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STUDY TITLE: Florida Big Bend Seagrass Habitat Study

REPORT TITLE: Florida Big Bend Seagrass Habitat Study, Narrative Report

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KEY WORDS: Eastern Gulf; Florida Big Bend; biology; seagrasses; inventory; maps; aerial photography; survey; photographimetric technique; benthic photographs; habitat; zonation; hard-bottom.

BACKGROUND: The crescent-shaped portion of Florida's west coast from Ochlockonee Bay south to Tarpon Springs is referred to as the Florida Big Bend. The expanse of continental shelf area within the Florida Big Bend is important to fisheries and environmental interests. When this area became the focus of oil and gas developers, the State of Florida indicated that the lack of information on live-bottom and seagrass distribution within the area would not permit responsible management of exploratory activities. Consequently, the U.S. Department of the Interior initiated the Florida Big Bend Seagrass Study to provide supporting data for development of biological stipulations and evaluation of lease block specific plans of exploration or development.

OBJECTIVES: (1) To inventory and map seagrass beds in the Florida Big Bend area by combining aerial remote sensing and extensive ground truthing data; (2) to determine the seaward extent of major seagrass beds within the study area; and (3) to classify and delineate major ecological habitat types in the study area.

DESCRIPTION: The study area encompassed approximately 1.5 million ha of seafloor extending from the coastline to the 20-m isobath. The study was conducted in three parts: (1) a pre-overflight ground truthing cruise; (2) a remote sensing overflight encompassing the study area; and (3) a post-overflight ground truthing cruise to verify interpretation of remote sensing data.

During the first cruise (Cruise 1) conducted from 24 October to 1 November 1984, 1,232 km of seafloor between the 10- and 20-m depth contours were surveyed using a towed underwater television system. Navigational fixes consisting of Loran-C time delays and bottom-type descriptions were recorded at 5-min intervals along the transects. Additionally, 50 signature control stations ranging in water depths from 3 to 23 m were established to assist aerial photographic interpretation in locations of known seagrass coverage. At each station, large floating targets were deployed; divers then took quantitative (343.6 cm2) and qualitative 35-mm photographs of the seafloor under the targets to estimate seagrass density and species composition. Aerial overflights were made between 30 October and 15 November 1984 along 26 north-south flight lines. Photographs were taken using 23 cm x 23 cm color print film. The scale on all photographs was 1:40,000. During Cruise 2 conducted from 19 to 27 February 1985, nine additional transects (174 km) were surveyed using towed divers and underwater television. Eleven of the 50 signature control stations established during Cruise 1 were resampled using the same methods employed during the earlier cruise. Aerial photographs were analyzed stereoscopically, and seagrass beds were classified by density (dense, sparse, and patchy). Due to signature similarities between seagrass beds and low relief coral, sponge, and gorgonid assemblages frequently seen between them, live bottom could not be differentiated from seagrass habitat at the 1:40,000 imagery scale.

SIGNIFICANT CONCLUSIONS: Within the Florida Big Bend study area, 16% of the area was described as dense seagrass beds, 33% as sparse seagrass beds, and 19% as patchy seagrass beds. Seagrass associations occurred in two general zones based on depth. In waters shallower than 10 m, dense associations of turtle grass, manatee grass, and shoalgrass provided dense images in the aerial photography. Seaward of this zone, sparse associations of seagrasses, macroalgae, and live bottom were identified extending to at least the 23-m depth contour. The extended nature of this sparse, offshore zone was considered a unique feature of the Florida Big Bend area zonation pattern. Seasonal variation in seagrass blade density and species composition was observed at the offshore signture control stations. Little information is available concerning the ecology of the fringing zone seagrass beds of the Florida Big Bend area.

STUDY RESULTS: Approximately 1.5 million ha were mapped during overflights of the Florida Big Bend study area. Two maps were produced: one at 1:40,000 scale and another at 1:250,000 scale. The second map was a composite, produced to be superimposed on existing Minerals Management Service Protraction Diagrams. Results from combined aerial mapping and ground truthing delimited 232,893 ha of dense

seagrass beds; 498,034 ha of sparse seagrass beds; and 279,722 ha of patchy seagrass beds within the study area.

On a broad scale, the Florida Big Bend seagrass stands exhibited zonation typical of southern Florida or Caribbean seagrass beds. An inshore association of turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), and shoalgrass (*Halodule wrightii*) occurred in water depths less than 10 m. Turtle grass and manatee grass formed dense beds that were easily detected by aerial photographs. At the seaward margin of these dense beds, an overlap area consisting of five species (manatee grass, turtle grass, and shoalgrass, as well as *Halophila decipiens* and *H. engelmanni*) was detected. Offshore, from 10 m out to at least 23 m a sparse fringing zone occurred. This zone was composed of a mixed association of seagrasses, macroalgae, and live bottom. The only true seagrasses present were the Halophila species.

Blade density determined from the nearshore association ranged from 41 to 309 blades m-2. In the offshore association, blade densities ranged from 374 to 2,657 blades m-2. Blade density was not indicative of bottom coverage by seagrasses within the two zones. Blade densities at 9 of the 11 signature control stations resampled during Cruise 2 were 50 to 90% lower and *H. decipiens* was completely absent. Temperature, light, and wave action probably contributed to the observed spatial and seasonal patterns in the grass beds.

STUDY PRODUCTS: Continental Shelf Associates, Inc. and Martel Laboratories, Inc. 1985. Florida Big Bend Seagrass Habitat Study. A final report for the U.S. Department of the Interior, Minerals Management Service Gulf of Mexico OCS Region, Metairie, LA. Contract No. 14-12-0001-30188. 114 pp.

Continental Shelf Associates, Inc. and Martel Laboratories, Inc. 1985. Florida Big send Seagrass Habitat Study Photographic Atlas. A final report for the U.S. Department of the Interior, Minerals Management Service Gulf of Mexico OCS Region, Metairie, LA. Contract No. 14-12-0001-30188. 6 pp. + 557 plates.

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