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Assessment of Non-Energy Minerals in the Exclusive Economic Zone, Offshore Mississippi

Robin Cranton

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Robin Cranton and J. Robert Woolsey

1988

The Mississippi Mineral Resources Institute
University, Mississippi 38677

ASSESSMENT OF NON-ENERGY MINERALS IN THE EXCLUSIVE ECONOMIC ZONE. OFFSHORE MISSISSIPPI

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Robin Cranton
and
J. Robert Woolsey

Submitted to
The Louisiana Geological Survey

September 30, 1988

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ACKNOWLEDGMENTS

It would be impossible to name all those individuals who have contributed to the successful completion of this project. Our thanks are extended to all who provided us with data for our data inventory and market analysis, including representatives from The University of Mississippi. Mississippi State University, The University of Southern Mississippi, Millsaps College, The University of Alabama in Birmingham, The University of South Alabama, The Southern Mississippi Planning and Development District, The Gulf Coast Research Laboratory, The Louisiana Geological Survey, The Mississippi Bureau of Geology, The Mississippi - Alabama Sea Grant Consortium, The Mississippi Bureau of Marine Resources, the USAE Waterways Experiment Station, The Naval Oceanographic and Atmospheric Administration, the National Geophysical Data Center, and The Minerals Management Service.

Special thanks are extended to David Booth of the Mississippi Bureau of Geology for designing both computer databases, and to Paul Mitchell of The Mississippi Mineral Resources Institute for drafting the maps and figures.

ASSESSMENT OF NON-ENERGY MINERALS IN THE EXCLUSIVE ECONOMIC ZONE, OFFSHORE MISSISSIPPI

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The Gulf Task Force was formed in September of 1987 as part of the Federal/State Task Force Program, administered by the Minerals Management Service under the direction of the Department of the Interior. The states of Alabama, Louisiana, Mississippi and Texas were charged with the responsibility of assessing the occurrence, distribution, and feasibility of developing nonenergv mineral resources of the Exclusive Economic Zone (EEZ) offshore each respective state. The goal of the task force was to provide the Minerals Management Service with data useful in selecting areas for future mineral lease sales. Non-energy minerals of interest were identified as sand, gravel, shell, and heavy minerals. The offshore limits of the study were restricted by the 200-meter bathymetric contour.

As a member of the Gulf Task Force, the Mississippi Mineral Resources Institute has prepared the following inventory and assessment of data relevant to the occurrence of mineral resources, offshore Mississippi. This report contains the following deliverables, as requested by the Minerals Management Service: 1) data inventory 2) data summary and identification of potential areas of interest, 3) generalized market analysis, and 4) conclusions and recommendations for further investigations.

DATA INVENTORY

The study began with a search of available literature pertaining to characteristics and occurrences of marine minerals, offshore Mississippi. Various state and federal agencies, academic institutions, and private companies were

contacted and were asked to contribute to the search. Two computer databases were designed using dBase III Plus software. The sedimentologic database houses specific raw data, such as heavy mineral identification, grain size data, and shell resource estimates (Appendix I). A separate but related bibliographic database summarizes relevant information contained in each published reference. It provides an abstract and identifies the types of information which can be found in the reference. Most importantly, the bibliographic database also refers the reader to appropriate map sheets where sample locations or tracklines are plotted. These map sheets serve as the focus around which the available information will be discussed.

Ten map sheets were prepared which show the locations of various types of surface and subsurface samples and geophysical tracklines. The maps were organized such that data relevant to each individual resource (heavy minerals, shell, sand and gravel) were plotted together. For clarity, the study area was generally divided into the nearshore area (including the Mississippi Sound and the barrier islands) and the offshore area. Geophysical tracklines were also plotted for nearshore and offshore areas, but were considered separately from the sediment data.

Sand and Gravel

No published studies have been devoted specifically to the determination of sand and gravel resources offshore Mississippi. Previous sand dredging for beach replenishing purposes has occurred; unfortunately, the necessary geologic characterizations have been conducted by private companies and thus the results are not within the public domain. However, several studies have dealt with the geologic history of the northern Gulf of Mexico and thus have provided sediment analyses and distribution maps which provide clues to potential sand and gravel resources in Mississippi's offshore area. These studies include those of

Chastain 1981. Dohm 1936, Foxworth et al. 1962, Hahn 1962, Isphording and. Lamb 1985, Isphording et al. 1985, Kindinger et al. 1982, Ludwick 1964, O'Brien 1984, Ötvös 1976 and 1986, Upshaw et al. 1966, and Wilson 1984. Very generalized lithologic descriptions of subsurface cores are provided by Barfus 1984, Carroll 1982, Harper 1982, Rainwater 1964, Wimberly 1985, and Woolsey et al. 1985. Sample locations for these studies are shown on Map Sheets 1 - 3. Sample locations for Barfus 1984, Carroll 1982, Harper 1982, O'Brien 1984, and Wilson 1984 are shown on Map Sheet 2 as "MS-ALA Sea Grant Vibracores".

In addition to these, other works include the Baseline Environmental Survey of the MAFLA Lease Areas (State University System of Florida 1975; Doyle and Sparks 1980), the Tuscaloosa Trend Regional Data Search and Synthesis Study (B.A. Vittor & Associates, Inc. 1985), and the Heavy Mineral Placer Potential Map of the U.S. Continental Shelf, Western and Northern Gulf of Mexico (Shideler 1988).

Heavy Minerals

Heavy mineral data have been collected from within the entire study area. Sample locations for heavy mineral studies are shown on Map Sheets 4-6. Studies utilizing surface or near-surface samples include Dohm 1936, Drummond and Stow 1979, Foxworth et al. 1962, Goldstein 1942, Hahn 1962, Harrison 1973, Simonson and Meylan 1983, Stow et al. 1976, and Upshaw et al. 1966. Vibracore and water-lift samples, secured by the Mississippi Mineral Resources Institute in 1985, were analyzed by Reynolds 1985, Wimberly 1985, Woolsey 1984, and Woolsey et al. 1985 (Map Sheet 4). Over 600 samples from the study area have been analyzed for heavy mineral content.

Shell

Only one study was found which dealt entirely with the occurrence of potentially economic shell deposits (Demoran 1979, Map Sheet 7).

Geophysical Studies

A different approach was taken in preparing map sheets for depicting geophysical studies. Because many different authors have had access to and utilized the same geophysical data, such data are plotted according to cruises.

One hundred thirty six km of high resolution seismic data were collected aboard the R/V Rounsfell during the fall of 1980 (Map Sheet 8). This cruise was coordinated through the efforts of the Mississippi-Alabama Sea Grant Consortium, the University of Alabama, Birmingham, and the University of Mississippi, and extended from Lake Borgne, Louisiana eastward to and including Mobile Bay, Alabama.

The U.S. Geological Survey conducted two surveys during the spring and summer of 1981. The first survey, conducted aboard the R/V Gyre, provided high resolution data along tracklines running both parallel and perpendicular to the shelf break at 5km spacings (Map Sheet 9). Penetration ranged from 0 to 500 meters. In order to reach those shallow areas within Mississippi Sound and around the Mississippi barrier islands and the Chandeleur Islands, a second cruise was carried out aboard the R/V Carancahua, which provided high resolution seismic records of shallow and moderate depth (Map Sheets 8 and 9).

The Mississippi Mineral Resources Institute conducted a geophysical survey in March of 1983 aboard the R/V Amity (Map Sheet 8). This survey included 198 km of shallow seismic, Side-scan sonar and gamma ray sled work.

Data holdings within the National Geophysical Data Center (NGDC) were also searched given latitude/longitude parameters of 28° to 32° N. latitude and 85° to 90° W. longitude. NGDC holdings which fell within the offshore

area of Mississippi can be seen on Map Sheet 10. The tracklines indicated for each organization may indicate bathymetric, magnetic, gravity, seismic, side-scan sonar, or refraction data availability. Data indicated from the Minerals Management Service are intensive high-resolution seismic profiling for lease-sale hazard studies.

DATA SUMMARY AND IDENTIFICATION OF POTENTIAL AREAS OF INTEREST

Sand and Gravel

Distribution maps of the surficial sediments of Mississippi Sound have been prepared by several authors. Few, relatively insignificant differences exist among the available literature. In general, Mississippi Sound sediments are predominantly estuarine silts and clays, with sands occurring marginally along the mainland and barrier island trend (Figure 1). Basically this same sediment distribution pattern has been traced throughout the subsurface sediments to a depth of approximately 20 feet (O'Brien 1984). Recent sediments average 20 feet in thickness and lie on top of more compacted Pleistocene sediments.

Sands from within Mississippi Sound have historically been dredged for beach replenishment purposes. Harrison County beaches were restored in 1952, 1972, and as recently as 1988. For each of these projects, the source sand was dredged from within the confines of the Mississippi Sound, approximately 1800 ft. from shore. Thus the dredging occurred within those sands identified above as occurring immediately adjacent to the mainland.

Surficial sediments of the Mississippi shelf and slope are generally divided into six sediment zones: 1) the Mississippi prodelta facies; 2) the Chandeleur facies; 3) the St. Bernard prodelta facies; 4) the nearshore

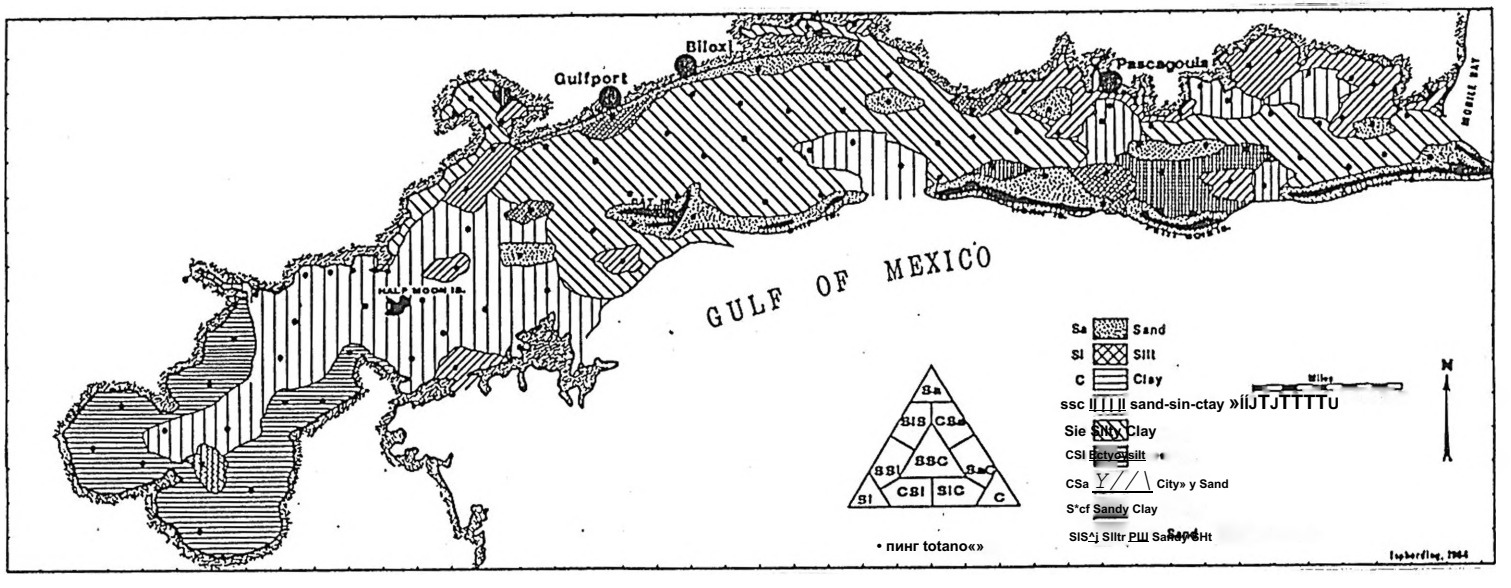

FIGURE 1: Surface sediment distribution, Mississippi Sound (from Isphording & Lamb]985)

fine-grained facies; 5) the Mississippi - Alabama sand facies; and 6) the Mississippi - Alabama reef and interreef facies (Figure 2; Ludwick 1964). Of particular interest to the present study, the Mississippi - Alabama sand facies is found over most of the Alabama shelf and extreme western Florida. It extends just into the offshore Mississippi study area, south of the eastern-most barrier islands. Because cores have not been obtained from this outer shelf and slope area, this sediment distribution pattern has not been traced into the subsurface sediments; however, Ludwick (1964) estimates the thickness of the deposit to be less than 50 feet. The average grain size of this sand facies has a median diameter of 0.18 mm (fine-sand size).

The information we do have concerning subsurface sediments comes from the interpretation of seismic records collected aboard the R/V Gyre in 1981. Using these records, Kindinger et al. (1982) recognized four major unconformities and two sedimentary sequences (a sedimentary sequence being described as a seismic stratigraphic unit containing a major regression and a major transgression). Within the lower sequence, the authors were able to identify parallel-type bedding showing heavy channelling. This channelling is clearly divided into three groups of channel patterns which may indicate pulses in the total regression of the sea (Figure 3). A major stillstand occurred midway through this regression, which allowed the sea to partially backfill the river channels and deposit progradational deltaic sediments. Thus much of the previous channelling was covered by very thick deltaic deposits. Subsequent well borings (not extensively discussed by the authors) suggest deltaic deposition (clay overlain by fine sandy clay).

The upper sequence also contains channel deposits (Figure 4). Again, the lithology is not well known, however these sediments are at least partially covered by the prodelta deposits of the St. Bernard Delta.

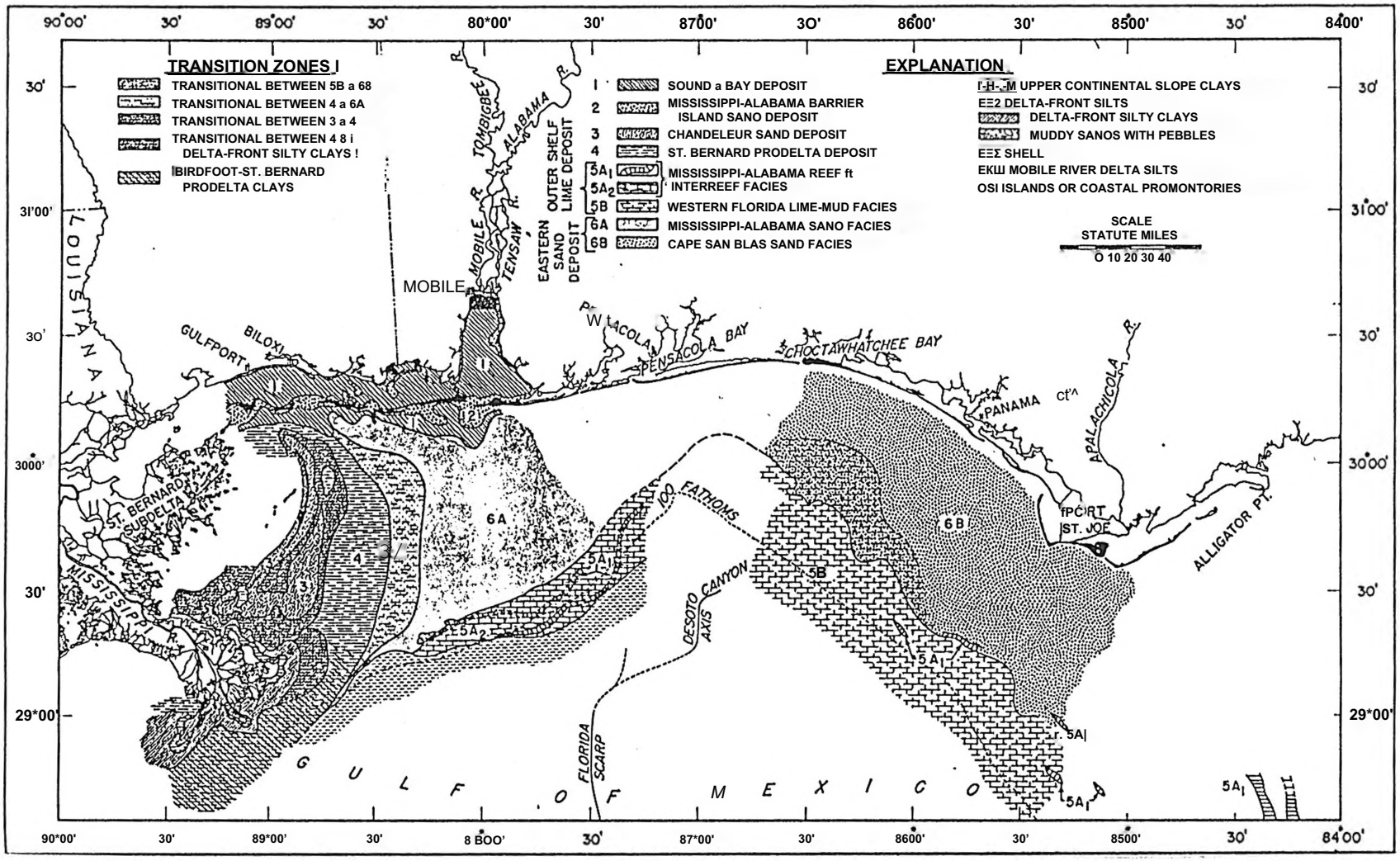

FIGURE 2: Surface sediment distribution, northern Gulf of Mexico (from Ludwick] 964)

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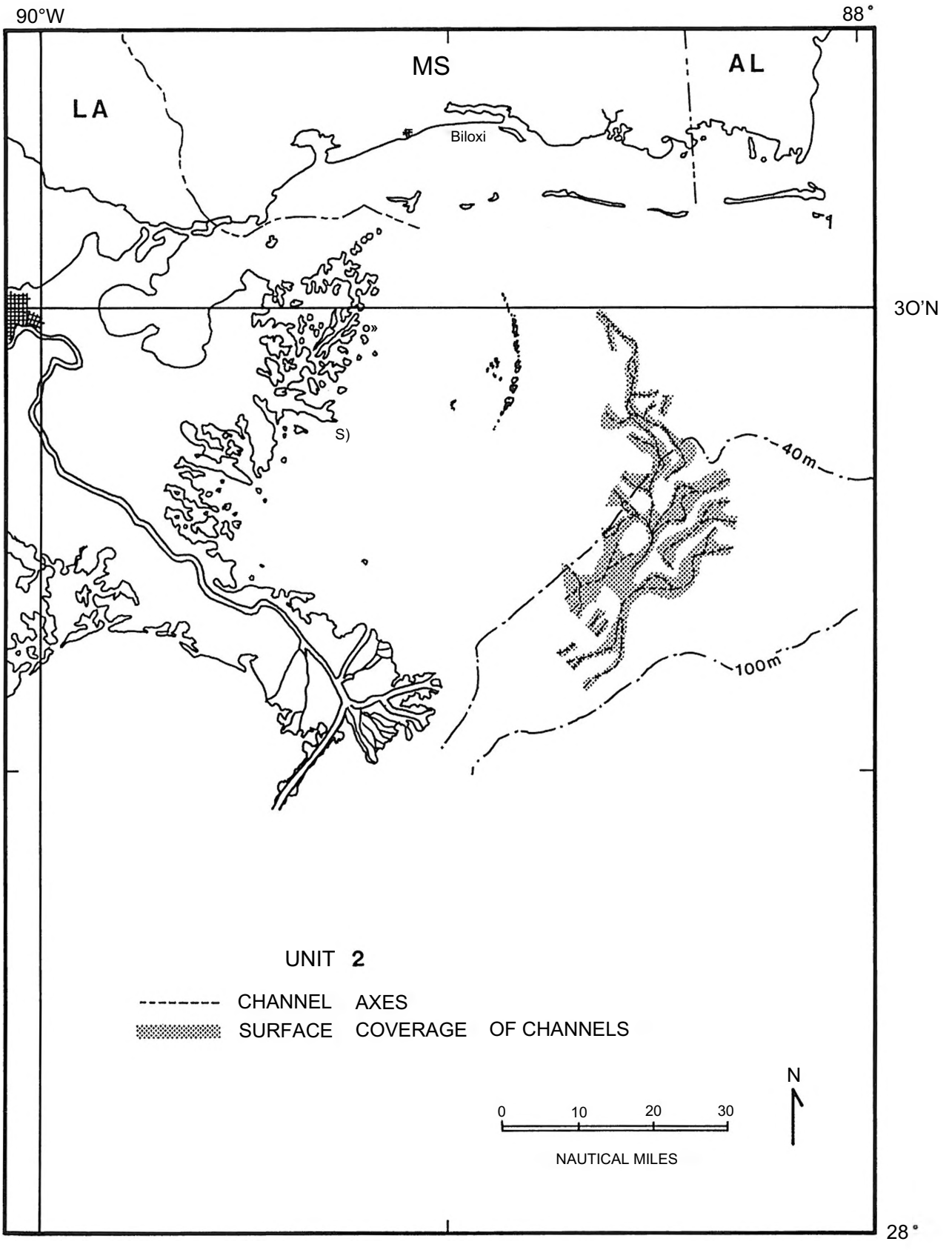


FIGURE 3: Channel pattern within lower sedimentary sequence inferred from seismic reflection profiles (from Kindinger et al. 1982)

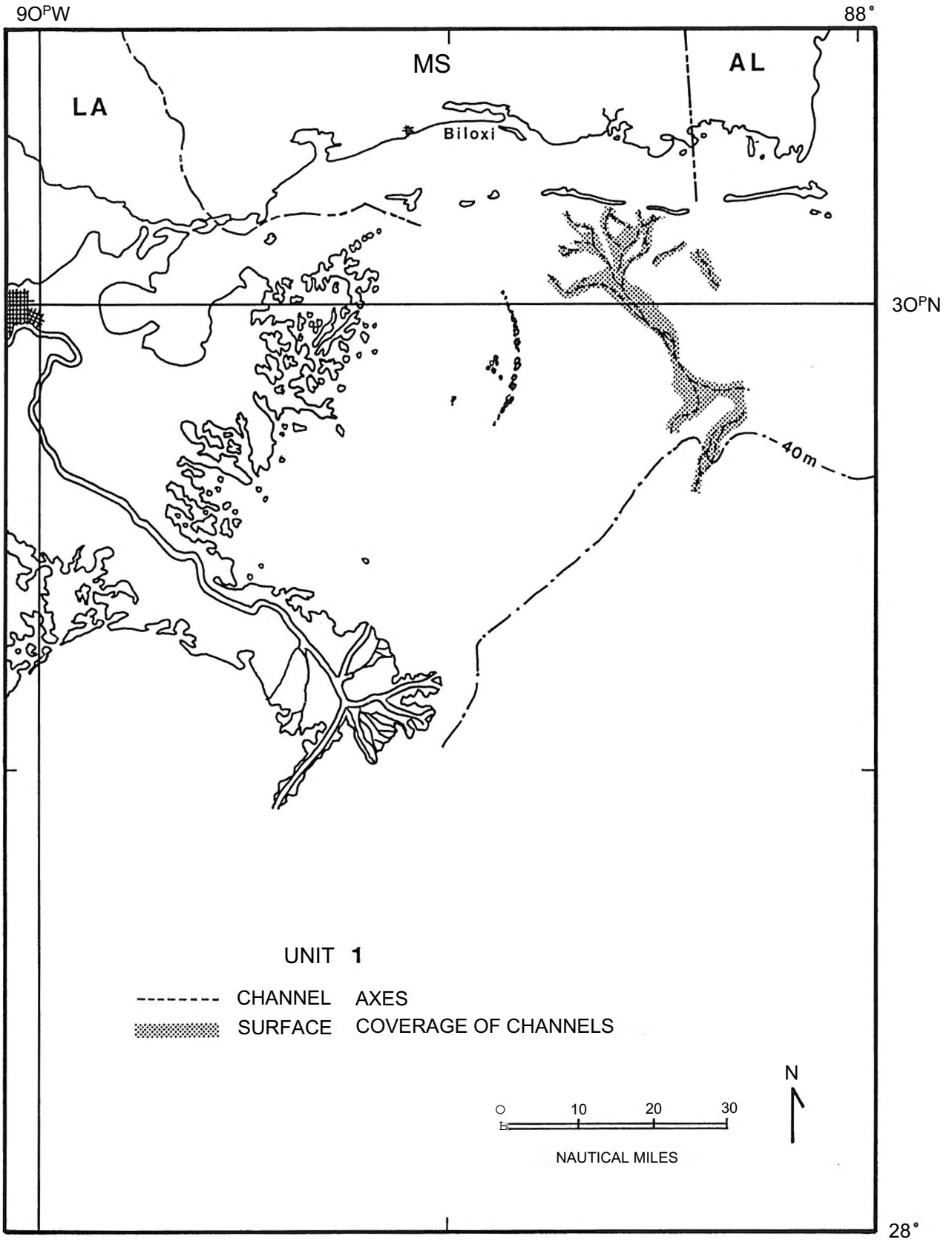


FIGURE 4: Channel pattern within upper sedimentary sequence inferred from seismic reflection profiles (from Kindinger et al. 1982)

These channel deposits may represent potential areas of interest with respect to sand, gravel, and heavy mineral accumulation. It is apparent though that much more information is necessary in order to assess the possibilities.

Heavy Minerals

It is generally agreed among those people who have studied Mississippi shelf sediments that heavy minerals occur in two distinct suites or provinces. The Eastern Province typically contains abundant ilmenite, kyanite, staurolite, zircon, and tourmaline. These minerals are thought to be derived from the Cretaceous and younger sediments of the Appalachians. The Western Province, composed chiefly of pyroxenes, amphiboles, epidote, ilmenite and biotite, is believed to be derived from the drainage basin of the Mississippi River. A rather narrow transition zone exists between the two provinces and roughly coincides with the transition of the St. Bernard prodelta deposit and the Mississippi - Alabama sand facies of Figure 2.

Of the heavy minerals known to occur in the study area, those minerals of commercial interest include ilmenite, rutile, kyanite, staurolite, zircon, monazite, and xenotime. Many of these occur in potentially economic quantities in laminae in the foreshore and backshore of the barrier islands; however, these deposits are not accessible on Petit Bois, Horn and Ship islands as they are a part of the Gulf Island National Seashore.

Other than the barrier islands themselves, a promising area for investigation of heavy mineral occurrence might be a zone identified by Van Andel (1960) as containing sands with greater than 4% heavy mineral content. This zone is situated between Petit Bois Island and the western end of Dauphin Island and extends seaward for about 6 miles. A later study by Stow et al. (1976) shows a plume of diluted heavies in this area, but does not concur with the

concentration suggested by Van Andel. Additionally, a limited number of vibracore and waterlift drill samples ranging from ten to twenty feet in penetration were taken by the Mississippi Mineral Resources Institute offshore of the Mississippi barrier islands. Results obtained from analysis of these cores generally concurred with the findings of Stow et al. (Wimberly 1985, Woolsey 1984, 1985). Shideler (1988) suggests the sandy continental shelf area seaward of the M.M.R.I. sampling area could have significant placer potential. His suggestion is based on surficial heavy mineral content and seafloor physiography.

Shell

One study was identified which dealt entirely with the occurrence of potentially economic shell deposits (Demoran 1979). Demoran identified four reef areas within Mississippi Sound which have the potential of providing 1,870,396 cubic yards of shell. The amount of overburden ranges from 0 to 3 feet. The water depth around these deposits ranges from 7 to 27 feet, deep enough to allow conventional trailing suction dredges to approach the deposits.

Through seismic record interpretation, Kindinger et al. (1982) identified oyster reefs in their previously defined upper sedimentary sequence. The reefs appear to be quite extensive, occurring just southeast of the Chandeleur Island chain, but are blanketed by deltaic deposits.

A considerable amount of data relevant to the abundance and location of shell in Mississippi has been collected in past survey studies by Radcliff Materials Company, now owned by Dravo Materials, Mobile Alabama. These data are considered proprietary.

GENERAL MARKET ANALYSIS

It is difficult to make an adequate market analysis with so little resource data available for the offshore Mississippi area. At best we can give only a brief accounting of the marketing potential of offshore resources based on recent dredging operations in Mississippi Sound and current land-based operations.

Sand and Gravel

Sand and gravel are high-volume, low-cost commodities which are largely used as construction aggregates and for beach nourishment and erosion control. In order for an offshore deposit to be considered economic, extraction and transportation costs must be kept to a minimum.

Currently, the market for construction aggregates in south Mississippi is somewhat depressed. Sand and gravel are presently being sold for $5.50 per ton F.O.B. on the Mississippi Coast. Transport cost by truck is generally $0.10 per ton/mile. Sand and gravel is being purchased by the construction industry at $9.50 per ton in New Orleans, Louisiana and Mobile, Alabama; however, the accessibility of nearby resources makes it uneconomical at present to truck in sand and gravel from outside sources. Barging costs are considerably less than trucking costs, which may allow the offshore deposits to be more economical than the shore deposits in the long run. According to Lewis (1983), the cost of transporting aggregate by barge is $0.10 per ton/mile, with loading costs of about $2.50 to $4.00 per ton. These costs drop dramatically with regular barge runs and back hauls: $1.25 for loading costs, and $0.02 per ton/mile for shipping costs. It must be stressed, however, that it could be equally as economical, if not more so, to barge aggregates down the Mississippi or Tombigbee rivers from the plentiful supplies in the northern and west central parts of the state.

Sands for replenishing Harrison County beaches were recently dredged and piped to the beach from 1800 feet off shore. A total of 1,024,000 cubic yards were purchased at a price of $2.15 per cubic yard. The sands came from a deposit which measured approximately 1500 feet wide, and from 500 to 1000 feet in length. The sands were tested for toxicity, and in sieve analysis, 10% passed through the #200 sieve. These sands were piped directly to shore with no washing or processing costs involved.

These are representative figures for dredging sands designated for a specific purpose from a resource located very close to its point of sale. It is assumed that dredging costs might increase depending on several factors. Dredging for aggregates would almost certainly involve some on-board preliminary processing, and transportation costs would increase proportionally with distance from the resource to the point of sale. Probably the major unknown risks would involve as yet undetermined real or perceived needs for environmental protection that would no doubt develop in the course of dredging.

Heavy Minerals

Those minerals of particular interest include the oxides of titanium, including ilmenite, rutile and leucoxene. Two companies manufacture titanium dioxide in Mississippi: E.I. du Pont de Nemours & Company, Inc. at Pass Christian, and Kerr-McGee Chemical Corporation at Hamilton. The Kerr-McGee facility has recently undergone three major expansions. In 1984, a $4 million expansion program was completed that increased production capacity to 63,000 tons per year. Later that year, a second expansion was begun, increasing capacity to 72,000 tons per year. In 1986, the company announced even another expansion to increase its capacity to 93,000 tons per year. Feedstock for the Hamilton plant is synthetic rutile manufactured at Kerr-McGee's Mobile, Alabama plant. Feedstock for the

Mobile plant is ilmenite from Australia, with approximately 180,000 short tons being imported for this purpose in 1985 (Minerals yearbook 1985 - p. 40). Similarly, the DuPont plant imported 225,215 short tons of ilmenite from Australia in 1985 and 195,893 short tons in 1986 (Minerals yearbook 1986 - preprint).

It seems likely, then, that heavy mineral sands could be easily marketed in the immediate area if economic concentrations could be located in environmentally suitable areas. Present economic parameters governing TiO_2 mining and processing in similar geologic settings require grades of approximately one to two percent TiO2 minerals, with TiO_2 content ranging from 55 to 100 percent.

Shell

Commercial shell dredging has been a well-developed industry along the northern coast of the Gulf of Mexico. Shell has been used primarily as "grit" for poultry, in agricultural lime production, and to a lesser extent, in road construction. Current dredging prices are $6.00 to $8.00 per cubic yard, brought to shore and transported within a radius of 10 miles. For longer hauls, the price can double. Offshore mining of shell remains a viable industry however, as these reefs often represent the sole source of lime for the coastal counties. Local consumers may include USG Corporation, which produces both quicklime and hydrated lime from shell at its New Orleans plant.

CONCLUSIONS & RECOMMENDATIONS FOR FURTHER STUDY

Mississippi's offshore areas have been extensively explored with respect to sediment composition and distribution. Unfortunately, however, comprehensive studies have not been directed toward resource evaluation.

Sand for beach replenishment has been dredged successfully from within the confines of Mississippi Sound. Apparently the sand is of sufficient size, however fine-grained, to provide adequate protection from beach erosion in this low-energy setting, as replenishment endeavors have only been repeated approximately every twenty years. It is desired, however, that periodic beach nourishment be carried out on a regular basis, at least every five years. To do this, a comprehensive study of Mississippi Sound sediments must be undertaken in order to fully characterize the occurrence and distribution of sands suitable for beach replenishment purposes. Once attained, these data can be considered relative to pertinent environmental and socio-economic information for optimum selection of future borrow sites.

Offshore of the barrier islands, several ancient river channels have been described in the subsurface through the use of seismic data. These channels could indicate the presence of economic sand, gravel, or heavy mineral deposits, but much more data would be required in order to make an adequate assessment. Detailed grain size analyses should be performed on sediment samples from these channel areas. Additionally, subsurface sediments beneath the large Mississippi - Alabama sand facies should be analyzed extensively. The amount and type of overburden for each area also should be characterized, as removing the overburden, beyond the determined acceptable overburden ratio, can drive the cost of a dredging operation beyond economic limits. All other conditions, physical, environmental and economic, being favorable, current technology would easily allow exploitation of these potential resources out to a water depth of as much as 100 meters.

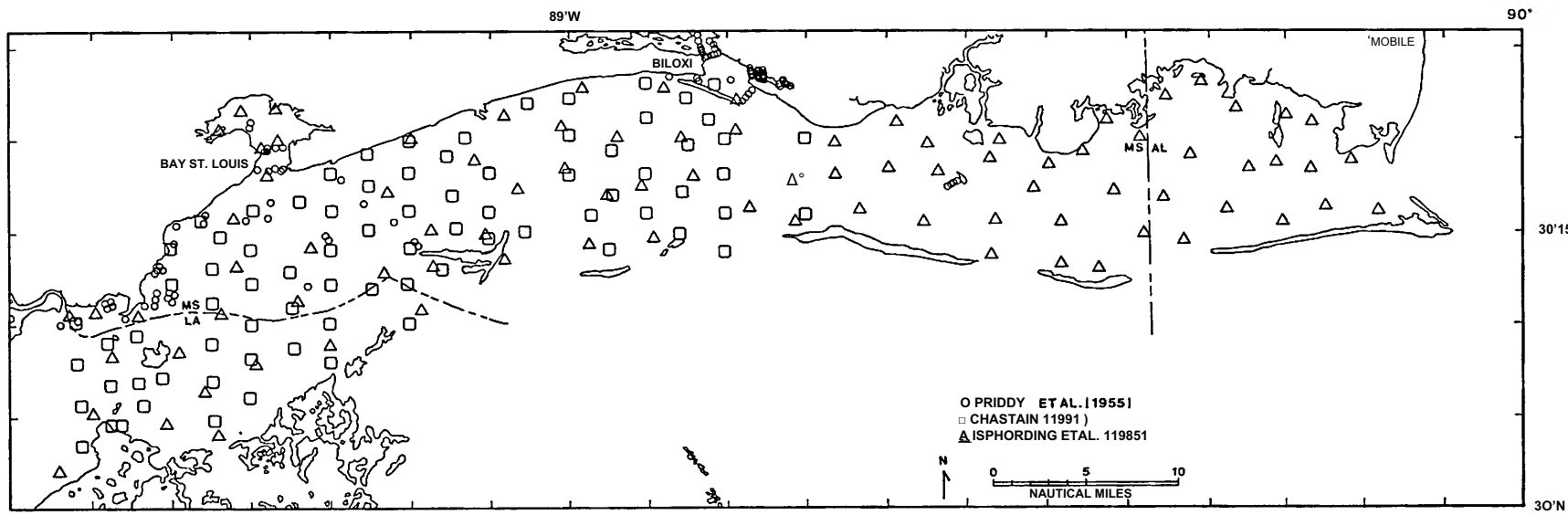
Heavy mineral analyses could be carried out concurrently with the sedimentologic analyses. Emphasis should again be placed on the offshore channels and

subsurface sediments beneath the Mississippi - Alabama sand facies. The heavy mineral deposits of Mississippi Sound and the barrier island chain are not presently considered to be of economic value, partially because of the status of the islands as a national seashore, but also because environmental constraints would not allow economic extraction without further technological improvements to present mining and processing methods.

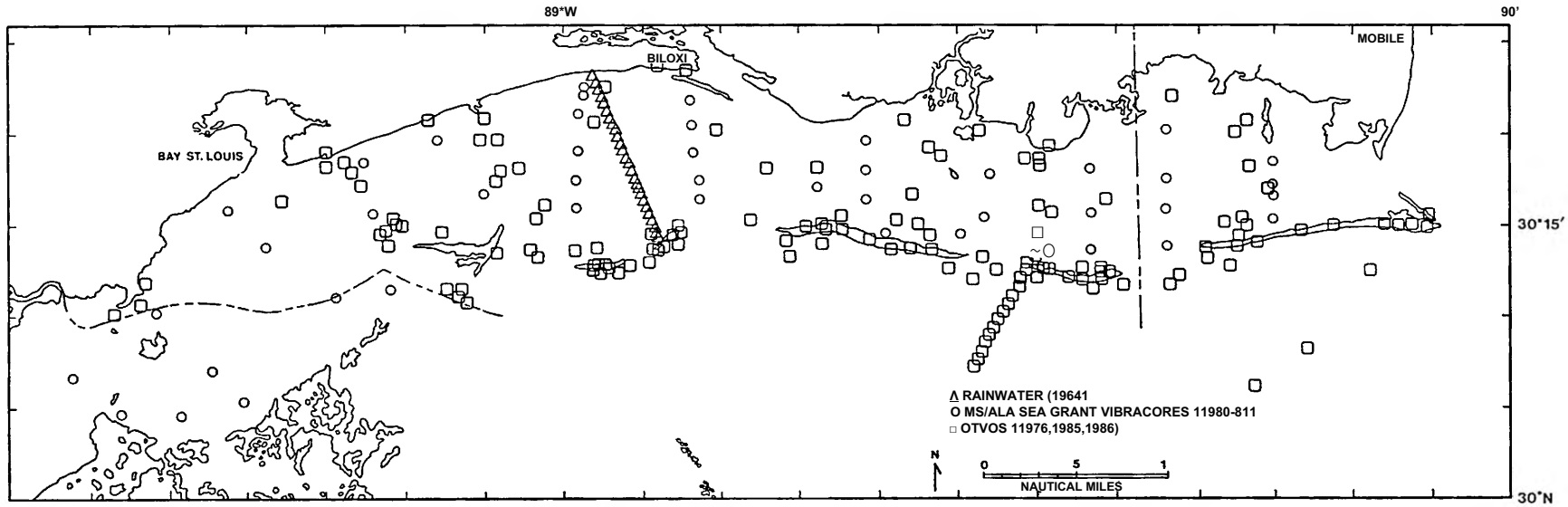
These barrier island heavy mineral deposits are nevertheless interesting from an academic standpoint. The combined effects of longshore drift and long period waves move the heavies shoreward and deposit them on the Gulf side of the barrier islands. Wind and wave action effectively transport them across the islands where they are deposited as wash-over and blow-over sands adjacent to the leeward shore in the relatively calm lagoonal environment of Mississippi Sound. The Mississippi Mineral Resources Institute plans to conduct an extensive seismic survey of the Sound followed by a comprehensive drill sampling program in an effort to describe the characteristics of this low-energy environment.

Approximately two million cubic yards of reef shell are known to exist and are available for exploitation in Mississippi Sound. It is generally thought that these resources can be mined by the use of available technology and with little disturbance to the environment. However, similar safeguards must be incorporated into any mining plan as in any other mining scheme. On-board processing would require that silts be washed back down into the water column, most assuredly causing a turbidity plume. Coping with environmental regulations may render the venture uneconomic.

MAP SHEETS



MAP SHEET 1: Sediment studies



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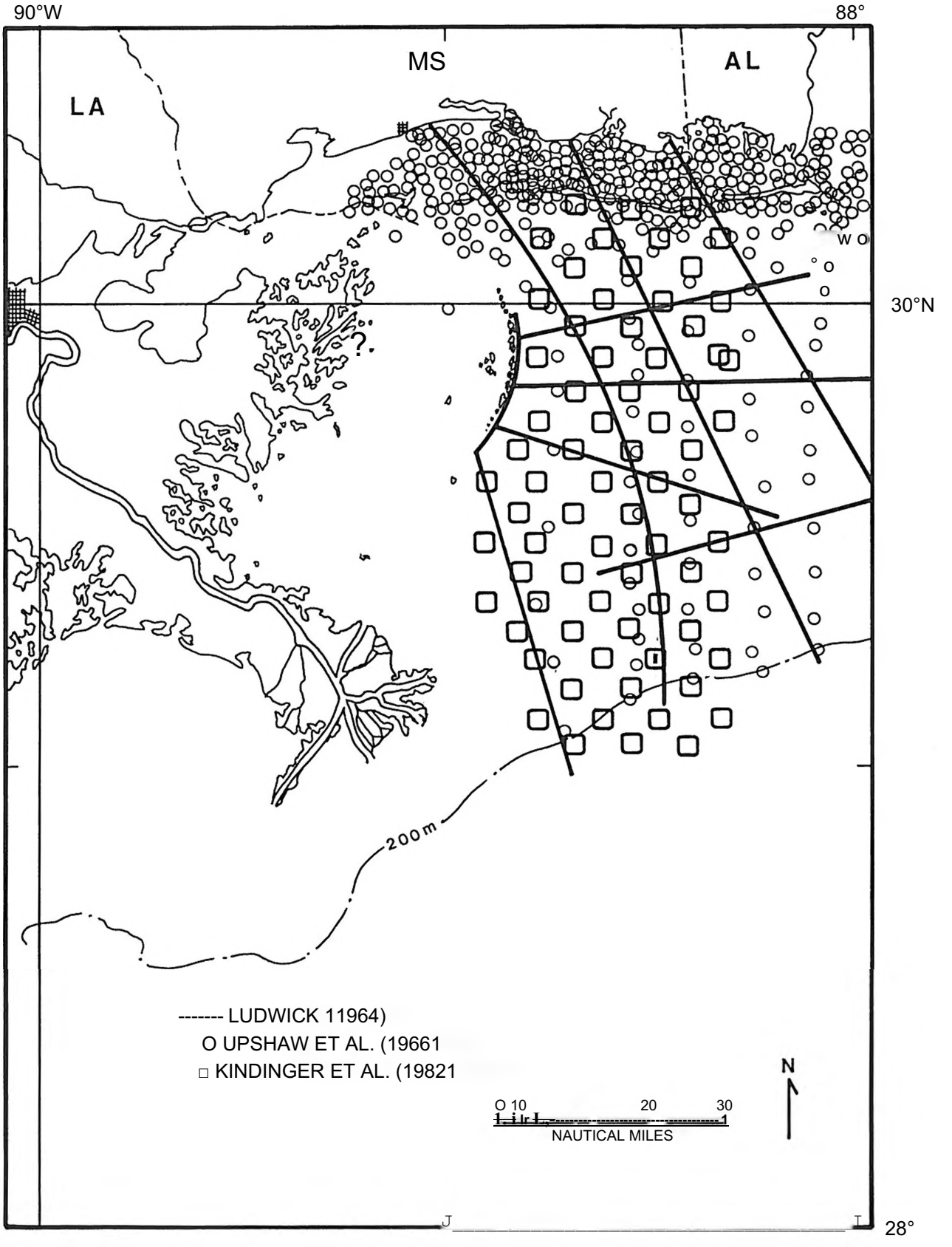
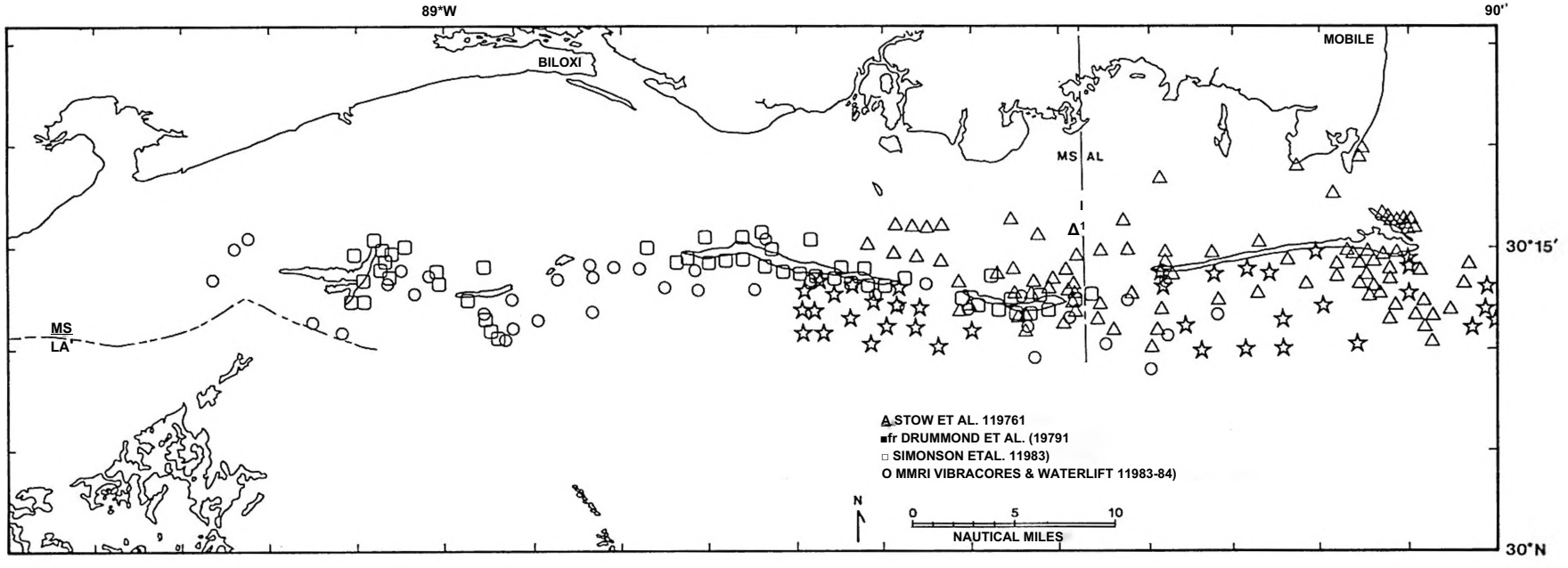


MAP SHEET 3: Sediment studies



MAP SHEET 4: Heavy mineral Studies

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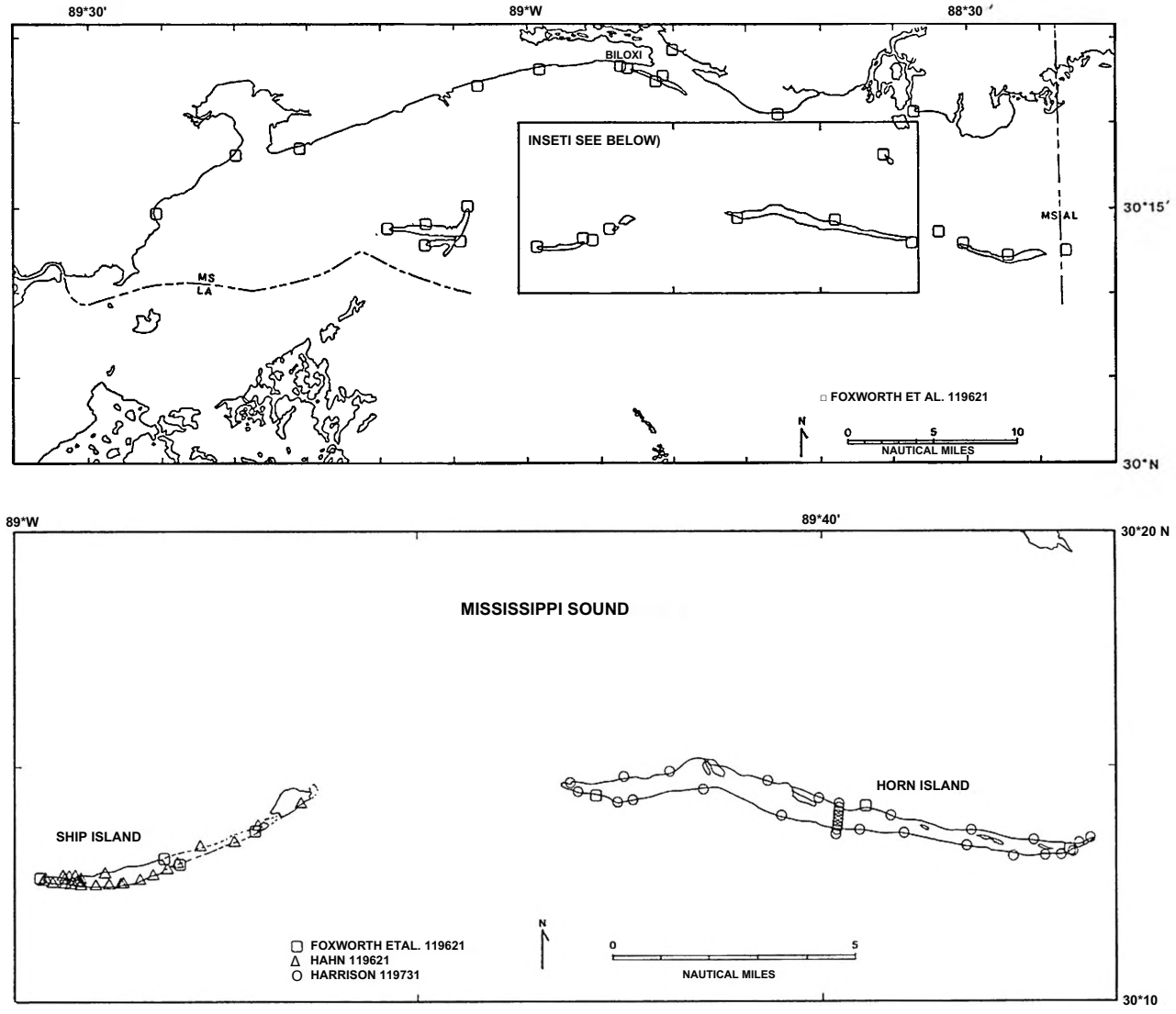

MAP SHEET 5: Heavy mineral studies

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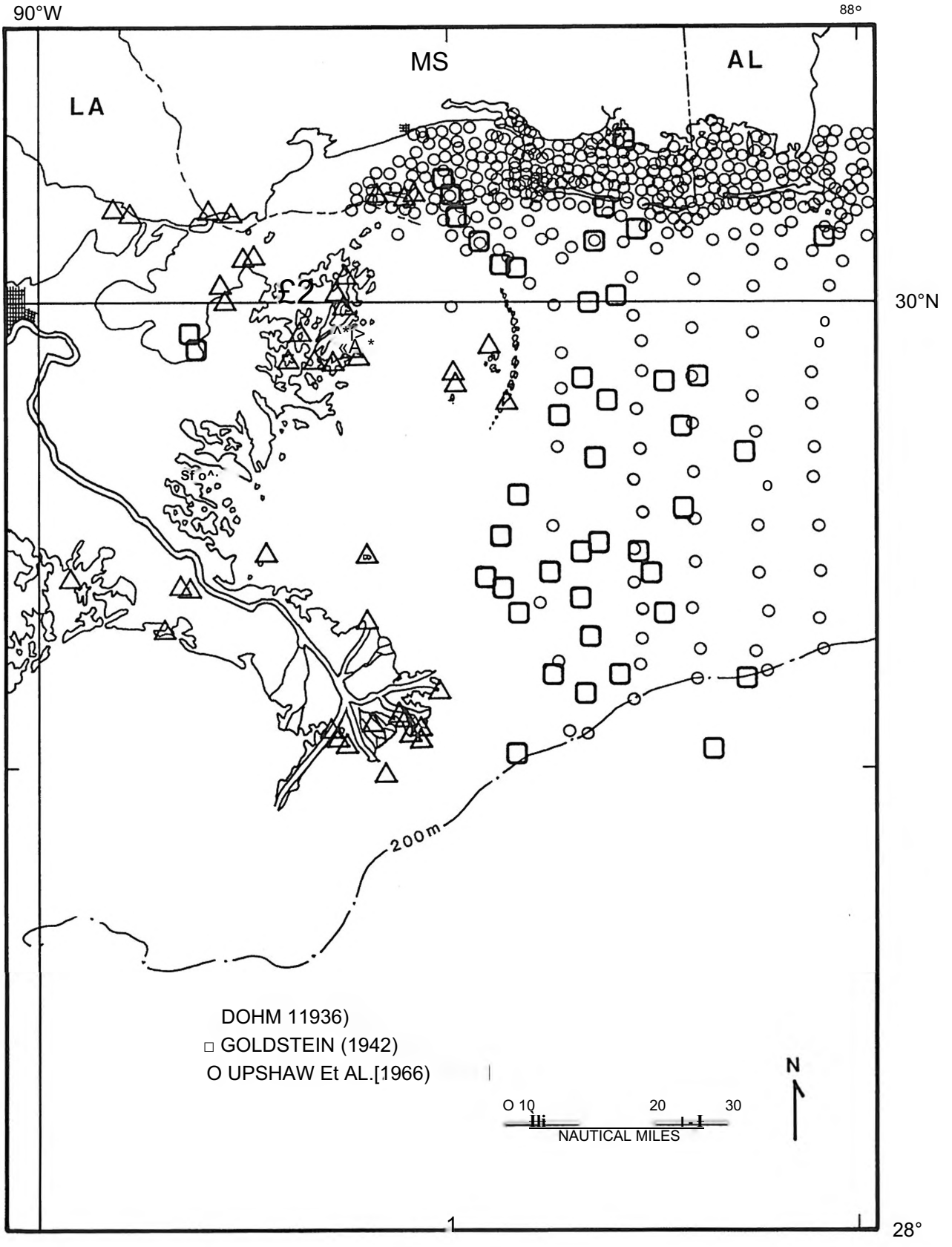
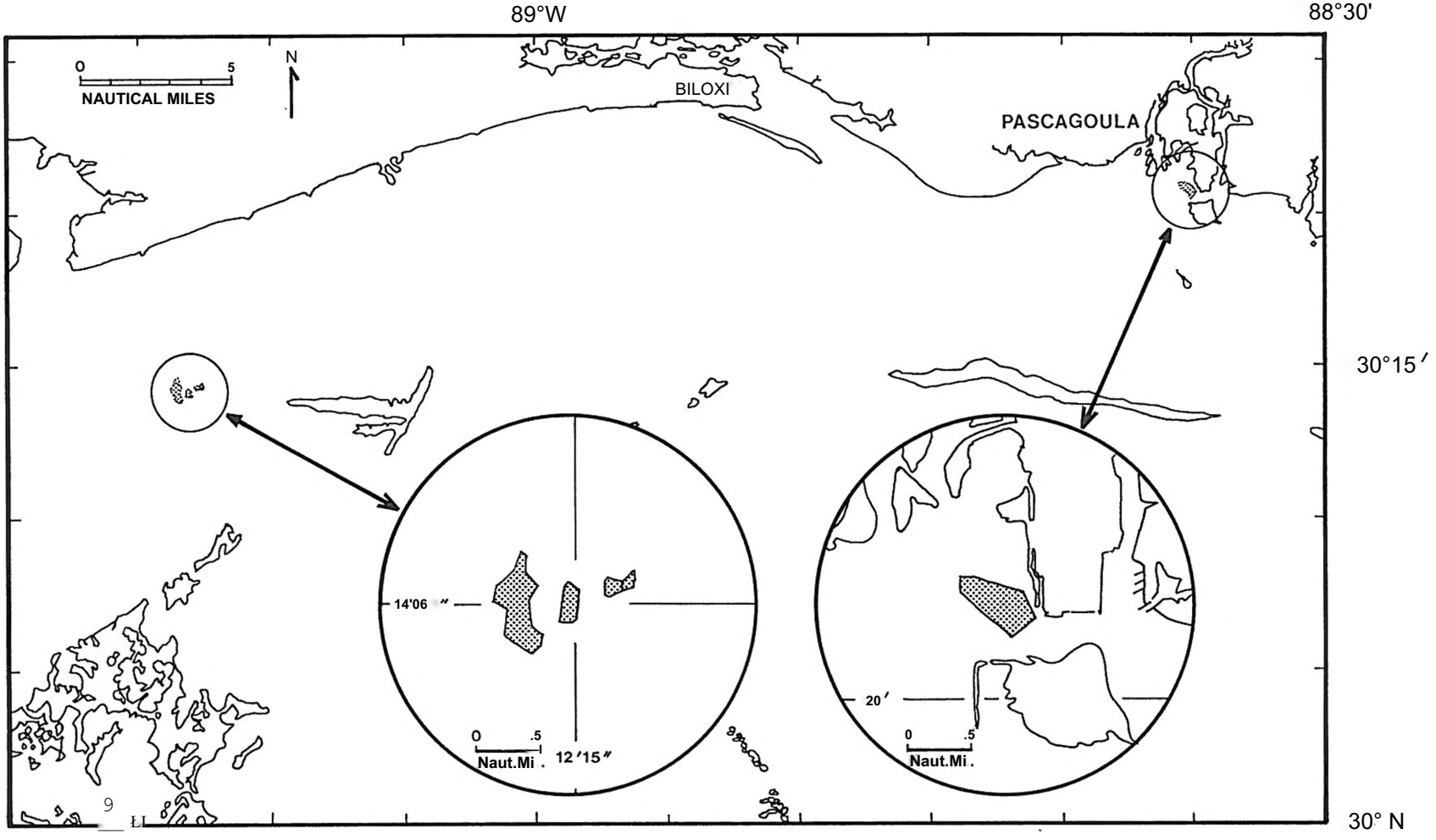
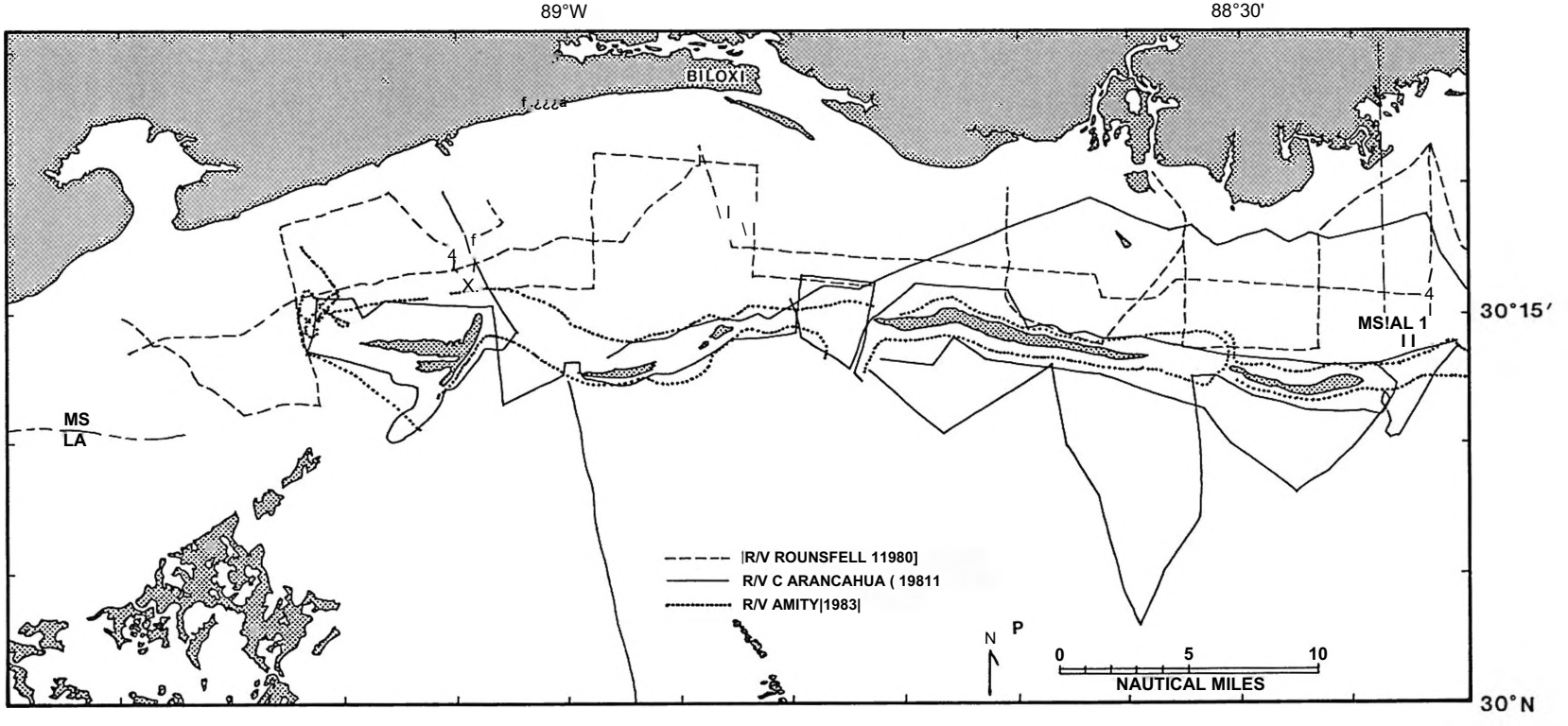


MAP SHEET 6: Heavy mineral studies



MAP SHEET 7: Shell deposits in Mississippi Sound (Demoran 1979)



MAP SHEET 8: Geophysical tracklines

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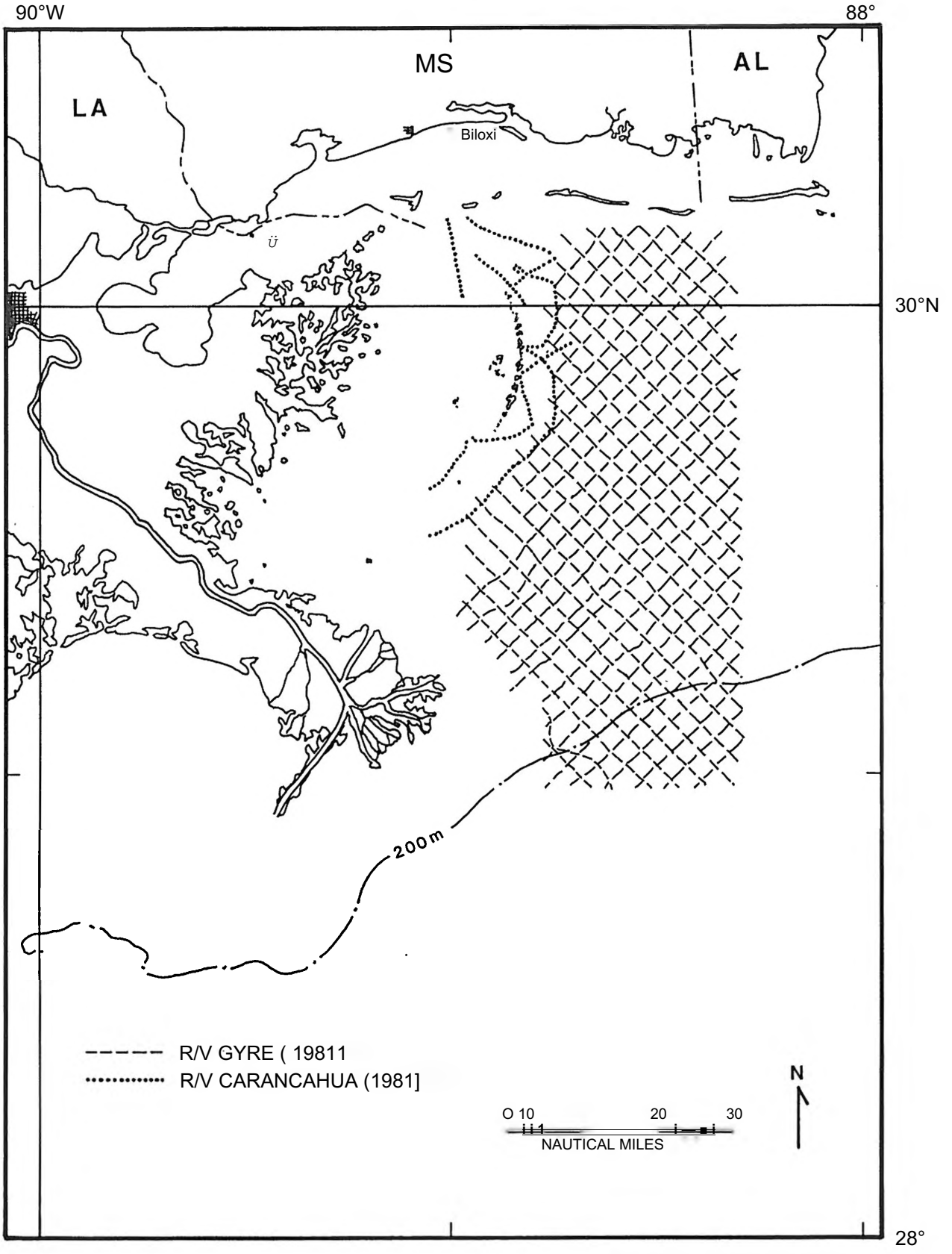
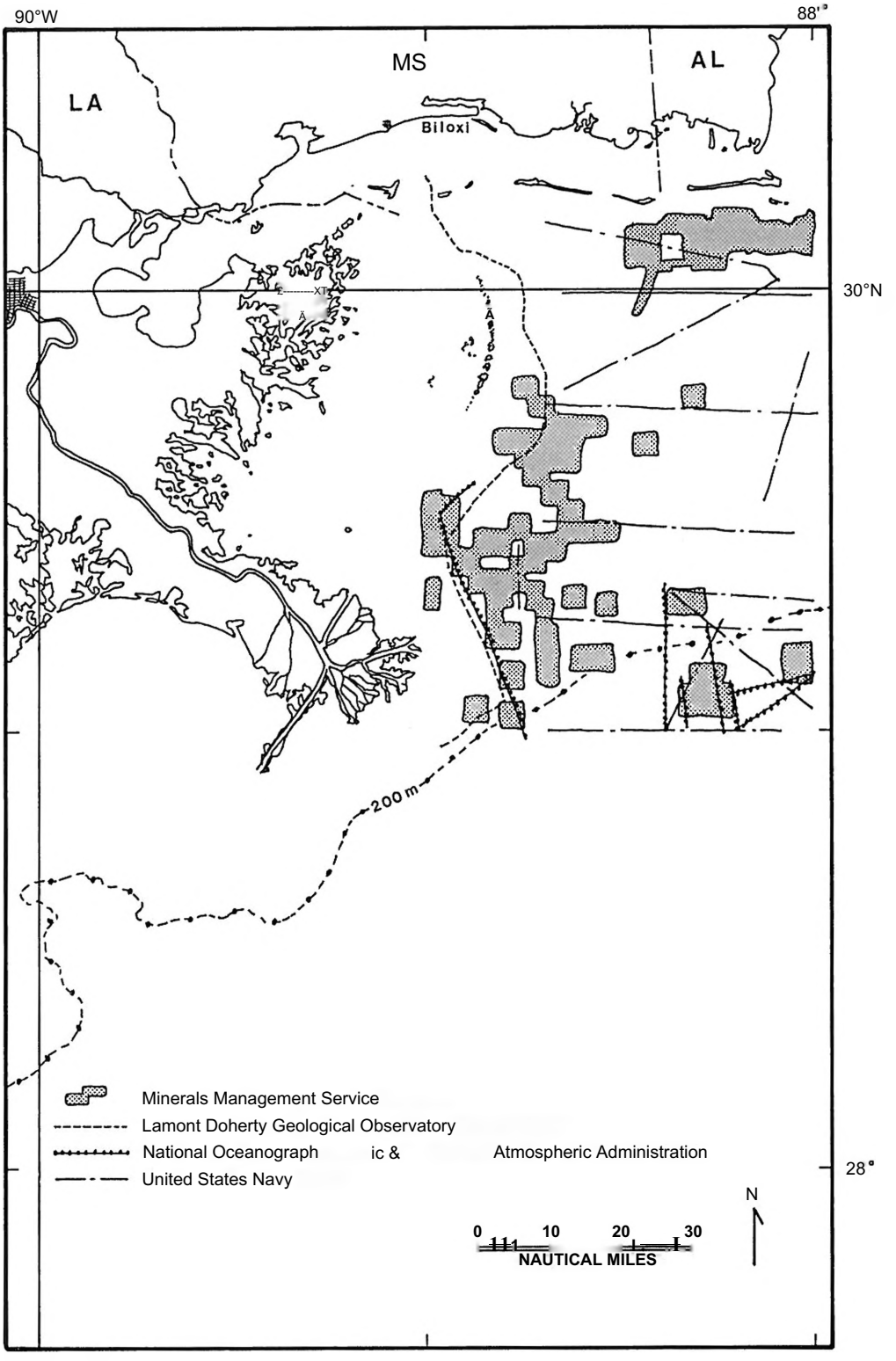


MAP SHEET 9: Geophysical tracklines



MAP SHEET 10: Geophysical tracklines

BIBLIOGRAPHIC DATABASE

KEY TO BIBLIOGRAPHIC DATABASE

AUTHOR:	
TITLE:	
REFERENCE:	
YEAR OF PUBLICATION:	
ARCHIVE:	Location where samples are stored, if known.
LOCATION COORDINATES:	Lat./Long. range for entire study area

TYPE OF DATA FOUND IN PUBLICATION:

GEOPHYSICAL:	Did the study rely on interpretation of geophysical data? (These data are generally not available in the publication.)
SAMPLE ANALYSIS:	Were sediment samples collected for this study? If raw data were not published, this will be noted under "Notes or Remarks".
OTHER:	Are there any miscellaneous data given in the publication? Examples: oceanographic, paleontologic, etc.
DESCRIPTION OF SPECIFIC DATA INCLUDED:	Topical information, such as sedimentologic, paleontologic, heavy mineral, structure, stratigraphy, oceanography, magnetic data, etc.

GEOPHYSICAL DATA:

If geophysical data were used in the study, this section will identify the following:

PERFORMED BY:	Company or agency that conducted the survey.
DATA TYPE:	Type of geophysical data used.
NUMBER OF TRAVERSES:	Number of traverses made, if on a systematic grid. Will show "0" if random tracks were made.
COVERAGE:	Trackline coverage in km.
RESOLUTION:	Seismic profiling with acoustic source frequencies of 50 - 500 Hz = low resolution; 500 - 3.5 kHz = high resolution.
INSTRUMENT TYPE:	Type of geophysical instrument used in survey.
LOCATION MAP PAGE:	Map sheet within present report where geophysical data are plotted.

SAMPLE DATA:

TYPE OF DEVICE:	Sampling device used, if known. If sampling device is not known, will indicate whether samples are surface or subsurface.
LOCATION MAP PAGE:	Map sheet within present report where sample localities are plotted.
NUMBER OF SAMPLES UTILIZED FOR:	
GRAIN SIZE:	Number of samples which were analyzed for grain size distribution.
SIZE DISTRIBUTION:	Number of samples on which statistical analyses of grain size were performed.
HEAVY MINERALS:	Number of samples which were analyzed for heavy mineral content.
SHELL MATERIAL:	Number of samples which were analyzed for shell content.
CHEMICAL ANALYSIS:	Number of samples which were analyzed for trace metals, radioactivity, etc.

OTHER DATA:

OCEANOGRAPHIC SURVEYS:	Current patterns, etc.
PALEONTOLOGIC DATA:	Brief description
OTHER DATA OR SURVEYS:	Brief description

NOTES OR REMARKS:	Any additional notes or comments. If raw data are not given or are not keyed to lat./long, coordinates, it will be noted here. If data cannot be identified by lat./long, or Loran-C coordinates, they will not be found in the sample database.

ABSTRACT:	May be taken directly from the author's abstract, or paraphrased from the text.

Author: BARFUS, B.L.

Title: LITHOLOGIC AND SEISMIC DETERMINATION AND CORRELATION OF RECENT DEPOSITIONAL ENVIRONMENTS IN WESTERN MISSISSIPPI SOUND

Reference: MASTER'S THESIS, UNIV. OF MISSISSIPPI, 109PP-

Year of Publication: 1984

Archive:

LOCATION COORDINATES
North Latitude: 3000.000 To: 3023.000
West Longitude: 8850.000 To: 8935.000

QP рдуд FOUND IN PUBLICATION

I Geophysical [T,F3?: T Sample Analysis [T,FJ?: F..... Other [T,F]?: F J
Description of Specific Data Included: LITHOLOGIC

GEOPHYSICAL DATA

Performed by: U.S.G.S. Data Type: SEISMIC
Number of Traverses: 0 Coverage: 136.00 km. Resolution: HIGH
Instrument Type: SONAR/MINI SPARKER Location Map Page: 8

* NOTES or REMARKS *

MS/ALA Sea Grant seismics & vibracores, 1980-82; Lithologic descriptions of cores & seismic interpretation; Seismic cruise: R/V Bounsfell (August 1980)

* ABSTRACT *

Examination of 85 miles of seismic profiles and twenty vibracores of Holocene sediments of western Mississippi Sound and eastern Lake Borgne reveals a complex lithostratigraphic depositional sequence resulting from the interaction of fluvial and shallow marine processes in a region undergoing marine transgression. From seismic and vibracore data, it is concluded that: (1) Holocene sediments unconformably overlie Sangamon aged sediments which were subaerially exposed resulting in a highly weathered, oxidized, and eroded surface which exhibits a gentle southwest dip; (2) Seven depositional environments including delta front, prodelta, barrier island, estuarine, marine, tidal flat, and large Mississippi-type prodeltas were identified in the Holocene sediments; (3) The formation of a series of barrier islands between 3.0 and 4.0 ka and the Mississippi — La Loutre prodelta between 2.3 — 3.0 ka resulted in the formation of the Sound; (4) Deltaic sedimentation in the Sound ceased as sea level continued to rise in the late Holocene and fluvial sediments became trapped in recently formed estuaries; and (5) Estuarine conditions evolved in the Sound following cessation of delta development.

Author: BRANDE, S., DINGER, J.S., McANNALLY, C.W., MILLER, R. AND KINDINGER, J.

Title: SEISMIC SURVEY OF MISSISSIPPI SOUND, MISSISSIPPI, AND MOBILE BAY, ALABAMA

Reference: MS/ALA SEA GRANT SYMPOSIUM ON MS SOUND, MASGP-81-007, PP. 105-115.

Year of Publication: 1981

Archive: U.A.B.

LOCATION COORDINATES

North Latitude: 2957.000 To: 3045.000

West Longitude: 8750.000 To: 8947.000

TYPE OF DATA FOUND IN PUBLICATION

Geophysical LT,F3?: T Sample Analysis [T,F3?: F Other [T,F]?: F

Description of Specific Data Included: SEISMIC INTERPRETATION

GEOPHYSICAL DATA

Performed by: U.S.G.S. Data Type: SEISMIC

Number of Traverses: 0 Coverage: 136.00 km. Resolution: HIGH

Instrument Type: SONAR/MINI SPARKER Location Map Page: 8

* NOTES or REMARKS *

Seismic cruise: RV/Rounsfell (August, 1980)

* ABSTRACT *

In 1980, the Mississippi-Alabama Sea Grant Consortium provided funding for a three year project which had as its major objective the characterization of subsurface sediments of Mississippi Sound, Mobile Bay, and the nearshore Gulf of Mexico. This plan would be accomplished by first conducting a seismic survey of the area, followed by a complementary vibracoring program. One hundred, thirty-six km. of high resolution, shallow seismic profiles were obtained. The present report provides the results of a cursory examination of these seismic records. A variety of geologic, biologic, and man-made features were described. These features included unconformities, ancient river channels, high angle, steeply dipping beds, ancient oyster reefs and shell deposits, ship channels, spoil banks, and possible dispersed spoil.

In Mississippi Sound, several ancient river channels were recognized. Highly inclined bedding was encountered in the vicinity of the barrier islands, dipping toward the mainland shore. No ancient oyster reefs or buried shell deposits were noted.

WS TASKFCKC.dbf DATABASE RECORD: 6

Author: CARROLL, H.C.

Title: LITHOLOGIC AND SEISMIC DETERMINATION AND CORRELATION OF DEPOSITIONAL ENVIRONMENTS IN CENTRAL MISSISSIPPI SOUND

Reference: MASTER'S THESIS, UNIV. OF MISSISSIPPI, 54PP-

Year of Publication: 1982

Archive:

===== LOCATION COORDINATES----------
! North Latitude: 3010.000 To: 3023.000
! West Longitude: 8835.000, To: 8900.000

TYPE OF DATA FOUND IN PUBLICATION
Geophysical [T,F]?: T Sample Analysis [T,F]?: F Other [T,F]?: F
Description of Specific Data Included: LITHOLOGIC

GEOPHYSICAL DATA
Performed by: U.S.G.S. Data Type: SEISMIC
Number of Traverses: 0 Coverage: 136.00 km. Resolution: HIGH
Instrument Type: SONAR/MINI SPARKER Location Map Page: 8 *

* NOTES or REMARKS *
MS/ALA Sea Grant vibracores & seismics, 1980-82; Lithologic descriptions of cores & seismic interpretation; Seismic cruise: RV/Rounsfell (August, 1980)

* ABSTRACT *

The purpose of this study was to define the depositional environments of Holocene age sediments in the central region of the MS Sound using vibracore data and high resolution seismic profiles. Conclusions drawn from examination of 85 miles of seismic profiles and 14 vibracores were as follows: (1) The Pleistocene erosional surface exhibits a southwest dip into the Mississippi Embayment; (2) Holocene sedimentation rate within the Sound was not steady, as sediments in the western area are thicker than those in the east; (3) The Pleistocene surface in the eastern reaches of the Sound was subaerially exposed for a longer period of time than was the adjacent western section; (4) The ancient Biloxi River mouth underwent a westward migration, forming at least two prograding delta lobes; (5) The ancient Pascagoula River cut a broad river valley in the Pleistocene sediments of central MS Sound, depositing both fluvial and tidal flat deposits along the margins of the embayed estuary that was formed by the Holocene transgression ; and (6) The upper 20 feet of the sediments in the study area represent a complex interaction between fluvial-dominated processes and shallow marine coastal processes.

Author: CHASTAIN, D.L.

Title: WESTERN MS SOUND: ANALYSIS OF SEDIMENTARY RESPONSES & RECENT DEPOSITION IN A SEMI-ENCLOSED BRACKISH WATER BASIN, NORTHEAST GULF OF MEXICO

Reference: MASTER'S THESIS, UNIV. OF MISSISSIPPI, 106PP.

Year of Publication: 1981

Archive:

LOCATION COORDINATES
North Latitude: 3000.000 To: 3025.000
West Longitude: 8840.000 To: 8935.000

TYRE OF DATA FOUND IN PUBLICATION

Geophysical [T,F]?: F Sample Analysis [T,F]?: T Other [T,F]?:

Description of Specific Data Included: SEDIMENTOLOGIC

SAMPLE DATA

Type of Device: KALISICO GRAB SAFFLER Location Map Page: 1

Number Of Samples Utilized For: Grain Size= 82, Size Distribution= 82,
Heavy Minerals= 0, Shell Material= 0, Chemical Analysis= 0.

MISCELLANEOUS DATA

Oceanographic Surveys:
Paleontological Data :
Other Data or Surveys: 7. WATER & 7. ORGANICS IN SEDIMENTS

* NOTES or REMARKS *

Raw data available in publication, but not keyed to lat./long. coordinates

* ABSTRACT *

The purpose of this investigation was to map the most recent sediment distribution in western Mississippi Sound and to determine what sedimentary processes are operating within the Sound. Eighty-two surface samples were collected and analyzed from western Mississippi Sound. Dominant sedimentary components identified were sand and mixtures of sand, silt and clay. Medium to fine grained, moderately sorted sand is characteristically distributed around the Sound's margins, grading to finer silts and clays in the central regions. Sediments are being derived from St. Louis Bay, Biloxi Bay, the Pearl River and Lake Borgne, the remnant St. Bernard delta lobe, and the Gulf of Mexico. Six depositional subenvironments were identified within western Mississippi Sound. These include offshore, middle sound, nearshore, pass, backbarrier, and channel subenvironments. The presence of these varied subenvironments suggests that current patterns and energy regimes are not uniform within the study area.

HHS TASKFORC.dbf DATABASE RECORD: 1

Author: DEMORAN, W.J.

Title: A SURVEY AND ASSESSMENT OF REEF AND SHELL RESOURCES IN MISSISSIPPI SOUND

Reference: M. M. R. I. REPORT OF INVESTIGATIONS NO. 794, 19PP.

Year of Publication: 1979

Archive:

LOCATION COORDINATES
North Latitude: 3013.370 To: 3020.300
West Longitude: 8835.240 To: 8914.080

TYPE OF DATA FOUND IN PUBL I CAT I ON
Geophysical [T,FI?: F Sample Analysis LT,FI?: T Other LT,FI?: F J
Description of Specific Data Included: REEF SHELL OCCURRENCE

SAMPLE DATA
Type of Device: PE I EPSON DREDGE Location Map Page: 7
Number Of Samples Utilized For: Grain Size= 13, Size Distribution= 0,
Heavy Minerals= 0, Shell Materia1= 13, Chemical Analysis= 0.

NOTES or REMARKS

Probes used to define thickness of overburden and shell deposits

ABSTRACT

Shells of reef-building oysters* are found in large concentrations in the shallow bays and sounds along the northern Gulf Coast. Such deposits exist in Mississippi Sound, and in past years reef shell was dredged in the waters of the state. There is still a shell resource remaining in areas that could be dredged without harming oyster reefs or the environment. This shell constitutes a natural marine resource of great potential that should be properly utilized and exploited.

This study was conducted to (1) locate and map available shell deposits, (2) to determine the amount or volume of shell in each deposit, and (3) to estimate the value of the shell material using current market prices.

*Crassostrea virginica (99.9Z Calcium carbonate)

Author: DOW, C.F.

Title: PETROGRAPHY OF TWO MISSISSIPPI RIVER SUBDELTAS

Reference: LOUISIANA GEOLOGICAL SURVEY BULLETIN NO. 8, PP. 339-396.

Year of Publication: 1936

Archive:

LOCATION COORDINATES
North Latitude: 2900.000 To: 3030.000
West Longitude: 8830.000 To: 9000.000

TYPE OF DATA FOUND IN PUBLICATION
J Geophysical ET,FJ?: F Sample Analysis CT,F]?: T Other CT,F]?: F J
! Description of Specific Data Included: SEDIMENTOLOGIC, HEAVY MINERAL ;

SAMPLE DATA
Type of Device: SURFACE SAMPLES & BORINGS Location Map Page: 6
Number Of Samples Utilized For: Grain Size= 0, Size Distribution= 101,
Heavy Minerals= 16, Shell Material= 0, Chemical Analysis= 0.

* NOTES or REMARKS *

Results given but not keyed to latitude/longitude: sediment sieve analysis, cumulative & frequency curves, sorting, heavy mineral percentages *

* ABSTRACT *

Swinging back and forth across coastal Louisiana the Mississippi River has formed numerous deltas and subdeltas. The most recent of these is the active Plaquemines subdelta, while one of the less recent is the abandoned St. Bernard subdelta. This study was an attempt to determine by petrographic and mechanical analyses, any change in transporting ability undergone by the Mississippi since the deposition of the St. Bernard subdelta. Though this goal was not reached, some valuable information was obtained.

Heavy mineral analyses revealed only two samples to be derived from present day Mississippi River material. All other samples compared favorably with the Mississippi River sediments with one exception. Mineral analysis of Cat Island sands revealed that these sands were derived from a different source area, possibly an eastern source. Cat Island sands typically had a higher percentage of metamorphic minerals.

Author: DRUMMOND, S.E. AMD STOW, S.H.

Title: HYDRAULIC DIFFERENTIATION OF HEAVY MINERALS, OFFSHORE ALABAMA AND MISSISSIPPI : SUMMARY

Reference: GEOLOGICAL SOCIETY OF AMERICA BULL., PART I, VOL. 90, P. 806-807.

Year of Publication: 1979

Archive:

LOCATION COORDINATES

North Latitude: 3007.000 To: 3020.000

West Longitude: 8800.000 To: 8840.000

TYPE OF DATA FOUND IN PUBLICATION

Geophysical LT,FJ?: F Sample Analysis [T,F]?: T Other CT,F]?: F

Description of Specific Data Included: HEAVY MINERAL

SAMPLE DATA

Type of Device: SURFACE SAMPLE Location Map Page: 4

Number Of Samples Utilized For: Grain Size= 0, Size Distribution= O,

Heavy Minerals= 110, Shell Materia 1= 0, Chemical Analysis= 0.

NOTES or REMARKS

Raw data not given in publication

* ABSTRACT *

The distribution of heavy minerals in offshore Alabama and Mississippi is controlled by hydraulic differentiation, not by variable lithology of the source area or selective destruction of species during transport. Two energetically distinct groups of minerals can be recognized; each predominates in different energy zones of the offshore area. The smaller more dense minerals (ilmenite, zircon, leucoxene, monazite, and rutile) have low mean settling velocities and are concentrated in low-energy environments, such as in the Mississippi Sound and offshore in deeper water. Larger, less dense heavy minerals (kyanite, tourmaline, staurolite, and sillimanite) occur in high-energy areas near the shore of barrier islands and at tidal passes and have high mean settling velocities. Even though considerable variation exists in the relative abundances of minerals in different samples, minerals within any sample are generally in hydraulic equilibrium with each other.

Author: FOXWORTH, R.D., PRIDDY, R.R. , JOHNSON, W.B. AND MOORE, W.S.

Title: HEAVY MINERALS OF SAND FROM RECENT BEACHES OF THE GULF COAST OF MISSISSIPPI AND ASSOCIATED ISLANDS

Reference: MISSISSIPPI GEOLOGICAL SURVEY BULLETIN, NO. 93, 92PP.

Year of Publication: 1962

Archive:

===== LOCATION COORDINATES =======
: North Latitude: 3000.000 To: 3025.000 ;
¡ West Longitude: 8815.000 To: 8930.000 ;

TYPE Qp DATA FOUND IN PUBLICATION
; Geophysical LT,F]2: F Sample Analysis CT,F]?: T Other [T,FJ?: F J
! Description of Specific Data Included: PEAVY MIPERAL ¡

======= SAPFLE DATA ==========
¦ Type of Device: CORE, HAND AUGER Location Map Page: 5 ¦
¦ Number Of Samples Utilized For: Grain Size= 46, Size Distribution= 0, ¦
¦ Heavy Minerals= 46, Shell Materia 1= 0, Chemical Analysis= 0. * ¦

* NOTES or REMARKS *

4" cores taken where concentrations of dark sand were at least that thick; dark sands were shaved from laminations <1" thick

* ABSTRACT *

This bulletin presents a review of studies of heavy mineral grains in beaches and dunes and quartz sand along the mainland of the Mississippi coast and the associated islands. The investigation was designed to determine the mineral species, their sources, and their concentrations, with a view toward exploitation of the richer deposits.

Although the heavy minerals vary in species and in concentration from place to place, Foxworth has shown that for the Sound as a whole, the order of abundance in percent is: staurolite 25.77, kyanite 24.17., tourmaline 20.47, ilmenite 11.87, magnetite 3.67, limonite - hematite 3.47, leucoxene 2.57, zircon 2.07, rutile 1.77, sillimanite 1.37, and andalusite 1.17.

WS TASKFORC.dbf DATABASE RECORD: 25

Author: GOLDSTEIN, A., JR.

Title: SEDIMENTARY PETROLOGIC PROVINCES OF THE NORTHERN GULF OF MEXICO

Reference: JOURNAL OF SEDIMENTARY PETROLOGY, VOL. 12, NO. 2, PP. 77-84.

Year of Publication: 1942

LOCATION COORDINATES
North Latitude: 2600.000 To: 3030.000
West Longitude: 8500.000 To: 9730.000

Archive:

TYPE OF DATA FOUND IN PUBLICATION =
Geophysical [T,F]?: F Sample Analysis CT,FT?: T Other CT,F]?: F
Description of Specific Data Included: HEAVY MINERAL

SAMPLE DATA
Type of Device: SURFACE SAMPLER Location Map Page: 6
Number Of Samples Utilized For: Grain Size= 0, Size Distribution= 0,
Heavy Minerals= 60, Shell Materia1= 0, Chemical Analysis= 0.

* NOTES or REMARKS *

Some samples from Dohm, 1936; raw data available in publication, but not keyed to latitude/longitude

* ABSTRACT *

Sediment samples from the northern border of the Gulf of Mexico show regional differences in mineral composition which permit the distinction of four areas of sediments, each with a characteristic mineral suite. These "sedimentary petrologic provinces" are here termed the Eastern Gulf Province, the Mississippi River Province, the Western Gulf Province, and the Rio Grande Province. The mineral assemblage characteristic of each province is briefly described.

Two provinces are identified offshore Mississippi. The Eastern Gulf Province contains a metamorphic assemblage, characterized by the presence of ilmenite, staurolite, kyanite, zircon, tourmaline and sillimanite. The Mississippi River Province contains those minerals carried by the modern Mississippi River: amphiboles, dolomite, pyroxenes, epidote, ilmenite and biotite.

Author: HAHN, A.D.

Title: RECONNAISSANCE OF TITANILM RESOURCES ON SHIP ISLAND, HARRISON COUNTY MISSISSIPPI

Reference: U.S. BUREAU OF MINES REPT. OF INVESTIGATIONS, LO. 6024, 24PP.

Year of Publication: 1962

Archive:

===== LOCATION COORDINATES =====
! North Latitude: 3012.000 To: 3016.000 ¡
J West Longitude: 8852.000 To: 8900.000 ;

op NTA FOUND IN PUBLICATION :..... — ■ ■ =
J Geophysical CT,F]?: F Sample Analysis [T,F]?:.T Other [T,F]?: F ¡
J Description of Specific Data Included: HEAVY MINERAL ¡

SAMPLE DATA
! Type of Device: HAND/ROTARY DRILL Location Map Page: 5
! Number Of Samples Utilized For: Grain Size= 110, Size Distribution= 0,
J Heavy Minerals= 110, Shell Materia 1= 0, Chemical Analysis= 0. *

* NOTES or REMARKS *

Heavy mineral percentages (and percent titanium dioxide) given per sample; other specific heavy minerals not identified; vague lithologic descriptions

* ABSTRACT *

This report describes reconnaissance by the Bureau of Mines of titanium - bearing beach sands on Ship Island in the Gulf of Mexico off the south coast of Harrison County, Mississippi. The purpose was to determine the ilmenite, rutile, and associated heavy mineral content of black—sand-bearing beach sands. The investigation was part of a survey of titanium resources in the U.S.

The western part of Ship Island is a potential source of titanium. Based on a cutoff of 1.07 heavy minerals in a near—surface bed of sand, the deposit contains about 11,000,000 dry short tons with an average grade of 5.937. heavy minerals and 1.037 titanium dioxide. Based on laboratory tests, the recoverable concentrates are about 209,000 tons of ilmenite with a grade of 44.247 titanium dioxide, 44,000 tons of zircon with a grade of 64.367 zircon dioxide, 115,000 tons of kyanite with a grade of 917 kyanite, 178,000 tons of staurolite with a grade of 70.57 staurolite, and 2000 tons of mixed zircon and monazite with a grade of 41.77 monazite. Although heavy minerals occur in all the near—surface sands on Ship Island, the sand of the eastern part is too low in titanium dioxide content to be classified as a titanium resource. The inferred reserve of heavy-mineral—bearing sand on the eastern part of the island, based on a cut-off of 1.07. H.M., is about 25,000,000 short tons with a grade of 1.977 H.M.'s.

Author: HARDING, J.L.

Title: HEAVY-MITRAL OCCURRENCES ON ISLANDS OF THE MISSISSIPPI SOUND AND ADJACENT AREAS OF THE MAINLAND (ABSTRACT)

Reference: GEOLOGICAL SOCIETY OF AMERICA BULL. 71, NO. 12, PART 2, PP.2015-16.

Year of Publication: 1960

Archive:

LOCATION COORDINATES
North Latitude: 3010.000 To: 3045.000
West Longitude: 8730.000 To: 8915.000

TYPE OF DATA FOUND IN PUBLICATION
Geophysical [T,F]?: F Sample Analysis IT,FJ2: F Other CT,F]?: F
Description of Specific Data Included: HEAVY MITRAL

* NOTES or REMARKS Y

Abstract only; no data or results included

Y ABSTRACT Y

Samples of heavy minerals have been collected for three years at localities from the Alabama-Florida state line on the east to Cat Island, Mississippi, on the west.

The marked similarity of mineral suites from each of the sampling stations indicates a common source. However, changes in the degree of concentration at each of the locales manifest reworking of the near—shore and bottom sediments. The primary control of this present depositional cycle is being exercised by littoral drift. This is further evidenced by the southwestward migration of the island masses.

Petrographic examination shows that the most frequent minerals of the heavy fraction, following bromoform separation, include ilmenite, kyanite, rutile, staurolite, tourmaline, and zircon with minor amounts of hornblende and monazite.

Author: HARPER, G. G.

Title: SEISMIC STRATIGRAPHY AND CLAY MINERAL DISTRIBUTION IN CENTRAL MISSISSIPPI SOUND, NORTH CENTRAL GULF OF MEXICO

Reference: MASTER'S THESIS, UNIV. OF MISSISSIPPI, 101PP.

Year of Publication: 1982

Archive:

LOCATION COORDINATES
North Latitude: 3014.000 To: 3022.000
West Longitude: 8830.000 To: 8900.000

TYPE OF DATA FOUND IN PUBLICATION
Geophysical [T,F]?: T Sample Analysis [T,F]?: T Other CT,F]2: T
Description of Specific Data Included: SEISMIC, X-RAY CLAY ANALYSIS

GEOPHYSICAL DATA
Performed by: U.S.G.S. Data Type: SEISMIC
Number of Traverses: O Coverage: 136.00 km. Resolution: HIGH
Instrument Type: SONAR/MINI SPARKER Location Map Page: 8

SAMPLE DATA
Type of Device: VIBRACORE Location Map Page: 2
Number Of Samples Utilized For: Grain Size= 0, Size Distribution= 0,
Heavy Minera Is^ 0, Shell Materia 1= 0, Chemical Analysis= O.

MISCELLANEOUS DATA

Oceanographic Surveys:
Paleontological Data :
Other Data or Surveys: 82 SAMPLES, X-RAY CLAY ANALYSIS

* NOTES or REMARKS *

MS/ALA Sea Grant seismics & vibracores, 1980-82; seismic interpretation, lith., x-ray clay analysis; Seismic cruise: R/Vounsfell (August, 1980) random tracks *

* ABSTRACT *

Sixteen vibracores, located along three north-south seismic transects from central Mississippi Sound, were analyzed for clay mineral composition. The vibracores allowed subsurface study down to six meters, and the seismic profiles extended the depth of investigation to twenty meters below the sediment-water interface. The main objectives of the study were to determine any seismic reflection configurations and to identify the clay mineral species present in the surface sediments, their dispersal patterns, and their relation to transport systems moving sediment into the Sound. This information was used to provide insight into the geologic history and sedimentary processes acting within central Mississippi Sound.

The Pleistocene/Holocene boundary was revealed in the seismic records for part of the study area. Major tidal channels and transgressive/regressive events were also traced through the area using the seismic records.

Major clay mineral species of central Mississippi Sound were found to be. smectite and kaolinite, with some illite and vermiculite present. The clay mineral assemblage was primarily controlled by the Mississippi River system, its subdeltas, and by longshore currents bringing clays from eastern drainages throughout the Holocene.

Author: HARRISON, W.E.

Title: HEAVY MINERALS OF HORN ISLAND, NORTHERN GULF OF MEXICO

Reference: J. OF SEDIMENTARY PETROLOGY, VOL. 43, NO. 2, P.391-395.

Year of Publication: 1973

Archive:

LOCATION COORDINATES
North Latitude: 3013.000 To: 3016.000
West Longitude: 8847.000 To: 8833.000

TYPE OF DATA FOUND IN PUBLICATION
Geophysical [T,F]?: F Sample Analysis [T,F]?: T Other CT,F]?: F
Description of Specific Data Included: HEAVY MINERAL

SAMPLE DATA
Type of Device: SURFACE Location Map Page: 5
Number Of Samples Utilized For: Grain Size= 0, Size Distribution= 0,
Heavy Minerals= 31, Shell Materia1= 0, Chemical Analysis= O. i *

* NOTES or REMARKS Y

Principally a provenance study; heavy mineral percentages given for island sand samples

* ABSTRACT *

The heavy mineral assemblage of Hom Island is highly diagnostic of a metamorphic source area. The crystalline metamorphic region in east-central Alabama and west-central Georgia which is drained by the South Alabama and Apalachicola Rivers and their respective tributaries is suggested as the ultimate source area for the heavy minerals of Hom Island.

Author: ISPHORDING, W.C. AND LAMB, G.M.

Title: SEDIMENTATION, DISPERSAL AND PARTITIONING OF TRACE METALS IN COASTAL MISSISSIPPI-ALABAMA ESTUARINE SEDIMENTS

Reference: MISSISSIPPI—ALABAMA SEA GRANT CONSORTIUM, PROJECT NO. R/ER-4, 29PP.

Year of Publication: 1985

Archive:

===== LOCATION COORDINATES =

North Latitude: 2950.000 To: 3026.000
West Longitude: 8800.000 To: 8952.000

TYPE OF DATA FOUND IN PUBLICATION

J Geophysical [T,F3?: F Sample Analysis [T,F]?: T Other [T,FJ?: T
J Description of Specific Data Included: SEDIMENTOLOGY/MINERALOGY/CÆMICAL

SAMPLE DATA

Type of Device: 1.5-METER CORE Location Map Page: 1 J
Number Of Samples Utilized For: Grain Size= 109, Size Distribution= 0,
Heavy Minerals= 0, Shell Material= 0, Chemical Analysis= 109. J

MISCELLANEOUS DATA

Oceanographic Surveys:
Paleontological Data :
Other Data or Surveys: Trace Metals

* NOTES or REMARKS *

Sediments analyzed for: carbonate & organic carbon, Fe, Al, Cr, Ni, Zn, Mn, Vn, Cu, Ba, Pb

* ABSTRACT *

The purpose of this investigation was to document the chemistry, lithology, and mineralogy of the bottom sediments of Lake Borgne and Mississippi Sound. A second objective was to determine the manner by which various metals were site partitioned in these sediments.

Mississippi Sound was divided into three sub-regions for the purpose of comparing spatial differences. Western Mississippi Sound sediments were dominated by sand-silt-clay mixtures and silty clays. The Eastern Sound had a greater preponderance of clay—size material, probably derived from Mobile Bay. Sands were present in the vicinity of the barrier islands, in the area of South Pass, and in the beach areas between Gulfport and the mouth of Biloxi Bay. Central Mississippi Sound was dominated by clayey sediments; sandy clays, clayey sand, and sand-silt-clay mixtures. The clay mineral suite of the Sound consisted dominantly of the minerals smectite, illite, and kaolinite. Other minerals detected included chlorite, mixed layer clays, and in eastern Mississippi Sound, trace amounts of zeolites.

Metal levels observed throughout the Sound were, for the most part, comparable to other bays and estuaries in the northern Gulf Coast and well below those found in Mobile Bay.

Author: ISPHORDING, W.C. , STRINGFELLOW, J.A., AND GLOWERS, G.C.

Title: SEDIMENTARY AND GEOCHEMICAL SYSTEMS IN TRANSITIONAL MARILE SEDIMENTS IN TLE NORTHEASTERN GULF OF LEXICO

Reference: GULF COAST ASSOC. OF GEOLOGICAL SOCIETIES TRANS., V.35, PP.397—408.

Year of Publication: 1985

Archive:

--=-= LOCATION COORDINATES =====
: North Latitude: 2950.000 To: 3026.000 5
; West Longitude: 8400.000 To: 8952.000 ¡

========== TYPE OF DATA FOUND IN PUBLICATION ==========
! Geophysical CT,FJ2: F Sample Analysis ET,F]2: T Other ET,F]?: T ¡
! Description of Specific Data Included: SEDIMENTOLOGY/MINERALOGY/CHEMICAL !

SALELE DATA

Type of Device: SURFACE OR LEAR-SURFACE	Location Map Page: 1
Number Of Samples Utilized For: Grain Size=	0, Size Distribution= 0,
Heavy Minerals= 0, Shell Material=	0, Chemical Analysis= 0.

MISCELLALEDUS DATA

Oceanographic Surveys:
Paleontological Data :
Other Data or Surveys: Trace Metals

* NOTES or REMARKS *

Published results of Sea Grant study - refer to Isphording & Lamb, 1985, Database record no. 29 *

* ABSTRACT *

The coastal zone of the northeastern Gulf of Mexico is marked by a series of bays and estuaries that serve as the principal depositional basins for rivers draining an area of greater than 160,000 sq. km. These rivers annually contribute a sediment load to the basins in excess of 12 million tons. Because each river drains a watershed of different lithologic character and each river is further characterized by a different flow regime and hydraulic properties, the sediments deposited in the marginal basins have their own uniqueness.

Extensive municipal and industrial "dumping" of effluent over the years has also acted to imprint geochemical differences on each of the depositional basins. Depending upon the degree of industrialization within the watershed, estuaries may be described as ranging from heavily impacted (Mobile Bay), moderately impacted (Apalachicola Bay, Mississippi Sound), or slightly impacted (Pensacola Bay). A strong correlation was observed between the degree of heavy metal contamination and the textural and organic content of the sediments. Analyses further indicated that most metals were partitioned in the bottom sediments in forms that would permit their subsequent release back into the water column or would allow transference of the metal to fauna by ingestion.

Author: KINDINGER, J.L., MILLER, R.J., STELTING, C.E., AND BOUMA, A.H.

Title: DEPOSITIONAL HISTORY CF LOUISI ANA-MISSISSIPPI OUTER CONTINENTAL SHFI F_

Reference: U.S.G.S. OPEN-FILE REPORT NO. 82-1077, 55PP.

Year of Publication: 1982

Archive:

=.. — === LOCATION COORDINATES ===
! North Latitude: 29000.000 To: 30150.000 J
! West Longitude: 89000.000 To: 88200.000 J

========== TYPE OF DATA FOUND IN PUBLICATION ==========
; Geophysical £T,Fj?: T Sample Analysis £T,F]?: T Other £T,Fj?: T i
ï Description of Specific Data Included: SEISMIC, SEDIMENTOLOGIC !

===== GEOPHYSICAL DATA-------..... - ==—.-=====■—
¡ Performed by: U.S.G.S. Data Type: ACOUSTIC/SEDIMENT ¦
¡ Number of Traverses: 46 Coverage: 3200.00 km. Resolution: HIGH ¦
J Instrument Type: MINISPRK/SUB.PROFIL/AIRGUN/PDR Location Map Page: 9 ¦

= SAMPLE DATA--------.....-.. ... · ·--------- --
¦ Type of Device: CLAMSHELL GRAB Location Map Page: 3 ¡
¦ Number Of Samples Utilized For: Grain Size= 76, Size Distribution= 0, !
¦ Heavy Minerals= 0, Shell Material= 0, Chemical Analysis= 0. !

MISCELLANEOUS DATA

Oceanographic Surveys: SURFACE CURRENT SYSTEM
Paleontological Data :
Other Data or Surveys:

X NOTES or REMARKS X

2 Cruises: RV/Gyre (April 1981), RV/Carancahua (July 1981). See abstract for list of maps produced.

X ABSTRACT X

A geological study was undertaken in 1981 in the Louisiana-Mississippi outer continental shelf for the Bureau of Land Management. The study collected 3200 km of high resolution seismic survey records, 76 surficial sediment samples and monitored 228 surface drifter bottles for establishing the surface current system. The purpose of the study was to provide an interpretation of the geologic framework and geologic history of the area since middle Pleistocene, and to present the regional distribution of geological features that can be hazardous to offshore oil and gas production. Minisparker seismic records in combination with air gun and subbottom profile records reveal that 7 major stages of shelf development have occurred since the middle Pleistocene. The shelf development has been controlled by the rise and fall of sea level. These stages are defined by 4 major unconformities, several depositions of transgressive sediments, sequences of river channeling and progradationai delta deposits.
NOTE: Interpretation of seismic records produced the following maps:
(1) surface & near—surface structure, (2) diapir & fault distribution,
(3) buried stream channels, (4) shallow gas & buried oyster banks, (5) buried delta lobes, (6) isopachs of 2 stratigraphic units, and (7) structure contours of 3 stratigraphic horizons.

Author: LUDWICK, J. C.

Title: SEDIMENTS IN NORTHEASTERN GULF OF MEXICO

Reference: IN MILLER, R.L., ED., PAPERS IN MARINE GEOLOGY, PP. 204 - 238.

Year of Publication: 1964

Archive:

===== LOCATION COORDINATES ======
North Latitude: 2900.000 To: 3000.000
West Longitude: 8500.000 To: 8900.000

===== TYPE OF DATA FOUND IN PUBLICATION =====
Geophysical CT,F]2: F Sample Analysis CT,Fj?: T Other CT,F3?: T J
Description of Specific Data Included: SEDIMENTOLOGIC

SAMPLE DATA
Type of Device: ORANGE PEEL DREDGE, GRAY. CORE Location Map Page: 3
Number Of Samples Utilized For: Grain Size= 0, Size Distribution= 0,
Heavy Minerals= 0, Shell Materia 1= 0, Chemical Analysis= 0.

MISCELLANEOUS DATA

Oceanographic Surveys: BATHYMETRY
Paleontological Data :
Other Data or Surveys:

* NOTES or REMARKS *

No raw data; sed. properties described = sorting, median diameter, 7. leachable, 7. sediment >.062mm, intermediate diameter in mm. of coarsest grain, shell distr. *

* ABSTRACT *

The purpose of this paper was to describe and interpret the distribution pattern of modem surficial sediment deposits on the continental shelf and in nearshore areas in the northeastern Gulf of Mexico. Sea-floor samples were obtained along eleven sampling profiles. Sedimentary properties were determined along these profiles. These properties indicated that there is a high order of organization to the distribution of sediments over the area. Eight well-defined lithofacies were determined from the data: Sound and Bay deposits, composed more or less of a unified body of silt— and clay-sized sediment; MS-ALA Barrier Island Sand deposit, composed of well-sorted, medium-grained, quartz sand; Chandeleur Sand deposit, comprised of fine-grained, well-sorted sand; St. Bernard Prodelta deposit, made up of silt- and clay-sized particles; Outer Shelf Lime deposit, having two distinct facies off MS/ALA and FLA, differing in 7. quartz sand, 7. silt and clay, grain size, homogeneity, and median grain size; and the Eastern Sand deposit, also having two distinct facies, differing in textural make-up - the MS/ALA Sand Facies, with average coarsest quartz grain diameter of 1.3mm, and the Cape San Blas Sand Facies, with average coarsest quartz grain diameter of 2.9mm.

Author: O'BRIEN, H.D-, JR.

Title: LITHOTOPE ANALYSIS OF HOLOCENE SEDIMENTS IN THE SHALLOW SUBSTRATE OF MISSISSIPPI SOUND

Reference: MASTER'S THESIS, UNIVERSITY OF MISSISSIPPI, 101PP.

Year of Publication: 1984

Archive:

===== LOCATION COORDINATES

J North Latitude: 3003.000 To: 3022.000 !
! West Longitude: 8815.000 To: 8935.000 ¡

= TYPE OF DATA IN PUBLICATION

! Geophysical [T,F]2: F Sample Analysis £T,F]?: T Other [T,F1?: F ¡
¡ Description of Specific Data Included: SEDIMENTOLOGIC !

SAMPLE DATA

! Type of Device: Vibracore Location Map Page: 2
J Number Of Samples Utilized For: Grain Size= 229, Size Distribution= 229,
Í Heavy Minerals= 0, Shell Material= 0, Chemical Analysis= 0. *

* NOTES or REMARKS *

MS/ALA Sea Grant vibracores, 1980-81; no raw data given in publication; lithofacies maps show lithologies at selected subsurface levels

* ABSTRACT *

The purpose of this study was to determine distribution patterns of Holocene sediments of Mississippi Sound in an effort to better understand past depositional environments. Thirty-nine vibracores were analyzed at equally spaced, arbitrarily selected intervals. Lithofacies maps were constructed for the Sound at these intervals. Results confirm that sea level has not been constant during the recent depositional history of Mississippi Sound; the sandy barrier platform has been unstable during recent history; and the constriction of Mississippi Sound by the St. Bernard subdelta and the large barrier platform led to the low energy deposition of muds and silts until destructional forces opened up the area to higher energy deposition of sands and silty sands during late Holocene.

WS TASKFDRC.dbf DATABASE RECORD: 16

Author: GTVOS, E.G.

Title: MISSISSIPPI OFFSHORE INVENTORY & GEOLOGICAL MAPPING PROJECT

Reference: MS MARINE RESOURCES COUNCIL, COASTAL ZONE MANAGEMENT PROGRAM, 27PP.

Year of Publication: 1976

Archive: G.C.R.L.

===== LOCATION COORDINATES =====
! North Latitude: 3005.000 To: 3018.000 !
! West Longitude: 8815.000 To: 8915.000 !

TYPE OF DATA FOUND IN PUBLICATION
! Geophysical [T,F]?: T Sample Analysis ET,F]?: T Other CT,F]?: F !
! Description of Specific Data Included: SEDIMENTOLOGIC !

= GEOPHYSICAL DATA
! Performed by: W.E.S. Data Type: SEISMIC !
! Number of Traverses: 0 Coverage: 672.00 km. Resolution: HIGH !
! Instrument Type: PINGER & UN I BOW Location Map Page: NONE !

= SAWLE DATA
! Type of Device: ROTARY CORE Location Map Page: 2 !
! Number Of Samples Utilized For: Grain Size= 198, Size Distribution= 0, J
Heavy Minerals= 0, Shell Materia1= 0, Chemical Analysis= 0. ;

* MITES or REMARKS X

Maps of bottom sediment distribution, spoil areas, oyster reefs, erosional shoreline characteristics; Seismics: provided by W.E.S., Vicksburg (June, 1973)

* ABSTRACT X

The objectives of this study were: (1) to study the sediment content and geology of beds underlying Mississippi Sound and to generate geological cross sections from these data; (2) to study and map bottom sediments of Mississippi Sound and its major embayments in Mississippi; and (3) to describe the mainland and three island shores in terms of their erosional— accrétien al characteristics.

Author: OTVOS, E.G.

Title: A NEW STRATIGRAPHIC SYSTEM, GEOLOGIC EVOLUTION & POTENTIAL ECONOMIC SAND RESOURCES IN THE MISSISSIPPI SOUND AREA, MISSISSIPPI - ALABAMA

Reference: M.M.R. I. OPEN FILE REPORT NO. 85-6, 71PP.

Year of Publication: 1985

Archive: G.C.R.L.

LOCATION COORDINATES
North Latitude: 3003.000 To: 3025.000
West Longitude: 8815.000 To: 8935.000

TYPE OF DATA FOUND IN PUBLICATION
Geophysical [T,F]?: F Sample Analysis [T,F]?: T Other [T,F]?: F
Description of Specific Data Included: SEDIMENTOLOGIC, PALEONTOLOGIC

SAMPLE DATA
Type of Device: ROTARY CORES & VIBRACORES Location Map Page: 2
Number Of Samples Utilized For: Grain Size= 105, Size Distribution= 0, I
Heavy Minerals= 0, Shell Material= 0, Chemical Analysis= 0.

NOTES or REMARKS
105 cores described lithologically and paleontologically; no specific grain size data given, but data are available at G.C.R.L.; microfossil identification

ABSTRACT

The purpose of this report was to summarize available detailed geological information about the stratigraphy, sand resources, and geologic history of units that underlie the entire Mississippi Sound and certain adjacent areas. Information was obtained from 105 rotary and vibra-cores. Over 1000 granulometric and microfossil analyses were performed on the samples. Total penetration of cores varied from one site to another and between coring methods. Rotary cores were segmented into approximate 3.5 ft. lengths with 1.5 ft. intervening, noncored intervals, penetrating from 20 ft. to a maximum of 300 ft. below sea level. Vibracores were continuous and usually penetrated from 12 to 25 ft. below the sediment/water interface.

From these cores, sand thicknesses were determined throughout the study area. As expected, the areas of greatest sand thickness were marginal to the Sound, occurring along the barrier island chain and sporadically along the mainland shore. Central Mississippi Sound had less sand (usually less than 1 ft. in thickness, but sometimes as much as 10 ft.). Heavy mineral accumulations were not found.

Author: OTVOS, E.G.

Title: STRATIGRAPHY AND POTENTIAL ECONOMIC SAND RESOURCES OF THE MISSISSIPPI - ALABAMA BARRIER ISLAND SYSTEM AND ADJACENT OFFSHORE AREAS

Reference: M. M. R. I. OPEN FILE REPORT NO. 86-1F, 67PP.

Year of Publication: 1986

Archive: G.C.R.L./M.M.R.I.

LOCATION COORDINATES.....
North Latitude: 3010.000 To: 3020.000
West Longitude: 8804.000 To: 8910.000

TYPE OF DATA FOUND IN PUBLICATION
Geophysical [T,F]?: F Sample Analysis [T,F]?: T Other CT,F]?: T
Description of Specific Data Included: SEDIMENTOLOGIC, PALEONTOLOGIC

SAMPLE DATA
Type of Device: ROTARY & VIBRACCRES Location Map Page: 2
Number Of Samples Utilized For: Grain Size= 56, Size Distribution= 0,
Heavy Minerals= 0, Shell Materia1= 0, Chemical Analysis= 0.

MISCELLANEOUS DATA

Oceanographic Surveys: BATHYMETRY
Paleontological Data : 182 SAMPLES ANALYZED FOR FOSSIL CONTENT
Other Data or Surveys:

* NOTES or REMARKS *

56 cores described lithologically and paleontologically; no specific grain size data given, but data are available at G.C.R.L.; microfossil identification

* ABSTRACT *

This report describes the composition, stratigraphy, and geologic history of Quaternary sedimentary units that underlie the Mississippi - Alabama barrier islands. General lithologic and paleontologic descriptions are given for 56 cores which penetrate the islands and immediately adjacent Mississippi Sound and Gulf of Mexico sediments. While potential sand resources are not identified as such, sampled core intervals from the Sound and Gulf containing at least 807. sand are noted. Due to the status of the islands as part of the Gulf Islands National Seashore, most of this area cannot be considered for mining purposes.

Author: PRIDDY, R.R., GRISLER, R.M., SEBREN, C.P., POWELL, J.D., & BURFORD, H.

Title: SEDIMENTS OF MISSISSIPPI SOUND AND INSHORE WATERS

Reference: MISSISSIPPI GEOLOGICAL SURVEY BULLETIN, NO. 82, 54PP.

Year of Publication: 1955

Archive:

===== LOCATION COORDINATES =- =
Î North Latitude: 2950.000 To: 3023.000 ¡
J West Longitude: 8815.000 To: 8950.000 J

TYPE OF DATA FOUND IN PUBLICATION
; Geophysical ET,Fl?: F Sample Analysis CT,F]?: T Other [T,F]?: F ¡
¡ Description of Specific Data Included: SEDIMENTOLOGIC, CHEMICAL ANALYSIS !

SAMPLE DATA
! Type of Device: 15" CORES Location Map Page: 1 ¡
! Number Of Samples Utilized For: Grain Size= 192, Size Distribution= O, ¡
! Heavy Minerals= 0, Shell Materia1= 0, Chemical Analysis= 166. ¡ *

* NOTES or REMARKS *

Sediments analyzed by elutriation - lithologic descriptions only; chemical analysis — total nitrogen, nitrate, nitrite, organic nitrogen, alum., iron

* ABSTRACT *

Investigations of inshore bottoms of parts of Mississippi Sound were started in the summer of 1952 and were continued the summers of 1953 and 1954. The purpose of the study was to determine the physical and chemical nature of the bottom materials with reference to the distribution, mortality, and abundance of oysters, shrimp, fish, and other organisms, in order to find the types of bottom most favorable for the various species.

Some general observations were made concerning the bottoms of Mississippi Sound. The bottoms are mostly muddy. Beaches composed partly of sand border the mainland and the barrier islands, and there are a few sandy shoals, but the probable sand area of the whole Sound is not more than 5 per cent. In contrast, about 80 per cent of the Sound has a clay-mud bottom. The remaining 15 per cent has a silt or sandy silt bottom which is fairly firm.

Whereas the sand bottoms are sometimes clean, often white, the clay-mud and silty mud bottoms are dark, even black. The silts or sandy silts are in some places firm enough to hold up growing oysters. Although the clay-muds are too infirm to support oysters, they are adequate for shrimp. Thus, three bottom types are described: sand, oyster bottom, and shrimp bottom. All three contain grains of the same minerals in about the same proportions.

Author: RAINWATER, E.H.

Title: LATE PLEISTOCENE AND RECENT HISTORY OF MISSISSIPPI SOUND BETWEEN BEAUVOIR AND SHIP ISLAND

Reference: MS GEOLOGICAL, ECONOMIC & TOPOGRAPHICAL SURVEY, BULL. 102, P.32-61.

Year of Publication: 1964

Archive:

LOCATION COORDINATES
North Latitude: 3012.000 To: 3023.000
West Longitude: 8850.000 To: 8900.000

TYPE OF DATA FOUND IN PUBLICATION
Geophysical [T,F]?: F Sample Analysis [T,F]?: T Other [T,F]?: T
Description of Specific Data Included: LITHOLOGIC, PALEONTOLOGIC

SAMPLE DATA
Type of Device: DEEP CORES (105' MAXIMUM) Location Map Page: 2
Number Of Samples Utilized For: Grain Size= 0, Size Distribution= 0,
Heavy Minerals= 0, Shell Material= 0, Chemical Analysis= 0.

MISCELLAMEOUS DATA

Oceanographic Surveys:
Paleontological Data : 166 SAMPLES; FORAMI NI FERA DESCRIPTIONS
Other Data or Surveys:

NOTES or REMARKS

General lithologic descriptions only

ABSTRACT

Study of 166 samples from 22 borings which penetrated the Recent sediments and into the upper Pleistocene section has made it possible to outline the general depositional history of a portion of Mississippi Sound during that time.

A marine transgression over beach and associated deposits took place in late Pleistocene. The transgression ended when the latest Pleistocene continental ice sheets started to form and the sea level began to fall. Subsidence of the area continued, and some of the sediments which were deposited at the retreating shoreline were preserved.

It appears that the shoreline was south of the offshore islands during the last glacial stage, and the area now covered by Mississippi Sound was land that was being eroded and weathered. As sea level rose, due to melting of the ice sheets, the shoreline advanced landward. Formation of the barrier islands was initiated during this period, and the islands were built higher as the level of the sea rose. Mississippi Sound was formed by flooding of the coastal area behind the islands, and the lower valleys of the major streams were drowned to form bays. Sea level reached its present stand about 5000 years ago. From that time to the present, the Sound has been receiving mostly fine sediments (clay & silt) which have filled more than 1/2 of the originally 30' deep body of water.

Author: REYNOLDS, W.R.

Title: TREND SURFACE ANALYSIS OF HEAVY MINERAL DISTRIBUTIONS OFFSHORE OF THE MISSISSIPPI SOUND BARRIER ISLAND CHAIN

Reference: M.M.R. I. OPEN FILE REPORT NO. 85-4F, 190PP.

Year of Publication: 1985

Archive: M.M.R.I.

LOCATION COORDINATES
North Latitude: 3005.000 To: 3018.000
West Longitude: 8815.000 To: 8915.000

TYPE Qp $_{mTA}$ FOUND IN PUBLICATION

Geophysical CT,F]?: F Sample Analysis [T,F]?: T Other [T,F]?: F

Description of Specific Data Included: HEAVY MINERAL

SAMPLE DATA

Type of Device: VIBRACORES & WATER-LIFT Location Map Page: 4

Number Of Samples Utilized For: Grain Size= 0, Size Distribution= 0,
Heavy Minerals= 47, Shell Material= 0, Chemical Analysis= 0.

* NOTES or REMARKS *

M.M.R.I. core and water-lift series, 1983-84; Heavy minerals & lithology

* ABSTRACT *

The purpose of this study was to locate and analyze heavy mineral populations offshore of the Mississippi barrier islands. Particular species of interest included the oxides of titanium (ilmenite, leucoxene, and rutile), as well as zirconium, kyanite and staurolite. Results showed a significant accumulation of heavy mineral species within the flood tidal deltas offshore of the tidal passes and in the shelf sediment immediately offshore of the barrier islands. In addition, it was found that all of the offshore heavy mineral populations were contained in the. smaller phi sizes, generally very fine sand and coarse silt.

*NOTE: This study was part of a project funded by the Mississippi-Alabama Sea Grant Consortium: Report R/ER-11, 1985. (Heavy mineral data will be found in sample database under taskforce database record no. 15.)

Author: SHIDELER, G.L.

Title: HEAvY-MIl·ERAL PLACER POTENTIAL MAP OF THE U.S. CONTINENTAL SHELF, WESTERN AND NORTHERN GULF OF MEXICO

Reference: U.S. GEOL. SURVEY MISCELLANEOUS FIELD STUDIES MAP, MAP MF-2037

Year of Publication: 1988

Archive:

LOCATION COORDINATES
North Latitude: 2600.000 To: 8800.000
West Longitude: 3200.000 To: 9730.000

TYPE OF DATA FOUND IN PUBLICATION
Geophysical [T,F]?: F Sample Analysis [T,F]?: F Other [T,F]?: F
Description of Specific Data Included: HEAVY MINERAL· POTENTIAL

* NOTES or REMARKS *
Map preparation based on many of the studies outlined in this database

* ABSTRACT *

The purpose of this study was to delineate, on a regional basis, the potential for heavy mineral placers on the U.S. Continental Shelf in the western and northern Gulf of Mexico from the U.S.-Mexico border to the Alabama-Florida state line. Favorable areas for placer occurrence are mapped in an effort to guide in focusing costly exploratory efforts, such as coring operations & geophysical surveys.

Three areas are shown to have moderate to high potential for heavy mineral placer occurrence on the Texas shelf. They are: 1) the ancestral Rio Grande delta; 2) the widespread sandy region north of 28 N. latitude and east of 96 W. longitude, in water depths of <50 fathoms; and 3) the modern shoreface along the length of the Texas coast.

On the Louisiana-Mississippi shelf, one of the most promising areas is the western Louisiana inner shelf west of 90 W. longitude in water depths of <15 fathoms. Much of the eastern Mississippi-Alabama shelf east of 89 W. longitude has moderate to high potential. This area has a favorable combination of widespread sandy host sediment, relatively high concentrations of economically significant heavy minerals, and relict physiographic features that suggest favorable pa leoenvi rommen tal conditions for placer genesis.

Author: SIMONSON, D.N. AND MEYLAN, M.A.

Title: RECONNAISSANCE TESTING OF SEISMIC STRATIGRAPHY MODELS FOR MI FERAL RESOURCE EXPLORATION OF OFFSHORE MISSISSIPPI

Reference: M.M.R.I. OPEN-FILE REPORT 82-10S, UNIVERSITY, MISSISSIPPI, 117P.

Year of Publication: 1983

Archive: U.S.M.

LOCATION COORDINATES
North Latitude: 3020.000 To: 3030.000
West Longitude: 8820.000 To: 8920.000

TYPE OF DATA FOUND IN PUBLICATION

Geophysical [T,F]?: T Sample Analysis CT,F]?: T Other [T,F]?: F

Description of Specific Data Included: HEAVY MIPERAL

GEOPHYSICAL DATA:

Performed by: U.S.G.S. Data Type: SEISMIC
Number of Traverses: O Coverage: 400.00 km. Resolution: HI 04
Instrument Type: SONAR/MINI SPARKER Location Map Page: 8

SATELE DATA

Type of Device: CLAMStFI L GRAB Location Map Page: 4
Number Of Samples Utilized For: Grain Size= 0, Size Distribution= 51,
Heavy Minerals= 51, Shell Material= 0, Chemical Analysis= 0.

NOTES or REMARKS

Grab samples: 18-20 cm sed.. Seismic cruise: RV/Carancahua (July 1981), reflections good to 80m, random tracks around barrier islands

* ABSTRACT *

Fifty-one grab samples were collected in 1.2 to 7.0 meter deep water on the Gulf and lagoon sides of Cat, Ship, Hom and Petit Bois islands. Sparker profiles were made in conjunction with the sampling. Grain size analyses determined that the sediments were fine to medium sands. These occur on the surface of an acoustically horizontally stratified layer five to twenty meters thick, apparently representing Holocene aggradation in Mississippi barrier islands.

Heavy mineral separation was used on the 2.25 - 4.0 phi fraction. Based on an average of all point counts, the following relative proportions of heavy minerals are present: dark opaques, principally ilmenite (297.), kyanite (19), staurolite (1ΘZ), light opaques, principally leucoxene (12%), tourmaline (97.), zircon (5Z), rutile (27.), sillimanite (2Z), and hornblende (ΓZ), with the remainder primarily being opaque aggregates. These percentages are comparable to those of previously studied beach sands from the barrier islands.

Heavy minerals comprise 0.1 to 3.67. of the 2.25 to 4.0 phi size fraction, with percentages generally decreasing westward from Petit Bois to Cat Island. Comparison of relative heavy mineral percentages in samples from east to west along the barrier island chain, and on the Sound vs. Gulf side of the islands, did not reveal any significant trends.

Author: STOW, S.H., DRUMMOND, S.E. AND HAYNES, C.D.

Title: OCCURRENCE AND DISTRIBUTION OF HEAVY MINERALS, OFFSHORE ALABAMA AND MISSISSIPPI

Reference: TRANSACTIONS SOCIETY OF MINING ENGINEERS, VOL. 260, P.75-77.

Year of Publication: 1976

Archive:

LOCATION COORDINATES
North Latitude: 3010.000 To: 3020.000
West Longitude: 8805.000 To: 8840.000

TYPE OF DATA FOUND IN PUBLICATION

Geophysical LT,F]?: F Sample Analysis LT,F3?: T Other ET,F]?: F
Description of Specific Data Included: HEAVY MlfxERAL

SAMPLE DATA

Type of Device: SURFACE Location Map Page: 4
Number Of Samples Utilized For: Grain Size= 0, Size Distribution= 0,
Heavy Minerals= 97, Shell Material= 0, Chemical Analysis= O.

* NOTES or REMARKS *

Distribution of heavy minerals by weight percent; raw data for all samples not given

* ABSTRACT *

This paper is a preliminary report on the occurrence and distribution of economically interesting heavy minerals in sands from the sea floor surface of the offshore area, Alabama - Mississippi. The study concentrates on the Dauphin — Petit Bois islands area and reveals a westward decrease in heavy mineral abundance due to the westerly longshore transport in this area. Heavies also show variations in concentrations due to disruption of the longshore current and the mixing of sediments from Mississippi Sound. Heavy minerals of interest include kyanite, sillimanite, staurolite, zircon, monazite, ilmenite, leucoxene, and rutile.

The authors suggest the potential for over 23 million tons of heavies in the study area. However, their data and interpretations are not indicative of recoverable resources as the deposit dimensions are not defined.

Author: UPSHAW, C.F., CREATA, W.B., AND BROOKS, F.L.

Title: SEDIMENTS AND MICROFAUNA OFF THE COASTS OF MISSISSIPPI AND ADJACENT STATES

Reference: MS GEOLOGICAL, ECONOMIC & TOPOGRAPHICAL SURVEY, BULL. NO. 106,127PP.

Year of Publication: 1966

Archive:

LOCATION COORDINATES

North Latitude: 2900.000 To: 3030.000
West Longitude: 8700.000 To: 8910.000

TYPE OF DATA FOUND IN PUBLICATION

Geophysical [T,F]?: F Sample Analysis [T,F]?: T Other CT,F]?: T ;
Description of Specific Data Included: SEDIMENTOLOGY, HEAVY MINERAL, PALEO.;

SANELE DATA

Type of Device: SHORT CORE & PETERSON DREDGE Location Map Page: 3,6
Number Of Samples Utilized For: Grain Size= 506, Size Distribution= 52,
Heavy Minerals= 45, Shell Material= 506, Chemical Analysis= 89. *

MISCELLANEOUS DATA

Oceanographic Surveys: BATHYMETRY, WATER TEMPERATURE & SALINITY
Paleontological Data :
Other Data or Surveys:

* NOTES or REMARKS *

Raw data available in publication, but not keyed to latitude/longitude

* ABSTRACT *

The objective of this study was to describe the lithologic, microfaunal and environmental characteristics of a modern depositional system.

The study area covers approximately 7800 square miles on the continental shelf of the northern Gulf of Mexico. It extends from the eastern margins of the Mississippi delta in Louisiana to a line extending southward from the eastern end of Pensacola Bay in Florida, and from the mainland coast of Mississippi, Alabama, and Florida to the margin of the continental shelf. Studies reported here include size and composition of sediments and distribution of foraminifera and ostracoda. Size and compositional analyses are based on 506 bottom samples from open marine environments. Clay analyses were made on 90 samples; carbon isotope ratios were determined on 90 samples; acid soluble percentage, grain size distribution and counts of groups of foraminifera and ostracodes were determined for 451 samples.

Author: VAN ANDEL, T.H. AND POOLE, D.M.

Title: SOURCES OF RECENT SEDIMENTS IN THE NORTHERN GULF OF MEXICO

Reference: JOURNAL OF SEDIMENTARY PETROLOGY, VOL. 30, NO. 1, PP. 91 - 122.

Year of Publication: I960

Archive:

LOCATION COORDINATES
North Latitude: 2S00.000 To: 3200.000
West Longitude: 8400.000 To: 980.000

DATA FOUND IN PUBLICATION

J Geophysical CT,F]?: F Sample Analysis [T,F]?: T Other CT,F]?: F
Description of Specific Data Included: HEAVY MINERAL.

SAMPLE DATA

Type of Device: SLHFACE Location Map Page: 6
Number Of Samples Utilized For: Grain Size= 0, Size Distribution= 0, J
Heavy Minerals= 0, Shell Material= 0, Chemical Analysis= 0.

* NOTES or REMARKS *

Data obtained from many outside publications; some raw data given but not keyed to lat./long.

* ABSTRACT *

Sand-size sediments are contributed to the northern Gulf of Mexico by a large number of streams and, to a lesser extent, by marine erosion of coastal deposits, mainly of Pleistocene age. The heavy mineral assemblages and distributive provinces of most sources can be recognized in the Holocene sediments of the northern Gulf of Mexico. Five heavy mineral provinces have been established, the Eastern Gulf, Mississippi, Western Gulf, Texas Coast, and Rio Grande provinces.

The Eastern Gulf province is characterized by a kyanite-staurolite association derived from the Cretaceous and younger sedimentary mantle of the Appalachians. The Mississippi province is characterized by a horblende-pyroxene association with appreciable amounts of epidote and garnet. This assemblage has been derived from glacial deposits.

Author: WILSON, A.M.

Title: RESPONSE MODELING OF HOLOCENE SEDIMENTS WITHIN THE SHALLOW SUBSTRATE OF CENTRAL MISSISSIPPI SOUND

Reference: MASTER'S THESIS, UNIVERSITY OF MISSISSIPPI, 89PP.

Year of Publication: 1984

Archive:

== LOCAT I ON COORDINATES ==

North Latitude: 3014.000 To: 3022.000

West Longitude: 8830.000 To: 8900.000

========= TYPE OF DATA FOUND IN PUBLICATION :=

Geophysical CT,FJ?: F Sample Analysis CT,FJ2: T Other ET,FJ?: F

Description of Specific Data Included: SEDIMENTOLOGIC

SAMPLE DATA

Type of Device: Vibracore Location Map Page: 2

Number Of Samples Utilized For: Grain Size= 63, Size Distribution= 63,

Heavy Minerals= 0, Shell Materia1= 0, Chemical Analysis= O.

* NOTES or REMARKS *

MS/ALA Sea Grant vibracores, 1980-81

* ABSTRACT *

The purpose of this study was to describe the depositional processes affecting sedimentation and sediment distribution of the shallow substrate in central Mississippi Sound. Sediments were analyzed at three specified intervals from 17 vibracores. Sediment analysis showed that sand is present in large amounts marginal to the coastline, adjacent to the barrier islands and in island passes. Sands enter the study area from the Pascagoula River, Biloxi Bay, and from the Gulf of Mexico.

Eleven depositional sub-environments were identified within the study area. These included swash, forebeach, deltaic distributary channel, natural levee, foreshore swash, nearshore, midsound, fluvial, tidal flat, back barrier and dune.

Author: WIMBERLY, W.J.

Title: HEAVY MINERALS OF THE RECENT SANDS SOUTH OF THE MISSISSIPPI SOUND BARRIER ISLANDS

Reference: MASTER'S THESIS , UNIV. OF MISSISSIPPI, 116PP .

Year of Publication: 1985

Archive:

== LOCATION COORDINATES

! North Latitude: 3010.000 To: 3015.000
! West Longitude: 8815.000 To: 8905.000

YY^ др NTA FOUND IN PUBLICATION

ï Geophysical [T,F]?: F Sample Analysis [T,F]?: T Other [T,F]?: F J
I Description of Specific Data Included: HEAVY MIl·ERAL ;

oAMFLE DATA

! Type of Device: CORE AND WATER-LIFT Location Map Page: 4
; Number Of Samples Utilized For: Grain Size= 41, Size Distribution= 0, !
! Heavy Minerals= 41, Shell Material= 0, Chemical Analysis= 0.

Ж NOTES or REMARKS Ж

M.M.R.I. core and water—lift series, 1983-84; Heavy mineral identification and generalized lithologic descriptions

Ж ABSTRACT Ж

A total of 41 core and water-lift samples, obtained from the Recent sands on the Gulf side of the Mississippi Sound barrier islands, were examined for possible economic accumulations of heavy minerals. Sand-size fractions were analyzed from samples taken at the following intervals: 0.0'-5.0', designated as Level 1, and 5.0'-10.0', designated as Level 2.

The average percentages of individual heavy mineral species from the total heavy mineral fraction were as follows: ilmenite 37.4%, kyanite 16.87%, staurolite 13.42%, leucoxene 10.427., tourmaline 7.65%, hornblende 3.15%, zircon 2.65%, rutile 2.64%, sillimanite 2.18%, and epidote 2.14%. A variety of trace minerals comprising less than 1% of the heavy fraction were encountered. The predominantly metamorphic assemblage leads to the postulation that the source area is the metamorphosed rocks of the southern Appalachians. However, statistical analysis revealed that amounts of hornblende and epidote increased from east to west within the study area, thus showing the influence of sediments from the Mississippi River Province to the west.

The heavy minerals comprise an average of 0.45% of the sands in the study area samples. No significant difference was found in the percentages from Level 1, as opposed to Level 2.

WS TASKFORC.dbf DATABASE RECORD: 13

Author: WOOLSEY, J.R.

Title: PRELIMINARY RECONNAISSANCE FOR INDUSTRIAL MINERALS IN MISSISSIPPI SOUND AND ADJACENT OFFSHORE TERRITORIES OF MISSISSIPPI

Reference: M. M. R. I. OPEN FILE REPORT NO. 83-13S, 21PP.

Year of Publication: 1984

Archive: M.M.R.I.

LOCATION COORDINATES
North Latitude: 3005.000 To: 3018.000
West Longitude: 8815.000 To: 8915.000

TYPE OF DATA FOUND IN PUBLICATION
Geophysical [T,F]?: T Sample Analysis [T,F]?: T Other [T,F]?: T
Description of Specific Data Included: PEAVY MINERAL, GAMMA RAY

GEOPHYSICAL DATA
Performed by: M.M.R.I. Data Type: SEISMIC, GAMMA RAY
Number of Traverses: 0 Coverage: 198.00 km. Resolution: LOW
Instrument Type: SIDE SCAN SONAR/GAWA RAY SLED Location Map Page: 8

SAMPLE DATA
Type of Device: VIBRACORE & VIBRALIFT Location Map Page: 4
Number Of Samples Utilized For: Grain Size= 0, Size Distribution= 0,
Heavy Minerals= 16, Shell Material= 0, Chemical Analysis= 44.

MISCELLANEOUS DATA

Oceanographic Surveys:
Paleontological Data :
Other Data or Surveys: GAMMA RAY SPECTROMETRY - U, Th, K, AND Th/U

* NOTES or REMARKS *

M.M.R.I. Core & water-lift series, 1983-84; Heavy minerals identified; Seismic cruise: RV/Amity (March, 1983), random tracks

* ABSTRACT *

A geophysical survey was completed in March of 1983 which included 107 nautical miles of shallow seismic, side-scan sonar and gamma-ray sled work. From these data, fourteen vibracores and 16 grab samples were selectively obtained to aid in defining surficial areas of heavy mineral concentration and shell reef occurrence.

Heavy mineral assemblages were described from 16 interface (grab) samples located more or less along an east-west traverse across the seaward side of the barrier island system. When wet sieved, only those sediments retained in the greater than 62-micron fraction were studied. The greatest percentage of heavy minerals was found to be in the 3 to 4 phi fraction for most samples, with the highest percentages being in the eastern part of the study area and generally decreasing toward the west. Percentage values also show that ilmenite is the most abundant species of the samples, followed by kyanite, leucoxene and garnet.

Recommendations are given for further study in the area (see Woolsey, et al., 1985; Taskforce Record No. 15).

Author: WOOLSEY, J.R., REYNOLDS, W.R. , AND BARGERON D.L.

Title: EXPLORATION FOR INDUSTRIAL MINERALS IN MISSISSIPPI SOUND AND ADJACENT OFFSHORE TERRITORIES OF MISSISSIPPI AND ALABAMA

Reference: MI SS I SS I PPI-ALABAMA SEA GRANT CONSORTILE, PROJECT R/ER-11, 192PP.

Year of Publication: 1985

Archive: M.M.R.I.

===== LOCATION COORDINATES ======
North Latitude: 3005.000 To: 3018.000
West Longitude: 8815.000 To: 8915.000

TYPE OF DATA FOUND IN PUBLICATION
Geophysical CT,FJ?: T Sample Analysis CT,FJ?: T Other [T,FJ?: T
Description of Specific Data Included: LITHOLOGIC, PEAVY MINERAL

GEOPHYSICAL DATA
Performed by: M.M.R.I. Data Type: SEISMIC
Number of Traverses: 0 Coverage: 198.00 km. Resolution: LOW
Instrument Type: SIDESCAN SONAR Location Map Page: 8

SAMPLE DATA
Type of Device: VIBRACORE & VIBRALIFT Location Map Page: 4
Number Of Samples Utilized For: Grain Size= 0, Size Distribution= O,
Heavy Minerals= 47, Shell Material= 0, Chemical Analysis= O.

MISCELLANEOUS DATA

Oceanographic Surveys:
Paleontological Data :
Other Data or Surveys: GAMMA RAY SPECTROMETRY - U, Th, K, AND Th/U

* NOTES or REMARKS *

M.M.R. I. Core and watet—lift series, 1983-84; Heavy minerals & lithology; Seismic cruise: RV/Amity (March, 1983), random tracks around islands

* ABSTRACT *

Thirty-seven vibracore and vibralift samples were obtained from the seaward side of the Mississippi barrier island chain. Heavy minerals were separated and identified from 47 samples. From core and sample analyses, the following conclusions were made. Heavy minerals of the several types sought were not found in concentrations of economic interest. Specialty sands of desired specifications for economic exploitation were not observed. Shell concentrations of the oyster variety offshore of the barrier islands may occur in favorable concentrations outside of state territory in federal waters.

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