



R/V KANA KEOKI

Nov. 11 - Nov 25, 1974

# United States Department of the Interior

## GEOLOGICAL SURVEY

IN ADMIN 5/1/79

Office of Marine Geology  
P. O. Box 6732  
Corpus Christi, Texas 78411

74014

### RESEARCH CRUISE REPORT

Ship Name: R/V KANA KEOKI      Operating Institution: Univ. of Hawaii

Cruise No.: BLM - Leg Bravo      Dates: 11-11-74 to 11-25-74

Area of Operation: South Texas Continental Shelf extending from Matagorda Peninsula southward to the U.S./Mexico international boundary.

Port Calls: Corpus Christi and Port Brownsville, Texas

Project Title: Marine Geological Survey of the Texas Outer Continental Shelf as Part of the Baseline Environmental Assessment.

Senior Scientist: Dr. Gerald L. Shideler

Scientific Participants, Title, and Affiliation:

1. Dr. Gerald L. Shideler - Geologist and Chief Scientist - U.S.G.S.
2. Dr. Robert Miller - Organic Geochemist - U.S.G.S.
3. Mr. Michael Dorsey - Physical Science Technician - U.S.G.S.
4. Mr. Ronald Miller - Physical Science Technician - U.S.G.S.
5. Mr. Rod Jackson - Geological Field Assistant - U.S.G.S.
6. Mr. Michael Coleman      "      "      "      "
7. Mr. Douglas Watson      "      "      "      "
8. Mr. Steven Rabalais      "      "      "      "
9. Mr. Robert Vitaglione      "      "      "      "
10. Mr. Ted Nehr Korn      "      "      "      "
11. Mr. Kenneth Roberts      "      "      "      "
12. Mr. Michael English - Navigator - Decca
13. Mr. Robert Trice - Navigator - Decca

Description of Scientific Program: The overall objective of the program is to acquire the necessary geological, chemical, and biological baseline data for an environmental assessment of the South Texas Outer Continental Shelf. The data acquisition phase of the program is to be completed prior to leasing of the area for energy-resource development (Figure 1). The geological phase of this program is concerned primarily with determining the nature of seafloor sediments and substrate, as well as the nature of suspended sediment within the water column. This cruise was a continuation of the work conducted on BLM-Leg Alpha, and consisted of water column, bottom

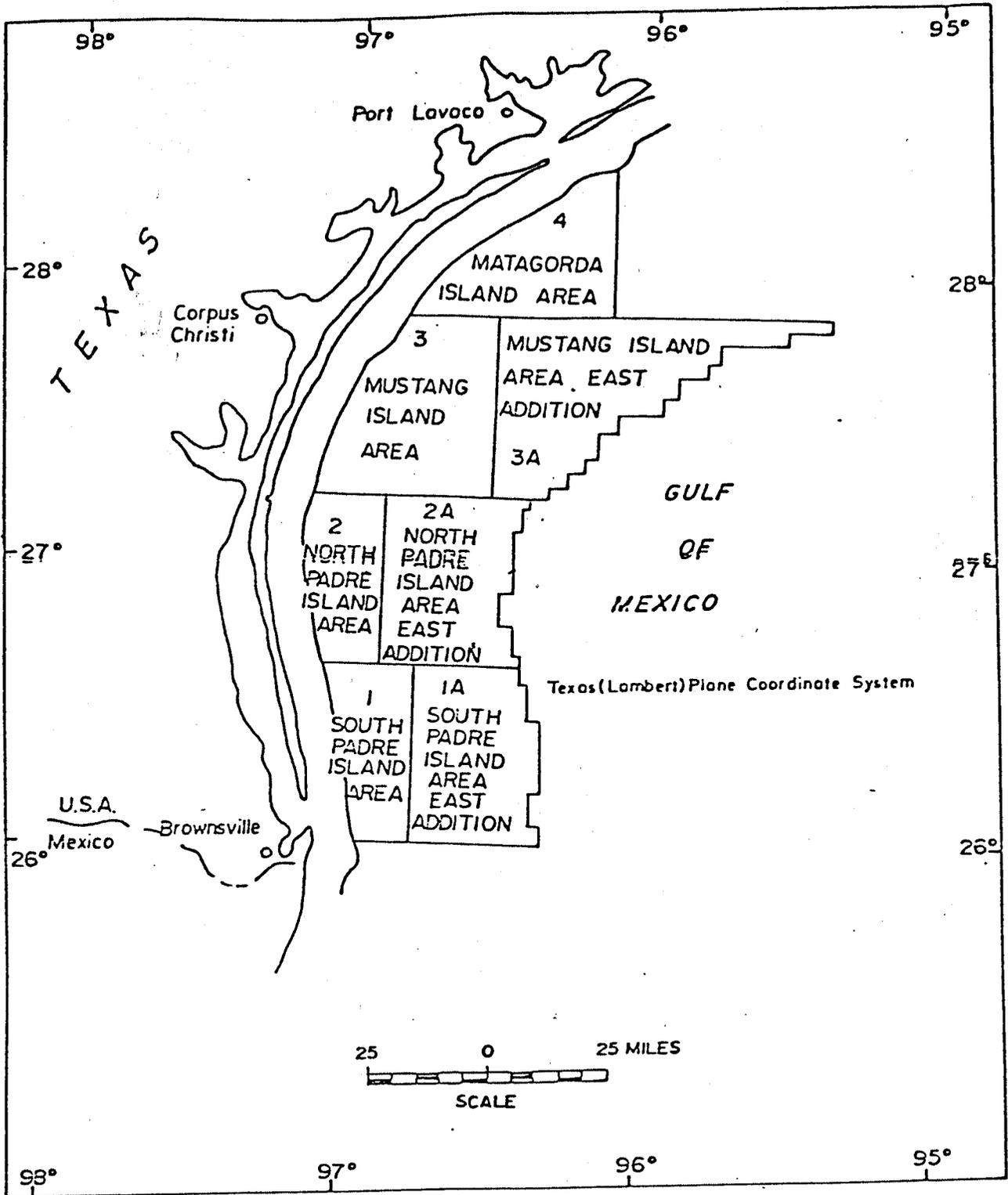


Figure 1 - South Texas lease area

sediment, and substrate sampling. This cruise is being followed by BLM-Leg Charlie which will be concerned with completing the sampling work, as well as with obtaining continuous seismic reflection and side-scan sonar profiles.

Observations and Samples: A total of 109 stations were occupied throughout the Texas OCS area during this cruise. Specific data obtained at these stations consist of the following:

- 1) Water samples for suspended sediments - 49 samples (3 at each of 13 stations plus 10 for quality control)
- 2) XBT records - 44 stations
- 3) Bottom photographs - 19 stations
- 4) Smith-MacIntyre grab samples - 71 stations (6 subsamples at each)
- 5) Gravity cores - 26 stations
- 6) Box cores - 39 stations
- 7) Samples for organic analyses - 34 stations
- 8) Benthic faunal collections - 110 (from grabs and box cores)
- 9) Drift bottle casts conducted - 24 stations
- 10) Seismic reflection profiles (3.5 kHz) and bathymetry - all stations.

Summary of Sea State Conditions, Weather, and Operational Problems:

With the exception of a few fair weather days, the general sea state and weather conditions throughout most of the cruise were poor. Swells were generally greater than .5 ft., and occasionally peaked at 13-14 ft. Wind velocities were frequently up to 25 kts., and were occasionally within the 30-40 kt. range. The highest velocity winds were northerly, and were associated with passing cold fronts. Hazardous sea state conditions occasionally precluded night operations and prevented the captain from closely approaching the calibration platform to obtain lane counts for our navigation system. Fog and electrical storms also delayed operations. The total amount of ship down time directly attributable to weather and sea state conditions during the cruise was 5.4 percent (18 hours). Ship-board mechanical problems encountered during the cruise accounted for another 8.1 percent (27 hours) down time. Cruise operations were severely hampered by problems with the precision navigation system. The navigation signals were frequently lost, thus requiring an excessive amount of steaming time to pick up lane count at known calibration localities. Poor signal reception was attributed to a combination of atmospheric and equipment factors. The amount of down time directly attributable to navigation problems was 41.1 percent (137 hours).

The total composite amount of ship down time resulting from all sources during BLM-Leg Bravo was 54.6 percent.

Deviations from Cruise Plan Caused by Physical Conditions:

As a result of the 54.6 percent total down time caused by weather, navigation problems, and mechanical problems, the total amount of data acquisition intended for Leg Bravo was not entirely completed; the remaining

data will be acquired during ongoing Leg Charlie. In addition, during the second week of the cruise, the box corer was lost in 98 meters of water because of a severed winch cable. Since neither an underwater viewing system nor a grappling hook were aboard ship, salvage attempts were postponed until the Leg Charlie cruise. As a result of this loss, the box coring operations were terminated because no backup box corer was available aboard ship. Also during the second week, the casing cover for the Benthos underwater camera was lost while raising the camera to the surface. Since no spare casing cover was aboard ship, the bottom photography operations were terminated. However, this was not a major loss because bottom photographs previously acquired during the cruise showed no significant information. This is attributed to the high turbidity and low visibility of the Gulf bottom waters under the high sea state conditions experienced during this cruise. Bottom photographs were acquired from 19 stations at varying depths, all of which indicated highly turbid bottom waters that totally obscured the sea floor.

#### Preliminary Scientific Observations:

1. In agreement with results from BLM-Alpha, the 3.5 kHz seismic reflection profiles suggest some possible hydrocarbon seeps associated with faulting near the edge of the continental shelf. Some possible seeps were observed in the east-central part of the North Padre Island Area - East addition, thus extending southward the area of seepage observed in Leg Alpha.
2. Ferro-Manganese encrusted reef rock was obtained in 98 meters of water in the southeastern corner of North Padre Island Area - East addition. This also extends southward the occurrence of manganese materials observed in Leg Alpha.
3. A cursory inspection of XBT records suggests that the inner shelf waters are generally homogeneous, or else exhibit slightly increasing temperature gradients; this may possibly be attributed to pronounced mixing associated with the high wind velocities and sea state conditions experienced during the cruise. In contrast, the middle and outer shelf waters exhibit increasingly higher degrees of thermal stratification with increasing water depth; relatively warm surface water masses generally overlie colder deeper masses, with well-defined thermoclines. There is also some indication of a relatively warm intermediate-depth layer at some of the deeper stations.
4. The bottom sediments throughout most of the Texas OCS area that was sampled during BLM-Leg Bravo consist of grayish-olive or olive-brown mud. Sand was found to be a minor constituent, and gravel detritus was not observed in any significant quantity.