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STUDY TITLE: Florida Big Bend Sea Grass Habitat Study

REPORT TITLE: Assessment of Hurricane Damage in the Florida Big Bend Seagrass Beds

CONTRACT NUMBER: 14-12-0001-30188

SPONSORING OCS REGION: Gulf of Mexico

APPLICABLE PLANNING AREA: Eastern Gulf of Mexico

FISCAL YEARS OF PROJECT FUNDING: 1984; 1985; 1986; 1987

COMPLETION DATE OF REPORT: February 1987

COSTS: FY 1984: $261,201; FY 1985: $70,000; FY 1986: $54,745; FY 1987: $1,052

CUMULATIVE PROJECT COST: $386,998

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KEY WORDS: Eastern Gulf; Florida; Big Bend; biology; seagrasses; hurricane; recovery; observations; benthic photographs; videotapes; density; hard-bottom; West Florida Shelf

BACKGROUND: During fall and winter of 1984 and 1985, the Minerals Management Service (MMS) funded a seagrass mapping study of the Florida Big Bend area. Following the passage of major hurricanes in summer 1985, the MMS decided to sponsor a follow-up study to assess hurricane impacts and seagrass recovery in the area. New field data were collected during a survey in August 1986, and all previously collected data on seagrasses of the Big Bend area were reviewed and compared with new data sets.

OBJECTIVES: (1) To provide follow-up data to those collected in 1984 and 1985 during the Florida Big Bend Seagrass Study; and (2) to assess hurricane damage and seagrass recovery in the area.

DESCRIPTION: The study area encompassed approximately 1.5 million ha of seafloor extending from the coastline to the 20 m isobath. Two approaches used during the

previous study were repeated approximately one year after the passage of major hurricanes. The first involved qualitative observations made along transects surveyed by divers and/or television. The second involved photographic sampling at selected stations in the area. During Cruise 1 of the previous survey, conducted from 24 October to 1 November 1984, 232 km of seafloor between the 10- and 20-m depth contours were surveyed using a towed underwater television system. During Cruise 2, conducted from 19 to 27 February 1985, nine additional transects (174 km) were surveyed using towed divers/television. During the previous study, 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. Quantitative photographs of the seafloor were taken at these stations using a Nikonos 35-mm underwater camera with a 0.03 m^2 framer. Counts of seagrass blades in each photograph provided estimates of blade density.

From June through October 1985, a seagrass monitoring program was conducted in Gainesville Area Block 707. The aim of this study was to monitor impacts of discharged drilling muds on live-bottom areas and deep seagrass communities. Data collected during this study, particularly dry weight biomass estimates of seagrass leaves (*Halophila decipiens* and *H. englemanni*) and seagrass density estimates from photoquadrats, were used to augment the effort.

The new field surveys were conducted between 14 and 19 August 1986. Days of sampling signature control stations were alternated with days of television/diver transect surveys. Most transects were surveyed with both diver and television in the water at the same time. Navigational fixes consisting of Loran -C time delays and bottom-type descriptions were recorded at 5-min intervals along the transects. Twenty of the original signature control stations were resampled photographically in August 1986. Four of these stations were live bottom, and a live-bottom reference station from the monitoring program was also resampled. At this station 10 staked quadrats were sampled photographically with a 0.1 m^2 framer.

SIGNIFICANT CONCLUSIONS: It was apparent that seagrass, algal, and live-bottom communities on the west Florida shelf are resilient to storm impacts. Areas of *Halophila* sp. denuded by Hurricane "Elena" in 1985 appeared fully recovered after the 1986 growing season. Live-bottom organisms, particularly octocorals, seem to be adapted to withstand both wave energy and sand scour associated with storms.

STUDY RESULTS: Resurveyed transect data were compared with the original survey data. Little change in percent cover by major habitat types was evident. Along one transect, there was an observed increase in seagrass coverage; however, this was apparently due to an extension of the transect length during the second survey and not to increased seagrass cover.

Comparisons of 1984 and 1986 data from the *H. decipiens* stations showed leaf density and biomass were higher at some stations and lower at others, but the mean values were comparable. There was no demonstrable relationship between standing stock

estimates and hurricane tracks that could be shown. Three of the signature control stations dominated by *H. engelmanni* in October 1984 had only sparse *Halophila* shoots and rhizomes present during August 1986. The elimination of *H. engelmanni* at these stations was not considered a hurricane impact. Dense nearshore beds, composed of mixed stands of turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), and shoalgrass (*Halodule wrightii*), showed no noticeable changes between the 1984 and 1986 surveys. Biotic coverage and gross taxonomic composition of the epifaunal communities at the live-bottom stations were comparable between 1984 and 1986 surveys.

In 1985, when divers visited the monitoring site in the Big Bend area where Hurricane "Elena" had passed through eight days earlier, tremendous destruction of seagrasses, macroalgae, and sessile invertebrates was found. Considerable sediment movement had also occurred in some places. The August 1986 survey, conducted approximately one year after the passage of the hurricane, showed that seagrasses were again present in areas that had been completely denuded. The seagrass/algal and live-bottom areas of the west Florida shelf were considered resilient to the occasional passage of major hurricanes.

STUDY PRODUCT: Continental Shelf Associates, Inc. 1987. Assessment of Hurricane Damage in the Florida Big Bend Seagrass Beds. A final report for the U.S. Department of the Interior, Minerals Management Service Gulf of Mexico OCS Region, New Orleans, LA. Contract No. 14-12-0001-30188. 95 pp.