commence six months after the beginning of the program and phase out near the end of the first year.

II-C.4. Develop Techniques for Delineating Areas

A part-time effort will be conducted during the first year of the program which will consist of gathering information on currently used methods for delineating areas of particular concern. All existing techniques will be evaluated and their applicability ascertained in view of the list of key areas previously tabulated. One composite technique will be developed, which matches the special features of the areas selected. More than one technique may be needed so that sufficient flexibility will be incorporated into the development process to allow a family of procedures to fit all selected areas. These processes will be applied to the selected key areas to complete the area delineation.

Once the initial list of key areas has been constructed, the selection criteria has been established and the delineating techniques have been developed, it will be refined and reduced to a workable size list of potential areas of particular concern. Each area will be carefully defined with detailed explanations of why the area of particular concern was chosen. This effort will occupy the first quarter of the second year.

II-C.5. Develop Management Strategies and Priority Uses

Each area will be analyzed separately to determine a management

technique which will best protect or enhance the uniqueness which caused it to be designated an area of particular concern. Priority uses will be carefully considered providing the decision makers with information critical to impact assessment and area usage. Alternate management strategies will be devised based upon the premise that the decision-makers can use viable options necessitated by factors external to the environmental considerations. This effort will be completed by the end of the second quarter of the second year.

II-C.6. Updating Selection Criteria

Facilities will be included in the study to allow complete updating of the selection criteria. Techniques will be developed to allow the updating of the selection of areas of particular concern to reflect new knowledge, changing public opinion, changing criteria, modified priority uses, and variations in management strategies. The selection process will be an on-going process in the coastal management program, incorporating a mechanism for public participation in the final selection. This effort will take three months to complete but continue throughout the entire program on an as needed basis. The result will be a dynamic final selection of key areas which will be sensitive to the changing needs of the coastal management program.

SUBTASK II-D: LOCAL, REGIONAL AND CUMULATIVE IMPACT ASSESSMENT

The coastal zone decision-making body must have the capability to assess the impact of a proposed project from a social, economic and environmental standpoint. This should be done initially by a staff which has information concerning the predicted changes and ecological indicators,

an analysis of human and physical resource capability and a prediction of how the proposed project will affect the area of particular concern. These inputs must be combined with other factors, analyzed, synthesized and presented to the decision-maker. It is critical to the success of the Coastal Zone Management Program that a strong, useful impact assessment program be developed and its usefulness demonstrated. The well-known defects of environmental assessment techniques such as lack of technique structure, inadequacy of processes, lack of rational methodology, lack of capability of assessing cumulative impact and lack of an adequate data base must be avoided and overcome. The specific tasks as outlined below and shown in Figure 8 will accomplish these objectives.

II-D.1. Investigate Existing Assessment Techniques

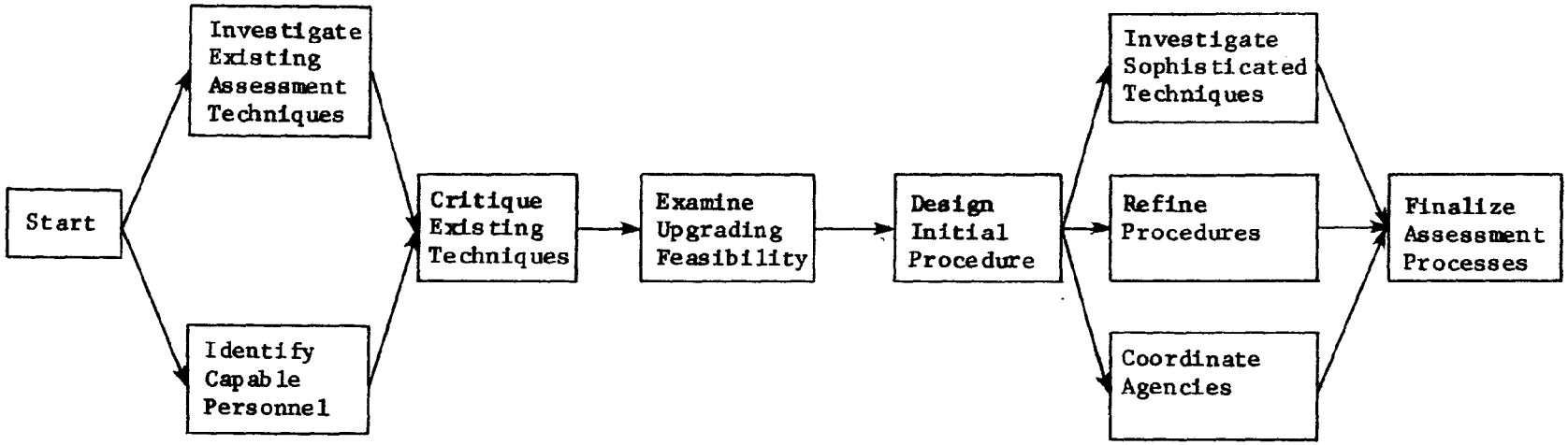
The impact assessment techniques which are currently being used will be critically investigated. Defect analysis will be performed to identify the limitations of the existing techniques. The extent of agency interaction, cooperation and integration concerning coastal zone decisions will be ascertained, and personnel and budgetary resources that are currently being used will be determined. Finally, the process of how data, information, analysis processes, prediction techniques and overall impact assessment criteria data are combined into a statement which can be presented to a decision-maker will be investigated.

The result of this effort will be to provide a starting point from which to develop an effective impact assessment technique. It will start at the beginning of the program and require six months to complete.

II-D.2. Critique Existing Techniques

A detailed critique of the existing impact assessment procedures will

Figure 8: SUBTASK II-D - DEFINE IMPACT ASSESSMENT PROCESS



be assembled to identify those areas where upgrading of procedures and improved coordination would prove most fruitful in the short term. The potential for revising existing management procedure in state agencies to conform to coastal management will be determined. Specifically, the potential for developing closer coordination between similar state and federal agencies (e.g. LWLFC and federal Fish & Wildlife Service) will be investigated to integrate techniques of both, leading toward more uniform standards for evaluating proposed projects. As the structure of Louisiana's CZM develops, the potential of enhancing existing management structures in the state will be ascertained. The final result will be a complete analysis of the existing impact assessment procedures to ascertain the feasibility of upgrading current techniques and supplying a point from where to start development of a final assessment process. This total effort will begin in the middle of the first year and extend on a part-time basis for one full year.

II-D.3. Design Impact Assessment Procedure

An impact assessment procedure for use with individual project proposals will be developed based upon factors, criteria, and indicators developed during the first two years of the program. Reliance on existing indicators and professional judgment will be necessary while optimum utilization of local and professional judgment must be identified. The various professionals and their relevance to the assessment process will be identified. Effective methods for involving state agency professionals in the decision-making process will be determined. This effort will require three months and will be completed by the end of the second year.

II-D.4 & 5. Finalize the Procedure

The initial procedure will be refined by incorporating applicable, sophisticated techniques and coordinating all agencies involved. An investigation will be made of sophisticated techniques for impact assessment which will include complex computer analysis of the obtainable data. Data correlation, parameter interrelationships and multivariate analysis will be investigated to aid in understanding regional impact of particular projects. Spacial and temporal correlation and prediction techniques will be applied to enable cumulative impact prediction. Innovative processing techniques will be applied to enable cumulative impact prediction. Innovative processing techniques will be incorporated in hopes of developing new methods to determine the resource and environmental capability for long-term planning purposes. All applicable numerical and data analysis techniques will be used to assure that the state of the art of the computational technology is applied towards the impact assessment problem. This is an on-going effort which will start at the beginning of the third year and continue into the operational phases of the management program. The initial investigation of sophisticated techniques will last one full year.

The initial procedures will be continuously evaluated by test-study projects and actual management decision needs. In each case the process will be one of using the procedure, discovering inherent limitations and modifying the program to more adequately fulfill the needs of the decision-makers. This continuous refinement will occupy the third year and extend into the operational management program.

Concurrently during this third year methods will be devised and

organizations proposed which will encourage full cooperation with the professionals of state and local agencies. It is critical to the success of the entire Coastal Zone Management Program that the information is available and that the data professionals, the management personnel and those charged with jurisdictional responsibility are in close accord. It will be one of the final charges of this study to assure that a well organized procedure be established where the decision-makers can present their needs in a positive manner and obtain clear, concise guidelines upon which to base their decisions. This effort will occupy the last year of the program and continue into the operational phase.

ITEMIZED BUDGET

ENVIRONMENTAL ASPECT OF COASTAL MANAGEMENT PROGRAM
DEVELOPMENT AND PROGRAM COORDINATION

	Man Months	Cost	Total
Salaries & Wages			
Jack R. Van Lopik* Director, CWR and Principal Investigator	1	-0-	
Wm. G. McIntire* Assoc. Director, CWR & Coastal Information Programs Coordinator	1	-0-	
Joan Myers* Staff Assistant	1	-0-	
Lincoln Smith Data Analyst	8	13,333	
Paul Templet Chemical Systems	8	10,000	
Mary Hood Marine Biologist	8	9,537	
Eugene Turner Ecosystems	4	4,400	
James Stone* Biologist-Ecologist	1	-0-	
Ted B. Ford* Fisheries Management	.5	-0-	
Ronald Becker* Information Management	1	-0-	
Roger Miller Scientific Editor	4	3,752	
× Systems Analyst	8	12,000	
Patricia Byrne Library Research	8	6,667	
× Programmer	8	6,771	
Research Associate	8	9,000	
× Graduate Assistants (2)	8	4,800	
Secretary-Typist	6	2,500	
Student Wages		2,000	
Sub Total			84,760
Indirect Cost of Salaries & Wages @ 22%			18,647
Employee Benefits of Salaries & Wages @ 13.7%			11,612
Travel			
In State		1,500	
Out of State (Washington, D.C., Florida, and Texas)		2,000	
Sub Total			3,500

	Man Months	Cost	Total
Supplies & Expenses (maps, photographs, charts, data tapes, telephone, postage, etc.)			3,000
Computer Costs**			-0-
Total Budget			$121,519

*Personnel supported by state funds.
**Budget assumes that computer time will be available at no cost.

LEGAL/GOVERNMENTAL ASPECTS OF COASTAL MANAGEMENT PROGRAM DEVELOPMENT

RATIONALE

Coastal management program development under P.L. 92-583 requires, among other things: 1) identification of the boundaries of the coastal zone to be managed (SUBTASK I-A); 2) identification of the means by which the state proposes to control land and water uses in its coastal zone--including constitutional, statutory, administrative and judicial references (SUBTASK I-B); 3) a description of the organizational structure proposed to implement the program including responsibilities and interrelationships of various levels of government (SUBTASK I-C and III-A). These three interrelated tasks are crucial to the development of a coastal management program since the establishment of boundaries, means of control and organizational structure will legally constitute the management program upon completion of the planning or program development phase. These three tasks must continue throughout the program development phase since continuous coordination and perhaps modification will be necessary as conclusions are reached in other aspects of coastal management program development, e.g., permissible uses, areas of particular concern, guidelines on priority of use. Figure 1 shows the organizational structure suggested for Louisiana's CZM planning program. This proposal deals with the legal aspects of the program and is shown in Figure 1 as Legal-LSU with the assigned tasks printed below each box.

SUBTASK I-B deals almost exclusively with legal materials and legal analysis. SUBTASKS I-A and III-A have important legal aspects to them, e.g., determination of boundaries must consider the legal aspects of

Figure 1: PROGRAM ORGANIZATION

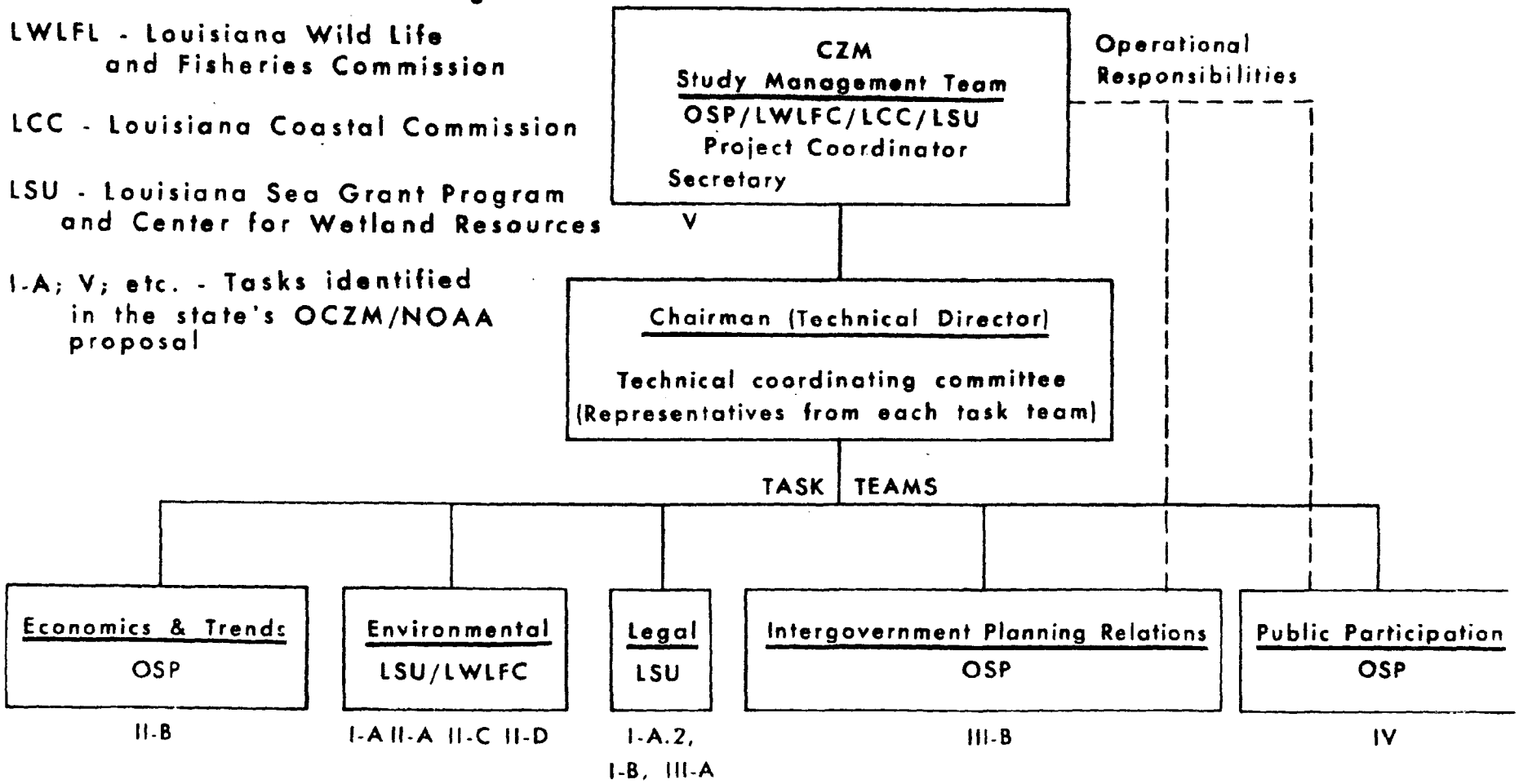
OSP - Office of State Planning

LWLFL - Louisiana Wild Life and Fisheries Commission

LCC - Louisiana Coastal Commission

LSU - Louisiana Sea Grant Program and Center for Wetland Resources

I-A; V; etc. - Tasks identified in the state's OCZM/NOAA proposal



definition and delimitation, description of interrelating agencies must include a description of legal authority, scope of jurisdiction. Since boundaries and agency interrelationship are so much a part of determining the means for control of land and water uses, it is proposed that they be handled together, by one study team. (SUBTASK I-C will be initiated during the second year.)

Figure 2 shows the nine month scheduling of the tasks to be undertaken by the Sea Grant Legal Program. SUBTASK ACTIVITY I-A.2 will be completed by June 30, 1975, and a final report made to the Study Management Team (SMT). SUBTASKS I-B and III-A will continue past June 30, 1975, with status reports to the SMT on that date. The complete study schedule is shown on Figure 3.

SEA GRANT LEGAL PROGRAM

The Sea Grant Legal Program has been developing expertise in coastal management law in Louisiana and the U.S. for the past five years. SGLP provided direct assistance to the LACCMR in the preparation of its reports and assisted with legal studies in the development of Superport legislation and regulations. An active program in coastal law research and advisory services is in progress at this time. Considerable legal research has been done providing a firm base on which to build a coastal management program. Considerable time and effort can, therefore, be saved by using the work of the Sea Grant Program as a starting point for development of coastal management.

PROPOSAL

The "expansion of tasks" sections provide research questions which

Figure 2: INITIAL PROGRAM LEGAL TASK SCHEDULE

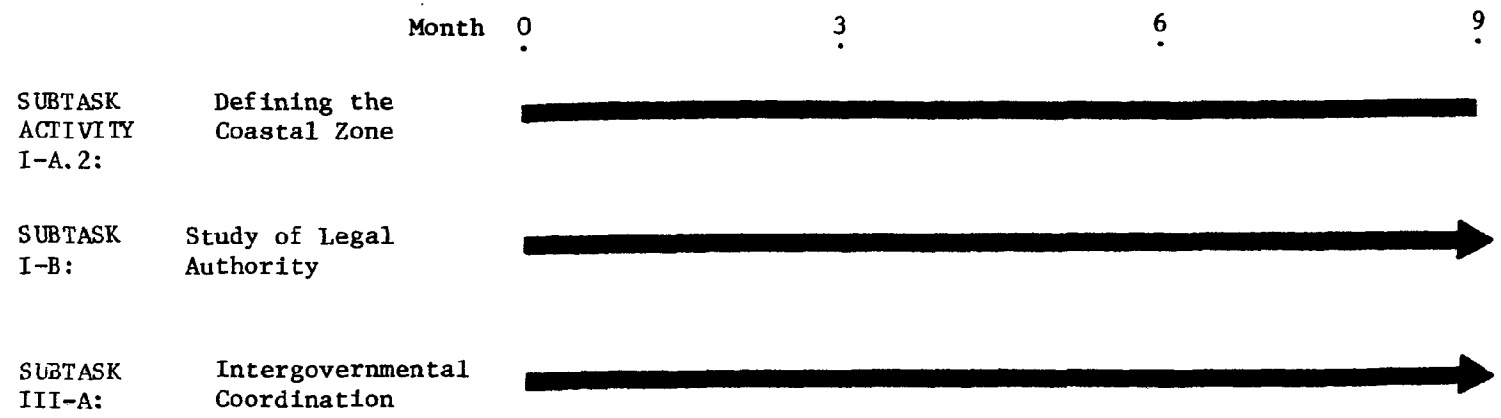


Figure 3: TIME SCHEDULE OF PERFORMANCE BY TASK

TASKS

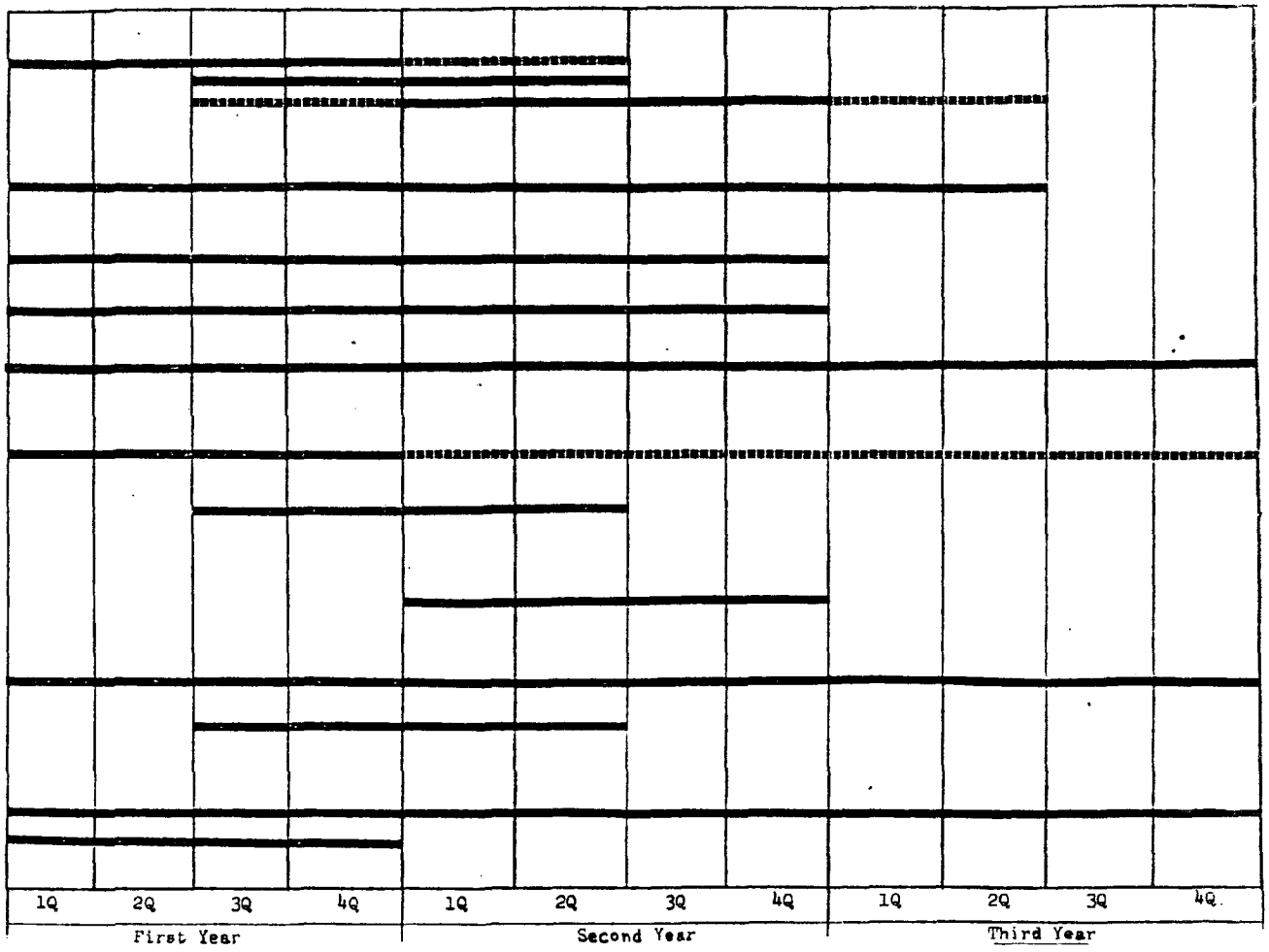
I. Structuring Program
   A. Defining the Coastal Zone
   B. Study of legal authority
   C. Organization Recommendations

II. Development of Evaluation Procedures
   A. Capacity to inventory, monitor, and analyze ecological indicators
   B. Predictive capacity for resource demand and service levels
   C. Designation of areas of concern
   D. Develop impact assessment procedure

III. Governmental Coordination
   A. Identify governmental agencies and coordination roles
   B. Identify planning activities of government affecting coastal zone and coordination roles
   C. Identify federal land and coordination roles

IV. Public Participation
   A. Conduct hearings, conferences, and seminars
   B. Develop public participation and education techniques

V. Administration
   A. Grant and contract administration
   B. Technical assistance of other groups



supplement the "special tasks" section of the state's proposal to NOAA/OCZM. These additional tasks are necessary for a full evaluation of the subject. The tasks listed must be conducted during the three-year program, but do not reflect what would be accomplished during the initial nine-month budget period (1 Oct 1974 to 30 June 1975). The accomplishments to be achieved by 30 June 1975 are indicated in the section following the discussion of tasks. An itemized budget for the nine-month program is also included.

SUBTASK I-A: DEFINING THE COASTAL ZONE

1. Identification of biophysical parameters (Activity I-A.1) will be conducted by the Environmental Task Team (Fig. 1).

2. Identify other considerations in the delimitation of the landward limit of the coastal zone including:

a) physical considerations including highways and waterways,

b) governmental considerations including parish boundaries, wards and special districts,

c) designation of specific streams,

d) determine the attitudes of state leaders and legislators to see whether each kind of coastal zone is politically feasible.

Expansion of Subtask Activities

In addition to the items mentioned in 2 (a-d) above, the following matters will be considered:

a. New definition of "navigable waters of U.S." used by federal agencies:

1. impact the definition would have on Louisiana regulatory activities.

2. pros and cons of Louisiana following the federal lead in

shoreward CZ boundary definition.

b. Need for and cost/benefit of a survey to establish shoreward limit of CZ.

c. Relative benefits (or problems) involved in assuring common shoreware CZ boundaries with Texas and Mississippi.

d. Boundary determinants utilized where areas of particular (statewide; environmental) concern have been delineated by states. How precisely was the particular zone delimited?

e. Louisiana court rulings on adequacy of boundary determinations in other contexts (Lake Pontchartrain; parish boundaries; special districts, etc.).

f. Boundary delimitation techniques employed by other states with extensive wetlands (as a reference source).

1. administrative and implementation history. How feasible is a wetlands boundary?
2. legal cases or rulings relating to adequacy of boundary delimitations in other states (are they constitutional?).

g. Enforceability of the coastal management law under various types of landward definitions:

1. attitudes and views of enforcement officials.
2. constitutional arguments regarding "vagueness," "equal protection," etc.

h. Legislative language appropriate to various alternative definitions--with recommendations on most appropriate in Louisiana.

i. Status of Tidelands litigation--will lack of complete delimitation of "coastline" under SLA have any effect on coastal management program in Louisiana?

j. Adequacy of surveys of all federal lands excluded from coastal

zone. If inadequate, is it important that it be rectified?

k. Effectiveness of boundary delimitations, by reference to other Louisiana contexts or other states, of use of technical measures such as:

1. tidal influence.
2. saltwater influence.
3. vegetation.
4. storm and flood surge limits.

SUBTASK I-B: STUDY, DEVELOP, AND IMPLEMENT LEGAL AUTHORITY NECESSARY TO MEET THE REQUIREMENTS OF SECTIONS 306(d) and (e) of CZMA

1. Identify major legal issues important to developing a sound coastal zone management program (land-water boundary issues, water use law, wetlands control, etc.) and suggest alternative approaches to resolving those issues.

2. Analyze existing governmental and legal studies of coastal zone management and related issues previously made by state agencies, university groups, consultants, etc.

3. Review Louisiana Civil Code, judicial, administrative and executive legal materials to determine whether the legal doctrine of the state conflicts with the management program.

4. Analyze the Louisiana constitutions of 1921 and 1974 for relevance to coastal zone management looking specifically at transitional provisions with specific cognizance of new laws related to the required consolidation of state agencies and the role of local government in land use control.

5. Analyze coastal zone management functions of the various state agencies and local and regional governmental entities.

6. Develop a mechanism for dealing with special problems such as the power to acquire land or manage unique or heavily stressed areas.

7. Recommend alternative methods for fulfilling requirements of Section 306(d) and (e) by the state management program.

8. Maintain close contact with the legislature. Should the Louisiana legislature pass a coastal management related bill during the 1974 session, the bill will have to be thoroughly studied.

9. Survey legislation and legislative proposals made in other states for ideas and concepts relevant to problems in the Louisiana coastal zone.

10. Maintain close contact with the neighboring and regional states. Louisiana coastal zone management will have to be closely coordinated with the management systems established in Texas and Mississippi.

Expansion of Subtask Activities

In addition to items 1-10 mentioned above, the following will also be considered:

1. Major legal issues:

a. What are the permissible land and water use controls in a Louisiana context which would not violate Louisiana and/or federal law?

b. What is the public domain law of Louisiana? Is it akin to the public trust doctrine? Over what lands and waters does it apply? How useful is this in a Louisiana coastal management program?

c. How critical is a delimitation of privately-owned as opposed to state-owned wetlands to coastal management in Louisiana?

d. Under current law, which governmental bodies regulate coastal land and water use at the state and/or local level? Is their authority sufficient under new coastal management program envisioned?

e. Under current law, are controls over certain land and water uses

reserved exclusively to local governmental units?

f. Does Louisiana Water Law protect public and/or private rights in water flow and circulation as well as water quality? How useful is Water Law in a coastal management regime?

g. Does Louisiana's proposed legal regime for CZM have sufficient authority to acquire interests in property (under CZMA)?

h. Under state and federal law, what are the criteria for constitutionality of a wetlands regulatory statute?

i. Under state and federal law, what are the criteria for proper delegation of authority from the Legislature to an agency for administering a wetlands regulatory law?

2. Survey of previous studies:

a) develop bibliographical index of issues and problems addressed

b) develop bibliography of Louisiana CZM law (treatises, texts, articles, memos)

c) extract suggestions from studies applicable to CZM in Louisiana coordinate with other legal research groups to insure cross-use of materials generated.

Louisiana Studies

a) Sea Grant Legal Program.

b) Joint Legislative Committee on Environmental Quality.

c) Justice Department.

d) Legislative Council.

e) Louisiana State Law Institute.

f) Legal literature.

h) Consultants.

i) LACCMR.

Gulf Coast and Key Wetlands States

Survey of coastal management laws of other states:

a) catalog key statutes, decisions and regulations.

Note specifically:

1. relationships between levels of government.
2. definition of "coastal zone" (especially where wetlands are involved)
3. land and water use activities subject to CZM jurisdiction.

3 and 4. Outline key Louisiana legal doctrines relevant to CZM: Prepare a loose-leaf reference source for quick reference and easy up-date.

a) Constitutional provisions (1921 and 1974).

b) Civil Code provisions (public domain, Sic Utere, etc).

c) Court decisions.

d) Statutes: creation and empowerment of state, local, special agencies; transitional legislation; consolidation of agencies; required coordination between agencies. (See intergovernmental coordination tasks where authority of all relevant agencies would be discussed.)

e) Land use laws, water use, waterbottom regulation, pollution, fisheries, wetland legislation, parish zoning, public works, agency regulations.

5. (See discussion under intergovernmental coordination, III-A).

6. Outline precedence for the establishment of special management zones in Louisiana for possible application in areas of particular concern; hydrologic basins; estuarine sanctuaries, etc. under coastal management program.

a) jurisdiction of Superport Authority.

b) special districts (levees, ports, freshwater).

c) Vieux Carre, other historic and cultural districts.

d) hunting and wildlife management areas.

7. Determine existing Louisiana law applicable to fulfill legal requirements of CZMA §306(d) and (e); determine alternative approaches to new law needed where current law could not meet §306(d) and (e) mandates.

8. Keep appropriate committees of the legislature informed of progress (in conjunction with Study Management Team):

a) Joint Legislative Committee on Environmental Quality.

b) House Natural Resources Committee.

c) Senate Natural Resources Committee.

9. Maintain regular liaison with CZM legal program counterpart in Texas and Mississippi on questions of:

a) activities CZM will exercise control over.

b) landward extent of coastal zone.

c) reciprocal relations in enforcement of coastal management laws.

d) other specialized programs.

e) interstate control of particular areas.

f. multistate land and water use planning.

TASK III: DEVELOPING ONGOING COORDINATION WITH LOCAL, REGIONAL, STATE, AND FEDERAL AGENCIES LEADING TO COMPLEMENTARY PROGRAM GOALS AND OPERATIONAL PROCEDURES WHERE POSSIBLE AND MUTUAL ASSISTANCE IN PROGRAM PLANNING AND IMPLEMENTATION

SUBTASK III-A: IDENTIFY KEY LOCAL STATE AND FEDERAL AGENCIES INVOLVED IN DECISIONS AFFECTING WETLAND AREAS, TO EXPLORE WAYS TO SHARE TECHNICAL INFORMATION, TO STREAMLINE PROCEDURES, TO ASSIST IN STRUCTURING COASTAL MANAGEMENT, AND TO DEVELOP COMMON GOALS AND OBJECTIVES

1. Inventory all local, state and federal agencies having significant responsibilities affecting wetland activities. Identify goals and objectives of each agency, operational procedures (this should be closely coordinated with the section on impact assessment), and general capabilities (planning, research, field personnel, and data gathering).

2. Perform analysis of agency functions identified in part "a" to identify overlap, duplication, conflicts, and gaps where they may exist.

   a) compare findings coming out of legal section and evaluation procedures section to further refine the specific areas where coordination or combined efforts between agencies would be necessary.

   b) where there are agencies with common or overlapping capabilities, design alternative structures for ensuring, complementing and combining functions to meet CZM needs.

3. Prepare recommendations for needed changes in laws or operational procedures.

Expansion of Subtask Activities

In addition to the items mentioned in 1-3 above, the following subjects will be considered and matrices filled.

1. Federal Level.

	Law & Regs.	Ag. Org.	Relations to La. wetlands	Relation to state & locals	Planning functions Personnel field oprs.	Possible links to state CZM
COE						
FWS						
EPA						
NMFS						
NEPA						
DOT						
AEC						
FAA						
FPC-ICC						
BLM						
HUD SCS						

a. Impact of §307 requirements in Louisiana--required amendments to state agency and federal agency procedures once Louisiana has an approved management program.

b. Determine state-federal dealings at this time. Is a lack perceived by agency people?

c. Identify potential amendments to laws Congress is considering and follow progress.

d. Determine potential ways for combining reviews, or administrative matters, crossing traditional barriers between state-federal.

e. Evaluate potential constitutional issues in state-federal relations affecting coastal decisions.

2. State Level.

	Const. Stat. Regs.	Ag. Org.	Pers. Budg. Equip.	Planning functions	Relations to locals & feds.	Links to state CZM
WLFC						
Health						
Lands						
Cons.						
SCC						
DPW						
Ag-For						
Inst.						
Super						

a. A committee of state agency representatives should be established at outset.

b. As concept and framework of Louisiana CZM takes shape, assess impact on existing agency activities and responsibilities--can functions be combined and administration streamlined?

c. Stay abreast of reorganization plans and interpretations under new constitution.

3. Local and Special District Level

	Stats. Regs.	Org. Pers. Budg.	Planning activities	Links to state & feds.	Potential use in state CZM
P.J.					
Mun.					
RPC					
Water Dist.					
Ports					
Levee Bds.					

a. Assess capability of local-special district units to participate in CZM from standpoint of:

1) control of land uses.

2) request for projects in their region.

3) planning-environmental assessment functions.

b. Determine techniques for legally linking regulatory or development programs to CZM.

c. Determine feasibility of grant-in-aid program to locals for purpose of amending plan-regulations-projects to conform to state CZM.

OBJECTIVES FOR 30 JUNE 1975

I. Final report will be submitted to SMT on legal aspects of determining boundaries for the coastal zone. The report will include alternative approaches available to state, recommendations on seaward, landward, and lateral boundary determination techniques, and an Appendix containing reference materials on legal aspects of coastal zone boundaries.

II. Status report will be submitted to SMT on analysis of legal issues with special attention on 1) major legal issues and potential impediments to CZM development in Louisiana, 2) impact of new constitution and reorganization of agencies on CZM development in Louisiana, and 3) most probable aspects of CZM where new law would be necessary to meet requirements of §306(d) and (e) and 39 Fed. Reg. 30153 (CZM Program Approval Regulations).

III. Status report will be submitted to SMT on legal aspects of intergovernmental coordination discussing impact on state-federal relations should Louisiana receive an approved management program and alternative legal mechanisms for involving local government (or special districts) in a management program.

ITEMIZED BUDGET

LEGAL/GOVERNMENTAL ASPECTS OF
COASTAL MANAGEMENT DEVELOPMENT

October 1, 1974 - June 30, 1975

	Man Months	Cost	Total
Salaries & Wages			
Marc J. Hershman (Task Team Coordinator)	2	4,332	
Research Attorney	8	11,000	
Sheryl Jolissaint	4.5	2,925	
Secretarial	3	1,500	
Student Wages		1,350	
Sub Total			$21,107
Indirect Cost of Salaries & & Wages @ 22%			4,644
Employee Benefits of Salaries & Wages @ 13.7%			2,892
Supplies & Expenses			1,700
Travel			
In State		750	
Washington, D.C. & Gulf Coast		750	
Sub Total			1,500
Total			$31,843

PERSONNEL VITAE

BECKER, RONALD E., Center for Wetland Resources, La. State U Univ., Baton Rouge, La. CIVIL ENGINEERING. b. Ames, Ia., Nov. 7, 28. m., c. 1. Geol. Engr., Colo. Sch. of Mines, 51; M.S.E. Purdue Univ. (Soil Mechanics), 58; Grad. Studies, Purdue Univ. (Civil Engineering), Doctoral Studies 66-68. Topo. Engr., U.S. Army (First Lt.), 52-58; Soil Mech. Engr., U.S. Army Engineers, Sacramento Dist., 59-60; Auto. Data Proc. Mgr., U.S. Army Engineers, Sacramento Dist., 60-63; Tech. Investigator, Program Mgr., Geoscience Dept., Texas Instruments Inc., Dallas, Tex., 63-66; Instr. in Res., Lab. for Agric. Remote Sensing, Purdue Univ., 66-68; Senior scientist, Radiation Sci. Branch, Texas Instruments Inc., Dallas, Tex., 68-70; LA. STATE UNIV.: RES. ASSOC., 70-, and ASST. TO DIR., CWR, 71-. Sigma Xi, Amer. Soc. Civ. Engr. (mem.), Reg. Prof. Engr. Texas. Special interests: Remote sensing, terrain analysis, soil mechanics, engineering geology, management systems. 13 publications.

Selected publications:

Aerial infrared surveys: a highway research tool. Highway Research Record 142:55-63, 1966 (with C. W. Lancaster).

The role of reconnaissance in management of recreational areas. Proceedings, First Annual Remote Sensing Conf. for Recreation and Resource Admin., Texas A&M Univ., College Station, Dec. 9-10, 1969, pp. 34-69.

Controlled diversions in the Mississippi Delta system: an approach to environmental management. Hydrologic and Geologic Studies of Coastal Louisiana, Rept. No. 8. Center for Wetland Resources, La. State Univ., Baton Rouge, 1971, 134 p. (with S. M. Gagliano and P. Light).

Wave energy studies along the Louisiana coast. Hydrologic and Geologic Studies of Coastal Louisiana, Rept. No. 12. Center for Wetland Resources, La. State Univ., Baton Rouge, 1971, 22 p.

Measurement of Louisiana's coastal shoreline. Hydrologic and Geologic Studies of Coastal Louisiana, Rept. No. 15. Center for Wetland Resources, La. State Univ., Baton Rouge, 1972, 16 p.

DAY, JOHN W., JR., Office of Sea Grant Development and Dept. of Marine Sciences, La. State Univ., Baton Rouge, La. ESTUARINE ECOLOGY. b. Baton Rouge, La., May 30, 45. m. c. 1. B.S. (Zoo), La. State Univ., 67; M.S. (Zoo), La. State Univ., 68; Ph.D. (Mar. Sci.), Univ. N. Carolina, 71. LA. STATE UNIV.: Research Assoc., 71-72; ASST. PROF. 72 -. Mem. Amer. Soc. Limn. Oceano., Assoc. S. E. Biologists, Sigma Xi, Mu Sigma Rho, Phi Kappa Phi. Special Interests: Estuarine ecology, systems ecology. 6 publications.

Selected publications:

Absorption of endrin by the Bluegill sunfish, Lapomis macrochirus. Pesticides Monitoring Journal, 3:201-203, 1970 (with Harry J. Bennett).

Carbon metabolism of estuarine ponds receiving treated sewage wastes. Ph.D. dissertation, Univ. of N. Carolina, pub. by Univ. Microfilms, Ann Arbor, Mich., 128 pp., 1971.

Carbon budget and total productivity of an estuarine oxidation pond receiving secondary sewage effluent. Proc. of Second Int. Symp. for Waste Treatment Lagoons, pp. 100-114, 1970 (with H. T. Odum and C. M. Weiss).

Community structure and carbon budget of a salt marsh and shallow bay esturine system in Louisiana. Center for Wetlands Resources, La. State Univ., Baton Rouge, La., publ. No. LSU-SG-72-04, 1973 (with W. G. Smith, W. C. Stowe, and P. R. Wagner).

Estuarine Food Chains. In Coastal Zone Management Guidebook, The Conservation Foundation, 1974 (with J. P. Schweitzer). (in press)

FORD, THEODORE B., Office of Sea Grant Devel. and Dept. of Marine Sci., La. State Univ., Baton Rouge, La. ICHTHYOLOGY. b. Columbia, Miss., June 28, 23. m., c. 4. B.A., Univ. of Miss., 48; M.S., 49; Ph.D., Univ. of Ill., 59. La. Wild Life and Fisheries Commission: Biologist II, River Basin Studies, 54-55; Biologist III, River Basin Studies, 55-60; Asst. Chief, Fish and Game Div., 60-62; Asst. Chief, Div. of Oysters, Water Bottoms & Seafoods, 62-66; Chief, Div. of Oysters, Water Bottoms & Seafoods, 66-70. LA. STATE UNIV.: Asst. Director for Research & Liaison, Office of Sea Grant Development, 70-73; ASSOC. DIRECTOR FOR RESEARCH & LIAISON, Office of Sea Grant Development, 74- ; PROFESSOR OF MARINE SCIENCES, 70-. Mem. and past pres. Gulf States Council on Wildlife, Fisheries & Mosquito Control; mem. and past pres. World Mariculture Soc.; mem. Gulf & Caribbean Fisheries Inst., National Shellfisheries Assn., The Wildlife Soc., M.O.W.W.; Chmn. Tech. Coordinating Committee, Gulf States Marine Fisheries Commission. Special interests: marine and lacustrine fauna of central Gulf Coast; fisheries mgt. and planning; coastal ecology; conservation; planning and resource mgt. 19 publications.

Selected publications:

Wild Life and Fisheries Commission, State of Louisiana. Gulf of Mexico Investigations - Research and Marine Resources. Pub. No. 107, Gulf Universities Research Corp., pp. 7-10, Oct. 1968.

Oysters, water bottoms and seafoods. La. Conservationist, 20(9 & 10):46, Sept.-Oct. 1968.

Shrimp season facts. La. Conservationist, 21(5 & 6):11, May-June 1969.

Effects of Hurricane Camille on Louisiana's oyster growing areas east of Mississippi River--Lake Borgne to California Bay--and other marine fisheries industries. La. Wild Life and Fisheries Commission, State of Louisiana, Oysters, Water Borroms and Seafoods Div., pp. 79-83, 1969.

Management guidelines for predicting brown shrimp, Penaeus aztecus, production in Louisiana. Proc. 23rd Annual Session, Gulf and Caribbean Fisheries Inst., Willemstad, Curacao, Nov. 1970. Univ. of Miami, pp. 149-164, June 1971.

HOOD, MARY A., Dept. Sea Grant Dev., La. State Univ., Baton Rouge La. MICROBIOLOGY. b. Portage, Wis., March 18, 44; B.S. (Biology) Southeastern La. College, 66; M.S. (Microbiology) La. State Univ., 70; Ph.D., 73. High School Teacher, Baraboo, Wis., 66-67; High School Teacher, Orfordville, Wis., 67, East Baton Rouge Parish, 68. LA. STATE UNIV.: Res. Asst., Dept. of Microbiology, 68-70; Res. Asst., Dept. Marine Sciences, 70-73; RES. ASSOC., 73 -. Mem. Amer. Soc. Microb., Phi Kappa Phi. Special interests: Marine Microbiology. 5 publications.

Selected publications:

Seasonal bacterial studies in Barataria Bay. La. State Univ., Coastal Studies Bull. No. 6:16-26, 1969. (with A. R. Colmer)

The biology of aquatic chitinoclastic bacteria and their chitinoclastic activities. La Mer, 1973. (with S. P. Meyers) (in press)

Implications of microorganisms in the biology of penaeid shrimp. 26th Ann. Gulf and Caribbean Fisheries Proc., 1973. (with S. P. Meyers)

Biodegradation of chitin in Louisiana salt marshes. Bact. Proc. 73:6-137, 1973. (with S. P. Meyers)

A comparison of three media in determination of bacterial content of sediments in Barataria Bay. La. State Univ. Coastal Stud. Bull. No. 5:125-134, 1970. (with A. R. Colmer)

HERSHMAN, MARC J., Law Center, La. State Univ., Baton Rouge, La. LAW. b. Philadelphia, Pa., Oct. 24, 42. m., c. 1. A.B. (political Science), Temple Univ., 64; J.D., Temple Univ., 67; Grad. Study, Univ. of Miami, 70. Lecturer in Political Sci., Temple Univ., 67-68; Lawyer (self-employed), 68; U.S. Army (Capt.), 68-70. LA STATE UNIV.: RESEARCH DIRECTOR, COASTAL RESOURCES LAW, 70 -. EXECUTIVE DIRECTOR, LA. ADVISORY COMM. ON COASTAL AND MARINE RESOURCES, 71-73. EDITOR-IN-CHIEF, COASTAL ZONE MANAGEMENT JOURNAL; EDITOR, Louisiana Coastal Law. La. Alternate Delegate to Southern Governor's Regional Conservation Council. Mem. Pa. Bar Assoc., Law of the Sea Inst., U. of R.I. Conferee, 68-70; Marine Tech. Soc., Sierra Club, Environmental Law Soc., Advisor LSU Law Center. Research interests: Legal aspects of natural resource conservation and development, state administration of natural resources, legal aspects of coastal zone management, environmental law.

Selected publications:

Louisiana Wetlands Prospectus. Final report of the Louisiana Advisory Commission on Coastal and Marine Resources, 1973.

Louisiana Coastal Law. Louisiana State Univ. Sea Grant Legal Program, Reports Nos. 1-15, 1971-1974.

Federal Coastal Zone Management Legislation - S.3507. In Proceedings, Second Coastal Marsh and Estuary Management Symposium, Louisiana State Univ., 1973.

Louisiana Superport Studies, Report No. 1. Center for Wetland Resources, Louisiana State Univ., 1972.

Commentary - On the Limitations of the National Environmental Policy Act. Ecology, 54(2).

McINTIRE, WILLIAM G., Center for Wetland Resources, La. State Univ., Baton Rouge, La. MORPHOLOGY. b. Price, Utah, June 28, 18. m., c. 3. B.S. (archeology-geology), Brigham Young Univ., 50; Ph.D. (geomorphology), La. State Univ., 54. LA. STATE UNIV.: Instr., 53-56; Reader, Univ. Dacca, East Pakistan, 55-56; Asst. Prof., 56-59; Assoc. Prof., 59-64; PROF., 64-; Director, Coastal Studies Inst., 66-73; PRIN. INVES., ONR contract, 66-; ASSOC. DIRECTOR, Center for Wetland Resources, 70-. Assisted on and organized several field trips in coastal Louisiana (NRC-ONR, 57; GSA, 62; etc.). Assisted in and organized several coastal conferences (NRC-ONR, 57; 2nd Coastal Conf., LSU, 59; NSF-ONR, 61; 2nd Coastal and Shallow Water Conf., LSU, 71). Mem. Phi Kappa Phi, Sigma Xi, Assoc. of Am. Geog., A.A.A.S., Soc. Am. Archeol., IGU Commission on Coastal Geomorphology. Special interests: coastal morphology and environments, comparisons of coastal environments on a worldwide basis, aerosols and coastal information management. 25 publications.

Selected publications:

Barbuda reconnaissance. La. State Univ., Coastal Studies Inst. Tech. Rept. 11, Part J, 53 p., 1966 (with R. J. Russell).

The Isla de Lobos and associated reefs. La. State Univ., Coastal Studies Inst. Tech. Rept. 42 (reprinted from Brigham Young Univ. Geology Studies, 13:3-46), 1967 (with J. K. Rigby).

Reports on the Mekong River delta. La. State Univ., Coastal Studies Inst. Tech. Rept. 57, 1968 (with S. M. Gagliano).

Development of barrier island lagoons: western Gulf of Mexico. Lagunas Costeras, un Simposio, pp. 49-62, 1969. Mem. Simp. Intern. Lagunas Costeras, UNAM-UNESCO, Nov. 28-30, 1967, Mexico, D. F. (with C. L. Ho).

Transiting coastal river channels. International Hydrographic Review, 48(1):11-43, Jan. 1971 (with J. M. Coleman).

SMITH, BENJAMIN LINCOLN, JR., Center for Wetland Resources, La. State Univ., Baton Rouge, La. OCEAN ENGINEERING. b. Concord, Mass., July 11, 35. m., 2 children. BSEE, Tufts Univ., Medford, Mass., 63; MSEE, Northeastern Univ., Boston, Mass., 67; Ph.D., Univ. of Rhode Island, Kingston, R.I., 73. Electronic Tech., U.S. Navy, 54-58; Jr. Electronic Tech., Raytheon Co., Bedford, Mass., 58-59, Electronic Tech. to Engineering Asst., summers 59-62; Engineer, Sanders Assoc., Nashua, N.H., 63-67; Res. Asst. to Res. Assoc., Univ. of R.I., Kingston, 66-72; Sr. Ocean Engineer/Electronic Engineer, Sanders Associates, Nashua, N.H., 72-74. Recipient Sanders Assoc. Grad. Fellow Award. Member Inst. Electrical and Electronic Engrs., ISA, MTS.

Publications:

Sonogram Spectral Analyses of Seismic Profiling Sources. Univ. of Rhose Island, Col. of Engr., Rept. CE-572, 1969.

Computer Calculation and Plotting of the Equi-potential Field Distribution Produced by Two Equal and Oppositely Polarized Sources Separated by a Linear Distance. Univ. of Rhode Island Dept. of Ocean Engr., Rept. OE-291, 1970.

Ocean State Prediction Applying Statistical Multivariate Analysis to Scarce Data. Fourth Annual Offshore Tech. Conf., 1972 (with Lester LeBlanc).

Estuarine Pollution Monitoring System Utilizing Multivariate Prediction Techniques. Proc., IEEE Internat. Conf. on Engr. in the Ocean Environment (OCEANS 72), 1972 (with Lester LeBlanc).

Reduced Instrumentation through Multivariate Statistical Prediction. 19th National Instrumentation Symposium, 1973 (with Lester LeBlanc).

Corrosion and Fouling of In Situ Estuarine Instrumentation. 19th National Instrumentation Symposium, 1973 (with Lester LeBlanc).

STONE, JAMES H., Dept. of Marine Sciences, La. State Univ., Baton Rouge, La. ECOLOGY. b. Helena, Montana, Oct. 20, 32. m., c. 2. B.A. (Phil-Bio.), Univ. Calif., Berkeley, 58; M.A. (Bio.), Univ. Ore., 62; Ph.D. (Zoo.), Univ. Cape Town, Rep. S. Africa, 65; Res. Sci., LaMont Geo. Obs., Columbia Univ., 65-66; Dir. Envir. Sci., Gulf South Res. Inst., 66-71. LA. STATE UNIV.: ASSOC. PROF., 71 -. Mem., British Ecol. Soc., Ecol. Soc. Amer., Amer. Soc. Limno. Oceanog., A.A.A.S. Special interests: Population and community ecology, industrial effects on aquatic ecology, statistical analyses and estuarine ecology.

Selected publications:

Summary of Recommendations. Rept. No. 1: Preliminary Recommendations and Data Analysis, Louisiana Superport Studies. La. State Univ., Baton Rouge, Center for Wetland Resources, Pub. no. LSU-SG-72-03, pp. 1-10, 1972

Preliminary Assessments of the Environmental Impact of a Superport on the Southeastern Coastal Area of Louisiana, Rept. No. 2. Louisiana Superport Studies, Pub. No. LSU-SG-72-05, Center for Wetland Resources, La. State Univ., Baton Rouge, 346 pp., 1973.

Recommendations for the Environmental Protection Plan, Louisiana Superport Studies, Report No. 3. La. State University, Baton Rouge, Center for Wetland Resources, 492 pp., 1973 (with J. Michael Robbins). (In press)

Environmental Planning for Future Port Development. University of Wisconsin Press, 43 pp., 1973 (with Jack R. Van Lopik) (In press).

Commentary - On the limitations of the National Environmental Policy Act. Ecol. 54(2):231-232, 1973 (with J. W. Day, et al.).

TEMPLET, PAUL H., Dept. of Chemistry and Physics, La. State Univ., Baton Rouge, La. CHEMICAL PHYSICS. b. Port Allen, La., July 29, 40. m., c. 2. B.S. (Chem. and Physics), La. State Univ., 62; M.A. (Phys. Chem.), Duke Univ., 64. NSF Grantee, Univ. of Ark., Summer, 61; Chemist, Shell Chemical Co., 64-66; Quality Control Supervisor, Shell Chemical Co., 66-68. LA. STATE UNIV.: Grad. Res. Asst., 68-71; Scientific Tech. Assoc., La. Advisory Comm. on Coastal and Marine Resources, 71-73; GRAD. RES. ASST., 73 -. Mem. Phi Eta Sigma; Sigma Pi Sigma; Chrm., Council on Environ. Issues; Press Council; Chemstrand Res. Grant; Delegate to Intercors SCOPE Conference; Campus Coordinator-Earth Day, April 1970. Special interests: Environmental activism, outdoor activities.

Selected publications:

Ultraviolet Absorption Spectra of Mercuric Halides. J. Chemical Physics, 45(11):5746, 1972.

Mercury Levels in Aquatic Species in the Lower Mississippi River. Presented to Wild Life and Fisheries Commission (with W.H. Pozzi).

Louisiana Government and the Coastal Zone, 1972. First Annual Report of the La. Advisory Comm. on Coastal and Marine Resources, March, 1972.

Wetlands '73: Toward Coastal Zone Management in Louisiana. Second Annual Report of the La. Advisory Comm. on Coastal and Marine Resources, March, 1973.

Louisiana Wetlands Prospectus, Conclusions, Recommendations, and Proposals of the La. Advisory Comm. on Coastal and Marine Resources, September, 1973.

TURNER, ROBERT EUGENE, Dept. of Marine Sciences, La. State Univ., Baton Rouge, La. ESTUARINE ECOLOGY. b. 46. m. B.A. (Biology), Monmouth College, 67; M.A. (Biology), Drake Univ., 69; Ph.D. (Zoology), Univ. of Georgia, 73. Teaching Asst., Drake, 69; Teaching Asst., Georgia, 70; Fellowship, Duke Univ., 71-73. LA. STATE UNIV.: RESEARCH ASSOCIATE, 73 -. Mem., Amer. Assoc. Adv. Sci., Amer. Inst. Biol. Sci., Amer. Soc. of Ichthyologists and Herpetologists, Ecol. Soc. of Amer. Research Interests: Nutrient cycling, community metabolism, biostatistics.

Selected publications:

Seasonal Plankton Production and Respiration Rates for a Georgia Salt-marsh Estuary and Coastal Waters. Ph.D. Dissertation, Univ. of Georgia, Athens, 1973.

The effect of 2-4-D on Succession in micro-ecosystems. M.A. Thesis, Drake Univ., Des Moines, Iowa, 1969.

VAN LOPIK, JACK R., Center for Wetland Resources, La. State Univ., Baton Rouge, La. GEOLOGY. b. Holland, Mich., Feb. 25, 29. B.S., Mich. State Univ., 50; M.S., La State Univ., 53; Ph.D., 55. Area Investigator, LSU, 51-54; U.S. Army, 55-57; Program Manager, Asst. Chief, and Chief, Geology Branch, U.S. Army Engineers Waterways Exp. Sta., Vicksburg, Miss., 55-61; Tech. Requirements Dir., Mgr. and Tech. Dir., Geosciences Operations, Texas Instr., Inc., Dallas, Texas, 61-68. LA. STATE UNIV.: PROF. AND CHAIRMAN, DEPT. OF MARINE SCI., DIRECTOR, SEA GRANT DEVELOPMENT, 68 -; DIRECTOR, CENTER FOR WETLAND RESOURCES, 70 -. Mem., AAAS (Fellow); Geol. Soc. Amer. (Fellow); Amer. Astron. Soc. (Senior mem., Chrm. and Dir., Southwest Sec., 66-67); Amer. Soc. Photogrammetry (mem., Board of Directors, 69-72, Chrm., Photo Interpretation Comm., 61, 65); Amer. Geophys. Union; Amer. Assoc. Petrol. Geol. (mem., Academic Advisory Comm., 73 -); Soc. of Amer. Military Engr.; Soc. Econ. Paleon. and Mineral. (mem. Research Comm., 62-65); Assoc. Amer. Geog.; Assoc. of Sea Grant Program Institutions (mem. Ex. Board, 72 -); La. Advisory Comm. on Coastal and Marine Resources (Commissioner, 71-73); Am. Management Assoc.; Soc. of Research Administrators; Marine Technology Soc.; National Research Council (Chrm. CORSPERS Panel on Geog. and Land Use, 69 -); Amer. Water Resources Assoc.; Natl. Ocean Industries Assoc. (mem., Advisory Council, 73 -); Sigma Xi. 47 publications.

Selected publications:

Recent Geology and Geomorphic History of Central Coastal Louisiana. Technical Report No. 7, Coastal Studies Institute, La. State Univ., Baton Rouge, La., 1955.

Depositional Environments of the Mississippi River Deltaic Plain---Southeastern Louisiana. In Geology of Deltas, Houston Geological Soc., Houston, Texas, 1966 (with Charles R. Kolb).

Pollution Surveillance by Non-Contact Infrared Techniques. Journal Water Pollution Control Federation, March, I, 1968 (with G. S. Rambie and A. E. Pressman).

Louisiana Wetlands Prospectus: Conclusions, Recommendations and Proposals of the Louisiana Advisory Commission on Coastal and Marine Resources, State of La., 1973 (with other commissioners and staff L.A.C.C.M.R.).

Environmental Planning for Future Port Development. Proceed. Conference on Port Plan. and Dev. as Related to Problems of U.S. Ports & the U.S. Coastal Environ., Univ. of Wisconsin, Milwaukee, 1973 (with J. H. Stone).

CAPABILITY STATEMENT

CAPABILITY STATEMENT

Capabilities developed by the Center for Wetland Resources through the Sea Grant Program and other coastal research activities complement and support Coastal Management Program Development in Louisiana. These capabilities are based on a long record of intensive field and laboratory research which began in 1950 and continues to the present. The Coastal Studies Institute was formed in 1954; the Sea Grant Program was initiated in 1968; and the Center for Wetland Resources was established in 1970 as an overview organization and focal point for university marine related activities. Investigative efforts have been directed toward gaining an understanding of Louisiana's complex and richly endowed coastal wetlands and nearshore waters. The long-range goal is to develop predictive environmental capabilities and provide guidance in meeting local and regional developmental needs with minimum impact on critical areas.

Our present capabilities derive from nurturing a well-staffed, multi-disciplinary program which maintains an appropriate balance between basic and applied research and development. The program includes a coastal legal activity housed in the LSU Law Center. Thus, the effective linking law-socio-economic activity with biological, physical and chemical phenomena is assured.

A natural evolvement has resulted in development of a capability for regional environmental synthesis. When the Sea Grant Program began in 1968 it was possible to launch an intensive field and laboratory study in the Barataria Bay region. This study was initiated through cooperation with the Louisiana Wild Life and Fisheries Commission. Drs.

Lyle St. Amant and Ted Ford were instrumental in the initial study area selection and investigative concepts. Cooperation with LWLFC is a vital part of our program.

In addition to the Barataria Bay environmental study, several major synthesis studies have been completed or are currently underway.

- An environmental study for the U.S. Army Corps of Engineers, New Orleans District
- Study of Superport feasibility for the Louisiana Superport Task Force
- Study for an environmental protection plan, Deep Draft Harbor and Terminal Authority
- Atchafalaya Basin environmental study for Environmental Protection Agency
- Environmental assessment study for Louisiana Offshore Oil Port, Inc. (consortium of oil companies)
- Study of coastal wetlands management in Louisiana and three foreign countries (England, Netherlands and France), Ford Foundation

Input and information support for the synthesis activity derives from an extensive research program within the Center which includes research activities conducted in the Coastal Studies Institute. Appendix A and B describes the Center and Sea Grant programs in more detail.

The Center's rationale for conducting regional synthesis investigations and utilizing information handling and management techniques is depicted in Figure 1. The range of studies indicated in the appendices supplies the background information for personnel concerned with data synthesis-analysis and information display investigations relevant

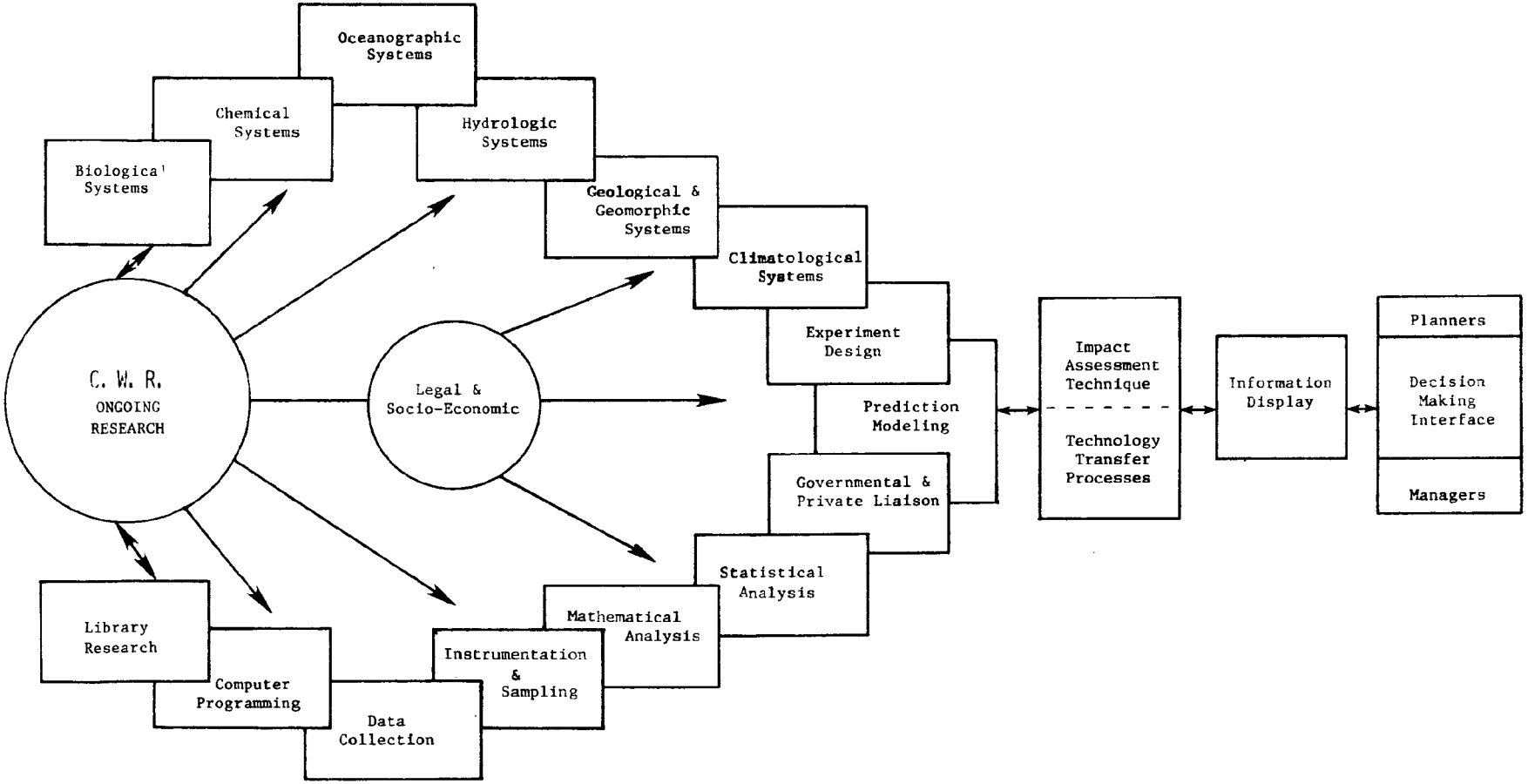


Figure 1: Center for Wetland Resource Coastal Information Synthesis Capability

to coastal zone planning and management.

The Center staff represents a resource for the State that can be utilized in addressing the critical long-range problems inherent in coastal management. Utilization of this resource can effectively focus university effort and assure programmatic continuity in addressing complex problems of multiple use of coastal wetlands. The existing close working relationships between the Center and groups concerned with coastal zone management problems assures continuous development and transfer of applicable information and technology.

Various types of facilities and equipment support Center activities that range from field operations to data processing and display. Well equipped photographic and cartographic facilities are maintained. The data processing laboratory includes a Calma Digitizer (controlled by a 16K Nova computer with printer and card reader), Wang calculators, key punch machines, and an IBM terminal connected with the LSU Computer Center. The Center Materials Laboratory contains specialized collections of coastal publications, maps, aerial photographs and related environmental data. Microfiche and microfilm readers and printers are available, as well as a microfilm recording camera.

Modern geochemical, sedimentologic and biologic laboratories are operated by the Center. Major equipment items included in the geochemical laboratory permit gas chromatographic, atomic absorption, spectophotometric, X-ray radiographic and differential thermal analysis investigations.

Although the proposed work does not require field data collection, familiarity with field logistical problems and instrumentation required for environmental data acquisition is essential for development of practical

monitoring and management techniques. The Center has a highly qualified technical staff that provides needed field and laboratory support including electronic and machine shop services. Off-the-shelf data collection equipment designed for deep-water oceanographic studies often requires modification for use in shallow-water environments. Consequently, we support a considerable effort in maintaining, fabricating and developing specialized field equipment. A field operation station is maintained at Grand Isle, Louisiana, and extensive foreign operations are mounted routinely to all of the world's coastal areas. Six Boston-Whaler size craft, six 14 or 16-foot skiffs, one 22-foot, inboard-outboard craft and one 24-foot houseboat equipped as a field laboratory are utilized in Louisiana operations.

APPENDICES

APPENDIX A

RESEARCH PROGRAM
CENTER FOR WETLAND RESOURCES

I. Introduction

The Center for Wetland Resources serves as a focal point within Louisiana State University for activities related to the study, management and development of marine and coastal areas and resources. This entity, created in October, 1970, provides common administration for the Coastal Studies Institute, the Department of Marine Sciences, and the Office of Sea Grant Development. The mission of the Department of Marine Sciences is mainly instructional; major research programs are vested primarily in the Coastal Studies Institute and the Office of Sea Grant Development.

Also Center personnel are engaged in several applied research contracts for state and federal agencies; these represent important adjuncts to related long-range research goals identified with the Sea Grant program and state needs.

In the following paragraphs research information concerning the Institute is presented separately from that covering Sea Grant and related projects. This format reflects the fact that the Institute maintains a separate identity as a research vehicle of the Geography Programs, Office of Naval Research, and underscores its dedication to basic understanding of physical phenomena characterizing the world's seacoasts. On the other hand, Sea Grant research is dedicated to problems of an applied nature that are indigenous to coastal Louisiana and the northern Gulf region.

II. Coastal Studies Institute

Research Objectives. The Institute seeks as ultimate objectives the knowledge and methodology needed for measurement, understanding and prediction of coastal environments around the world, as manifested by sea-air-land processes and associated morphological features. Work toward these objectives is organized around a morphological classification system, with the following features of

greatest current interest:

- Beaches and nearshore features
- Deltas, rivers, estuaries
- Coral reefs, cliff, fjord and archepelago coasts

Such an approach enables a multidisciplinary team of investigators to coordinate work on a variety of interrelated problems at the same geographic location, thus achieving better comprehension of the natural systems under study than could be realized from completely independent research. Other benefits are realized through coordination of logistic support requirements.

Research Strengths. Foremost among the Institute's research strengths is the operational field experience of its staff amassed in most of the world's coastal environments during the past 20 years under auspices of Geography Programs, Office of Naval Research. Another is the opportunity to devote almost full time to such research, again made possible through ONR's sustaining support. During this period, emphasis has shifted from phenomenological observation and description to a mechanistic approach involving quantification, analysis, and simulation.

A consequent result has been increased specialization of Institute staff, in fields characterized by strong application of mathematics and physical science.

The present mix of disciplines represented by the Institute staff is well suited for field investigation of the complex interacting processes that characterize seacoasts. Included are specialists in the dynamical aspects of coastal process-form regimes, interacting velocity fields, water mass properties and diffusion processes, atmospheric and thermodynamic processes, and coral reef ecology.

ONGOING RESEARCH PROJECT PARTICIPATION (COASTAL STUDIES INSTITUTE)

Campus	Department	Investigator	Research Interests	Project	Agency
LSU-BR	CSI	Coleman, James M.	Coastal morphodynamics (deltas), coastal form-process relationships.	Coastal Information Program. River mouth morphodynamics.	ONR
LSU-BR	CSI	Ho, Clara L.	Soil geochemistry.	Deltas, Rivers and Estuaries. Early diagenesis in coastal plain sediments; chemical processes in interstitial waters.	ONR
LSU-BR	CSI	Hsu, Shih-Ang	Coastal dynamical meteorology, air-sea-land interaction, boundary layer meteorology.	Beaches and Nearshore Features. Air-sea-land interaction (Trade Wind Island); atmospheric boundary energy flux.	ONR
LSU-BR	CSI	McIntire, Wm. G.	Coastal morphology and environments, aerosols, coastal information management.	Beaches and Nearshore Features. Sea-air-land interaction (Trade Wind Island); aerosol distribution and characteristics (with T. Whelan).	ONR
LSU-BR	CSI	Murray, Stephen P.	Coastal hydrodynamics; wind, tide, density currents; effect of coral reefs on current fields.	Beaches and Nearshore Features. Sea-air-land interaction (Trade Wind Island); variations in currents and water levels.	ONR
				Deltas, Rivers, and Estuaries. Water level dynamics in a bar-built estuary; high tide coast.	ONR

Campus	Department	Investigator	Research Interests	Project	Agency
LSU-BR	CSI	Roberts, Harry H.	Coastal ecology and sedimentary environments, carbonate environments, sedimentation and diagenesis.	Beaches and Nearshore Features. Beach ground water model.	ONR
LSU-BR	CSI	Rouse, Lawrence J.	Remote sensing of coastal environments.	Remote Sensing. Harmonic behavior of an air-water interface (with R. Becker).	ONR
LSU-BR	CSI	Sonu, Choule J.	Coastal hydrodynamics, coastal topographic response; littoral currents and sediments.	Beaches and Nearshore Features. Study of multiple variable interaction in a beach system.	ONR
LSU-BR	CSI	Suhayda, Joseph N.	Coastal hydrodynamics; interaction of waves and winds, currents and sediments.	Beaches and Nearshore Features. Sea-Air-land interaction; distribution of wave energy.	ONR
LSU-BR	CSI	Walker, Harley J.	Deltaic coastal morphology, arctic ecology, coastal processes; arctic geography.	Deltas, Rivers, and Estuaries. Water characteristics and mixing, Colville River mouth.	ONR
LSU-BR	CSI	Whelan, Thomas III	Organic geochemistry; coastal chemical systems.	Beaches and Nearshore Features. Sea-air-land interaction (Trade Wind Island); aerosol distribution and characteristics (with W. G. McIntire).	ONR
				Deltas, Rivers and Estuaries. Early diagenesis in coastal plain sediments; organic chemical systems.	ONR

Campus	Department	Investigator	Research Interests	Project	Agency
LSU-BR	CSI	Wiseman, Wm. J.	Coastal hydrodynamics, nearshore and estuarine circulation, water mass characteristics and mixing.	Deltas, Rivers, and Estuaries. Delta dynamics in highly stratified river mouths (with L. D. Wright).	ONR
LSU-BR	CSI	Wright, Lynn D.	Coastal morphodynamics; nearshore and estuarine circulation, water mass characteristics, and mixing.	Deltas, Rivers and Estuaries. Delta dynamics in highly stratified river mouths (with W. J. Wiseman).	ONR
				Coastal Information Program. Morphodynamics; variability of beach and barrier coasts.	ONR

ONGOING RESEARCH PROJECT PARTICIPATION (SEA GRANT AND RELATED PROJECTS)

Campus	Department/College	Investigator	Research Interests	Project	Agency
LSU-BR	Biochemistry	Allen, Robert S.	Lipid metabolism, shrimp nutrition.	Systems Ecology. Estuarine productivity (Associate Investigator).	Sea Grant
LSU-BR	Fisheries	Avault, J. W.	Catfish and crawfish culture, shrimp, pompano and other potential culture species; catfish breeding.	Seafood Industries. Crawfish culture.	Sea Grant
LSU-BR	Zoology	Bennett, Harry J.	Shrimp migration, life cycles of trematodes.	Systems Ecology. Estuarine productivity (Associate Investigator).	Sea Grant
LSU-BR	Rural Sociology	Bertrand, Alvin L.	Social organization, natural resources, recreation.	Law and Socio-Economics. Human factors in Wetland Resources Development (with 2 faculty Associates).	Sea Grant
LSU-BR	Center for Wetland Resources	Day, John W.	Estuarine ecology, systems ecology, liquid wastes management.	Systems Ecology. Estuarine productivity (Associate Investigator).	Sea Grant
				Waste Effects. Enrichment of marsh habitats with organic wastes (with W. G. Smith).	Sea Grant
				Environmental Assessment Program. Onshore field studies (Associate Investigator).	LOOP, Inc.[1]

[1] Louisiana Offshore Oil Port, Inc.

Campus	Department/College	Investigator	Research Interests	Project	Agency
LSU-BR	Geology	Ferrell, Ray E.	Environmental geochemistry, trace metals in coastal environments.	Waste Effects. Geochemistry of cadmium in a coastal ecosystem.	Sea Grant
LSU-BR	Center for Wetland Resources	Ford, Theodore B.	Marine and lacustrine fauna, fisheries management and development, coastal ecology.	Environmental Assessment Program. Management, coordination, and final report preparation.	LOOP, Inc.
LSU-BR	Center for Wetland Resources	Gagliano, Sherwood M.	Coastal form-process relationships, coastal zone management, North American archeology.	Coastal Zone Planning and Development. Environmental analysis for coastal zone planning.	Sea Grant
				Effects for water management in the Atchafalaya Basin, Louisiana.	EPA[2]
				Development and refinement of the Louisiana superport environmental protection plan and design of field data acquisition programs (Associate Investigator).	LDDHTA[3]
LSU-BR	Center for Wetland Resources	Gosselink, James G.	Plant nutrition, marsh ecology, systems ecology.	Systems Ecology. Primary productivity.	Sea Grant
				Physiological response of marsh plants to environmental stress.	CE-WES[4]
				Productivity of minor marsh grass species.	CE-WES

[2]Environmental Protection Agency

[3]Louisiana Deep Draft Harbor and Terminal Authority

[4]U.S. Army Corps of Engineers, Waterways Experiment Station

Campus	Department/College	Investigator	Research Interests	Project	Agency
		Gosselink, James G. (con't)		Environmental Assessment Program. Terminal site and pipeline corridor environmental assessments.	LOOP, Inc.
Nicholls State University	Biology	Harris, Alva H.	Aquaculture, parasitology, estuarine ecology, commercial fisheries.	Seafood Industries. Aquacultural and resource utilization studies in pipeline canals.	Sea Grant and LL&E[5]
LSU-BR	Law Center	Hershman, Marc J.	Environmental law, natural resources law, coastal zone management.	Law and Socio-Economics. Planning and management in Louisiana's coastal zone.	Sea Grant
LSU-BR	Center for Wetland Resources	Ho, Clara L.	Soil geochemistry, estuarine chemistry, nutrient cycling and distribution.	Systems Ecology. Estuarine productivity (Associate Investigator).	Sea Grant
				Growth and physiology of marine organisms (Associate Investigator).	Sea Grant
				Environmental Assessment Program. Onshore field studies (Associate Investigator).	LOOP, Inc.
				Effects for water manage- in the Atchafalaya Basin, Louisiana (Associate Investigator).	EPA

[5]Louisiana Land and Exploration Co.

Campus	Department/College	Investigator	Research Interests	Project	Agency
LSU-BR	Center for Wetland Resources	Hood, Mary A.	Physiological ecology and biodegradative activities of marine organisms, chitin recycling.	Environmental Assessment Program. Onshore field studies (Associate Investigator).	LOOP, Inc.
LSU-BR	Economics	Johnson, David B.	Externalities, law and economies, international finance theory.	Development and refinement of the Louisiana superport environmental protection plan and design of field data requisition programs (Associate Investigator).	LDDHTA
LSU-BR	Law Center	Knight, H. Gary	Ocean resources law and policy.	Law and Socio-Economics. Legal aspects of ocean resource exploitation.	Sea Grant
LSU-BR	Center of Wetland Resources	Loesch, Harold C.	Biological oceanography, estuarine fisheries, biodynamics.	Systems Ecology. Migration and distribution of fishery resources.	Sea Grant
LSU-BR	Food Science	Meyers, Samuel P.	Food microbiology, physiological ecology of marine molds, yeast, bacteria; biodegradation of oil pollution.	Systems Ecology. Growth and physiology of marine organisms.	Sea Grant
				Seafood Industries. Shrimp nutrition and invertebrate rations development.	Sea Grant
				Environmental Assessment Program. Onshore field studies (Associate Investigator).	LOOP, Inc.
LSU-BR	Food Science	Novak, Arthur S.	Seafood processing technology, quality control pharmacology, consumer protection.	Seafood Industries. Development of Gulf fishery products (with six faculty Associates).	Sea Grant

Campus	Department/College	Investigator	Research Interests	Project	Agency
LSU-BR	Rural Sociology	Paterson, Karen W.	Fertility, resource development, regional human resources.	Law and Socio-Economics. Human factors in wetland resources development (with A. Bertrand).	Sea Grant
LSU-BR	Agronomy	Patrick, William H.	Physical chemistry of waterlogged soils, nutrient recycling, fertility.	Systems Ecology. Estuarine productivity (Associate Investigator).	Sea Grant
LSU-BR	Chemical Engineering	Pike, Ralph W.	Fluid dynamics, transport phenomena, biological and ecological modeling.	Systems Ecology. Modeling and simulation (with B. Wilkins).	Sea Grant
				Seafood Industries. By-product development and pollution abatement in the menhaden industry (with R. Rao).	Sea Grant and MACL[6]
LSU-BR	Center for Wetland Resources	Pope, Robert M.	Natural resource economics.	Law and Socio-Economics. Renewable resource economics in Louisiana's coastal zone.	Sea Grant
				Development and refinement of the Louisiana superport environmental protection plan (Associate Investigator).	LDHHTA
Nicholls State University	Biology	Ragan, James G.	Parasites of marine invertebrates, marine fisheries, marine ecology.	Seafood Industries. Infection of the blue crab with Loxothylacus texanus.	Sea Grant

[6]Menhaden Advisory Council of Louisiana

Campus	Department/College	Investigator	Research Interests	Project	Agency
LSU-BR	Food Science	Rao, Ramachandra M. R.	Cryogenics, heat transfer, radiation preservation, foods chemistry.	Seafood Industries. By-product development and pollution abatement in the menhaden industry (with R. Pike).	Sea Grant and MACL
LSU-BR	Law Center	Robbins, J. Michael	Environmental law, marine law.	Development and refinement of the Louisiana superport environmental protection plan.	LDDHTA
LSU-BR	Center for Wetland Resources	Smith, William G.	Marsh and mangrove swamp ecology, estuarine sedimentation.	Systems Ecology. Estuarine productivity (Associate Investigator).	Sea Grant
				Waste Effects. Enrichment of marsh habitats with organic wastes (with J. Day).	Sea Grant
				Environmental Assessment Program. Onshore field studies.	LOOP, Inc.
LSU-BR	Microbiology	Srinivasan, V R.	Regulation of macromolecular synthesis and differentiation in bacteria, genetics of microorganisms, fermentation.	Systems Ecology. Growth and physiology of marine organisms (Associate Investigator).	Sea Grant
LSU-BR	Center for Wetland Resources	Stone, James R.	Population and community ecology, industrial effects in aquatic ecology, estuarine ecology, environmental assessment.	Coastal Zone Planning and Development. Superport feasibility studies.	Sea Grant

Campus	Department/College	Investigator	Research Interests	Project	Agency
		Stone, James H. (con't)		Development and refinement of the Louisiana superport environmental protection plan and design of field data acquisition programs (Principal Investigator).	LDDHTA
LSU-BR	Fisheries	Turnsdale, Frank M.	Decapod crustacean ecology, commercially important penaeid shrimp.	Systems Ecology. Migration and distribution of fishery resources.	Sea Grant
				Environmental Assessment Program. Onshore field studies (Associate Investigator).	LOOP, Inc.
LSU-BR	Center for Wetland Resources	van Beek, Johannes L.	Coastal geomorphology, quantitative geomorphology, coastal development.	Coastal Zone Planning and Development. Environmental analysis for coastal zone planning (Associate Investigator).	Sea Grant
				Effects for water management in the Atchafalaya Basin, Louisiana (Associate Investigator).	EPA
				Development and refinement of the Louisiana superport environmental protection plan and design of field data acquisition programs (Associate Investigator).	
LSU-BR	Chemical Engineering	Wilkins, Bert W.	Transport phenomena, applied mathematics, bioengineering.	Systems Ecology. Modeling and simulation (with R. Pike).	Sea Grant

APPENDIX B

THE LOUISIANA SEA GRANT PROGRAM

Introduction

Louisiana's Institutional Sea Grant Program exists to channel university expertise into research, education and advisory activities involving conservation, management and development of Louisiana's marine and estuarine* resources. The program was initiated at LSU in 1968, with concentration on the intensive development of living or renewable resources in the state's extensive coastal wetlands and estuaries. Although the viability and effective development of these valuable resources remain a major concern, the program's scope has broadened in response to urgent problems of more recent origin. These problems are associated with the need for comprehensive coastal zone management, and environmental stresses resulting from major economic development activities such as deep-draft "superports" and extensive flood control and hurricane protection systems.

Sea Grant activities in Louisiana are administered through LSU's Office of Sea Grant Development which was established in 1968. Subsequently it became an organizational unit of the University's Center for Wetland Resources, created by the LSU Board of Supervisors in

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*The terms "coastal," "marine," "estuarine" and "wetland" are used somewhat interchangeably in the context of our program. They imply a focus on that geographic region--including offshore and inshore areas influenced by marine forces--where most human activities are carried on and where interactions with the natural environment are most pronounced.

October 1970. The Center's organization and its relationship to other elements of the LSU System are illustrated in figures I-1 and I-2. This arrangement provides unified administration and direction for the Office of Sea Grant Development, Coastal Studies Institute, and Department of Marine Sciences--and thus establishes a focal point within the University for activities related to the study, management and development of marine and coastal areas and resources. Such an arrangement has permited (a) better direction and coordination of Sea Grant and Institute research activities, (b) efficient use of support facilities required by both programs, (c) utilization of strong regional and international research programs conducted by Sea Grant and the Institute as a foundation for continued development of appropriate curricula, and (d) enhanced consciousness by University and state policy-makers of the needs, opportunities and responsibilities for University leadership in public affairs related to the state's coastal zone.

Dr. Jack R. Van Lopik serves as Director of both the Center and the Office of Sea Grant Development. He is responsible to Dr. James G. Traynham, Vice Chancellor for Advanced Studies and Research, and Dean of the Graduate School. Thus the Center and, in effect, the Sea Grant program, occupies an administrative position equivalent to that of the six colleges and other major academic divisions of the University. Dr. Van Lopik has also been designated Advisor to the Chancellor for Marine Affairs.

In addition to the Director, the Sea Grant staff includes an Associate Director, who coordinates the Fisheries and Seafood Indus-

tries program and has responsibility for liaison with living-resource interests in government and industry; an Assistant to the Director who serves as the program administrative officer and coordinates the Advisory Service Program; and a Coordinator for Education and Training. Other personnel include professionals and technicians assigned to project work; marine science faculty holding dual appointments with OSG; clerical and support personnel. A field logistics coordinator and technican staff maintain a modest field research facility at Grand Isle, Louisiana, and provide equipment maintenance, property control, logistic support, field transportation, and operational assistance to all LSU Sea Grant participants requiring these services. On a full-time equivalent basis, Center personnel involved in Sea Grant activities total 14 professional staff persons and 14 non-professionals. During the current year the overall program has included approximately 75 professional staff and 100 others, totalling almost 70 on a full-time equivalent basis. These personnel represent approximately 20 departments in state universities.

The Office of Sea Grant Development administers all Sea Grant activities in Louisiana, and coordinates the activities of other participating institutions. Nicholls State University (Thibodaux) has been continually involved with Sea Grant since the program's inception. The University of Southwestern Louisiana (Lafayette) is receiving project support at present, and Northwestern State University (Natchitoches) has also been a program participant. Also, the Terrebonne Parish School Board is receiving modest Sea Grant support for an innovative pilot project in nautical studies at its vocational-

LSU SYSTEM ORGANIZATION
(With Supplementary Information on LSU-BR)

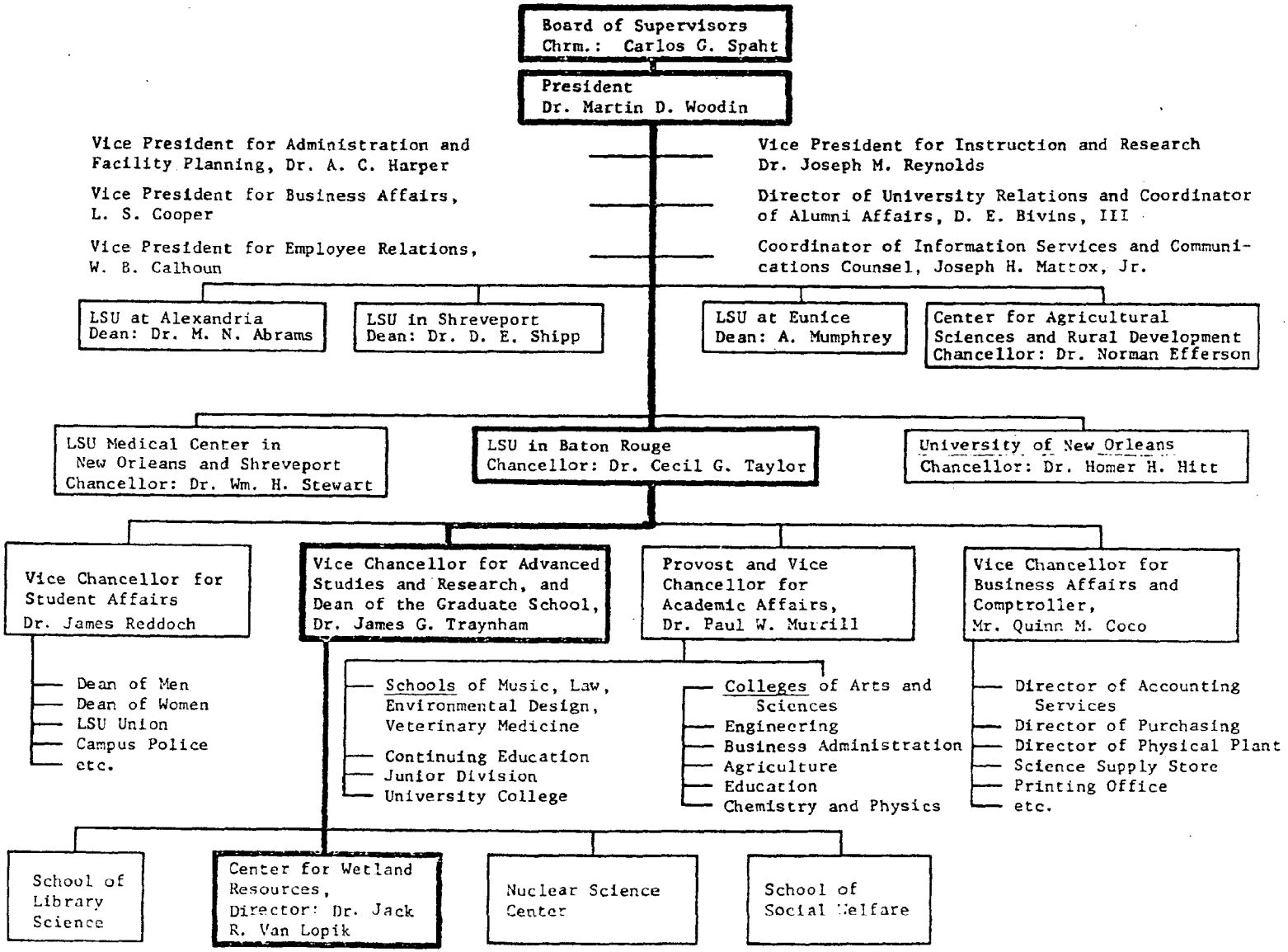
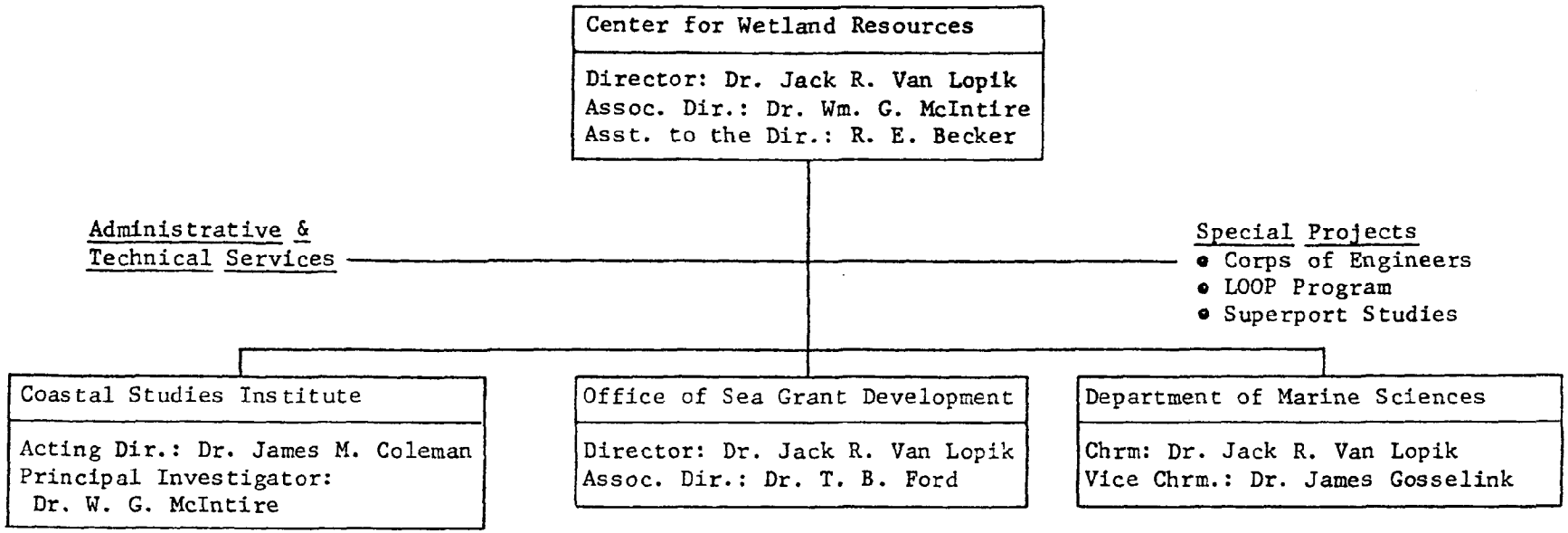


Figure I-1.

January 1974

ORGANIZATION - CENTER FOR WETLAND RESOURCES



Projects in the Following Fields:

- Coastal Information
- Morphodynamics
- Sea-Air-Land Interactions
  - Water Mixing and Diffusion
  - Coastal Currents
  - Wave Dynamics
  - Boundary Layer Meteorology
- Remote Sensing

Sea Grant Projects in

- LSU-BR Departments:

  Law School
  Food Science
  Chemical Engineering
  Rural Sociology
  Microbiology
  Marine Sciences
  Biochemistry
  Zoology
  School of Forestry and Wildlife Management
  Agronomy
  Cooperative Extension
  Geology
  Economics

- Other Universities:

  Nicholls State University
  University of Southwestern Louisiana

- Public School Districts

  Terrebonne Parish School Board

Standing Committees:

- Curriculum
- Student Affairs
- Budget

Figure I-2.

February 1974

technical high school.

Support for the Louisiana Sea Grant program has come from many quarters. In 1971, LSU received a $125,000 special legislative appropriation for "Sea Grant and related activities." Subsequently this became a line item in the University's regular budget request covering operation of the Center for Wetland Resources. In 1973, the legislature appropriated $200,000 to the University for Sea Grant matching purposes. And in spite of last year's deep cuts in federal Sea Grant funding, the program was able to maintain and even accelerate its planned missions with support from the Deep Draft Harbor and Terminal Authority (DDHTA) and the Louisiana Offshore Oil Port, Incorporated (LOOP). Apart from funding, the strongest testimonial to the program's value is found in the final recommendations of the Louisiana Advisory Commission on Coastal and Marine Resources (LACCMR), which asserted that responsibility for research in support of state coastal zone management efforts should be vested with the Louisiana Sea Grant Program.

The Louisiana Sea Grant Program has not had an active citizen advisory panel in the past, but has depended heavily on ad hoc suggestions from contacts in state agencies and industry groups. However, upon recommendation of LACCMR and the 1973 NOAA site visit team, the University administration has recently invited the participation of 25 distinguished state leaders in a group to be known as the Louisiana Sea Grant Advisory Council. The council membership list is included as Table I-1.

Table I-1

Louisiana Sea Grant Advisory Council

Mr. Vernon Behrhorst, Director, The Louisiana Coastal Commission, Lafayette

Mr. Lawrence K. Benson, Attorney at Law, Miling, Benson, Woodward, Hillyer & Pierson, New Orleans

Dr. Donald M. Bradburn, Pathologist & Director of Laboratories, Touro Infirmary, New Orleans

Mr. Victor Bussie, President, Louisiana AFL-CIO, Baton Rouge

Mr. John P. Laborde, Chairman & President, Tidewater Marine Service, Inc., New Orleans

Mr. Frederic Chatry, Acting Chief, Planning Division, New Orleans Dist., Corps of Engineers, New Orleans

Mr. Murphy J. Foster, Member, LSU Board of Supervisors, Franklin

Dr. Vernon F. Galliano, President, Nicholls State University, Thibodaux

Mr. James D. Graugnard, President, Lousiana Farm Bureau Federation, Inc., Baton Rouge

Mr. Kevin P. Reilly, State Representative, 68th District, Baton Rouge

Mr. C. W. McCoy, Chairman & President, Louisiana National Bank, Baton Rouge

Mr. Douglas L. Manship, Publisher, Morning Advocate/State-Times, Baton Rouge

Mr. Samuel B. Nunez, Jr., State Senator, District 1, Chalmette

Mr. Edward S. Reed, Executive Port Director & General Manager, Port of New Orleans, New Orleans

Mr. Edward J. Steimel, Executive Director, Public Affairs Research Council of Louisiana, Inc., Baton Rouge

Mr. Charles E. Roemer, II, Commissioner of Administration & Executive Assistant to the Governor, Baton Rouge

Mr. Patrick W. Ryan, Executive Director, Office of State Planning, Baton Rouge

Table I-1 (con't)

Dr. Lyle S. St. Amant, Assistant Director, Louisiana Wild Life & Fisheries Commission, New Orleans

Mr. Edward W. Stagg, Executive Director, Council for a Better Louisiana, Baton Rouge

Mr. Jack T. Styron, President, Menhaden Advisory Council of Louisiana, New Orleans

Background

Louisiana's coastal zone includes more than 7 million acres of shallow estuaries and coastal wetlands (ten times that of the entire U.S. Atlantic coast); comprises more than 20 percent of the state's area; contains half its inhabitants; produces much of the nation's crude oil, natural gas, and sulfur; and sustains commercial fisheries that produce about one-sixth of the nation's total landings. New Orleans, the second-largest U.S. port, is but one manifestation of the state's role in waterborne commerce and international trade. In addition, there are deepwater ports at Baton Rouge and Lake Charles--Baton Rouge ranks sixth or seventh in the U.S. Numerous private terminals are found along all the major waterways. Bulk carriers stream across the state along the Intracoastal waterway, and Louisiana cargoes move to inland markets as remote as Pittsburg via the Mississippi and its tributaries.

The very existence of the state's ecologically rich and productive coastal wetlands is a legacy of the Mississippi River's cyclical episodes of delta building and distributary channel abandonment. Within this zone of dynamic change, human occupancy since prehistoric times has been restricted to the skeletal system of narrow natural levees flanking distributary streams and barrier beach ridges. The intervening vast tracts of marshes, swamps, and lakes offered sustenance and habitat for a rich and varied assortment of fish and wildlife once regarded by many as inexhaustible. Natural changes occurred throughout the system, but a delicate balance was maintained. Ample nutrients and sediment to sustain the system's viability and

growth were assured through seasonal overbank flooding or crevassing and spillage of Mississippi River waters into the interdistributary lowlands.

Encroaching civilization brought flood control, drainage, transportation networks, agriculture, waste disposal, exploitation of raw materials and a host of other activities to the coastal wetlands. Perhaps the inexorable process of marsh deterioration was given its first human impetus by construction of levees along the river's main distributary; these artificial levees now extend almost to the Gulf. During the last thirty years a more visible and equally destructive impact has resulted from the dredging of waterways, now aggregating thousands of miles in total length, through the marshes and shallow estuaries. Environmental damage notwithstanding, these canals form a vascular system for the coastal economy serving a variety of purposes related to navigation, flood control, and the extractive mineral industries.

Artificial levees and channel improvements along major distributary channels hastened seaward flow of dissolved nutrients and sediment that succored the wetlands in earlier times. Dredging destroyed thousands of acres of ecologically valuable marshland and upset natural drainage and tidal circulation regimes. Deep-water channels facilitated intrusion of salt waters from the Gulf with consequent changes in botanical distribution/composition, loss of prime oyster producing areas, and destruction of nursery habitat for fisheries. The new channels also increased vulnerability of the marsh to wave attack, erosion, and hurricane surge. In some areas, runoff from rain falling

on the land--a natural regulator of salinity--was shunted too rapidly to the Gulf; in others, spoil banks and levees created barriers that favored stagnation. In the span of a few decades, human activities stressed the natural wetland ecosystem in ways too numerous to list--and with consequences yet to be measured.

On the other hand, these same human activities brought prosperity to a historically impoverished region. For many, steady jobs in a burgeoning oil industry were welcome replacements for the desolation of a trap line or the vicissitudes of commercial fishing. Even those who persisted in the traditional occupations were rewarded through the increased demand for shrimp and oysters created by "newcomers," and benefited from easier access to favored fishing grounds and markets. Many others found activities such as crabbing, shrimping, fishing, and trapping profitable either as recreational pastimes or regular occupations during off-duty periods. New fishery industries emerged through technological developments in utilization of industrial fish, e.g., menhaden. The charter boat industry in Louisiana was born with development of offshore drilling and production platforms.

Today in Louisiana there is the somber realization that the relative prosperity brought through exploitation of non-renewable resources is on the wane. Severance taxes on oil and gas production have provided more than half the state government's operating revenues and contributed commensurately to the general economy--but these revenue sources reached a peak about four years ago and have begun to decline. New discoveries have not kept pace with production rates, and the principal untested reserves are those offshore, beyond the state's

sovereign boundaries. Curtailment of natural gas supplies to the state's industrial consumers threatens many energy-intensive industries and virtually precludes further industrial growth unless alternative energy supplies can be found from sources not yet committed to interstate markets. Individuals closest to the commercial fisheries find evidence that the labor-intensive shrimping industry has not achieved significant increases in landings for more than 20 years--despite several-fold increases in fishing activity. The challenge to find new sources of economic stimulation and state revenues is obvious and a major concern of the Louisiana Sea Grant program.

Despite these danger signals, many believe that Louisiana still possesses the natural endowments needed to maintain its future economic health. Their projections depend heavily on energy from alternative sources--foreign crude oil imported through a strategically located Louisiana superport, atomic power stations along the Mississippi River, and geothermal energy from vast, untapped heat reservoirs. However great their potentials for economic stimulation, each of these has the potential for enormous damage to living systems, should laissez faire development occur.

The current explosion of public awareness of the environment has already proven timely insofar as mobilization of opinion in favor of resource conservation is concerned. Although Louisiana's opinion leaders have traditionally maintained a prosaic concern for economic developments vs. cultural and environmental amenities, there is now widespread unanimity concerning the need to realize and sustain the full potential of the state's renewable resources and other natural assets--

if for no other reason than as a replacement for declining oil revenues. Statewide, the pace of activities related to coastal and marine utilization has accelerated markedly since LSU's initial Sea Grant proposal was funded six years ago. Much in prominence during the past two years were the efforts of LACCMR to address state needs and problems attending long range conservation and use of these assets. The Deep Draft Harbor and Terminal Authority (DDHTA) came into existence, with a charge to maintain and preserve the viability of estuarine systems paramount in its charter. The pool of experienced personnel and organizational skills developed through Sea Grant-funded interdisciplinary programs in the estuarine zone have been responsive to these and many other needs.

In February 1971--none too soon, in view of the manifold problems confronting the State--the LSU Board of Supervisors adopted a "Wetlands Charter" which affirmed as a prime objective of the University the pursuit of further recognition as a center for study and development of wetland resources--both natural and cultural. Implicit in this commitment was (a) recognition of the University's responsibility to the people of this state and nation to focus its energies and talents on those unique resources that set it apart from most other regions and (b) achievement of Sea Grant College status. In respect to its coastal and floodplain wetlands, Louisiana has practical advantages and assets not equaled by any other region in the world. However badly this national trust may have been abused in the past, our existing wetland habitats must be preserved and maintained at a high level of productivity. This must be accomplished in full recognition of the need

for rational exploitation of non-renewable resources and adequate flood control, navigation, and water management programs. Optimization of the wetlands' economic potential must be achieved through an effective blend of conservation and exploitation.

Motivations for LSU's Sea Grant program thus stem from a variety of sources:

- The State's unique endowment of marine and estuarine resources
- Past and future economic dependence on these resources, and the challenge to find new sources of economic stimulation
- Growing national concern for preservation of natural biological systems and qualities that give the region its uniqueness
- The urgent national concern for full conservation and development of energy resources
- The University's commitment to achieve a position of national and international eminence as a center for the study and development of wetland resources.

Institutional Goals

In view of the State's geographic attributes and strong marine economic orientation, LSU's broad program objectives can be no less than those that must be met to achieve Sea Grant College status. These include:

- A strong academic faculty committed to the Sea Grant concept: a core group of coastal subject matter specialists, and broadly-based participation of individuals with backgrounds in many traditional disciplines, highly motivated to apply their knowledge in a

coordinated manner toward development of natural and human resources of the coastal zone.

- Public awareness and support of comprehensive programs, conceived with optimal development strategies, for the coastal and marine resources
- Institutional relationships involving the university, government, and private industry that respect common goals for management and use of common-property resources
- Qualified manpower for the diversity of occupations needed to implement new systems of public and private activity in the coastal zone
- Knowledge, systematically organized: to guide decisions concerning allocation of resources, and to utilize these resources efficiently in ways that achieve short-range objectives without sacrificing long-range options
- A delivery system that can make needed knowledge available when and where it counts, without the necessity of creating a ponderous new bureaucracy.

It is apparent that these objectives are general, and that they paraphrase the goals expressed by others or stated in the Sea Grant College and Program Act. They obviously cannot be achieved in a year--perhaps not in a decade. But the size, productivity, and uniqueness of Louisiana's coastal zone, and the economic dependence of her citizens upon this region, make concerted action all the more compelling.

Research Goals

Five research programs have been developed to (a) identify projects of a related nature; (b) encourage interdisciplinary communication among

investigators with similar interests but diverse viewpoints;(c) more effectively manage and motivate individuals and (d) permit more efficient determination of priorities and allocation of resources among generally similar activities. In general, each component project should contribute needed information to one of the following:

- Basic understanding or comprehension of a specific problem
- Ability to predict processes or phenomena, or to assess the effects of human activity
- Solution of operational problems posed by a specific governmental or private organization.

Systems Ecology Program

The systems ecology program derives its name from efforts to quantify and analyze estuarine ecological processes by means of techniques formally described as systems analysis. The goals of this effort are (a) a quantitative description of an equilibrium-state coastal marsh and estuarine system; (b) a capability to predict the natural and economic responses to economic external forcing functions acting on the system; (c) economically valid estimates of the subsidies which society receives from coastal marshes through "free work of nature" in waste discharge treatment and other natural functions.

Waste Effects Program

The goals of the waste effects program are (a) to demonstrate means by which seafood processing plant, municipal and other nutrient-charged effluents can be utilized productively by estuarine living systems, and (b) to assess the nature and extent of various toxic agents

and hazards to human health which may be concentrated in estuarine organisms via the estuarine food web.

Fisheries and Seafood Technology Program

The fishing and seafood processing industries are important sources of revenue in Louisiana, ranking below only agriculture and the oil and gas industry. Logically, a primary objective is improvement of economic returns to the state's fishermen and processing industries. Related goals are:

- Economic utilization of under-utilized species, especially those taken by shrimp trawling
- Byproduct utilization of fish processing wastes
- Mariculture of selected species
- Increased yield from marsh canals and impoundments
- Expanded markets for Louisiana fish products
- New product development and quality maintenance
- Consumer health and safety
- Knowledge of marine species biology and pathology

Coastal Zone Planning and Development Program

The overall goal of this program is to provide planners, developers, and policy-makers with information needed to achieve future urban and economic development in the coastal zone with minimal detriment to the environment. Subsidiary goals include:

- Inventory of land use and natural systems
- Identification of changes in natural systems resulting from diverse land usage and related activities, e.g., flood control

- Understanding of geographic/geologic factors that influence natural productivity
- Innovations in transportation systems, urban development, and other works associated with human activity
- Understanding of natural, social, and political factors that influence urban and industrial land use
- Solution of geotechnical, environmental, and hydrodynamic problems related to development of energy sources.

Law and Socio-Economics Program

A fundamental precept of the Sea Grant program recognizes that changes in social institutions must go hand in hand with technological innovations if the latter are to be successfully utilized. Goals to meet this need include the following:

- Innovations in public administration of wetland and coastal resources to account for the unique attributes and salient differences between these and inland resources
- Development of legal and regulatory codes that enable innovations in public and private use of coastal waters and water bottoms in coastal areas and the high seas without sacrificing options available to future generations
- Understanding of motivational characteristics and attitudes of Louisiana coastal residents
- Assessment of regional economic consequences of proposed resource allocation strategies
- Contributions to applications of economic theory relating to common property resources in the coastal zone

- Adequate opportunities for outdoor recreation to fulfill the needs of coastal residents and visitors.

Education and Training Program

A university has a primary commitment to teaching, and programs which do not have direct relevance to the educational process will probably not endure long in the university community. Thus far, research projects sponsored by Sea Grant have succeeded, from the Institution's point of view, because they have opened new areas of knowledge and professional stimulation to students and teachers alike. A continuing goal must be to provide this kind of challenge and opportunity in ways that also respond to real needs of a larger segment of society. From a more formal viewpoint, program goals are:

- Strong curricula in Marine Sciences and related departments
- Academic training of career professionals for study, management, and development of coastal and marine resources, at a rate consistent with growth of employment opportunities
- Adult education programs designed to communicate new knowledge and stimulate awareness concerning marine resources and affairs
- Extension courses for science and engineering professionals who desire additional specialized training in marine-related subjects
- Vocational training for marine positions in the offshore oil and towing industries
- Adequate marine science content in secondary school curricula as a grassroots approach to building public awareness and support for marine affairs

Advisory Service Program

Advisory services are delivered formally through projects expressly funded for this purpose, and informally through virtually every research and education project sponsored by Sea Grant. Objectives include the following:

- Production of publications and other information products, adapted to serve the various needs of a large, diverse user community
- Consultation and technical assistance on specialized problems of government and industry, particularly those which relate to public welfare, health and safety.
- An active media service and public relations program to stimulate citizen awareness of marine resources and related opportunities, activities, policies, and needs
- Extension services for appropriate groups and individuals.

Approach

The Office of Sea Grant Development administers the program in part directly through elements of the Center for Wetland Resources, and the remainder through departments at LSU-BR and other participating institutions. Administrative, informational and support activities are vested in the Center. Various individuals have been designated as program coordinators, and are expected to assist in program management functions including project planning, overview, and administration related to their program areas; and to coordinate liaison and advisory services with other agencies. They may also have project assignments or other responsibilities. Most of these program coordinators are

members of the Center faculty. Experience has clearly demonstrated the motivational advantages of a coordinator who is administratively attached to the Sea Grant program organization and can devote a substantial amount of time to functioning as a leader and spokesman for Sea Grant. The magnitude of the task, especially considering the growing workload of planning and proposal effort, special reports to the Washington office, and off-campus contacts, is simply greater than the typical member of an academic teaching department can handle and still do research or meet department-established performance criteria.

In the early years of the LSU effort, program composition depended mainly on expressions of interest by available university faculty. Evolution toward more structured programs has resulted in a better basis for allocation of resources and continuity of effort, as well as identification of deficiencies that could be met by seeking out needed skills on-campus, in-state or through new hiring. There are still many gaps in our programs, as indicated by goals without corresponding project effort. But goals are regarded as a blueprint for progress rather than an inventory of current work.

Efforts to make Sea Grant activities responsive to state needs have fostered involvement with many state agencies and private industries in the planning, coordination, and guidance of program development. Because of limited resources, our policy has been to work primarily with groups representing segments of an industry rather than single companies or individuals. An exception to this policy is the food processing industry where problems often arise within a single plant or product and a high level of security is deemed essential by

Table I-2

Principal Participating State Agencies and Industrial Organizations

Louisiana Wild Life and Fisheries Commission

Register of State Lands

State Planning Office

Lousiana Advisory Commission on Coastal and Marine Resources

Lousiana Deep Draft Harbor and Terminal Authority

Louisiana Coastal Commission

Department of Public Education

Board of Commissioners of the Port of New Orleans

Joint Legislative Committee on Environmental Quality

Menhaden Advisory Council of Louisiana

Louisiana Shrimp Association

Gulf States Marine Fisheries Commission

Louisiana Land and Exploration Company

American Shrimp Canners Association

International Shrimp Breaders and Processors Association

National Fisheries Institute

Louisiana Oyster Dealers and Growers Association

International Shrimp Council

Shellfish Institute of North America

Department of Justice (Office of Attorney General)

Governor's Council on Environmental Quality

Louisiana Offshore Oil Port, Inc.

National Turtle Farmers and Shippers Association

Louisiana Crawfish Farmers Association

the operator. The principal contacts are indicated in Table I-2. Work with these and other groups often involves provision of reciprocal support and services, as well as information sharing.

In several instances university teams, organized in part through Sea Grant efforts, have performed special studies on a cost-reimbursable basis. We emphasize that it is not Sea Grant's function to perform contractual services that satisfy needs of a routine or recurring nature. However, these opportunities to participate in new and innovative developments have strengthened the Sea Grant image in the state and have provided situations to test concepts that were developed in the Sea Grant program. In this respect they represent a valuable endorsement and testimonial to the practical values of the program. On the other hand, it must also be noted that such services are not accomplished without some adverse side effects. Non-sustaining (short-term) contractual commitments inevitably create management problems in the university by overloading faculty, administrative personnel, and logistic capabilities; disrupting teaching schedules, and deferring effort on scholarly publications and other measures of academic performance. They necessitate recruitment of additional qualified personnel for short-term assignments, and dilute effort on longer-term commitments. Unfortunately, compensation policies of the University do not adequately take such circumstances into account, so employee morale problems arise as well.

Sea Grant's approach to development of marine education and teaching opportunities is fully consistent with LACCMR's recommendations. These are best summarized in the following clips excerpted as a review of the commission's final report, Louisiana Wetlands Prospectus:

Excerpted from

Wetlands. . . PROMISE or PERIL?

(Center for Wetland Resources publication of February, 1974)

Focusing on education to counteract the slow and inadequate development of wetlands research, the Commission believes that a good starting point toward an informed citizenry is at the secondary-school level. Their immediate suggestion is the inclusion of marine and coastal resource material as part of a formal course in the eighth-grade science curriculum in Louisiana public schools. They feel that federal funds should also be sought to conduct marine-science institutes for high-school teachers.

The people of Louisiana will never fully benefit from their wetlands bonanza until adequately trained local manpower is available to tap its natural resources and develop their great potential for the future. Among the most serious deficiences is a shortage of locally trained, marine-oriented technical workers, such as boat pilots, able-bodied seamen, and diesel technicians. Off-shore construction firms need more than 5,000 welders today, and that figure could double by 1980. A disheartening consequence of this local manpower shortage is that the highest-paying jobs are often filled by out-of-state people. An analysis by the appropriate state agency of the present marine technician labor force, says the Commission could easily justify expansion of marine technician training programs. Today there are only two vocational training programs in the state aimed at producing marine technicians—South Terrebonne High School in Bourg and the Young Memorial Vocational-Technical School in Morgan City, whose programs could well serve as models for activities in other places. The Committee emphasizes, however, that priority would be better assigned to providing adequate support for existing programs than to the creation of new ones.

A further Commission recommendation would establish an Offshore Marine Academy as a cooperative university-technical school endeavor to develop two- or four-year training in generalized capacities such as management, supervision, ocean engineering, and seamanship.

Moving to the university level, the Commission is emphatically opposed to the creation of new marine-science degree programs until the job market is well-defined and existing programs are funded adequately. They stress quality over quantity in university programs, and feel that the Louisiana Coordinating Council on Higher Education, or its successor body, should carefully monitor current and proposed programs to assure excellence and avoid needless duplication of effort. The Commission believes that special attention should be given the mix of university instruction available in marine biology, physical oceanography, and marine socio-economic and legal fields. Although existing biological programs require additional facilities and equipment, primary emphasis, according to the Commission, should be given to strengthening of nonbiological academic courses and programs—with the exception of systems ecology and population dynamics fields, where additional program development is needed.

A high-priority necessity for adequate wetlands development involves adequate facilities. Unlike other Gulf Coast states, Louisiana has no marine-science research and teaching facility, which is especially unfortunate since coastal resources are economically more important to Louisiana than to any other Gulf Coast state. The Louisiana Wild Life and Fisheries Commission conducts biological and ecological studies in the marshlands of its refuge system and its Marine Laboratory on Grand Terre; but that laboratory is not equipped to routinely handle students or university researchers. Most of the LSU Sea Grant field activities in the Barataria Bay area utilize a leased camp as a base of research operations, but there are no classroom or laboratory facilities for formal, or even informal, instruction. USL maintains a similar facility at Fearman Lake, and NSU recently built a teaching research laboratory at Port Fourchon, but it is only partially equipped and can handle only a limited number of students.

Because of these conditions, the Commission favors immediate construction of a marine-science teaching and research laboratory that would be available to all state university faculties and students, and that would be accessible by automobile and boat, with sleeping and cafeteria equipment to accommodate a minimum of 60 persons. Should establishment of such a laboratory prove impractical, the Commission suggests that, as an alternative, all major marine-science research and teaching facilities of state universities be located at a single site within the coastal zone.

Sea Grant intends to contribute to this far-reaching program of human resource development primarily through staff-level assistance in coordination of implementing efforts, and mobilization of state facilities such as those of the LSU Division of Continuing Education and the Louisiana educational television consortium.

Our approach to advisory services has sought to innovate in areas where precedents were lacking, and to respect existing relationships where they were relevant. At their present stage of development, it appears that the various advisory elements are moving closer towards a truly cooperative effort.

The traditional service agency of LSU has been the Cooperative Extension Service. With strong ties to the agricultural experiment station, and possessing a well-established bureaucracy with its own identity, the extension service did not seem to be a very promising vehicle for proselytizing on behalf of the Sea Grant program--while that program was still in its infancy--nor did it seem that the early budgets could support such an effort. For that matter, audience characteristics in Louisiana's marine fisheries were veritable unknowns in terms of extension efforts. Consequently, Sea Grant support of extension agent services has been held to a very low level, pending adequate development of research areas. Alternatively, primary emphasis has been accorded to service activities characterized by direct liaison between Sea Grant faculty specialists and their professional counterparts in state agencies and trade organizations. A precedent for such a delivery system existed in the Department of Food Science, which has established a strong tradition of advisory service in seafood technology, independent of other campus service organizations.

The arrangements thus developed have worked well, but they have been characterized more by problem-solving than by informal education at the local level--which is the acknowledged forte of extension work. In the meantime, the Cooperative Extension Service has done some homework among the marine commercial fishermen, and Sea Grant research elements have matured to the extent necessary to support marine extension services more aggressively. We believe that the time is ripe for further expansion of extension agent services as soon as adequate funding becomes available.

Institutional Sea Grant Accomplishments

Continuing progress of an institutional nature is manifest in our growing involvement with state agencies, legislative groups, public commissions and industrial and citizen groups. Progress is also evident in the slow but steady administrative and governmental recognition of Sea Grant budgetary and facility needs by LSU and the state legislature. Additional effort is needed to strengthen the Department of Marine Sciences and make Sea Grant concepts more pervasive within the universities of the state.

Research efforts begun during the first years of LSU's Sea Grant participation are maturing, and the results achieved are showing up in a variety of ways--including formal course offerings based on products of research, scholarly publications, industrial processes and products, and inputs to state planning activities. One senior investigator has withdrawn from university sponsored research activities to start a private consulting firm, selling skills which he developed and refined to a high

degree through his involvement in Sea Grant and related projects.

Public information efforts have had a favorable reception--apparent in the many requests for "Aquanotes," "Louisiana Coastal Law," and the "Marine Sciences Teaching Aid" series, and re-use of materials from these sources in other news and information media. Output of printed material from Sea Grant researchers has continued to increase during the past year, as many activities matured.

The individual programs and projects summarized in the following pages and described further in volume 2 reflect a concerted effort to guide the entire program from an initial applied research orientation to the application of research and broader aspects of public service. We believe that these activities are fully responsive to state needs.

Overall progress is the sum of many individual accomplishments, too numerous to list in their entirety. Some program highlights from September 1972 to the present are noted in the following paragraphs excerpted from A Five-Year Sea Grant Management Summary, an unpublished internal CWR document.

> The 1972-73 fiscal year was one of significant growth and maturity for LSU's Sea Grant program. Federal funding reached a high point and expansion took place especially in the advisory service programs. Dr. Ford was appointed to the National Marine Fisheries Service advisory panel. Professor Gosselink transferred from the Botany Department to serve as Vice-Chairman of the Department of Marine Sciences. Dr. Robert Pope was recruited to serve as a staff economist for multi-disciplinary projects sponsored by the Center and to provide liaison with other economics interests on campus. A new project was implemented through Rural Sociology to provide information and guidance relative to acceptance of Coastal Zone Planning and Management programs by coastal residents. CWR was funded by DDHTA to prepare a draft Environmental Protection Plan as required by the legislative act which created the authority. This year saw completion of LACCMR's assigned mission and submission of its recommendations to the Governor. Negotiations

began early in 1973 with the Offshore Operator's Committee and later Louisiana Offshore Oil Port, Inc. which in May led to start-up of a 14-month environmental assessment program in offshore waters between Port Fourchon and Southwest Pass, and onshore along the proposed tank farm site and pipeline alignment. Systems Ecology investigations were curtailed in the type salt marsh area near Caminada Bay and the biological team was redeployed on LOOP project activities which provided an opportunity to extend similar studies to brackish and fresh water environments. In May 1973, the legislature again recognized the accomplishments and potential value of the Louisiana Sea Grant program through appropriation of $200k for Sea Grant and related activities. Of this amount, $28k was transferred to Nicholls State University to provide needed equipment for its Port Fourchon marine laboratory. However, legislative endorsement was not unanimous--some opposing legislators took notice of viewpoints expressed by certain CWR faculty and students at an earlier public hearing on a sensitive environmental issue. Professor Gosselink was named Principal Investigator for 2 contracts with the Corps of Engineers, Waterways Experiment Station. Dr. Gagliano secured contract funding from EPA for environmental studies in the Atchafalaya Basin region. Professor Gary Knight completed a summer consulting assignment for NMFS on legal obstacles to interstate agreements governing Gulf Coast fisheries. The heavy contract workload necessitated deferral of certain Sea Grant program commitments, but the National Office of Sea Grant rose to the occasion by permitting uncommitted funds to be carried forward to the next fiscal year in order to soften the impact of across-the-board budget cuts in FY 74.

Although the 1973-74 fiscal year is not yet half over, we can report on several milestone accomplishments and other important events. The LACCMR completed its deliberations and incorporated its recommendations in a "Louisiana Wetlands Prospectus." This report is currently being made available for public distribution through Sea Grant legal advisory channels as a means of stimulating maximal citizen inputs to anticipated legislative deliberations on coastal zone management. Key recommendations of the commission were reviewed in a public workshop/symposium on February 13-14, sponsored by the Louisiana Sea Grant program in cooperation with other key agencies, and attended by more than 300 public officials and community leaders.

Cooperative projects with LWLFC have been a continuing Sea Grant objective since the program's inception. Heartening progress toward this goal is evident in several areas--informal assistance rendered by Prof. James Stone in data

processing and biostatistical treatment of LWLFC field data; cooperative efforts by Dr. Clara Ho, CWR, and Mr. Barney Barrett, LWLFC, on a study of estuarine nutrient enrichment from Mississippi River waters. Center personnel, including Drs. Ford, Ho and Stone, have met with LWLFC representatives to develop cooperative proposals for 74-75 Sea Grant funding that will formalize and enlarge the scope of these arrangements. Professor Gagliano withdrew from the Center's research program, effective 21 January 1974, in order to devote full time to private business interests. His departure coincided with the nominal completion date of the Center's contract with the Environmental Protection Agency, "Impact of Water Management practices in the Atchafalaya Basin." Center work on "Design of an Environmental Protection Plan and Environmental Monitoring System" for the DDHTA was completed in December, although some ancillary research activities are being continued by Dr. Stone with remaining funds. The Director, with officials of the State Planning Office, Wild Life and Fisheries Commission and the Louisiana Coastal Commission, has coordinated proposal activities for a state Coastal Zone Management planning grant, and has assumed administrative responsibility for preparation of proposal documents by the Sea Grant Legal staff. Liaison with the State Planning Office has been initiated to explore ways that information produced by Center studies can be integrated into state and regional planning systems. CWR sponsored public distribution of a position paper on Marine Science Education abstracted from LACCMR recommendations. Initial Sea Grant support was awarded to the Terrebonne Public School Board for development of training materials needed in its vocational high school nautical science program. A sub-program was organized within the Fisheries and Seafood Industries Program area to provide additional visibility, encourage statewide coordination and stimulate needed research for the Louisiana crawfish industry. Initial Sea Grant funds supported crawfish marketing studies at USL. A new Sea Grant-sponsored CWR project was begun on chemical characteristics of marsh areas subjected to chronic hydrocarbon spillage. A statewide survey was initiated to inventory all university research talent available for future projects related to administration of a state coastal zone management program. Apparent progress was made toward solving the CWR's acute space problem, with allocation of additional floor space in the Military Science Building--but lack of funds for air conditioning has prevented its full utilization. Additional shop space was obtained through construction of a garage-type metal building. Louisiana's first marine extension agent was fielded in an area covering Terrebonne, Lafourche and St. Mary parishes. Professor

Knight continued to assist a state legislative committee in its efforts to revise the state's shrimp law. A Sea Grant-funded study on "recreational uses of private lands" was initiated through the Rural Sociology department with Dr. Michael Grimes as Principal Investigator. Other Sea Grant participation includes the Second World Crayfish Symposium being held on-campus April 7-11, with Dr. James Avault as Chairman, and the Regional Symposium on Diseases of Aquatic Animals, April 16-17, co-chairmen Dr. Robert Amborski and Dr. Mary Hood.

Although the various contracts cited in the above were administered by the CWR, they involved participation of many investigators from other departments. For the most part, these were individuals with whom we had previously established rapport through Sea Grant-funded work. The ability to mobilize such working arrangements with ease should be recognized as one of the most valuable benefits gained from the Sea Grant experience, and one that is facilitated by CWR's unique organizational structure.

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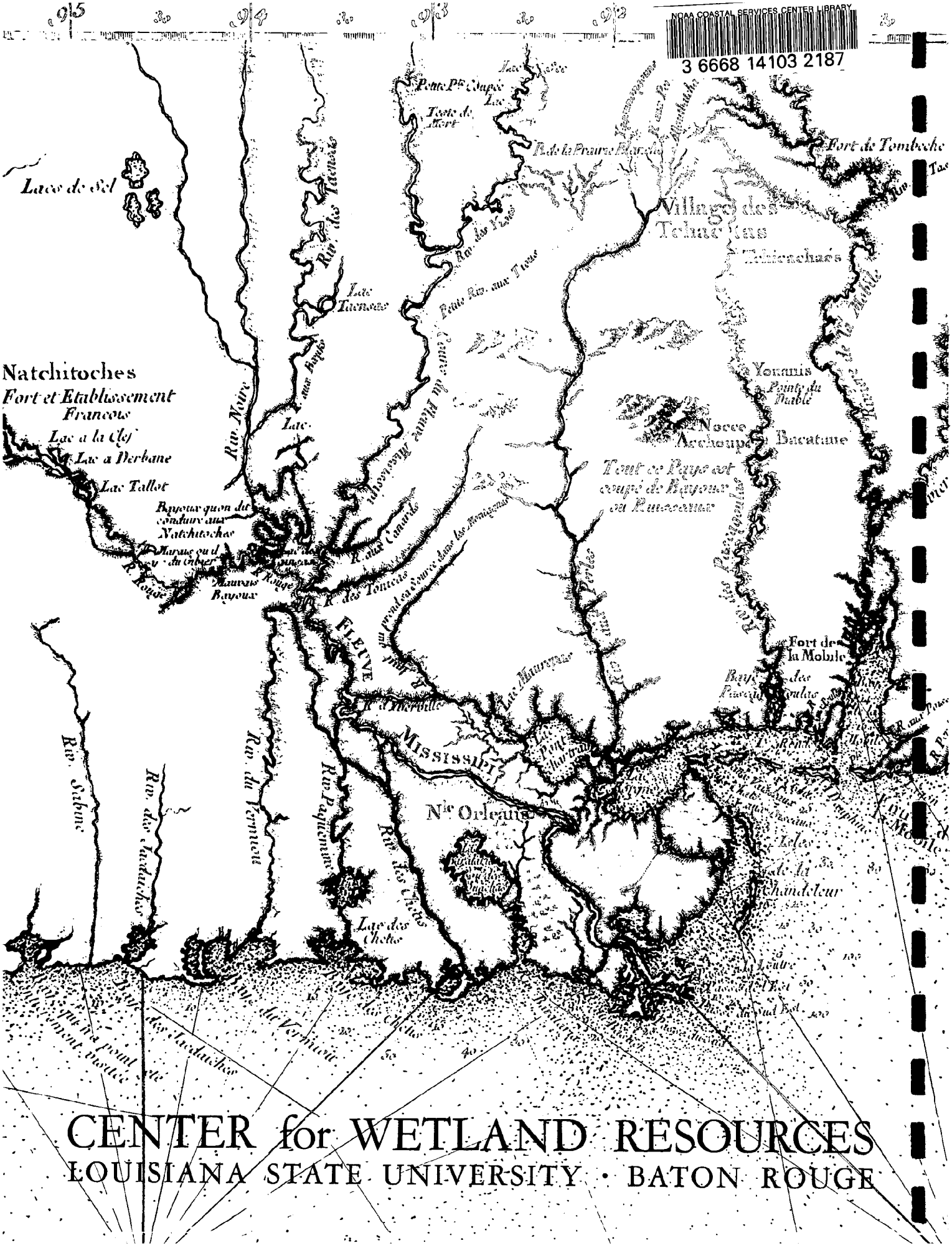

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