Proceedings

FIRST TERNARY EASTERN GULF OF MEXICO STUDIES MEETING

October 15-16, 1981, Tallahassee, Florida

Prepared for

THE BUREAU OF LAND MANAGEMENT
OUTER CONTINENTAL SHELF OFFICE
NEW ORLEANS, LOUISIANA

February 26, 1982

Woodward-Clyde Consultants

Consulting Engineers, Geologists and Environmental Scientists
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PROCEEDINGS:
FIRST TERNARY
EASTERN GULF OF MEXICO
STUDIES MEETING

October 15 and 16, 1981
Tallahassee, Florida

Sponsored by

BUREAU OF LAND MANAGEMENT
OUTER CONTINENTAL SHELF OFFICE
NEW ORLEANS, LOUISIANA

Arrangements Handled by

Woodward-Clyde Consultants
BLM Contract No. AA851-CT1-45

February 1982

PREFACE

The contents of this publication are based on a transcript of the general meeting session and abstracts provided by speakers. Arrangements for the meeting were handled by Woodward-Clyde Consultants under U. S. Department of the Interior, Bureau of Land Management Contract No. AA851-CT1-45.

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1. INTRODUCTION

In view of proposed outer continental lease sales such as 69, 79, 94, 103, and 106 within the next five years, environmental studies in the eastern Gulf of Mexico region have taken on a special significance. As a means of providing a timely and effective mechanism for the transfer of current study data and information between different project investigators in this area, the New Orleans Outer Continental Shelf (OCS) office of the Bureau of Land Management (BLM) is sponsoring a series of three regional studies meetings.

The First Ternary Eastern Gulf of Mexico Studies Meeting was held at the R. A. Gray Building auditorium in Tallahassee, Florida on October 15 and 16, 1981. Over 50 participants from state and federal governments, and industry attended the meeting. Table 1 presents a list of meeting participants. Ten presentations covering a number of different disciplines and projects in various stages of completion were given.

Among the hand-outs to participants was an Information Kit explaining the Environmental Studies Program administered by the New Orleans OCS office. The kit included the following material:

- Final agenda for the meeting
- New Orleans OCS office information pamphlet
- Quarterly OCS environmental studies report, July-September 1981
- Synopsis of completed and active study contracts for the New Orleans OCS office
- Regional studies plan for the Gulf of Mexico and South Atlantic OCS regions for Fiscal Year 1982
- User's guide to study reports and data from the Bureau of Land Management Outer Continental Shelf Environmental Studies Program
- Proposed 5-year OCS oil and gas leasing schedule
- Flow diagram of OCS office leasing steps

- Petroleum development and recreational fishing abstract
- Gulf of Mexico coastal ecological characterization program abstract
- A review of recent and active contracts
- BLM-OCS Studies Program: Proposed Gulf of Mexico Physical Oceanographic Program abstract.

A copy of the proposed five-year OCS oil and gas leasing schedule is included as Figure 1.

For general information purposes, BLM's User's Guide is the most inclusive source of previous and ongoing study data covering the Gulf of Mexico OCS regions. Copies of the User's Guide are available from the BLM OCS Office in New Orleans, Louisiana. Several of the other items made available during the Tallahassee Studies Meeting, and believed to be of particular interest to readers, are included in an Appendix at the back of this report:

- A review of recent and active BLM contracts relating to the effects of oil and gas activities
- A summary of the FWS/BLM Eastern Gulf of Mexico Coastal Ecological Characterization Studies
- A series of references to BLM-funded FWS mammal and bird studies.

Table 1

MEETING PARTICIPANTS

Name (Specialty)	Affiliation	Address and/or Phone
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Table 1 (continued)

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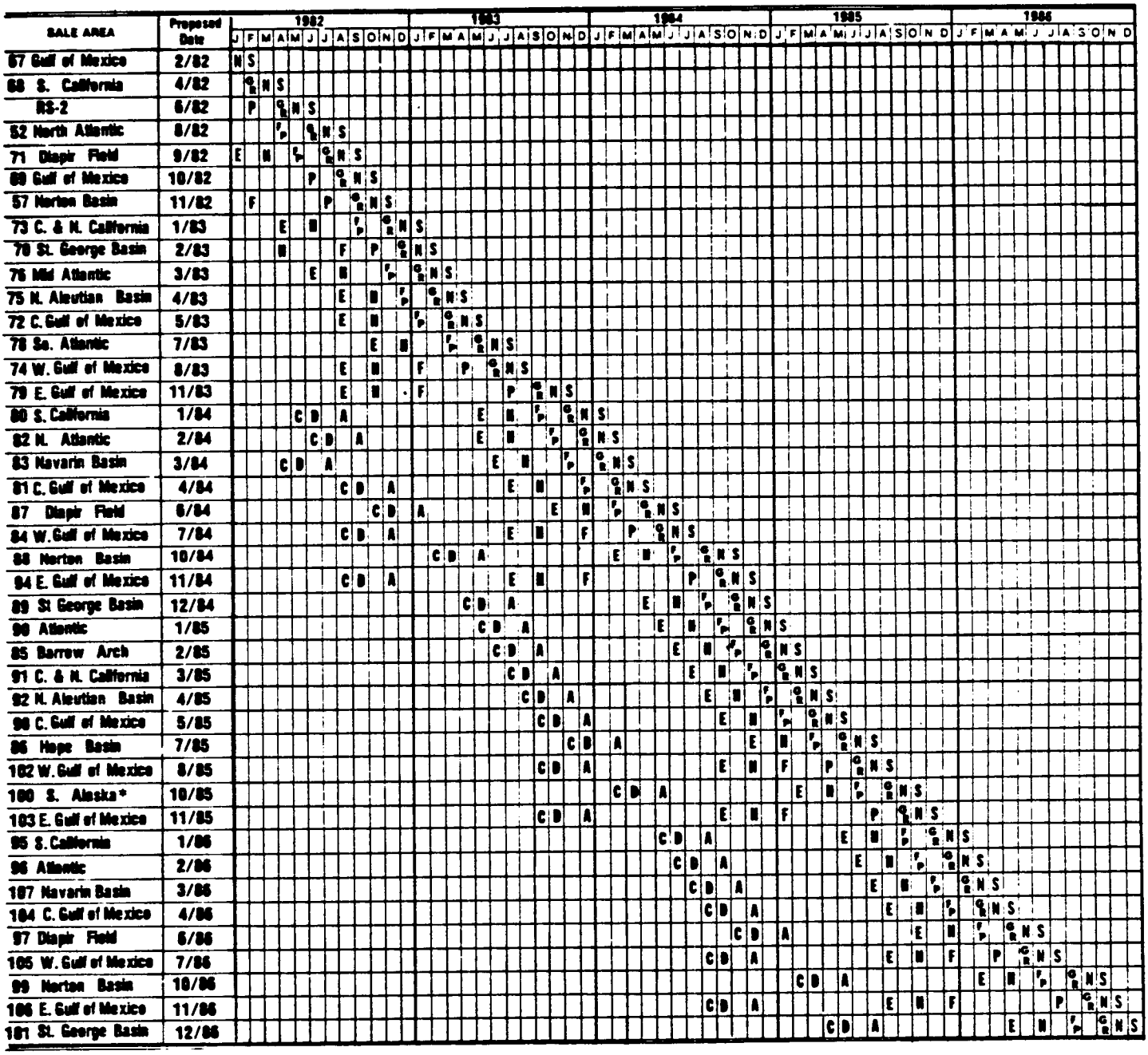

Figure 1. Proposed 5-year OCS oil and gas leasing schedule. (U.S. Department of the Interior, 1981, Proposed five-year offshore leasing program announced: Washington, D.C., new release, July 15, 7 p.)

2. PROPOSED 5-YEAR OCS LEASING SCHEDULE

Dr. Robert Rogers of the BLM New Orleans OCS office called the meeting to order and presented an update on the status of the proposed 5-year (1982 to 1986) oil and gas leasing schedule for the Gulf of Mexico OCS. A number of questions pertaining to lease area divisions and the EIS process were answered before introduction of the first scheduled speaker.

3. GENERAL SESSION

Nine additional presentations were given during the one and one-half day meeting. Table 2 presents a list of the presentation topics and speakers. An abstract for each of these presentations is included in the following section.

The second meeting in this series will be held in Mobile, Alabama, and is scheduled for May, 1982.

Table 2

MEETING AGENDA

Presentation Topic	Speaker
October 15, 1981	
Eastern Gulf of Mexico Coastal Ecological Characterization Studies	Dr. J. Johnson (USFWS - Slidell)
Distribution and Abundance of Endangered and Vulnerable Mammals, Birds and Turtles of the Gulf of Mexico and South Atlantic OCS	Dr. J. Johnson (USFWS - Slidell)
The USGS/BLM Gulf of Mexico Program	Dr. H. Berryhill (USGS - Corpus Christi)
Alabama Coastal Characterization Study	Mr. S. Schomer (FDER)
Circulation Study of the Western Florida Shelf	Mr. C. Cooper (New England Coastal Engineers)
Deep Sea Biology	Dr. W. Pequegnat (TerEco Corp.)
Gulf of Mexico Ecological Mapping Project	Dr. R. Darnell (Texas A&M University)
Standardization of Identifications of Benthic Polychaetous Annelids from the Gulf of Mexico Outer Continental Shelf	Mr. P. Johnson (Vittor & Associates)
October 16, 1981	
Southwest Florida Shelf Ecosystems Study - Overview	Dr. K. Macdonald (Woodward-Clyde Consultants)
Southwest Florida Shelf Ecosystems Study - Benthic Communities	Dr. D. Gettleson (Continental Shelf Associates)

ABSTRACTS

EASTERN GULF OF MEXICO COASTAL ECOLOGICAL CHARACTERIZATION STUDIES

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Principal Investigators: U.S. Fish and Wildlife Service, National Coastal Ecosystems Team, Slidell, Louisiana, and numerous state agencies, universities, and private contractors

Summary

In response to a need for an integrated overview on coastal ecosystems, the U.S. Fish and Wildlife Service's Coastal Ecosystem Project within the Biological Services Program started a series of studies in 1976 called "coastal ecological characterizations". These studies compile existing available information utilizing a holistic approach that identifies functional relationships among natural processes and components of coastal ecosystems. An ecological characterization study is designed primarily to integrate environmental and socioeconomic information in a form useful for planning, impact assessment, and analysis, and to identify research needs. A characterization study is a tool that will enable decisionmakers to address problems including planning for urban and industrial development, determining corridors for pipelines, siting of onshore and offshore facilities for Outer Continental Shelf (OCS) oil and gas activities, and determining priorities for future research.

The products from a characterization study are an ecological atlas, ecosystem models, a narrative report, and an information base or data source appendix. The atlas is a series of maps and diagrams that depict biological resources, including habitats; factors of potential

impact, including land-use practices, socioeconomic activities, environmental perturbations; and ecological processes within the study area. The ecosystem models delineate structural components, functional processes and their integral relationships to physical-chemical processes characteristic of the region. The narrative report contains descriptions of the study area, emphasizing natural and socioeconomic interrelationships, major uses of natural resources, and changes resulting from human activities. The information base or data source appendix includes a record of all references, copies of reprints and unpublished information and data acquired, a report on the location, and a description of unpublished data not acquired.

Since 1976, five characterization studies have been completed or are ongoing for the Gulf of Mexico coast. These studies include the following: Chenier Plain (southwestern Louisiana and southeastern Texas); Mississippi Deltaic Plain Region (southeastern Louisiana and Mississippi); Texas Barrier Islands Region; Northeastern Gulf of Mexico (Alabama and panhandle of Florida); and Southwestern Florida, including the Keys. All of the above studies were co-sponsored by FWS and BLM with the exception of the completed Chenier Plain which was a joint effort between FWS and EPA.

PRODUCTS AND AVAILABILITY DATE BY FISCAL YEAR:

A. Mississippi Deltaic Plain (Southeastern Louisiana and Mississippi) Region (FY80 and 81)

Wicker, K.M. et al. 1980. The Mississippi Deltaic Plain Region habitat mapping study. 464-1:24,000 habitat maps. U.S. Fish and Wildlife Service, Office of Biological Services. FWS/OBS-70/07 (FY 80).

Wicker, K.M. 1980. Mississippi Deltaic Plain Region ecological characterization: a habitat mapping study. A user's guide to the habitat maps. U.S. Fish and Wildlife Service, Office of Biological Services. FWS/OBS-79/07 (FY 80).

Larson, D.K., D. Davis, R. Detro, P. Dumond, E. Liebow, R. Motschall, D. Sorensen, and W. Guidroz. 1980. Mississippi Deltaic Plain Region ecological characterization: a socioeconomic study. Vol. 1. Synthesis papers. U.S. Fish and Wildlife Service, Office of Biological Services. FWS/OBS-79/05 (FY 80).

Larson, D.K., D. Davis, R. Detro, P. Dumond, E. Liebow, R. Motschall, D. Soreensen, and W. Guidroz. 1980. Mississippi Deltaic Plain Region ecological characterization: a socioeconomic study. Vol. 2. Map narratives. U.S. Fish and Wildlife Service, Office of Biological Services. FWS/OBS-79/06 (FY 80).

Larson, D.K., D. Davis, R. Detro, P. Dumond, E. Liebow, R. Motschall, D. Sorensen, and W. Guidroz. 1980. Mississippi Deltaic Plain Region ecological characterization: a socioeconomic study. Vol. 3. 78-1:125,000 maps. U.S. Fish and Wildlife Service, Office of Biological Services. FWS/OBS-79/07 (FY 80).

Mississippi Deltaic Plain Region ecological characterization atlas. 1981. 77 map bases with overlays at 1:100,000 scale. Earth Satellite Corporation, Washington, D.C. (FY 81).

Mississippi Deltaic Plain Region ecological characterization ecosystem models and narrative report. 1981. Private contractor (FY 82).

B. Northeastern Gulf of Mexico (Alabama and panhandle of Florida) (FY 81)

List does not include FY 83 products.

Northwestern Florida Coastal Region ecological characterization: a socioeconomic study. Volume 1: Synthesis Papers and Volume 2: Data Appendix. 1981. Private contractor (FY 82).

Alabama Coastal Region ecological characterization: a socioeconomic study. Volume 1: Synthesis Papers and Volume 2: Data Appendix. 1981. Alabama Geological Survey, Tuscaloosa, Alabama (FY 82).

Alabama Coastal Region ecological characterization: a habitat mapping study. 24-1:24,000 maps (1955). 1981. Alabama Geological Survey, Tuscaloosa, Alabama (FY 82).

Northeastern Gulf of Mexico ecological characterization: a habitat mapping study: 160-1:24,000 maps (1979). 1981. U.S. Fish and Wildlife Service, National Wetlands Inventory, St. Petersburg, Florida (FY 82).

Northwestern Florida Coastal Region ecological characterization: environmental synthesis papers and conceptual models (seven drainage basins). 1981. Florida Department of Environmental Regulation, Tallahassee, Florida (FY 82).

Alabama Coastal Region ecological characterization: environmental synthesis papers and conceptual models (two drainage basins). 1981. Alabama Geological Survey, Tuscaloosa, Alabama (FY 82).

A photographic and mapping survey of seagrasses for Northwestern Florida. 1981. Environmental Protection Agency, Las Vegas, Nevada (FY 81).

D. SOUTHWESTERN FLORIDA INCLUDING KEYS (FY 81)

List does not include FY 82 and FY 83 products.

Southwestern Florida Coastal Region ecological characterization: a socioeconomic study. Volume 1: Synthesis Papers and Volume 2: Data Appendix. 1981. U.S. Fish and Wildlife Service, Office of Biological Services. Private contractor (FY 82).

Southwestern Florida Coastal Region ecological characterization: a wetland habitat mapping study. 250-1:24,000 maps. 1980. U.S. Fish and Wildlife Service, National Wetlands Inventory, St. Petersburg, Florida (FY 80).

Southwestern Florida Coastal Region ecological characterization: environmental synthesis papers and conceptual models (five drainage basins). 1981. Florida Department of Environmental Regulation, Tallahassee, Florida (FY 82).

Red mangrove community profile. 1981. W.E. Odum, Univ. of Virginia, Charlottesville, Virginia (FY 81).

Turtle grass community profile. 1981. J.C. Ziemann, Univ. of Virginia, Charlottesville, Virginia (FY 81).

A photographic and mapping survey of seagrasses and coral reef for selected areas of Southwestern Florida. 1981. Environmental Protection Agency, Las Vegas, Nevada (FY 81).

An assessment of endangered and threatened plants (Federal and State) for Southwestern Florida. 1981. E. McRoy, Univ. of South Florida. Tampa, Florida (FY 81).

An assessment of endangered and threatened freshwater and upland animals (Federal and State) for Southwestern Florida. 1981. G. Wolfenden, Univ. of South Florida. Tampa, Florida (FY 81).

DISTRIBUTION AND ABUNDANCE OF ENDANGERED AND VULNERABLE MAMMALS, BIRDS AND TURTLES OF THE GULF OF MEXICO AND SOUTH ATLANTIC OCS

Objectives

1. Investigate the spatial distribution of marine mammals, birds and turtles and associated physical parameters such as currents, bathymetric regions, or temperature regimes.

2. Determine seasonal movements or changes in species' distribution over time.

3. Identify areas of special biological significance for feeding, migration, and maintenance of the populations encountered.

4. Provide a basis for estimating abundance of individual species within the overall study area.

5. Amplify the understanding of poorly known species.

6. Formulate specific questions and investigative lines for subsequent research relevant to oil and gas development.

7. Investigate the effects of oil on marine turtle nesting beaches.

Study Area

The study will encompass the coastal water and continental shelf of the United States between Merritt Island, Florida and the U.S./Mexican boundary in Texas. The seaward extension of study areas will be to the 200 m isobath or 222 km from the shoreline. Aerial surveys in FY 81 will be limited to four systematic subunits in the vicinity of: Brownsville, Texas; Marsh Island, Louisiana; Naples, Florida; and Merritt Island, Florida (Figure 2). Intervening areas will also be sampled but less intensively.

Data Collection

Field sampling in FY 81 will be identical to that used in FY 80 to maintain consistency throughout the year. The four subunits of the study area are sampled on a bi-monthly schedule. Each subunit is surveyed on three consecutive days during each bi-monthly period. Intervening areas between subunits are sampled to allow hypothesis testing, to establish faunal comparability and to investigate unique geographic features. Aerial surveys are made from a Beachraft AT-11 or similar place suitable for offshore surveys. Historical data are being assembled from whaling and maritime records and will be analyzed for comparative purposes.

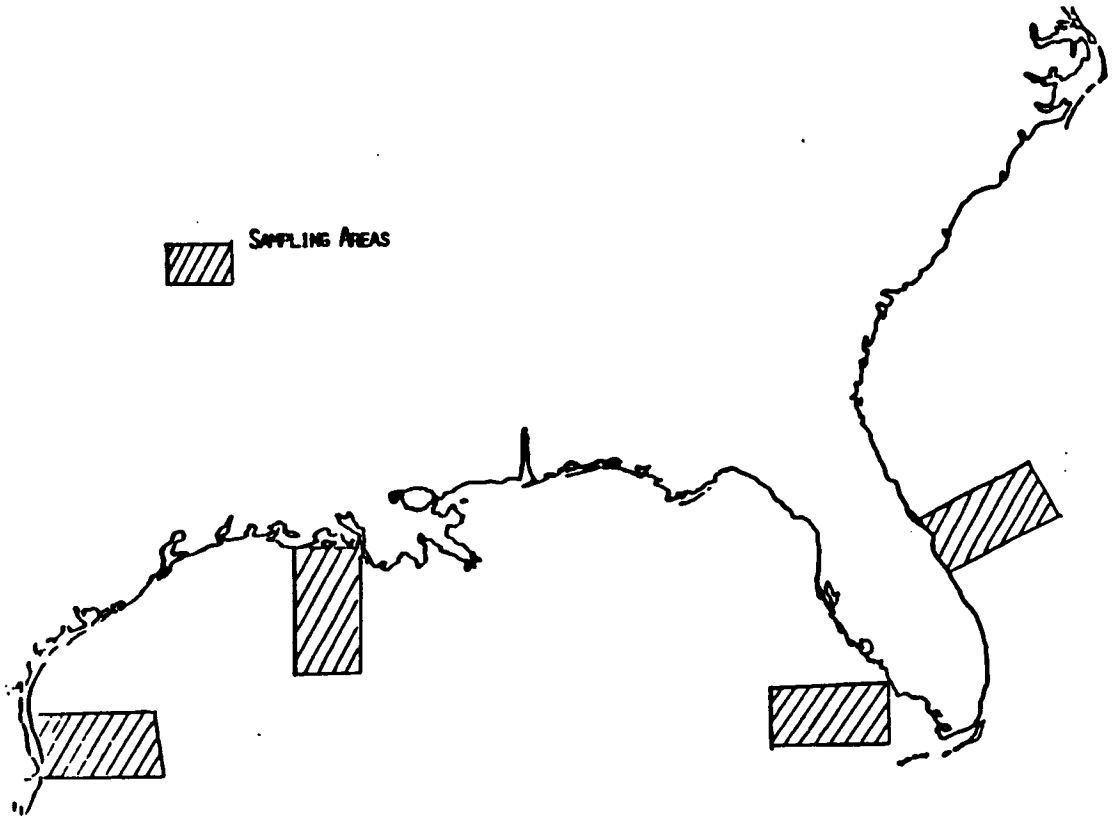

Figure 2. Marine Mammals, Birds and Turtles of OCS areas in the Gulf of Mexico and South Atlantic.

Results

The data base consists of 19,016 observations of birds, mammals, turtles, and associated features. The number of observations from any one subunit varies from 2,907 in the Brownsville, Texas subunit to 5,276 in the Naples, Florida subunit. Seasonal samples range from 4,661 observations in February to 1,360 in December. In all nearly 6,000 observations of species of primary interest are available in situations compatible with the statistical model for abundance estimates. Additionally, observations of over 160 oil slicks were made during the study.

Birds

During the aerial surveys data were obtained on 22 species of birds. Additional data were secured on distribution, habits and associations in both precise and more generalized groupings.

Royal Terns and Laughing Gulls were the most frequently sighted species. They were seen in nearshore waters, often in scavenging situations associated with commercial fishing boats and maritime traffic. These species were especially prominent in Louisiana and Texas waters where maximal shrimp activity is located.

The endangered Brown Pelican was encountered in Texas where populations are nearly extinct. Fourteen pelicans were observed in Laguna Madre. This area is commonly used rooting and nesting site for this species. No pelicans were observed in Louisiana west of the Mississippi River delta. Small groups are known in the vicinity of the Chandeleur Islands east of the delta.

Many offshore and pelagic birds were also present. Subadult and adult Masked Boobies were recorded 75-180 km off the Texas coast in August. One Masked Booby was observed in association with a whale shark and a large fish school. Masked Boobies were observed in low densities in the same area in 1979 and were one of the birds most significantly oiled during the period in which Ixtoc oil was in Texas waters. A single Brown Booby has been recorded during this flight series.

Sooty Terns which nest in great numbers on the Dry Tortugas were recorded commonly in June and August in Florida waters. Sooty Terns were not noted in Texas or Louisiana waters during the same period. Bridled Terns were evident in June only off Texas but in all areas surveyed in August. Bridled Terns have been noted to commonly perch on floating debris, which may expose them to oiling when in the are of a spill or contamination.

To date only Audubon's Shearwater and Greater Shearwater have been recorded off Merritt Island and Naples, Florida, respectively. Tropicbirds are relatively rare within the study area. Two were seen off eastern Florida approximately 75 km from the coast and one was noted in

association with Royal Terns and Laughing Gulls following a trawler in Louisiana waters.

Although Storm Petrels were seen in all subunits of the study area in June, they were conspicuous only in south Texas and eastern Florida during August. The repeated sightings of Cory's Shearwater in Texas waters in June and August at distances of 90 to 180 km offshore is important considering the rarity of previous records exclusive of the pilot phases of this study. The species is occasionally encountered off eastern Florida.

During an exploratory flight along the Gulf Stream of eastern Florida, it was confirmed that several bird species (Cory's Shearwater, Bridled Terns, and Storm Petrels) follow the Gulf Stream and approach near shore areas with the current. As a result, these offshore species were recorded 35 to 55 km offshore.

An exploratory/transit flight from Naples, Florida, to Brownsville, Texas across the Gulf in August provided a basis of investigating bird densities in the central Gulf. Especially surprising were over 500 land birds (mostly warblers) migrating across the open ocean. Such birds are expected to be present in OCS areas only during spring and fall migration periods.

Marine Mammals

Perhaps the most exciting observations to date have been the repeated sightings of Sperm Whales off the Texas Coast. Together with those of the Pilot Study these represent a viable population of this endangered species. Living Sperm Whales had not been recorded in Texas waters during this century. A total of 16 sightings of Sperm Whales were made in August and seven were observed in June. In August, the whales (including several mother/calf pairs) were in water up to 900 m in depth. This is in contrast to previous sightings in June and in 1979 when sightings were in waters in excess of 1400 m. The sightings in August were subsequent to the passage of Hurricane Allen and may reflect movements of the whales in response to weather conditions. During a transgulf survey Sperm Whales were noted up to 370 km from the coast, but the majority were only 90 to 110 km offshore from Brownsville, Texas. A total of four young have been recorded accompanied by females. In some instances solitary males were encountered.

A diverse fauna of marine mammals is present in waters off eastern Florida. Short-finned Pilot Whales, False Killer Whales, Risso's Dolphins and Beaked Whales (probably Mesoplodon) were recorded in June. False Killer Whales and Beaked Whales were noted in August. Increases in dolphin sightings in the eastern and central Gulf in August in relation to June potentially reflect seasonal movements that must await confirmation.

The presence of mother/calf pairs in several dolphin species is best detected by analysis of color photographs taken during surveys. Photographic interpretation usually allow more precise group sizes to be included in the statistical analyses.

Turtles

Geographic differences in the distribution and density of marine turtles are conspicuous on the basis of data acquired. In June and August less than ten turtles were observed in either Texas or Louisiana survey subunits. These consisted of Kemp's Ridley Turtles and Loggerhead Turtles. In contrast to the central and Western Gulf, both survey subunits in Florida had sightings totaling over 100 during the same period. The Merritt Island area is a major nesting site for both Green and Loggerhead Turtles, whereas the west coast of Florida has only sparse nesting by Loggerheads. The presence of large numbers of Loggerheads near Naples, Florida, possibly reflects the large proportion of individuals that do not breed every year or non-reproductive juveniles and subadults in feeding grounds. Nesting diminishes in August and September; thus, October and later flights will allow investigation of densities not related to nesting. Turtles sighted during flights along the Gulf Stream off eastern Florida were concentrated shoreward from the boundary of the current. Turtles were largely absent from the Gulf Stream current areas.

Historical Data

Historical data collection has been initiated with the identification of over 50 repositories of whaling logs, ships journals and related materials. Journals and logbooks are currently being screened for records of historical occurrences previously unavailable in the scientific literature.

THE USGS/BLM GULF OF MEXICO PROGRAM
Contract No.: AA851-IA1-16

The U.S. Geological Survey has been cooperating with the Bureau of Land Management since 1974 in the collection of geophysical data and the systematic mapping of seafloor geology and geologic hazards in the Gulf of Mexico OCS areas. These efforts thus far have produced the South Texas sheets of the Marine Atlas Series and detailed maps of the mudslide areas of the Mississippi delta. Additional studies to be finished in FY 82 are topical sheets of the Marine Atlas Series covering the western Louisiana shelf, a map of the shallow geology and geologic hazards of western Mississippi Sound from the Chandeleurs eastward to about Mobile Bay, an eastward extension of the detailed Mississippi delta map along the shelf edge to the longitude of Mobile Bay, and a westward extension of the same map to the head of the Mississippi Canyon, plus a regional map of shallow geology and geologic hazards for the entire upper slope in the northern Gulf from water depths of 200 m to about 1000 m.

Finally, the USGS will synthesize all of these studies, plus other available geophysical data into a single map of the shallow geology and geologic hazards of all of the Gulf of Mexico OCS areas. It is tentatively planned for presentation on standard 1° x 2° quadrangles at a scale of 1:250,000 and is scheduled for completion in the fall of 1982.

ALABAMA COASTAL CHARACTERIZATION STUDY

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In August 1980, the Geological Survey of Alabama and the U.S. Fish and Wildlife Service initiated a cooperative study of coastal Alabama (Contract No. AA851-MU0-20). The study includes Mobile and Baldwin Counties and is divided into three work tasks:

Task I. - Coastal Alabama Environmental Literature Review and Synthesis.

Task II. - Socioeconomic Data Collection and Synthesis for Coastal Alabama.

Task III. - Historical Habitat Mapping of Coastal Alabama

Task I consists of two subtasks that will generate three final products. Subtask I involves the production of a computer-based bibliography of published and unpublished reports on the biology, climatology, geology and geography, hydrology, and socioeconomic structure of the area. References are entered and can be retrieved by author, source, and key words. Also included are references to ongoing studies in coastal Alabama and contact agencies. Final products will include a computer tape containing the FAMULUS Information System and a user's manual to the system. Data collected for the coastal bibliography will be used to prepare a two-part environmental synthesis report. The first portion will contain a detailed description of the natural environment of the area. The second section will present a conceptual model and supporting text on four natural (freshwater, upland terrestrial, estuarine, and outer continental shelf) and two manipulated (urban industrial and agricultural) ecosystems in Mobile and Baldwin Counties and also include individual models for the estuarine ecosystem and one of its components, the marsh.

Nine socioeconomic synthesis papers and a companion data appendix will be producted by Task II. Synthesis paper topics include social and demographic characteristics, industrial and residential development, agricultural production, minerals production, commercial fishing, transportation, recreation/tourism industry, multiple-use conflicts, and environmental issues and regulations.

Task III involves the classification of wetland habitats that existed in coastal Alabama circa 1955. Habitat types will be delineated on 9" by 9" black-and-white photography using the U.S. Fish and Wildlife Service Wetlands Classibase 7.5-minute quadrangle maps, labeled, and planimetered. Final products for this task will include the 27 stable base maps and a user's guide.

Progress Report Abstract

Contract No. AA851-MU0-20

Task V - Northwestern and Southwestern Florida
Environmental Literature Search and Synthesis

Cooperative Agreement Between Florida Department of Environmental Regulation and U.S. Fish & Wildlife Service

Study Goals

The study area encompasses a total of 11 Florida watersheds (Figure 3); seven (7) along the southwestern coast extending from the Keys and Florida Bay through Crystal River, and four (4) along the northwestern coast from Apalachicola Bay through Pensacola Bay. Two products are forthcoming from this study:

1. Both published and unpublished (grey) literature pertaining to ecological conditions and processes in these areas is being compiled and reviewed. Bibliographic references for these documents are being entered into an interactive data base on the Northeast Regional Data Center in Gainesville, Florida. The references are key worded using a controlled vocabulary according to geographic coverage and subject matter (see Figure 4 for further explanation).

2. The reviewed material is being used as a basis for 11 ecological characterization (or synthesis) papers. The synthesis papers provide a comprehensive review of existing ecological information with emphasis on the coastal and estuarine setting. Toward this end a conceptual model of energy and material flow through each watershed is first constructed to aid the authors (and readers) in assessing the study area as an integrated ecological system.

Schedule and Status Report

Figure 5 presents a pert chart of original due dates and milestones as projected upon initiation of the study. A two month extension has recently been added to this schedule to include the Crystal and Anclote Rivers watershed northwest of Tampa (U.S.G.S. Hydrologic Unit 03100207). Overall completion is scheduled for July, 1982.

Regarding the bibliographic data base, approximately 8,000 references have been coded to date. Twenty percent of these have been key worded. Initial completion of this phase of data base construction is scheduled for December, 1981: however, this is expected to be an ongoing task for the duration of the project. The data base itself is operational although it presently contains only 10 percent of the coded

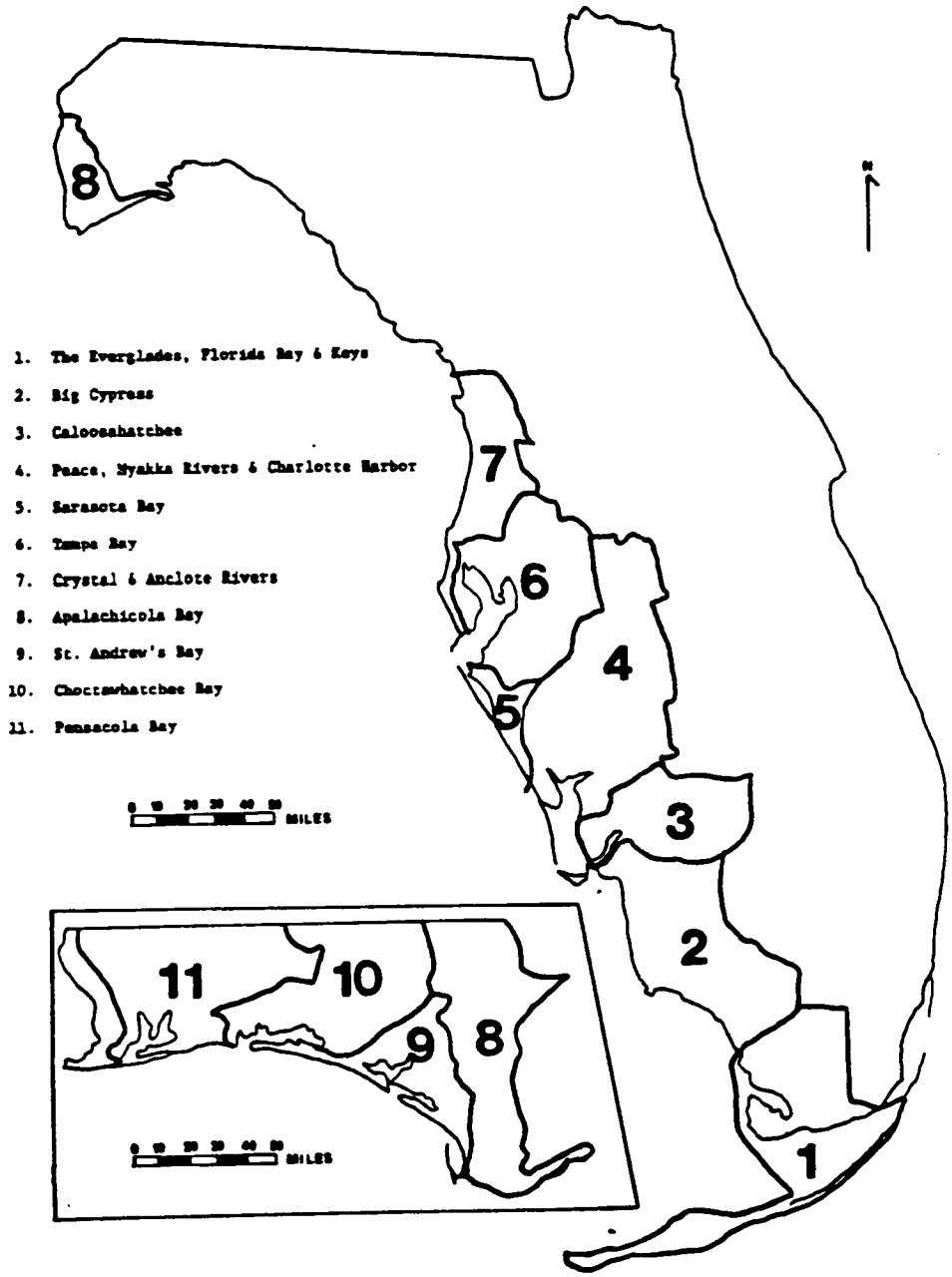

Figure 3. Study area boundaries for the Florida Gulf Coast literature search and synthesis.

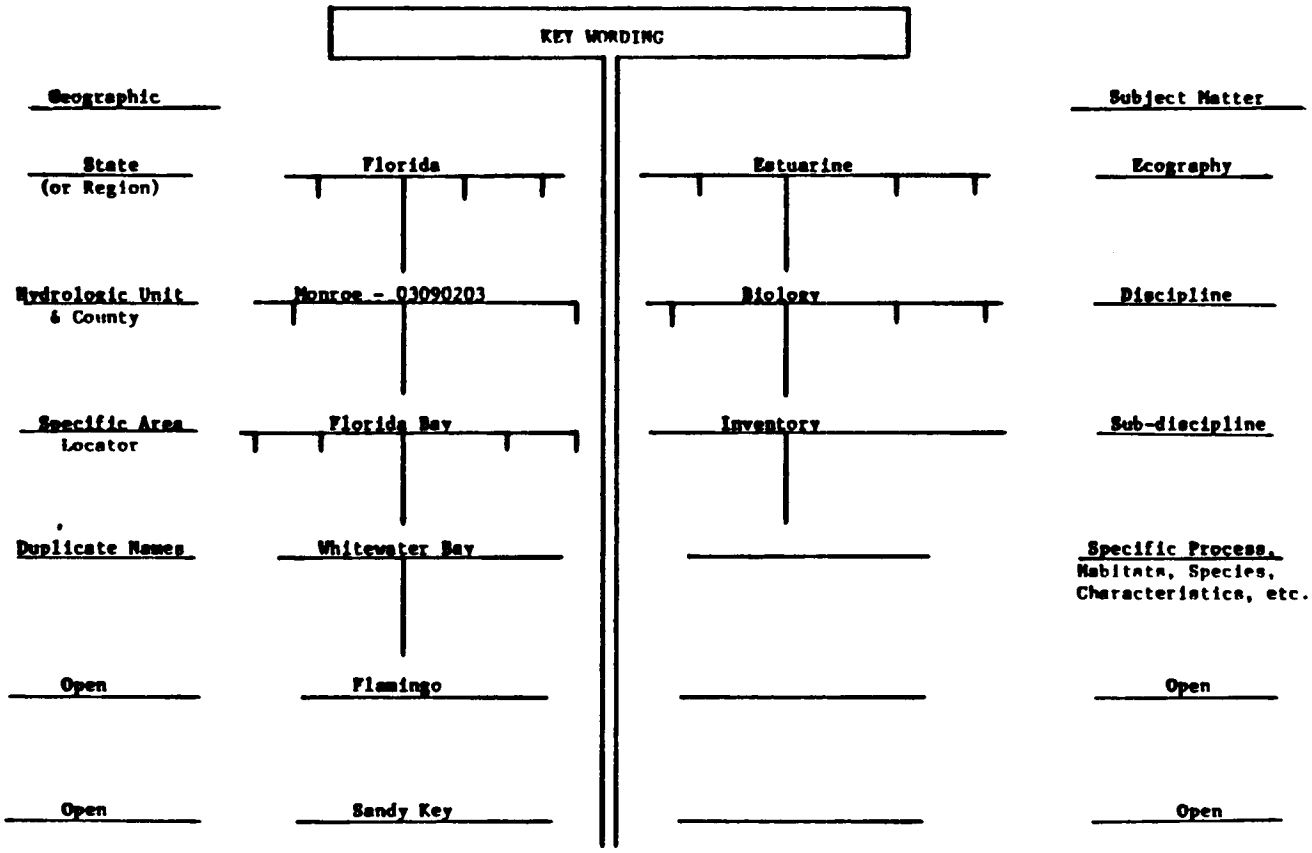

Figure 4. Example key wording of a reference using a two tier hierarchy of geographic and subject keywords.

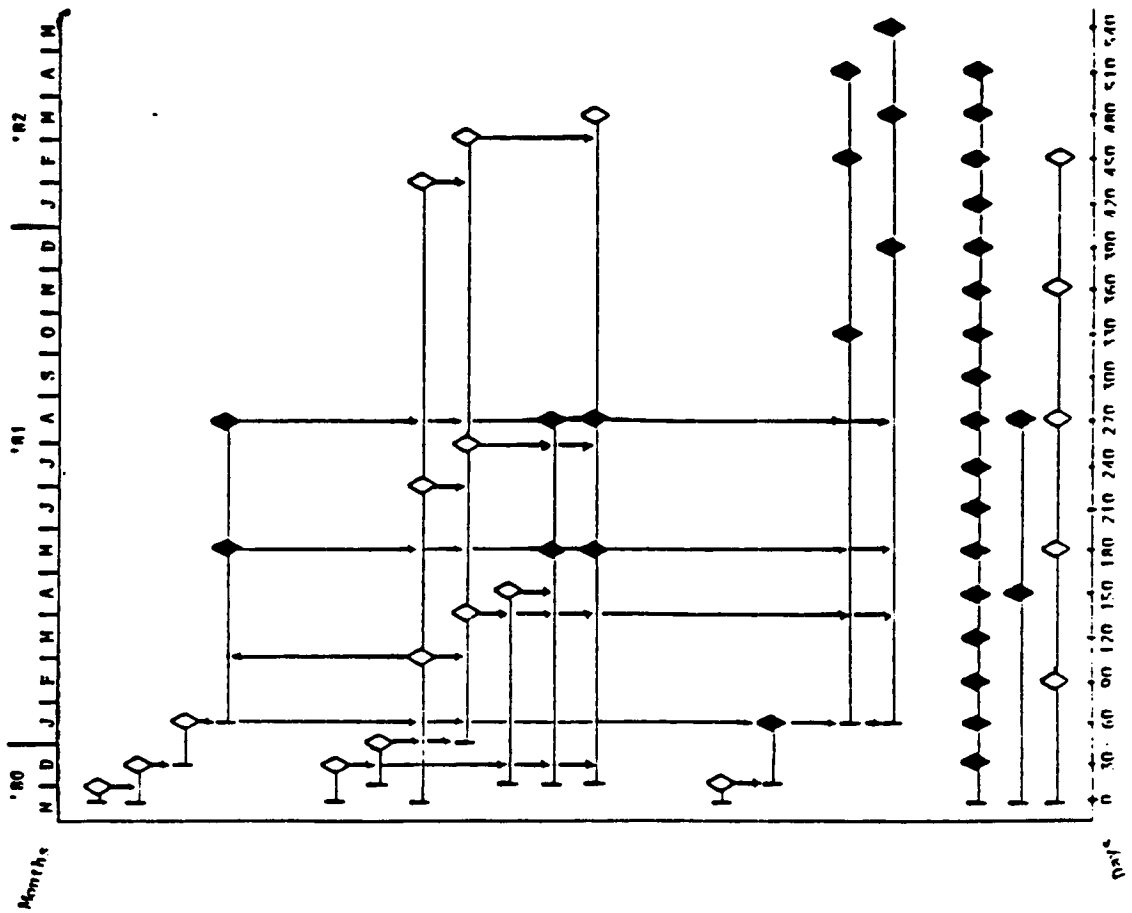

Figure 5. Schedule of work and product due dates for the Florida Gulf Coast literature search and synthesis.

information. The remaining 90 percent is scheduled for entry as it becomes available from the key-to-tape subcontractor.

Regarding the synthesis papers, first drafts for the southwest coast watersheds are currently being prepared. These were originally scheduled for completion in late October although a more realistic date is mid to late December. Schedule chronological order for completing the characterizations is from south to north beginning with the Keys and ending with Pensacola Bay.

ABSTRACT

CIRCULATION STUDY OF THE WESTERN FLORIDA SHELF

Study for: Bureau of Land Management
Contract No. AA851-CT0-72

Performed by: New England Coastal Engineers

Existing and prospective energy-related development on the Western Florida Shelf pose potential negative impacts to other uses of the shelf and coastline. In order to investigate impacts, the Bureau of Land Management has recently funded the work described in this paper which involves application of a circulation model to the shelf. This model is to provide information on:

1. Surface current velocities for input into oil spill trajectory models,

2. Mid-water circulation to predict dissolved and suspended matter transport,

3. Near bottom currents to predict long-term sediment transport, and

4. The important driving mechanisms affecting the first three items above.

To adequately fulfill BLM's modeling needs, it is essential that a 3-dimensional circulation model be used. The model which is being applied uses the so-called primitive equations (i.e., conservation of momentum). These equations are modified using two numerical techniques - a Galerkin technique in the vertical direction and an explicit finite difference technique in horizontal space and time. The result is a much simplified set of equations which can be economically solved. A brief review of the model formulation is given.

A part of the study, review of the existing data base in the region has been completed. The results of the review are summarized. Two studies provide current meter data for comparison to model results: one, a 1978 25-day study off Cedar Key, Florida in the northern region of the Gulf; the other, the 1973-74 Shelf Dynamics Experiment conducted along the shelf break south of Tampa. Accumulation and review of the data base has been completed and is summarized in Figure 6.

Initial model set-up and tuning was completed this summer and more recent modeling activity has focused on tuning and comparing the model with the Cedar Keys data. Figure 7 shows the horizontal grid system being presently used in the modeling. Prior to the west Florida shelf study the Cedar Keys data had not been analyzed so in order to make meaningful comparisons with the model some analysis of the data has been

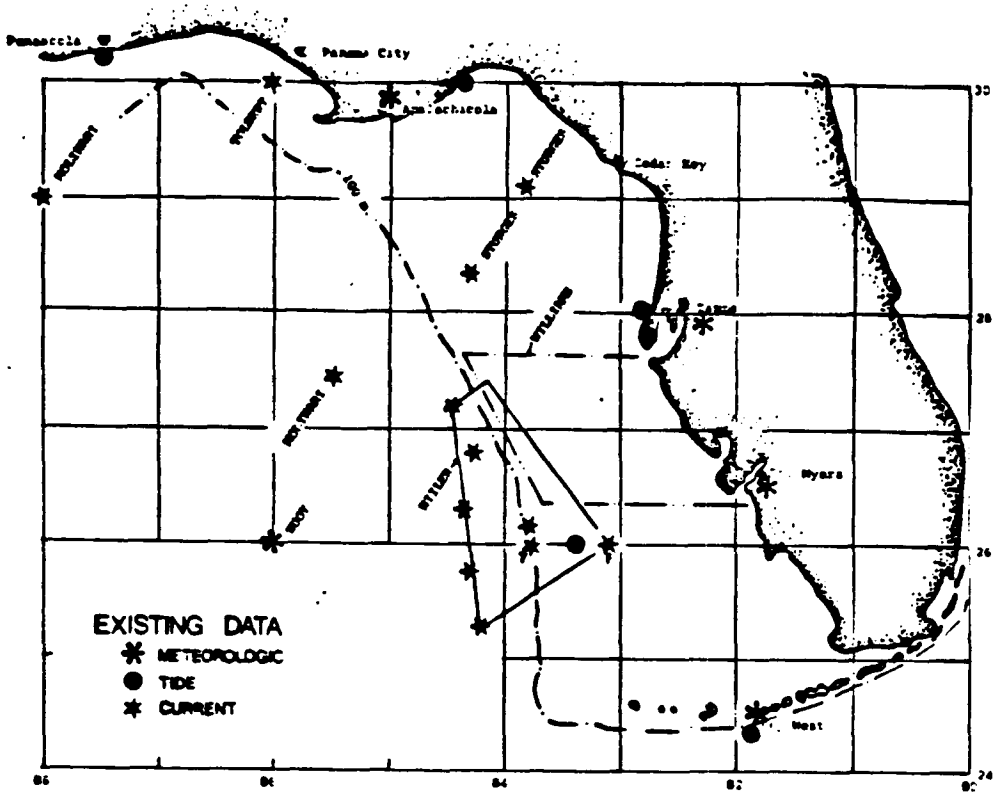

Figure 6. Sites of major sources of oceanographic and meteorologic data on the West Florida shelf.

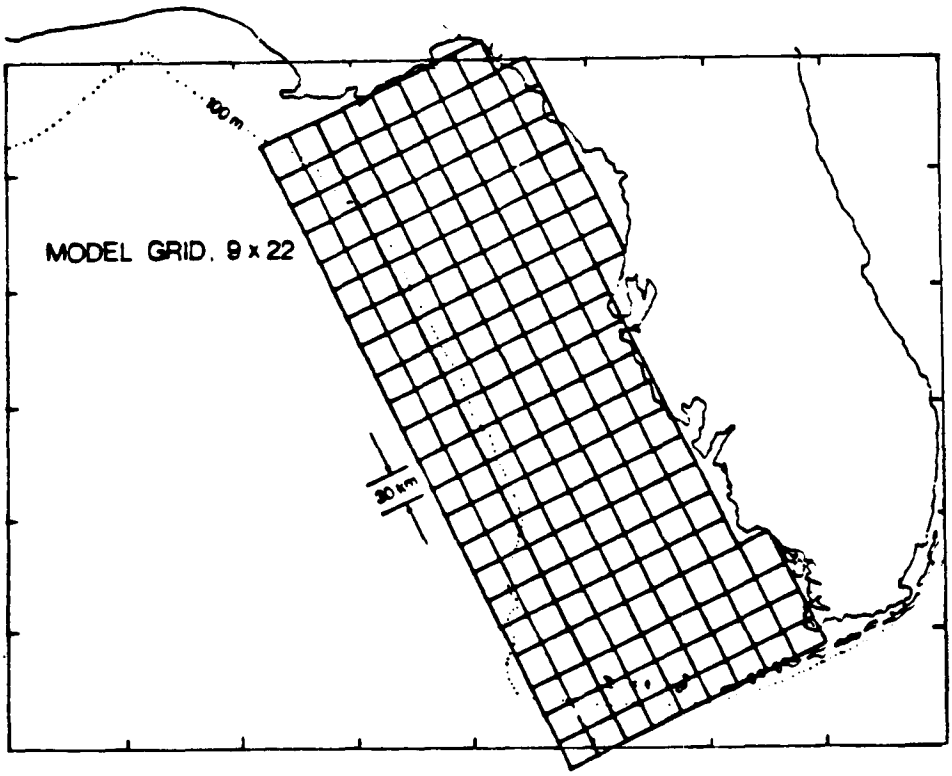

Figure 7. Horizontal grid used in model of the West Florida Shelf.

performed, and these results are summarized. The analysis shows the currents to be strongly dominated by the local winds particularly at the inshore data site. While wind is dominate at the offshore site, residual currents of yet undetermined origin constitute an important portion of the signal. Initial model comparisons with the real time data indicate a good correlation with the data though further study is planned to improve the comparison. These aspects of the modeling are summarized as well as future modeling efforts planned for the remainder of the study.

DEEP SEA BIOLOGY

Contract No. AA851-CT1-12

Willis E. Pequegnat and Linda H. Pequegnat
TerEco Corporation
College Station, TX

This project is studying the macroepibenthic vertebrate and invertebrate organisms living on the Outer Continental Shelf, continental slope, and abyssal plain of the Gulf of Mexico from DeSota Canyon on the east to the area off Brownsville, Texas (Figure 8). It is based almost exclusively upon biological and physicochemical data collected by Dr. Willis Pequegnat during the years 1964 to 1973. The principal emphasis is upon communities that exist in the Gulf north of the 25th paralled and below depth of 1000 m. For the sake of ecological perspective, the study examines and compares communities that exist above depths of 1000 m, thus producing a synthesis of the 1976 and present studies. It also compares the results of communities found in the study area with those stations taken on the shelf, slope, and plain from Brownsville, Texas, south to the Gulf of Campeche. This study not only complements the previous report on deep Gulf communities prepared by TerEco for BLM in 1976, but also extends that report by detailing the species found at each station. Thus, approximately 192 stations will be analyzed, involving over 2300 samples, which contain about 500 species and between 150,000 and 200,000 individuals.

Since the project began on February 2, 1981, we have sorted, curated, and inventoried some 2300 samples of unidentified material from the study area. These were sorted into 30 taxonomic groups. These lots of specimens have been distributed to appropriate taxonomic experts, about half of whom have completed their study of the specimens and returned collections and notes to us. Some taxonomic groups are being completed less rapidly than others, due to a large number of new species or other taxa encountered.

We have also drawn together and consolidated our data on previously identified material from the deep-sea stations involved in this study, creating two sets of data books: one based on species (listing all the station locations at which each species was taken) and the other based on station locations (listing all the species identified thus far from each station). These data books are set up so that new identifications coming in from the taxonomic specialists can be added to provide eventually a complete data profile by species and by station.

Data analysis and preliminary interpretation is well underway. For many taxonomic groups completed, geographic and vertical distributions have been plotted, and notes are being assembled for preparation of a draft report. The schedule for completion of the project is somewhat uncertain at this time, due to a pending proposal to the BLM for analysis of deep-sea photos from the same stations.

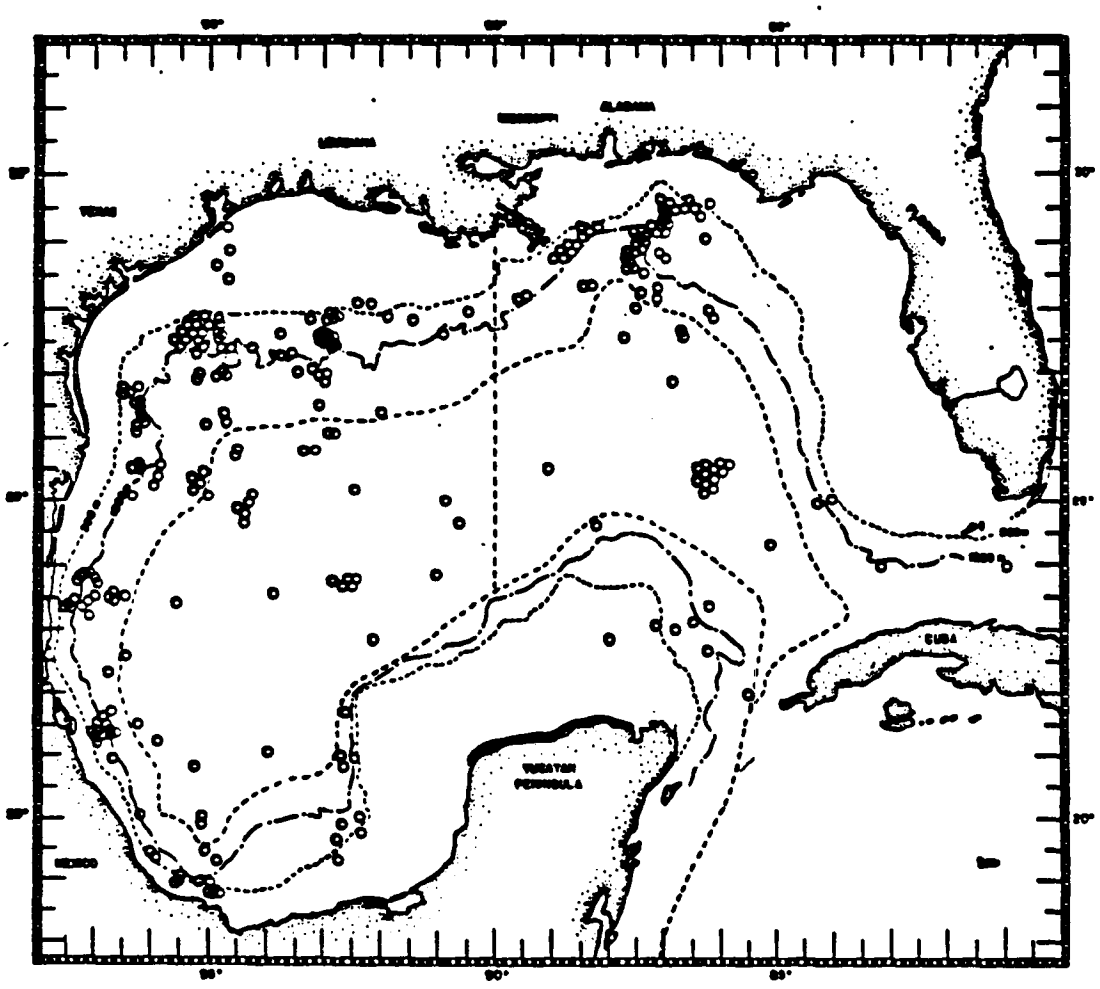

Figure 8. Map of Gulf of Mexico deep-sea benthic stations which are being analyzed for the study of macroepibenthic vertebrate and invertebrate organisms living on the OCS, continental slope, and abyssal plain from DeSoto Canyon to the area off Brownsville, TX.

GULF OF MEXICO ECOLOGICAL MAPPING PROJECT

Project No.: IPA-0-1

Rezneat M. Darnell
Department of Oceanography
Texas A & M University
College Station, TX

In fostering the orderly development of subsurface mineral resources of the continental shelf, the New Orleans OCS Office of BLM must also give due consideration to maintenance of environmental quality and protection of the living resources. In response to these concerns, the present project is designed to provide information concerning the distribution of biological resources which must be protected. Specific goals of the project include:

- Mapping of distribution patterns of shelf species and faunal assemblages,
- Location of areas of particular biological and ecological concern, and
- Definition of knowledge gaps and recommendation of studies to fill the gaps.

In order to accomplish these goals it has been necessary to locate and acquire all major data bases dealing with distribution patterns of the shelf biota. These then are analyzed to provide as complete a picture as possible of the patterns of interest. At present, two primary reports are anticipated. The first, dealing with the western shelf (Rio Grande to Mississippi River) should be completed by December 1, 1981. Due to the remarkable coverage of the western shelf data bases, for about 60 of the most common fish and invertebrate species the distribution patterns are being mapped on a seasonal basis. For an additional hundred or so species the data are being mapped on an annual basis.

Coverage for the eastern Gulf shelf appears to be less complete, but even here seasonal patterns for many species should be available. The eastern Gulf report should be complete by September 1, 1982.

Each report should include a terse narrative and several hundred maps. These maps will delineate the distribution patterns of individual species as well as the patterns of zonation of the faunal assemblages and location of areas of special concern.

STANDARDIZATION OF IDENTIFICATIONS OF BENTHIC POLYCHAETOUS ANNELIDS FROM THE GULF OF MEXICO OUTER CONTINENTAL SHELF

Contract No.: AA551-CT9-35

Contractor: Barry A. Vittor & Associates, Inc.
Mobile, AL

Project Manager: Dr. Barry A. Vittor
Technical Coordinator: Paul G. Johnson

A major component of the biological characterization of offshore lease areas by the Bureau of Land management has been the collection and analysis of thousands of benthic samples for polychaetous annelids. These small infaunal organisms have long been found to dominate marine soft bottom communities in terms of numbers of species and individuals, and were instrumental in the delineation of community assemblages along the continental shelf of the northern Gulf of Mexico. Their demonstrated sensitivity to environmental stress also makes them ideal candidates as possible indicators of environmental changes during future monitoring of these lease areas. This, however, requires repeatability in the taxonomic characterization of an area through accurate identification to the species level. In view of the difficulties encountered in identifying these organisms, the scattered nature of the relevant literature, and the large number of previously undescribed species encountered during BLM offshore studies, it was felt desirable to standardize identifications of all species represented in the major BLM baseline studies (South Texas and MAFLA) and the Central Gulf Production Platform Study so that results of these studies may be inter-compared and also compared to future monitoring studies. This is being accomplished through the acquisition, reexamination, and verification of all polychaete voucher material represented in the above collections. The principal product of this research effort will be a comprehensive series of taxonomic keys and descriptions for the 600+ species of polychaetes found in these Gulf collections, representing 296 general in 38 families. Illustrations of diagnostic features (Figure 9), distributional maps (Figure 10), and habitat information for each species will be provided. An introductory section will describe the geographical setting, materials and methodologies, terminology and techniques used in polychaete identifications, and general information on the biology, ecology and zoogeography of Gulf polychaetes. Intended to document and expedite the identification of the diverse, and often unique polychaete fauna of the Gulf of Mexico, this publication will provide a common, comparable taxonomic basis for future benthic macroinfaunal investigations in this area.

To date, over 300 of the estimated 600 species to be included in this publication have been described and figured. Of these, approximately 63 species are newly reported from the northern Gulf of Mexico and 84 species appear to be new to science. Although only 11 of

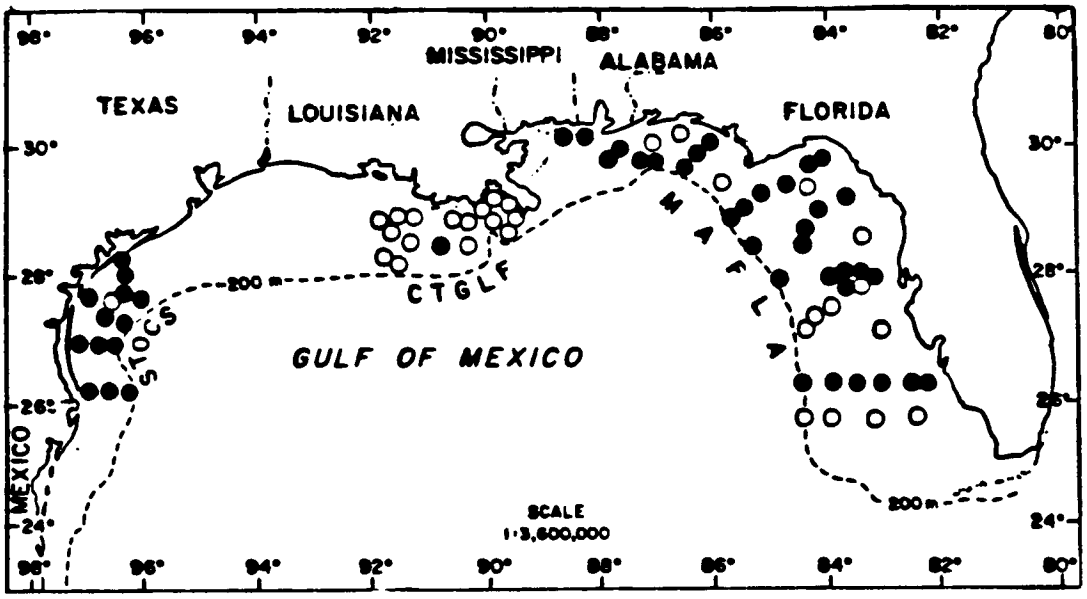

Figure 9. Distribution of Lumbrineris verrilli on the outer continental shelf of the northern Gulf of Mexico based on its occurrence (o) in BLM-OCS monitoring programs, (1975-1978).

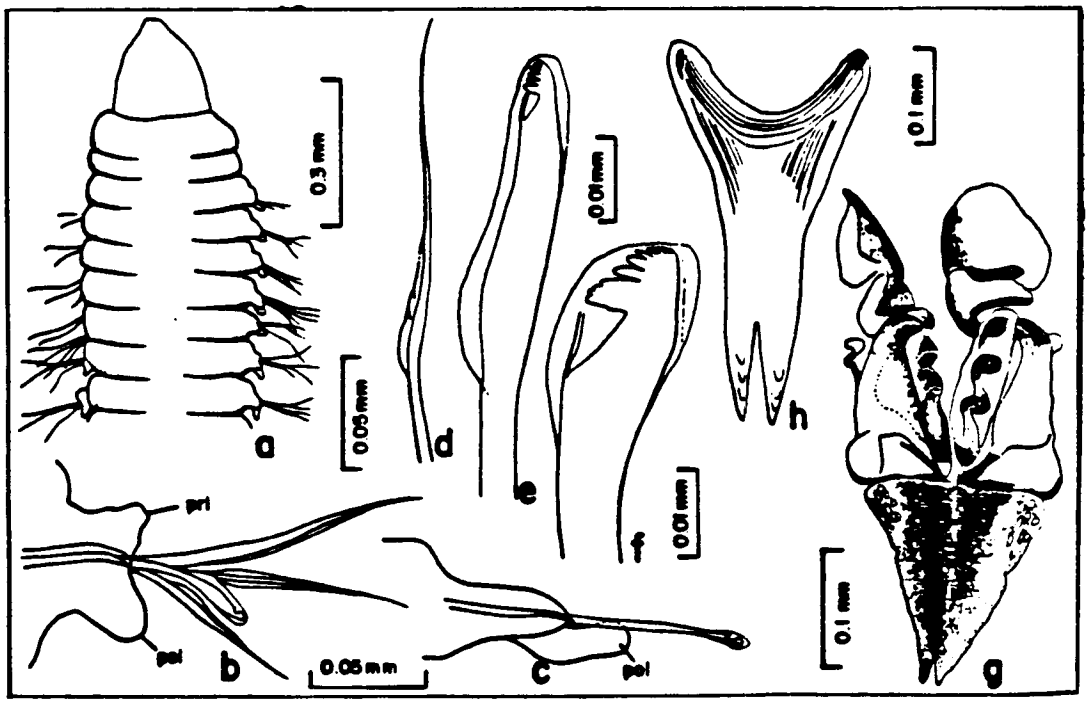

Figure 10. Lumbrineris verrilli: a, anterior end; b, parapodium from setiger 8; c, parapodium from posterior region; d, limbate seta from setiger 17; e, hooded hook from setiger 5; f, same, from setiger 28; g, maxillae; h, mandibles.

the 38 family chapters have been completed, they include the largest and most difficult to deal with, representing over 50 percent of the total species to be included and 858 pages of the anticipated 1500-page manuscript. These chapters are presently undergoing an outside review process which will assure their credibility with other recognized experts in the field of polychaete taxonomy. Several additional family chapters are nearing completion, and will be followed by analysis of the large number of smaller families. A recent modification to the contract allows for incorporation of polychaete collections from the ongoing Southwest Florida Shelf Ecosystems Study and the IXTOC Oil Spill Study, thus enhancing the intent and scope of the taxonomic standardization process.

SOUTHWEST FLORIDA SHELF ECOSYSTEM STUDY

Contract Nos.: AA851-CT0-50/CT1-45

Contractor: Woodward-Clyde Consultants
Project Manager: Dr. Keith B. Macdonald

Subcontractor: Continental Shelf Associates
Subcontractor Manager: Dr. David A. Gettleson

The primary goals of this broad-based, multi-year program are to (1) obtain environmental data on the impacts of potential petroleum exploration and production activities on the Southwest Florida Shelf, and (2) provide relevant information to decision makers in the BLM's OCS Minerals Management Program.

The study is being conducted by Woodward-Clyde Consultants (WCC) and Continental Shelf Associates (CSA). Additional subcontractors include Mote Marine Laboratory for soft bottom biology and Florida Institute of Technology for trace metals and hydrocarbon analyses. Specific program objectives are listed below:

1. To produce sea floor habitat maps that show the location and distribution of various bottom substrates across the SW Florida Shelf.

2. To broadly classify the biological zonation across and along the shelf, projecting the amount and percent of the area covered by live (hard bottom or reef) and soft bottom types.

3. Characterize the species composition and ecological function of principal bottom communities within the study area.

4. Characterize regional water column parameters.

5. Describe sediment grain size and total carbonate content.

6. Characterize "pre-development" levels of hydrocarbons and trace metals in the shelf sediments.

7. All of the preceding tasks will provide input to an assessment of the potential impacts of OCS oil and gas offshore leasing/development activities on live (hard) and soft bottom habitats and communities, which are integral components of the Southwest Florida Shelf ecosystem.

Three data collection cruises involving geophysics, underwater television and underwater still camera surveys were completed: September 10-October 10, 1980; October 10-22, 1980 and July 8-15, 1981. Three biological sampling cruises have also been completed: October 23-November 22, 1980; April 22-May 5, 1981 and July 16-August 5, 1981. A

final biological cruise is scheduled for February 1982. This will complete approximately quarterly sampling of the water column and of the sea floor biological communities.

The principal categories of field data collected during the study cruises are listed in Table 3. Figure 11 shows the five east-west transects (A through E) followed for geophysical, underwater television and still camera lowerings. Live (hard) and soft bottom benthic sampling locations are also indicated. Figure 12 shows a preliminary distribution map of sea floor habitat and biological assemblage types based on FY 80-81 data only, and provided by CSA.

An additional north-south study transect (Figure 13-F) was added in the FY 81-82 program. Also note that while benthic sampling during the first year (FY 80-81) was restricted to water depths of 20 to 100 m, it was extended in FY 81-82 to water depths of 200 m (Figure 13).

Laboratory workup of the FY 80-81 samples is now nearly complete and data analysis and interpretation are well underway. Preliminary draft reports covering water column characteristics, hydrocarbons and trace metals are in review. The draft, first year Final Report and Visuals Atlas -- designed for easy incorporation of additional FY 81-82 data -- will be forwarded to BLM, New Orleans, by year-end.

TABLE 3. SAMPLE/DATA TYPES

GEOPHYSICAL

Navigation/Positioning
Water Depth
Side-Scan Sonar Sea Floor Mapping
Shallow Penetration Subbottom Profiles

WATER COLUMN

STD/DO Profile
Salinity Samples (Near-Surface and Near-Bottom)
Dissolved Oxygen Samples (Near-Surface and Near-Bottom)
Temperature (Reversing Thermometer)
Transmissivity Profile
Photometer Profile
Nutrients (Inorganic Nitrogen, Phosphate, and Silicate)
Chlorophyll a
Yellow Substance

BENTHIC

Television Videotapes
Still Camera Photographs
Macroinfauna
Sediment Grain Size
Sediment Total Carbonate
Sediment Hydrocarbons
Sediment Trace Metals (Ba, Cd, Cr, Cu, Fe, Pb, Ni, Va, Zn)
Dredge Epifauna and Macroalgae
Trawl Epifauna and Macroalgae

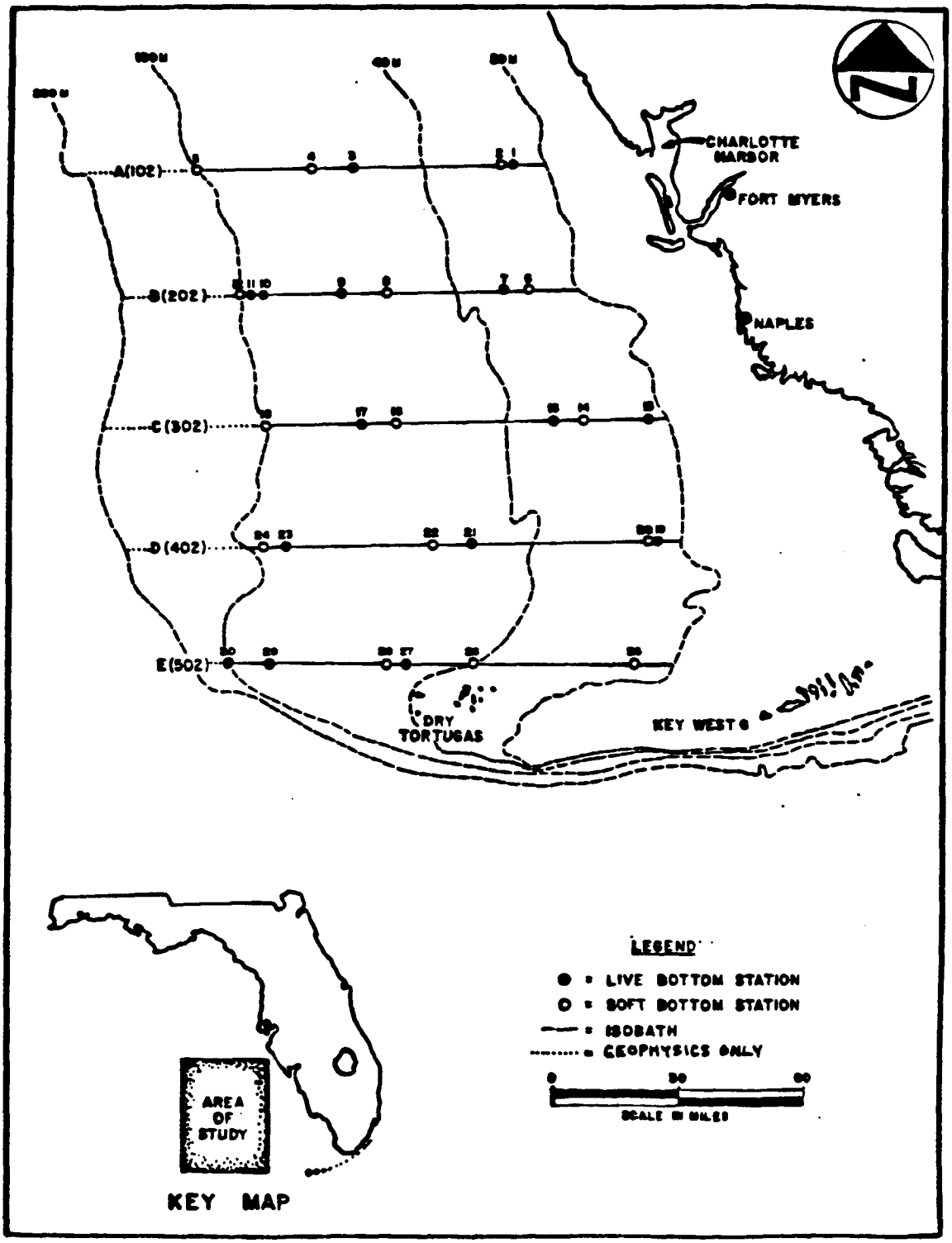

Figure 11. Southwest Florida Shelf Ecosystems Study - Year I Cruise Tracks.

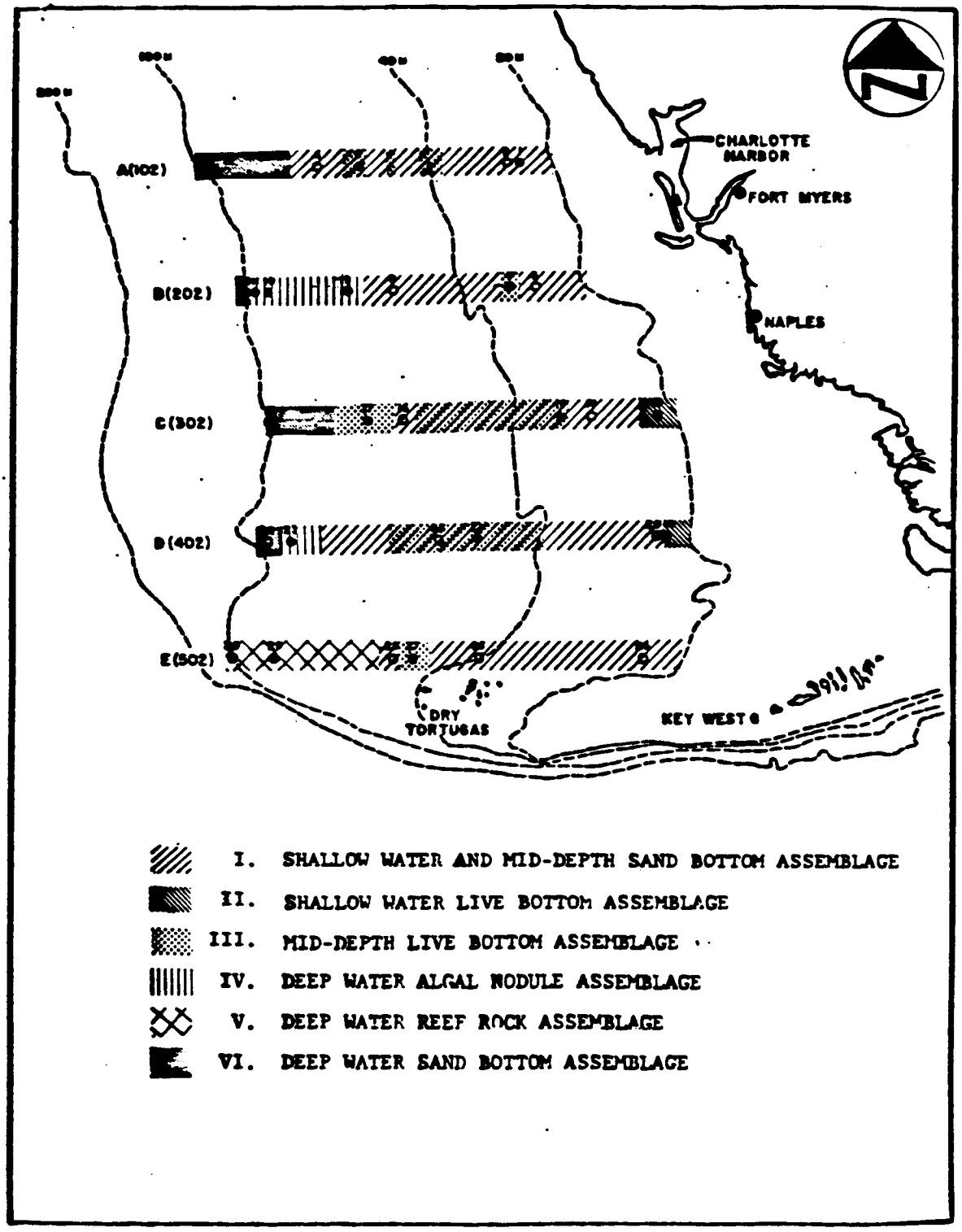

Figure 12. Preliminary Habitat and Biological Assemblage Types.

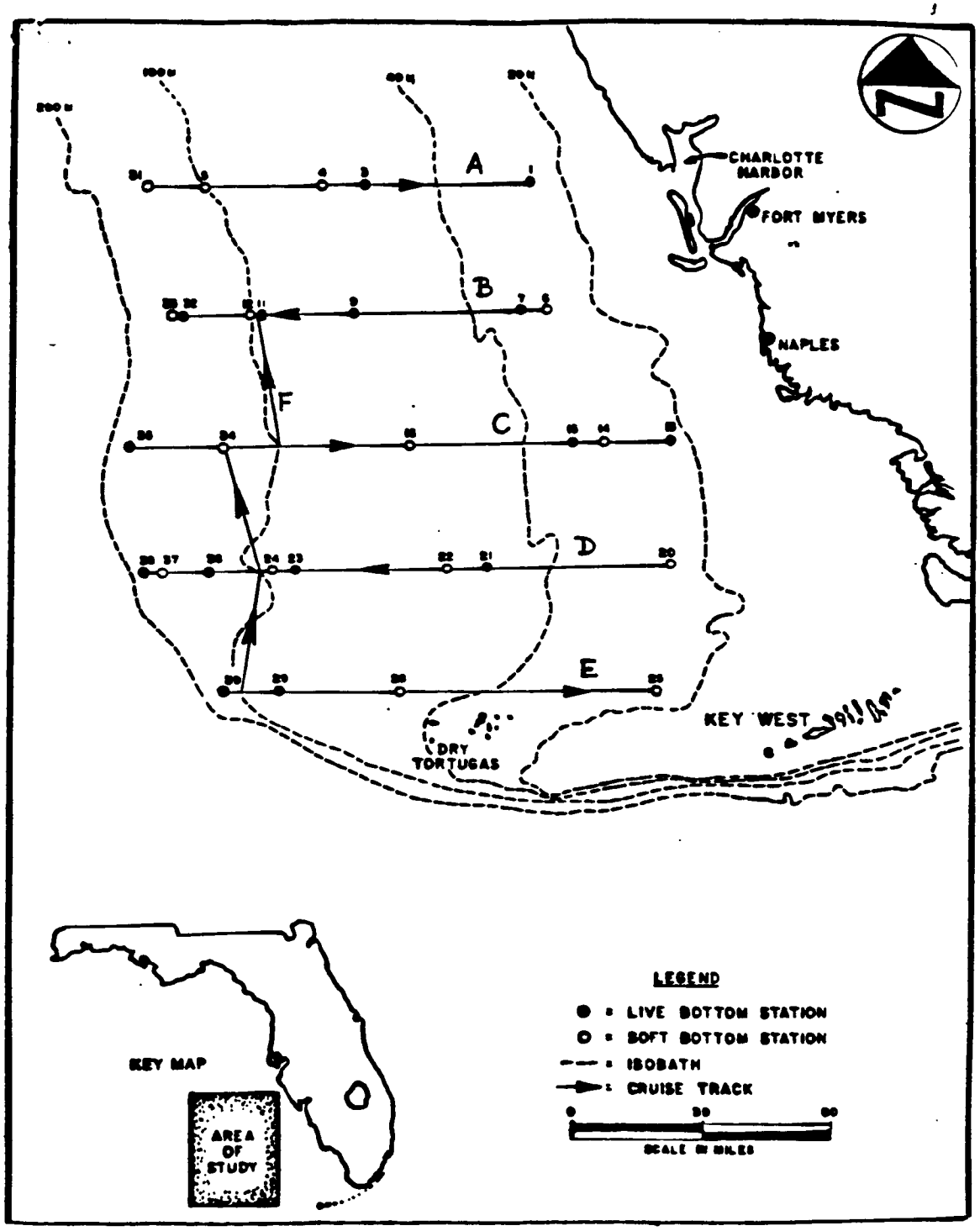

Figure 13. Southwest Florida Shelf Ecosystem Study - Year II
Proposed Cruise II Track.

APPENDIX

- Effects of Oil and Gas Activities:
  A review of recent and active contracts

- Gulf of Mexico Coastal Ecological
  Characterization Program

- Recent Publications: Marine Birds,
  Marine Mammals, Manatees and Dolphins

EFFECTS OF OIL AND GAS ACTIVITIES

A Review of Recent and Active Contracts

Contract No.	Study Title	COAR (Contractor)	Funding (1000's)
CT8-17*	Central Gulf of Mexico Platform Study	Defenbaugh (SWRI)	2,187
CT9-36*	Effects of Oil & Gas on Reef Fish Populations	Rogers (CSA)	396
MU0-37*	Effects of Oil & Gas on Texas & Louisiana Marine Ecosystems	Defenbaugh (USFWS)	9
CT0-65	Economic Impact of Oil Spills on Texas Coast	Avent (Restrepo)	250
CT0-71	IXTOC Oil Spill Damage Assessment (Environmental)	Avent (ERCO)	550

* Contracts closed-out or winding down.

CENTRAL GULF OF MEXICO PLATFORM STUDY

Purpose: To examine the biota and environmental conditions in a region of long-term, intense oil and gas development.

Study Area: Continental shelf off Louisiana.

Research Activities:

- Measure hydrocarbons and trace metals
  - in sediments
  - in water
  - in selected animals
- Determine biota population structure
  - bacteria
  - soft bottom fauna
  - platform fauna - fishes and fouling mats
- Estimate sublethal histological effects (fish lesions)

EFFECTS OF OIL AND GAS ON REEF FISH POPULATIONS

Purpose: To determine the standing stocks and structure of reef fish populations on man-made and natural reefs to assess the effects of oil and gas activities.

Study Area: Continental shelf off western Louisiana.

Research Activities:

- Population estimates (visual)
  - divers and submersibles
  - TV
  - still and time-lapse cameras
- Population estimates (sampling)
  - divers
  - remote (traps, hook and line, tag and release)
- Site characterizations (relief cover and area)
  - natural
  - platforms
- Hydrography

Final Report: In preparation.

ECONOMIC IMPACTS OF OIL SPILLS ON THE TEXAS COAST

Purpose: To assess the economic impact of the IXTOC-1 and Burmah Agate oil spills on coastal counties in Texas.

Study Area: All coastal counties in Texas.

Methods: Comparisons of pre-spill and post-spill economic data, i.e.:

- Fisheries landings and ex-vessel value (especially shrimp)
- Tourism and recreation records and surveys
- Indirect effects (estimates based on input/output multipliers from state of Texas-modelling effort)

IXTOC OIL SPILL ENVIRONMENTAL DAMAGE ASSESSMENT

Purpose: Assess environmental impact of the IXTOC-1 oil spill

Study Area: South Texas continental shelf (sub-tidal)

Research Activities:

- Chemical (post-spill hydrocarbon evaluation)
  - sediments
  - animal tissue
  - water column
- Chemical "fingerprinting"
- Faunal composition and structure
- Sediment grain-size and total organic carbon

ACTIVITIES AFFECTING THE OCS ENVIRONMENT

Operation Phase	*Activity/Technology Used*	*Pollutant/Agent*
1. Geophysical Evaluation	A. Seismic surveying	A. Noise
	B. Bottom Sampling	B. Disturbed sediments
2. Oil and Gas Exploration	A. Rig fabrication	A. Location of fabrication facility Dredging and filling Freshwater demand Emissions/discharges Competition for labor
	B. Rig emplacement	B. Rig location Disturbed sediments
	C. Drilling	C. Drill cuttings, drilling muds, and fluids Machinery noise
	D. Routine rig operations	D. Debris, sewage, and effluents Atmospheric discharges
	E. Temporary rig servicing	E. (Same as 2.A. above) Rig location
3. Field Development	A. Platform fabrication	A. (Same as 2.A. above)
	B. Platform installation	B. (Same as 2.B. above)
	C. Drilling	C. (Same as 2.C. above)
	D. Completion	D. Oil and petroleum compounds Risers, connections, and flow lines
	E. Routine rig operations	E. (Same as 2.D. above)
	F. Platform servicing	F. (Same as 2.E. above)
4. Production	A. Gathering of fluids	A. Oil
	B. Separation of oil/water, oil/gas, and scrubbing	B. Refinery location Freshwater demand Emissions/discharges Competition for labor
	C. Compressing/pumping	C. Oil
	D. Workover	D. (Same as 2.C. and 3.D. above)
	E. Routine platform operations	E. (Same as 2.D. above)
	F. Improved recovery	F. Chemical residues
5. Transportation and Storage	A. Fabrication of transportation and/or storage facilities	A. Complex; similar to heavy industrial activities
	B. Storage facility emplacement at sea or ashore	B. Storage facility location
	C. Transfer to tankers/barges	C. Space conflicts Chronic oil discharge Sewage/effluent discharge Atmospheric discharges Disposal of debris
	D. Construction and emplacement of pumping facilities	D. Pump location Competition for labor
	E. Routine tanker/barge operations	E. (Same as 5.C. above)
	F. Pipeline fabrication and emplacement	F. Disturbed sediments Pipeline location Competition for labor
	G. Pipeline operations	G. Oil
6. Refining	A. Construction or expansion	A. Refinery location Dredging and filling Freshwater demand Competition for labor
	B. Processing	B. Refinery emissions Waste disposal

NEW ORLEANS
Outer Continental
Shelf Office

BLM Special Information

BUREAU OF LAND MANAGEMENT
U.S. DEPARTMENT OF THE INTERIOR

GULF OF MEXICO COASTAL ECOLOGICAL CHARACTERIZATION PROGRAM

Prepared by

National Coastal Ecosystems Team
U.S. Fish and Wildlife Service
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for the

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New Orleans OCS Office
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INTRODUCTION

There has been rapid economic and environmental change within the Gulf of Mexico and its coastal areas during recent years. Much of this activity has been directly associated with energy development, both onshore and offshore, as well as with flood control, channelization, and urbanization. As these human-related changes have occurred, there has been increasing concern over the potential for serious environmental impacts as evidenced by the numerous regulatory and planning programs at all levels of governments. However, the organization and accessibility of scientifically-derived information has been inadequate.

Decisionmakers at all levels of responsibility require a more complete information base, i. e., an integrated, holistic overview of the areas that have been and may be affected by man's development activities. To address this need, the U.S. Fish and Wildlife Service (FWS) has developed a coastal ecological characterization program. The major purpose of an ecological characterization is to compile existing information from the biological, physical, and social sciences about coastal ecosystems. Existing information is then structured to identify functional relationships among processes and components of the ecosystem(s) studied.

Specifically, the objectives are to:

1. assemble, review, and integrate existing biological, physical, and socioeconomic information to establish a sound information base for decisionmaking purposes;

2. identify and describe various components (subsystems - drainage basins and watershed units, habitats, communities, and key populations and species) in coastal ecosystems;

3. identify and describe major physical, biological, and socioeconomic processes and interactions that are related to the components of the various ecosystems;

4. relate known and potential ecosystem responses to natural and man-induced changes, emphasizing OCS oil and gas activities; and

5. identify major information deficiencies, as an aid to determining research priorities in the study area.

The primary users of the products of these studies will be planners and natural resource managers of the FWS, Bureau of Land Management (BLM), U.S. Geological Survey (USGS), Environmental Protection Agency (EPA), and other federal, state, and local agencies as well as the general public.

Since 1976, five characterization studies have been completed or are ongoing for the Gulf of Mexico coast (Figure 1). These studies include the following: Chenier Plain (southwestern Louisiana and southeastern Texas); Mississippi Deltaic Plain Region (southeastern Louisiana and Mississippi); Texas Barrier Islands Region; Northeastern Gulf of Mexico Coast (Alabama and panhandle of Florida); and Southwestern Florida, including the Keys. All of the above studies were co-sponsored by FWS and BLM with the exception of the completed Chenier Plain which was a joint effort between FWS and EPA. Additional studies are completed, ongoing, or planned for Alaska and the Atlantic and Pacific coasts. Study areas include Rocky Coast of Maine, New Jersey and Delaware Coastal Region, Chesapeake Bay, North Carolina Coastal Region, Sea Islands of South Carolina and Georgia, Southern California, Northern and Central California, Pacific Northwest (Oregon and Washington), and Lower Cook Inlet, Beaufort Sea, Kodiak, and Bristol Bay, Alaska.

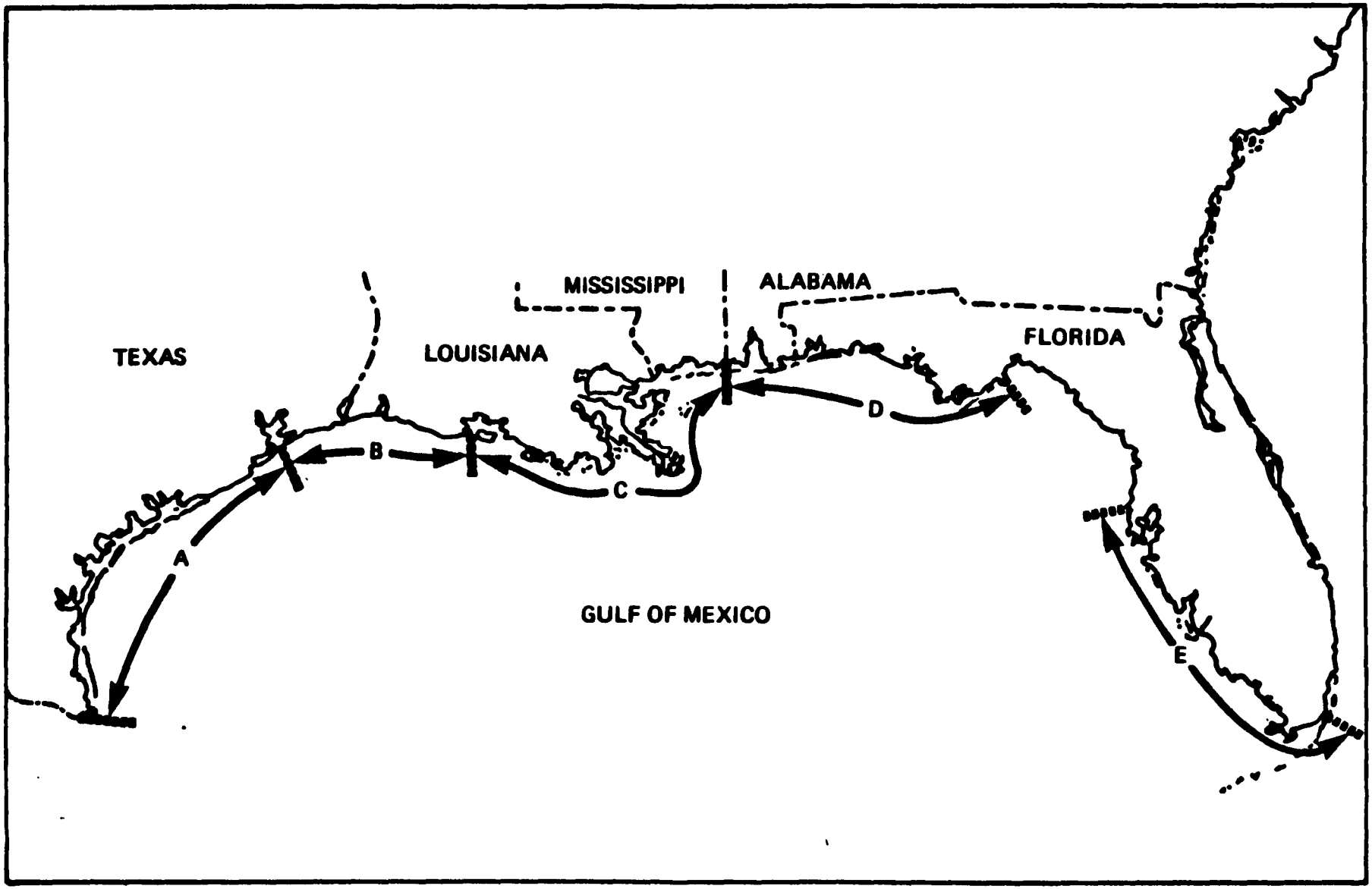


Figure 1 Location of Gulf of Mexico Coastal Ecological Characterization Study

PRODUCTS

The range of products varies depending on user needs, available information, and size of area. The development of characterization products follows a hierarchical approach, designed in accordance with the conceptual ecosystem models and information needs of users during the data collection and analysis. Figure 2 illustrates the data collection and analysis process and production of the ecological atlas, ecosystem models, narrative report, and data source appendix of a characterization study. Approximately 18-36 months are required to complete these products.

Ecological Atlas

The ecological atlas consists of maps and diagrams with supporting narrative and tabular data that depict biological resources, coastal processes, socioeconomic activities, coastal studies locations, physical features, and hydrological information (Figure 3). Map scales for the mapping efforts in the Gulf of Mexico are 1:24,000 and 1:100,000.

For the Mississippi Deltaic Plain, Texas Barrier Islands, and Northeastern Gulf of Mexico studies, habitats have been or will be mapped at a scale of 1:24,000. Habitats are delineated primarily by vegetative types based on a classification system designed by FWS for wetland and aquatic systems and the USGS for upland systems. Existing 1:24,000 wetland and aquatic maps of the southwestern Florida area produced by FWS will be used for that characterization study. For the Mississippi Deltaic Plain, Texas Barrier Islands, and Northeastern Gulf of Mexico (Alabama portion) mapping will be done using current photography (1978 or 1979) and a series of photographs from the mid-1950's. The Belle Isle 1978-1:24,000 habitat map for the Mississippi Deltaic Plain Region study may be found among the maps accompanying this report. Imagery used to prepare current habitat maps is approximately 1:65,000 color infrared; the habitat distributions for the 1950's have been interpreted from 1:20,000 and 1:24,000 black and white panchromatic photography. These habitat maps provide an overview of each area from which generalizations can be made about areal habitat extent and changes of habitats through time. The latter information is particularly useful in relating changes of habitats to natural and man-induced perturbations.

Preliminary habitat data from the Mississippi Deltaic Plain Region study show a 28% loss of total marsh from 1956-1978 in the Barataria Basin of Louisiana (Figure 4, Hydrologic Unit IV). During the same period there was only a 1% total marsh loss in the Atchafalaya Basin of Louisiana (Figure 4, Hydrologic Unit VI). Fresh marshes were reduced in areal extent by 85% in Unit IV and increased 139% in Unit VI during the 22-year period. These changes resulted from both natural processes (e.g., subsidence and shoreline erosion) and man-related activities (e.g., dredging and impounding).

The mapping of biological resources is at 1:100,000 scale and includes oyster and clam beds, fish spawning and nursery areas, submerged vegetation, nesting and high density areas for birds and sea turtles, waterfowl and furbearer concentrations, critical habitats for endangered and threatened species, and natural or artificial fishing reefs. The 1:100,000 Morgan City quadrangle map of the Mississippi Deltaic Plain Region study, portraying biological resources, is among the maps accompanying this report.

Physical features, at a scale of 1:100,000, that are mapped are shoreline changes, high and low wave energies, and inundations by major hurricanes and storms. Boundaries of fresh and nonfresh marshes in the 1950's, 1960's, and present, and water control structures including dams, locks, and weirs have also been mapped.

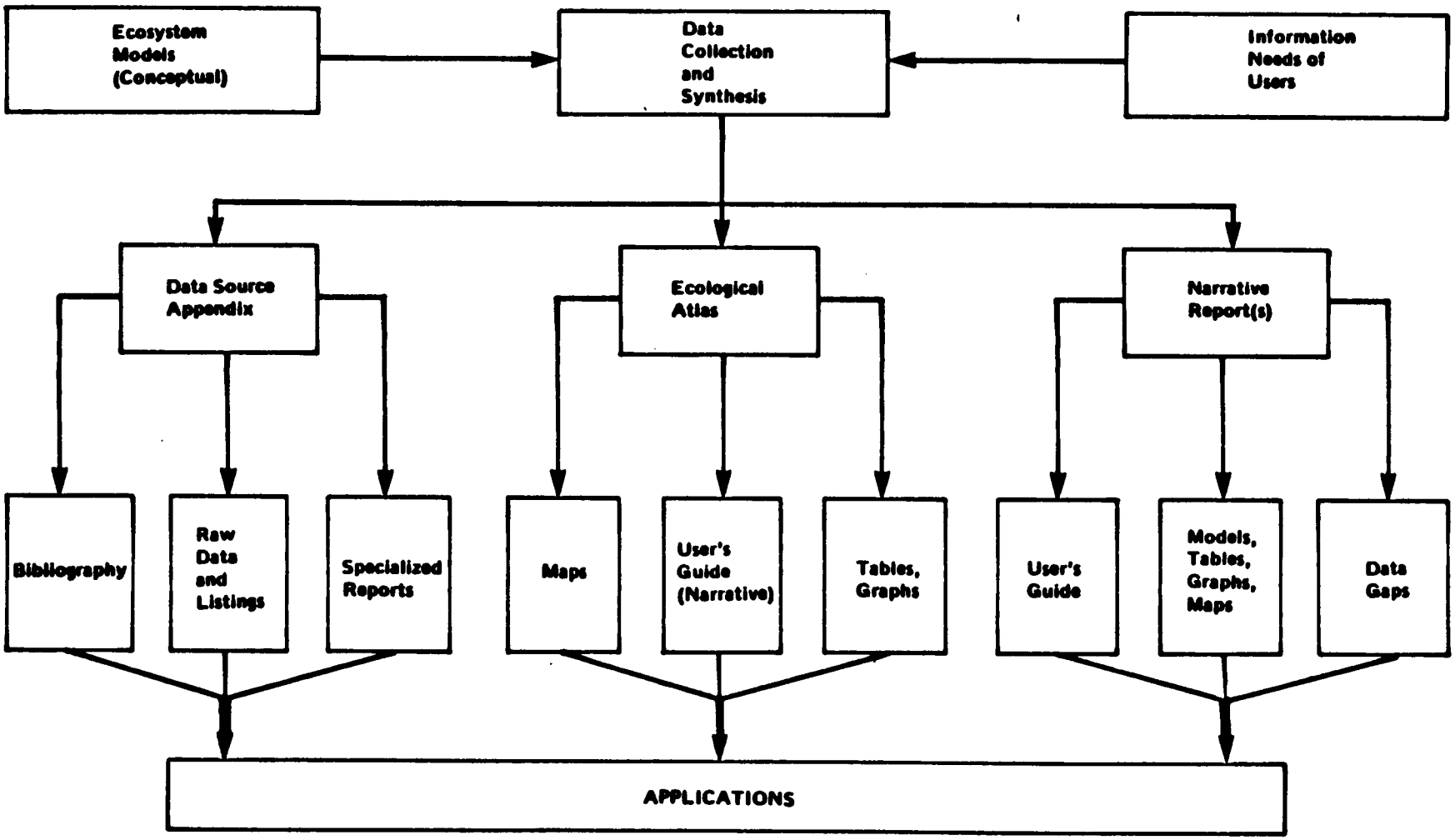


Figure 2 Simplified Diagram of Data Collection and Analysis Process for a Characterization Study

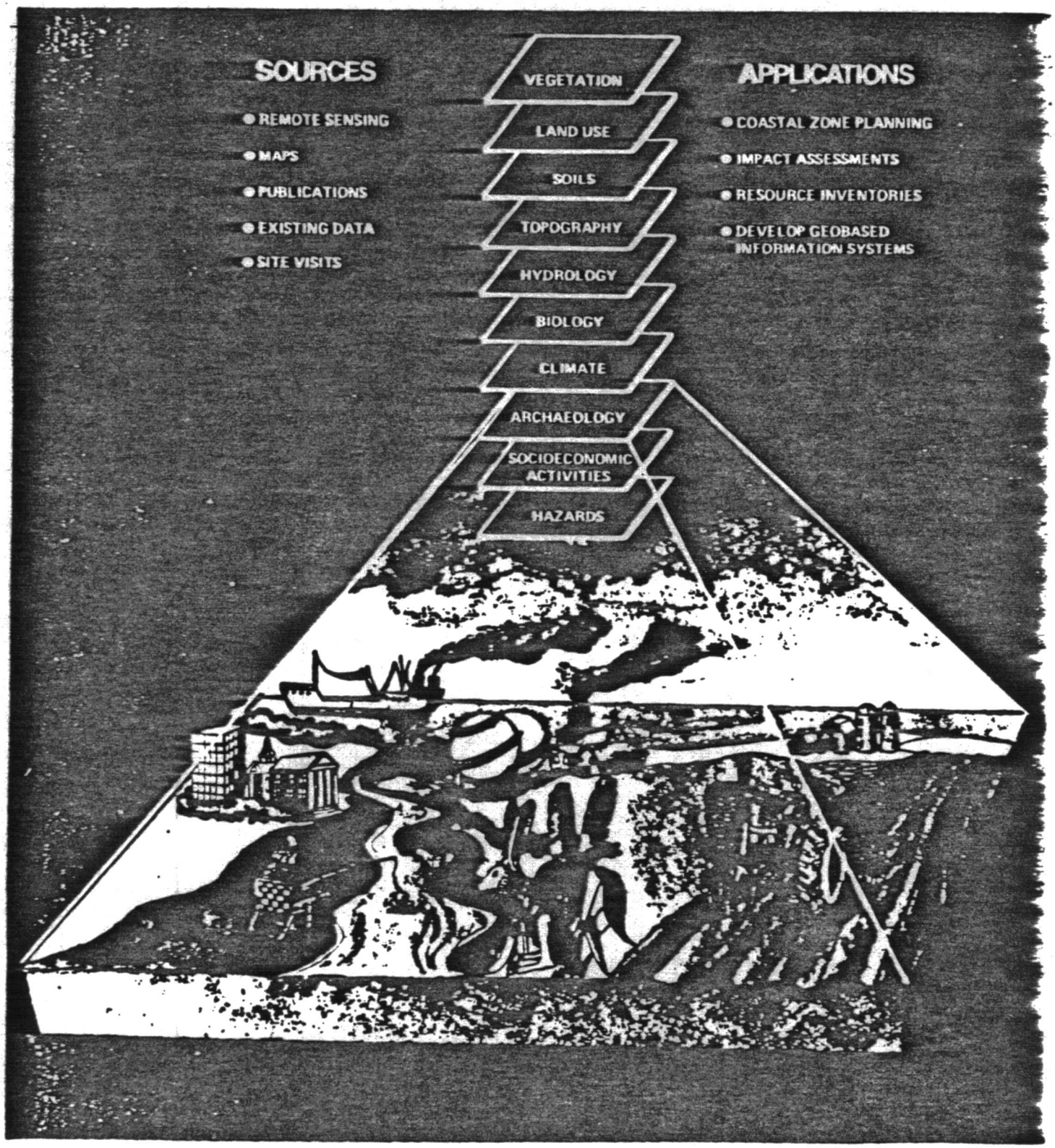


Figure 3 Mappable topics, sources of information, and applications of ecological atlas from a characterization study

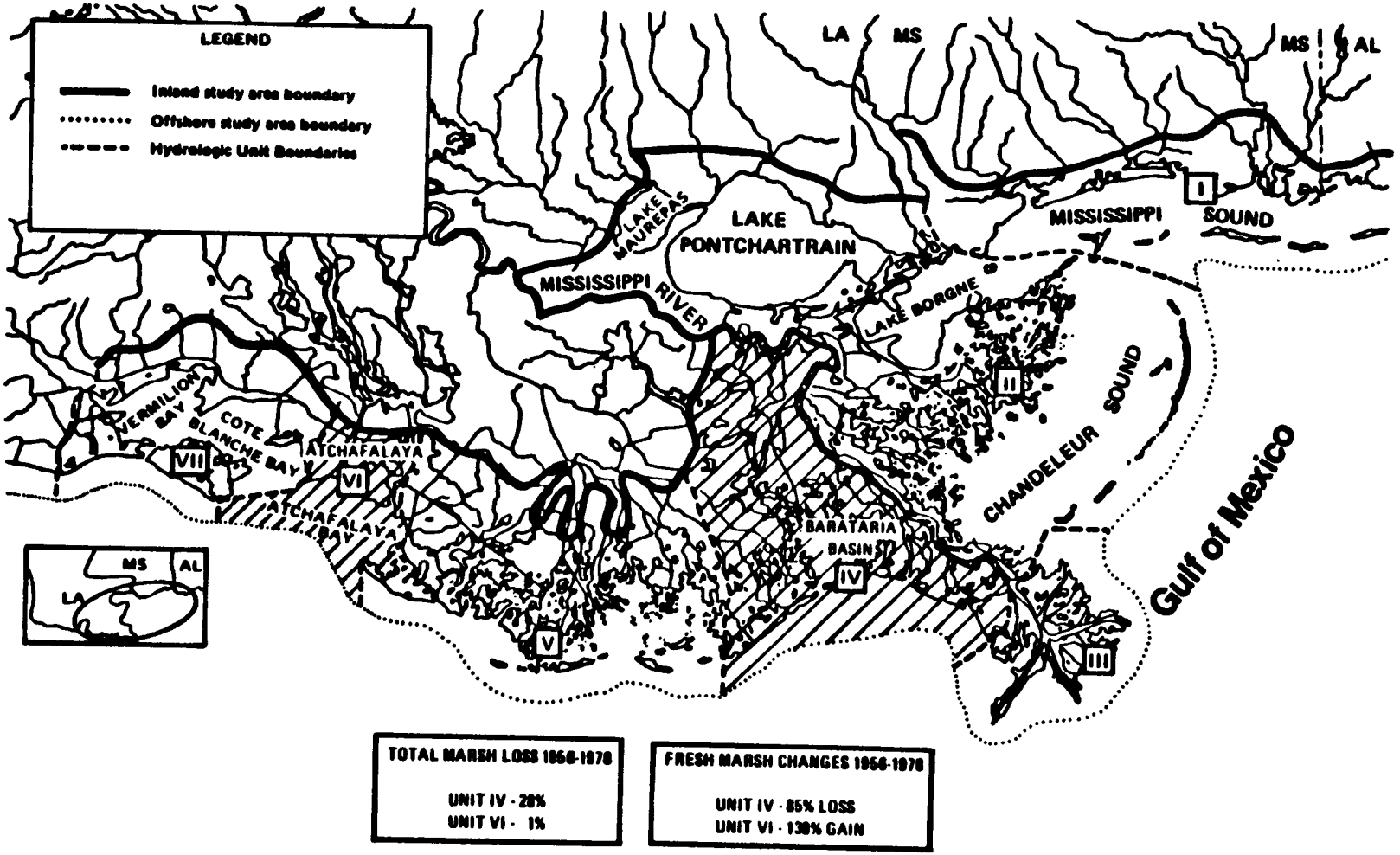


Figure 4 Mississippi Deltaic Plain Region Study Area

Socioeconomic features, scale 1:100,000, that are portrayed include conservation, preservation, and recreation areas; permitted point source discharges; energy developments, such as oil and gas infrastructure including pipelines; mineral resources; dredge spoil disposal sites; and historic and archaeological sites.

The package of maps for this report contains two 1:100,000 Morgan City quadrangle maps which depict pipelines, oil and gas fields and production facilities; recreation, preservation, and conservation sites; and transportation infrastructure for the Mississippi Deltaic Plain Region.

In addition, the ecological characterization atlases contain maps that show significant historical and current coastal studies sites, geological features, spoil areas, active dunes, currents, seasonal wind patterns, and estuarine circulation patterns.

Ecosystem Models

The conceptual ecosystem models are a series of graphic (energy circuit design and pictorial) and narrative representations of the study area. The representations define and delineate physical processes, biological resources, socioeconomic features, the functional relationships among them, and the forces that influence them. A flow model summarizing primary and secondary effects of cultural modifications on the hydrologic regime of the FWS/EPA Chenier Plain Region study is shown in Figure 5.

The ecosystem models serve as tools for the organization and preparation of the narrative report. The following procedures are common to both model construction and narrative preparation: (1) collecting, organizing, and interpreting existing information about ecosystems within the study area; (2) describing terms, concepts, and the holistic approach of the study; and (3) evaluating environmental changes resulting from human activities, management strategies, and their implications for components of the study area.

Narrative Report

The narrative report complements the ecosystem models by explaining cause and effect relationships of human activities, natural changes, and controlling influences upon the study area. The narrative report is organized into five major descriptive sections: the regional environment, subsystems, habitats, populations and species, and identification of data gaps.

The description of the regional environment provides an overview of the important physical-chemical, biological, and socioeconomic features, processes, and interactions that occur in the study area. This section also discusses the relationship of the study area to adjacent regions and describes trends that are occurring within the various systems.

Subsystems are defined as watershed units, drainage basins, hydrologic units, and estuarine systems, or a combination of these, that occur in the study area. Descriptions of subsystems include, as appropriate: areal extent, topography, soils, bathymetry, sediments, oceanography, climate, hydrology (including freshwater inflow), habitat (vegetative) types, energy inputs and balances, subsystem linkages, habitat changes related to specific socioeconomic activities, areas of ecological concern, and species of concern (i.e., species of ecological, sport, economic, subsistence, or endangered and threatened significance), and socioeconomic activities. Processes and interactions within the subsystem level are also discussed.

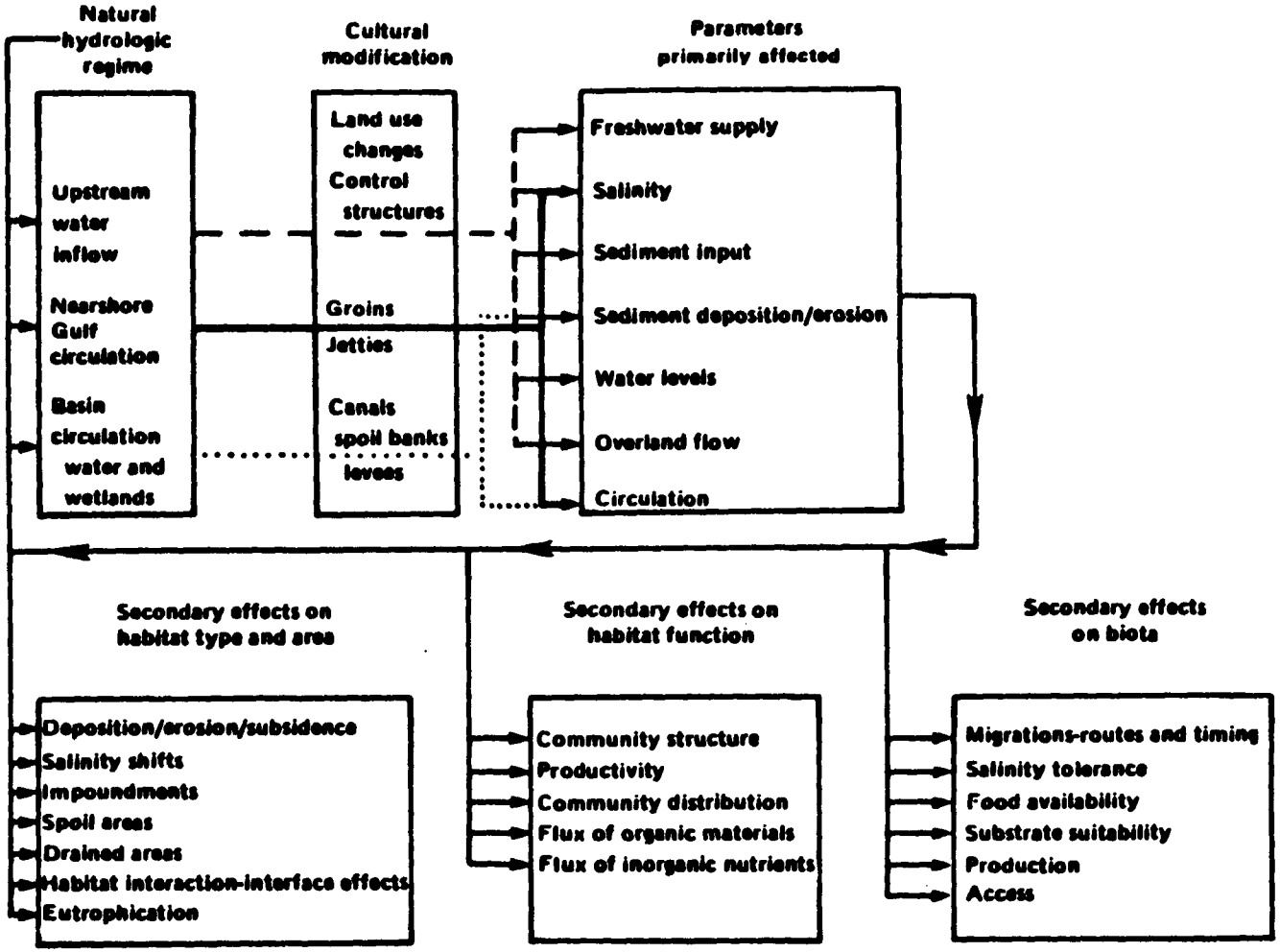


Figure 5 Flow Model Summarizing Primary & Secondary Effects of a Cultural Modifications

The aquatic, wetland, and upland habitat and community descriptions include: areal extent by study area and subsystem, physical characteristics (hydrology, sediments, soil), chemical characteristics (pH, nutrients, salinity), physical-chemical-biological interactions of processes affecting productivity, natural succession, trophic relationships, species of concern, seasonal use, and functional roles.

Selected populations or species of animals and plants occurring in the study area are discussed. The descriptions include information concerning seasonal use of and ecological role in habitats, seasonal and historical trends in abundance, feeding ecology and trophic relationships, breeding biology, limiting factors, economic value, efforts and success at management (state and federal), status of human use, and vulnerability to disruptive influences. Species lists are also compiled by subsystem and habitat.

The last section of the narrative report describes important ecological data deficiences. For these data gaps, methods for additional data acquisition are suggested, as well as recommendations for future research. This section also identifies inaccessible data and the effects of the data gaps on the development of the characterization study.

Data Source Appendix

The data source appendix for most studies is composed of the following:

1. a computerized storage and retrieval system of all reference material used in the characterization study;

2. an annotated list of high-interest species and their habitats;

3. raw data such as water quality measurements, habitat measurements, and economic statistics; and

4. a list of pertinent data sources that includes location, type of data, and statement of accessibility for each source.

APPLICATIONS

The coastal ecological characterization studies of FWS will provide integral information throughout the OCS leasing process conducted by BLM. For the programmatic environmental statement on the tentative leasing schedule, characterization studies will provide a regional synopsis of the biological and ecological information as well as a socioeconomic overview on the Gulf of Mexico coastal regions studied. This background allows the environmental analysis to focus on specific issues relative to the proposed OCS activity.

The characterization studies contain specific material useful to other federal and state agencies as they comply with BLM's request for resource reports for each lease sale. Areas of special ecological significance are identified in the studies for the nearshore and onshore environmenst to assist respondents in identifying these issues of importance to BLM for inclusion in the resource reports.

The Environmental Profiles which are developed by BLM to provide input into the decision-making process at several steps can benefit from the various components of the characterization studies. The Ecosystem (Conceptual) Models and Narrative Report provides a basic framework for organization of the information contained in the Environmental Profiles. The monographs on specific coastal communities (Community Profiles), such as seagrasses and mangroves, provide a basic ecological understanding as a background for impact analysis. The Ecological Atlas, samples of which are contained in this report, portrays areas of special significance for early planning of avoidance or mitigation measures for nearshore and onshore environments. By compiling and analyzing currently available information on nearshore and coastal ecosystems, the characterization studies delineate information needs which can be addressed through the BLM Environmental Studies Program.

The most effective utilization of the characterization studies is their application to the Environmental Statement (ES) process by describing existing environmental conditions, and predicting potential impacts of a proposed sale on coastal environments. Special benefit is the ease with which the characterization studies can be incorporated by reference into an ES as mandated, by the regulations promulgated by the Council on Environmental Quality, with regard to efficiency and effectiveness in the implementation of the National Environmental Policy Act.

Data from the characterization studies are also available for incorporation into the Secretarial Issue Document (SID) to quantify important socioeconomic and environmental issues in the coastal zone.

After a lease sale is held, a decision must be made as to whether the government is receiving fair market value from the energy resources. Environmental information as provided by the characterization studies can be used to assess cost-benefit relationships for a particular coastal region. Once the leases are issued, characterization studies can provide critical information to the USGS for making determinations concerning the possible effects of onshore facilities identified in Exploration and Development Plans submitted by leaseholders.

The characterization studies provide important information for use in BLM's Environmental Assessment Record (EAR) on OCS pipelines permitted by BLM with onshore impacts. For example, the 1:100,000 scale maps of the Morgan City area included in this report depict critical biological resources (oyster leases, clam beds, nursery areas, bird nesting areas, and waterfowl and furbearer concentration areas) which must be considered in pipeline planning. Other sensitive areas such as archaeological/historical sites, and conservation/recreation areas are also depicted as well as oil and gas infrastructure and pipelines. The pipeline map allows consideration of the relationship between planned pipelines and existing routes. Site-specific habitat maps (1:24,000 scale) provide detailed information on the habitat types to be traversed by pipelines. Information contained in the Narrative Report and Ecosystem Models provides the regional ecological and socioeconomic setting to the environmental analysts responsible for EAR preparation. This same type of analysis would apply to other onshore facilities (e.g., docks and storage facilities) associated with OCS oil and gas activities in the coastal zone.

In summary, the results of the FWS/BLM ecological characterization studies will provide ecological and socioeconomic information on nearshore and onshore environments of the Gulf of Mexico coastal region to the BLM, FWS, USGS, and other federal and state agencies. These users may apply the information to the Intergovernmental Planning Program for OCS Oil and Gas Leaseing, Transportation, and Related Facilities. The studies also provide valuable guidance to the BLM Environmental Studies Program when coastal research needs are considered.

Other applications of characterization study results include: (1) state coastal zone management planning; (2) regional and local land use planning; (3) oil spill contingency planning; (4) resource management; and (5) information management.

For example, the Louisiana Department of Transportation and Development (DOTD) is responsible for coastal zone management (CZM) planning and for administration of CZM programs. The separate parish governments are authorized to develop their own coastal programs with DOTD assistance, subject to DOTD approval. The Mississippi Deltaic Plain Region Ecological Characterization Study, as well as the Chenier Plain study, have both provided a sound information base for state and parish needs.

The characterization data bases also aid in oil spill contingency planning and damage assessments, in review of permit applications for dredging, for example, and in siting energy facilities. The data bases are also applicable in assessing impacts of other coastal energy development activities such as a study by the State of Louisiana Geological Survey funded by the Department of Energy to assess peat reserves and mining prospects in Lake Maurepas. Another energy-related problem for which characterization data bases are applicable is in the environmental evaluation of geopressure and geothermal development in Louisiana and Texas.

Other federal, state, local, and private agencies have incorporated characterization study materials in their work. The National Park Service (NPS), through its Branch of New Area-Urban Studies of the Denver Service Center, recently initiated a study in the Mississippi Deltaic Plain Region evaluating sites which may contain nationally significant examples of natural resources. The products of the characterization study of this region were provided to NPS and were described by community planners in the NPS as comprehensive and critical to environmental decisions in the region. The NPS expects to use not only the data illustrative of man's past and present activities, but also the information on trends that are occurring within the various natural systems in the Mississippi Deltaic Plain Region. The NPS has also used both ecological and socioeconomic information from the study to prepare testimony to support protection plans for offshore barrier islands in Mississippi and Louisiana.

Characterization data form the basis of environmental impact statements and preliminary planning studies prepared by many agencies and private contractors. A pipeline company in Illinois sent a representative to the FWS's National Coastal Ecosystems Team to examine maps from the Mississippi Deltaic Plain Region study to obtain information needed for evaluating potential pipeline routes in the area.

The narrative documents and maps produced in these studies are presently being considered for use in university courses in ecology and fisheries and wildlife management. Literature searches from the studies are computerized for wide accessibility to all users, and plans are being made to digitize various maps for ease in updating. Workshops have presented the Chenier Plain characterization study to concerned federal, state, and local agencies to demonstrate and test the application of characterization products in a "hands on" exercise. Such workshops are also a means by which users can provide direct contribution to future studies by clarifying their needs for information and making suggestions to improve the quality and usability of the products.

In view of the variety of applications of the ecological characterization study products, the primary contribution made by these studies appears to be the compilation of diverse kinds of information from widely scattered sources. The reported information is the best available, its sources are verified, and readers are directed to a wide range of related reference material. Mapped data are presented at the same scale to facilitate comparative analysis, and the products are accessible on both scientific and technical levels.

SUMMARY

Unlike the baseline or benchmark study, many of the elements described in the characterization are important, not because they are expected to change as a result of a proposed development, but because knowledge of these elements is needed to help us more clearly understand the ecosystems of a region. Characterizations should be an early or first step in the analysis of any coastal region under major study for impact analysis purposes for activities such as coastal and onshore impacts from OCS oil and gas development. Characterizations will also be an aid in establishing priorities for future research in environmental studies. Further, the characterization describes the component ecosystems of the study region as a whole and is not impact specific. Characterizations are intended to have multiple utility for assessing various proposed developments as they emerge in coastal areas.

Any questions or inquiries concerning FWS/BLM characterization studies and products should be directed to:

Information Transfer Specialist
National Coastal Ecosystems Team
U. S. Fish and Wildlife Service
Department of the Interior
1010 Gause Boulevard
Slidell, Louisiana 70458
FTS: 685-6511
Commercial: (504) 255-6511

or

Alice Laforet
New Orleans OCS Office
Bureau of Land Management
Department of the Interior
500 Camp Street, Suite 841
New Orleans, Louisiana 70130
FTS: 682-6541
Commercial: (504) 589-6541

FWS/OBS

Date

MARINE BIRDS OF THE COASTAL SOUTHEASTERN UNITED STATES

PART II

ANSERIFORMES

by

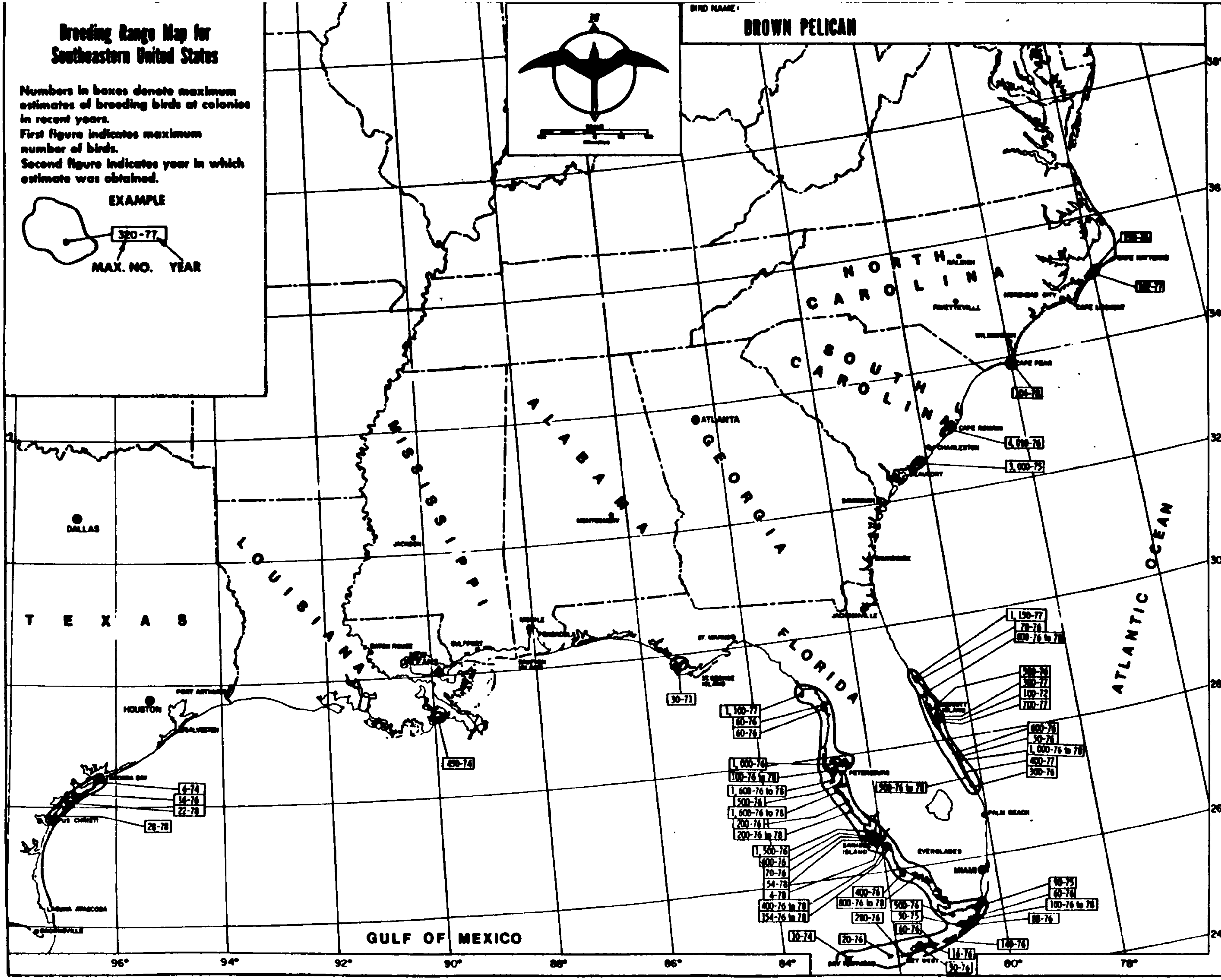
Roger B. Clapp, Deborah Morgan-Jacobs, and Richard C. Banks

Museum Section

United States Fish and Wildlife Service

National Museum of Natural History

Washington, D. C. 20560

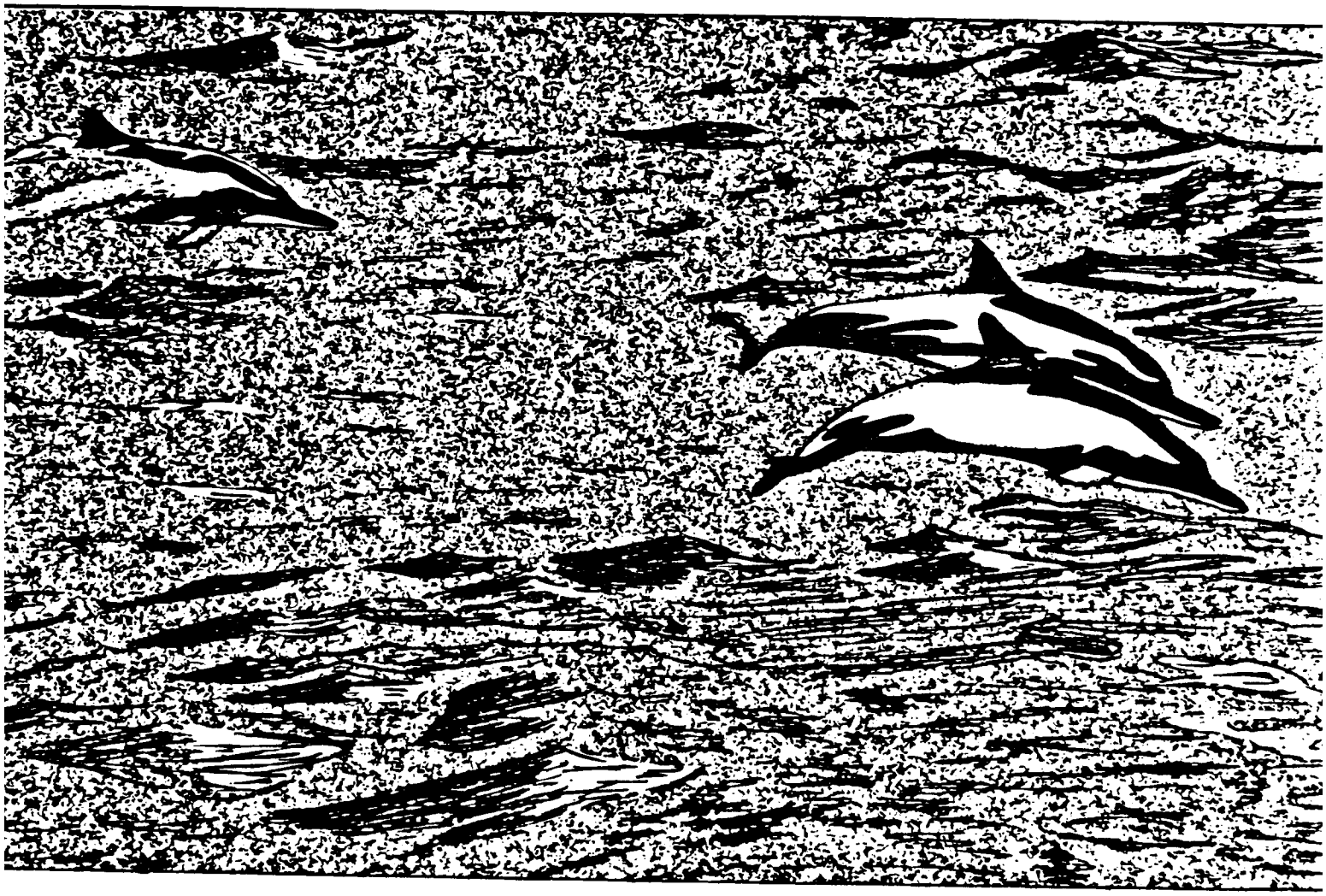


Breeding Range Map for Southeastern United States
Numbers in boxes denote maximum estimates of breeding birds at colonies in recent years.
First figure indicates maximum number of birds.
Second figure indicates year in which estimate was obtained.
EXAMPLE
320-77
MAX. NO.
YEAR
BIRD NAME:
BROWN PELICAN
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
ALABAMA
MISSISSIPPI
LOUISIANA
TEXAS
FLORIDA
ATLANTIC OCEAN
GULF OF MEXICO
ATLANTA
DALLAS
HOUSTON
JACKSON
CAPE FEAR
CAPE ROMAIN
CHARLESTON
JACKSONVILLE
ST. MARKS
PETERSBURG
PALM BEACH
EVERGLADES
MIAMI
KEY WEST
300-76
4,010-76
3,000-75
30-71
450-74
6-74
16-76
22-78
28-78
1,190-77
70-76
800-76 to 78
1,100-77
60-76
60-76
1,000-76
1,600-76 to 78
500-76
1,600-76 to 78
200-76
200-76 to 78
1,500-76
600-76
70-76
54-78
4-78
400-76 to 78
154-76 to 78
400-76
800-76 to 78
280-76
500-76
50-75
60-76
10-74
20-76
140-76
90-75
60-76
100-76 to 78
88-76
500-76 to 78
300-76
400-77
1,000-76 to 78
96°
94°
92°
90°
88°
86°
84°
80°
78°
36°
34°
32°
30°
28°
26°
24°

Biological Services Program

FWS/OBS-80/41
February 1981

Marine Mammals of the Southeastern United States Coast and the Gulf of Mexico



Bureau of Land Management
Fish and Wildlife Service
U.S. Department of the Interior

FWS/OBS - 80/41
February 1981

MARINE MAMMALS OF THE SOUTHEASTERN UNITED STATES COAST AND THE GULF OF MEXICO

by

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Contract No. 14-16-0009-79-951

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Bureau of Land Management

In cooperation with
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Denver Wildlife Research Center
New Orleans Field Station
Belle Chasse, Louisiana 70037

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Fish and Wildlife Service
U.S. Department of the Interior
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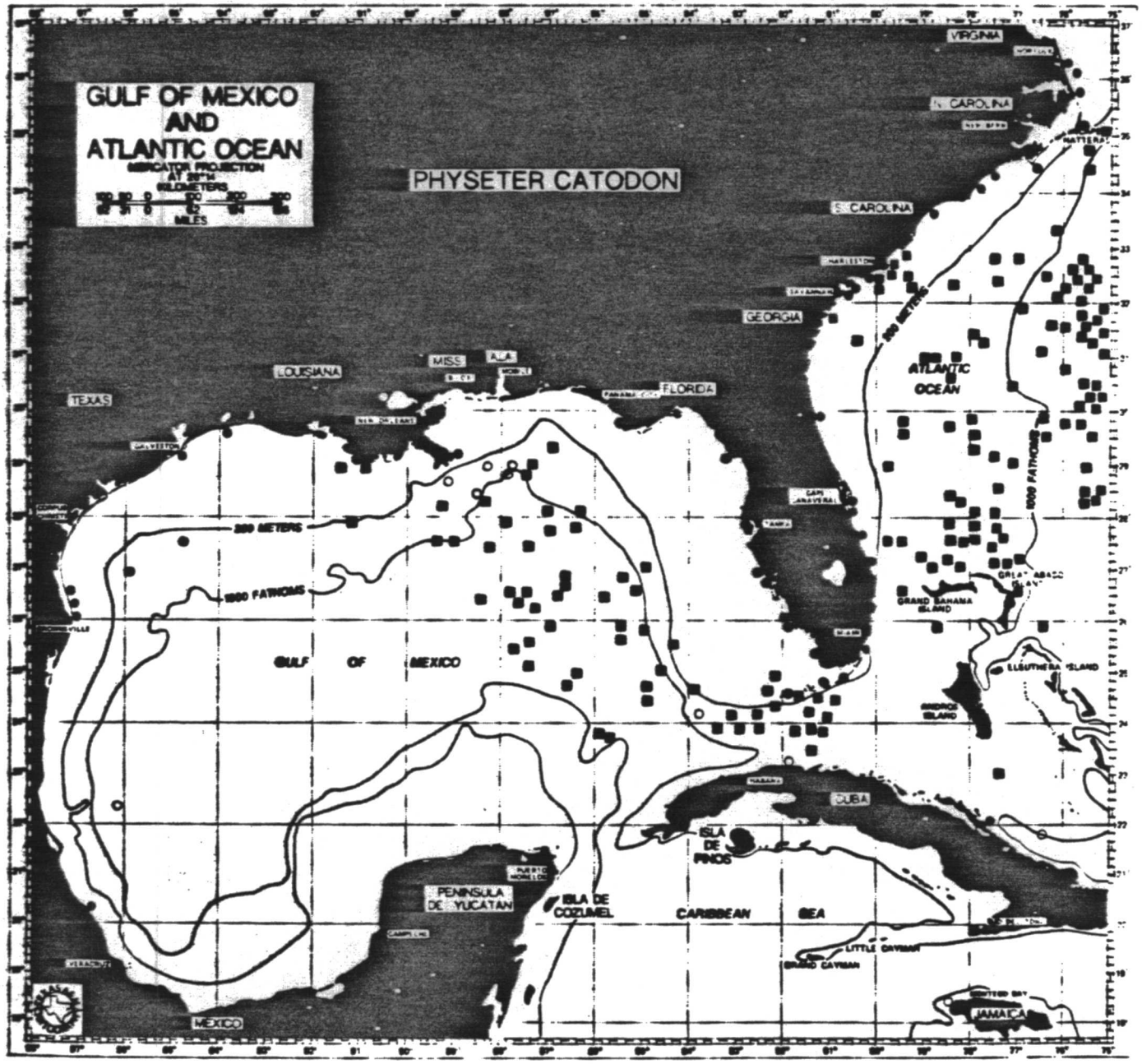


Figure 10. Distribution of the sperm whale, Physeter catodon. See legend for Figure 3 and text for explanation of symbols.

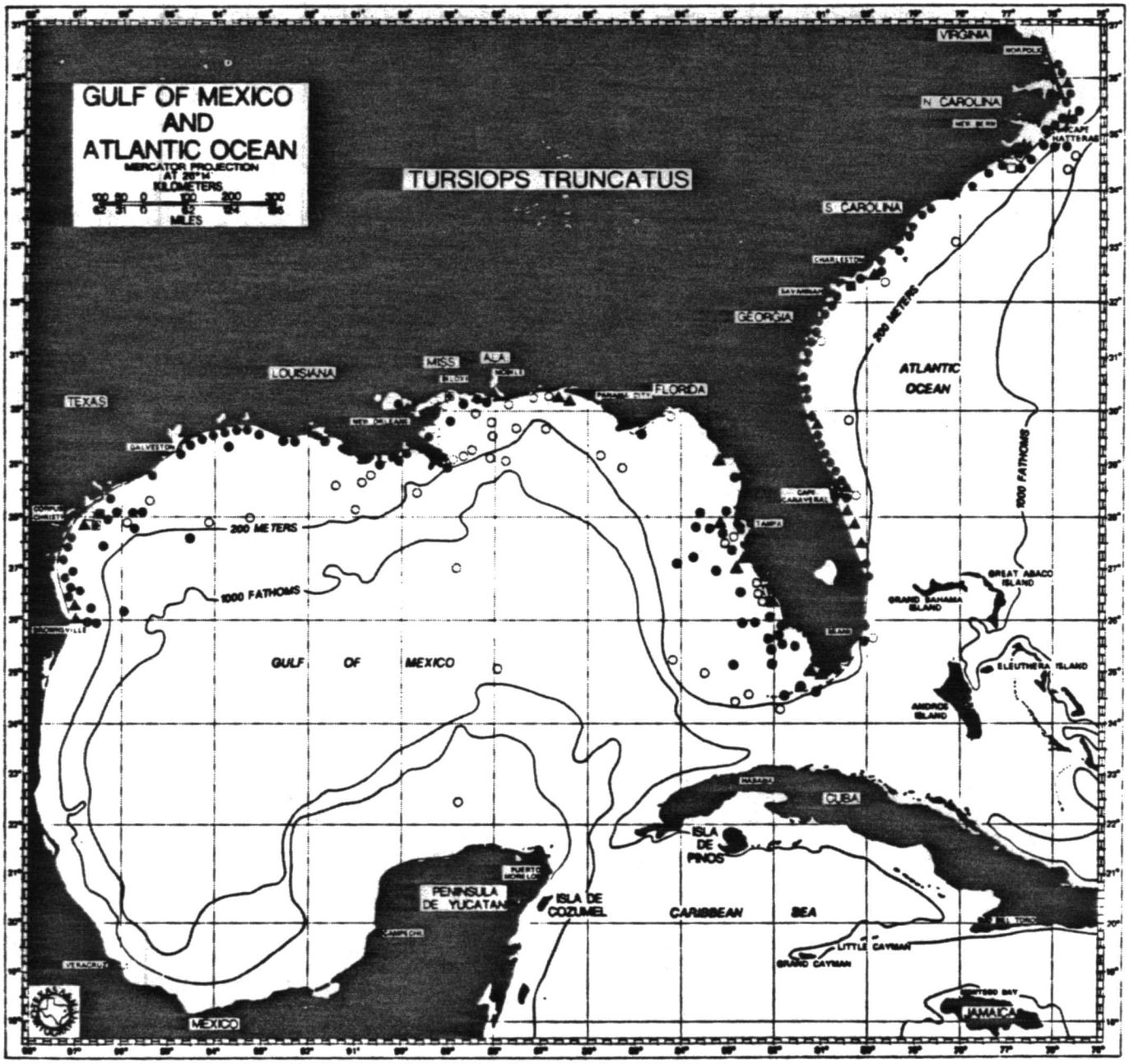
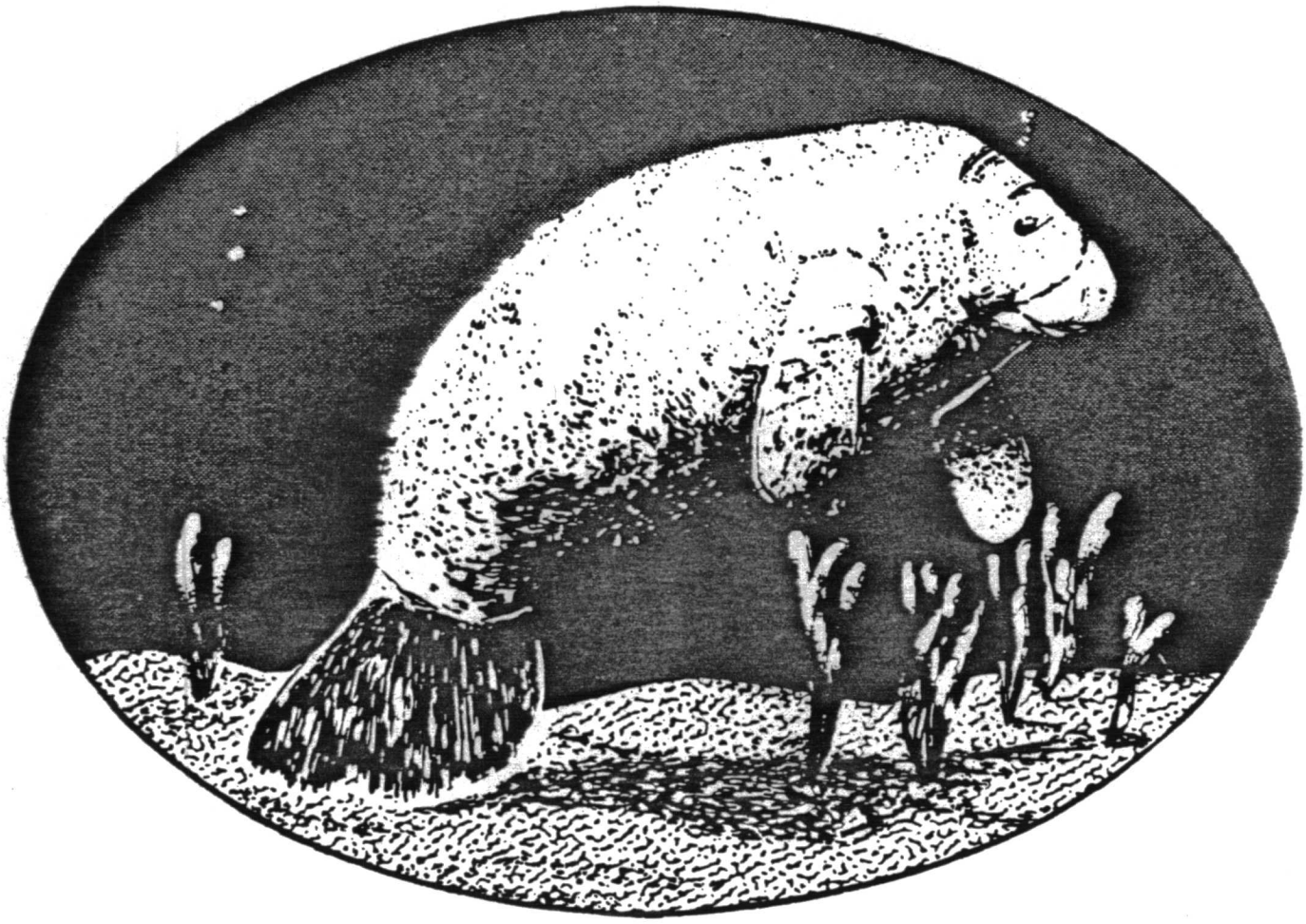


Figure 24. Distribution of the Atlantic bottlenose dolphin, Tursiops truncatus. See legend for Figure 3 and text for explanation of symbols.

Biological Services Program

FWS/OBS-80/50
April 1981

Aerial Surveys for Manatees and Dolphins in Western Peninsular Florida



Bureau of Land Management

Fish and Wildlife Service

U.S. Department of the Interior

FWS/OBS-80/50
April 1981

AERIAL SURVEYS FOR MANATEES AND DOLPHINS IN WESTERN PENINSULAR FLORIDA

(With Notes on Sightings of Sea Turtles and Crocodiles)

by

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Contract No. 14-16-009-79-951

In cooperation with:
U. S. Fish and Wildlife Service
Denver Wildlife Research Center
New Orleans Field Station
Belle Chasse, Louisiana 70037

Project Officers
David M. Smith and Cherry Keller
National Coastal Ecosystems Team
U.S. Fish and Wildlife Service

This project was sponsored by the
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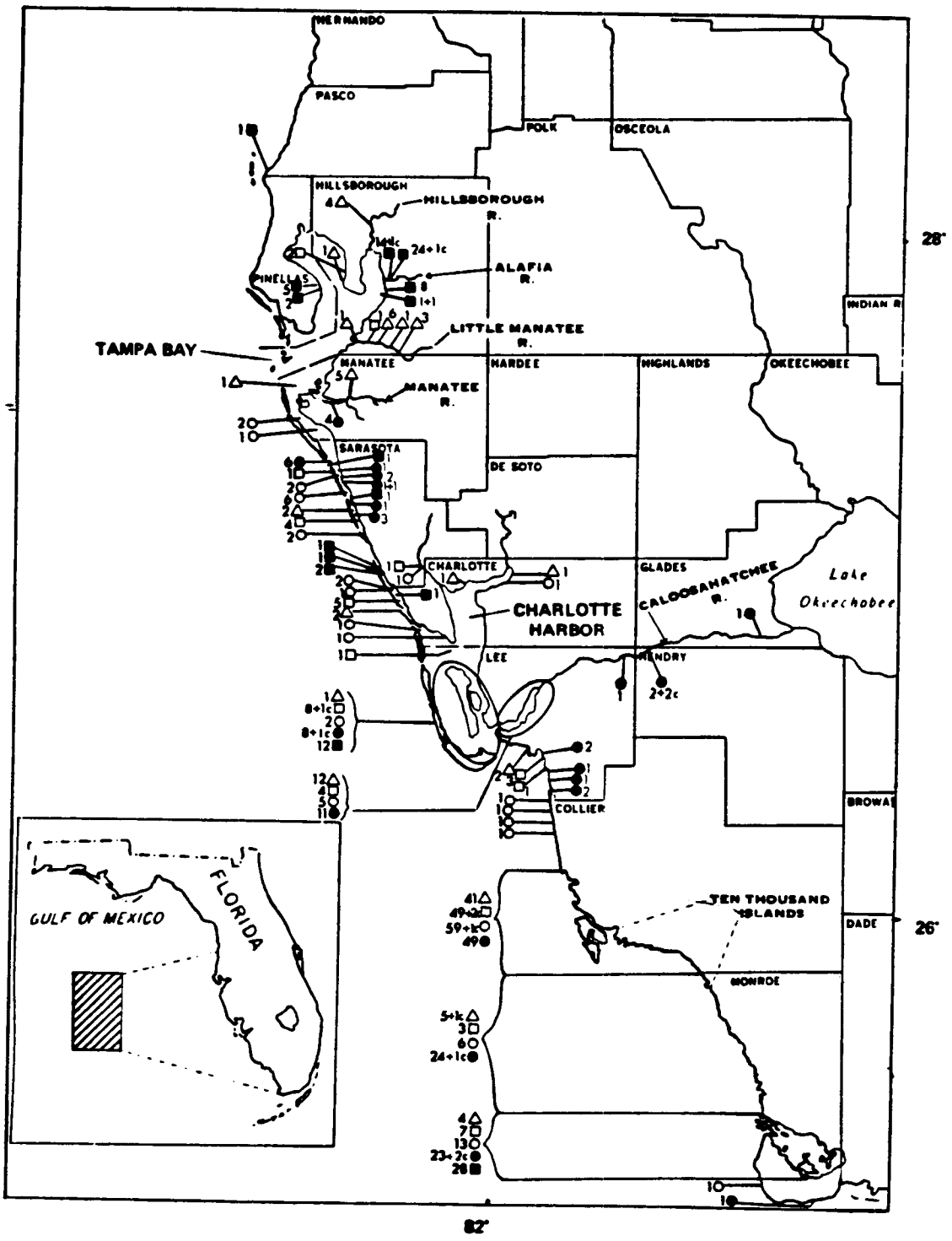

Figure 2. Location and numbers of manatees sighted during 1979 aerial surveys in western peninsular Florida. Symbols: △ July, □ September, ○ October, ● November, and ■ December; c = calf. Multiple sightings in localized areas are summarized.

The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

The Minerals Management Service Mission

As a bureau of the Department of the Interior, the Minerals Management Service's (MMS) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS), collect revenue from the Federal OCS and onshore Federal and Indian lands, and distribute those revenues.

Moreover, in working to meet its responsibilities, the **Offshore Minerals Management Program** administers the OCS competitive leasing program and oversees the safe and environmentally sound exploration and production of our Nation's offshore natural gas, oil and other mineral resources. The MMS **Minerals Revenue Management** meets its responsibilities by ensuring the efficient, timely and accurate collection and disbursement of revenue from mineral leasing and production due to Indian tribes and allottees, States and the U.S. Treasury.

The MMS strives to fulfill its responsibilities through the general guiding principles of: (1) being responsive to the public's concerns and interests by maintaining a dialogue with all potentially affected parties and (2) carrying out its programs with an emphasis on working to enhance the quality of life for all Americans by lending MMS assistance and expertise to economic development and environmental protection.