ACCESS NUMBER: 30836

STUDY TITLE: Development of Contingency Planning and Oil Spill Response data base in the Gulf of Mexico; Texas Coastal Zone

REPORT TITLE: Texas Environmental Sensitivity Index Project for the Central Texas Coast

CONTRACT NUMBER: 1435-01-96-CA-30836

SPONSORING OCS REGION: Gulf of Mexico

APPLICABLE PLANNING AREA: Western Gulf of Mexico

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KEY WORDS: Texas; estuary; oil spill; biology; wetlands; birds; fish; invertebrates; colonial waterbirds; habitat; seasonality; ESI (Environment Sensitivity Index); mapping; cartography

BACKGROUND: The Texas coastal zone is made up of a widely varying system of different habitat types and communities. The Minerals Management Service (MMS) enlisted by contract the Gulf states of Texas, Louisiana, Mississippi, and Florida to normalize response data to populate a single Gulf-Wide Information System (GWIS) to support oil spill response and other regulatory activities across the entire Gulf region.

OBJECTIVES: To produce a set of spatial data layers describing fauna and flora, human-use facilities, and shoreline classifications for the central Texas Gulf Coast. The data were created in ARC/INFO v. 7.0 and related software and designed for use in coastal management and especially in oil spill contingency planning.

DESCRIPTION: Data layers were created at map scales of approximately 1:24,000. The geographic area of data collection ranged from Sargent Beach, near Freeport, Texas, to the north end of the Laguna Madre, taking in the Matagorda, San Antonio, Copano, Aransas, and Corpus Christi bay systems.

The biological data collected for the GWIS project were created using ARC/INFO entities called regions, which comprise one or more polygonal areas with a single

unique identifier. This identifier links the region attribute table to separate data tables containing lists of species occurring within each region, seasonal occurrence of species in the project area, and classification and legal status of species. The identifier is linked to multiple life stage profiles for certain species; if a species was known or believed to breed within a region, the identifier was linked to the life stage/seasonality profile that includes breeding information for the species. An additional data field contains numbers or concentration of a species in the region. As data regarding concentration were limited and variable, only a few species (mostly waterfowl and nesting birds) were given numeric values in the concentration field. Some other occurrences of species were given a subjective value (e.g. high, medium, or low) based on anecdotal information and judgments by observers.

Most information about species occurrence and distribution was collected in a series of meetings held in locations on the Texas coast with local field biologists, land managers, and others. Texas Parks and Wildlife Department (TPWD) and U.S. Fish and Wildlife Service (USFWS) personnel gave information about lands and species managed by those agencies. Representatives of the Texas A&M University-Corpus Christi, University of Texas Marine Science Institute, the Conrad Blucher Institute, U.S. Geological Survey, Texas Department of Health, Lower Colorado River Authority, Corpus Christi Bay National Estuary Program, and nonprofit organizations including the Coastal Conservation Association, Nature Conservancy of Texas, Texas State Marine Education Center, and Audubon Society also attended, as well as private citizens such as commercial guides, a commercial oysterman, and birding groups. Participants described flora and fauna and their habitat and distribution.

Information gathered at the meetings was supplemented by existing databases of colonial waterbird and waterfowl surveys and other published sources. Mapping of fish and some invertebrates was based on bag seine, trawl, and gillnet sampling of estuarine fauna conducted by the TPWD's Coastal Fisheries Division between 1989 and 1994. ARC/INFO was used to access the TPWD survey database and locate records of fish and invertebrates in the coastal bays. Concentration areas, spawning areas, and migration routes were inferred or delineated by commercial guides and recreational fishermen.

Only one mammalian species was considered in the project, the Atlantic bottlenose dolphin (Tursiops truncatus), with areas of observed concentrations in bays mapped. Other mammals will probably be treated in other project phases.

A goal of the project was to map the distribution of oyster (Crassostrea virginica) reefs, hopefully with greater precision than descriptions of the distribution of mobile species, as oysters create micro-habitat which is immobile and in some cases vulnerable to oil. Reefs in some parts of the area have been mapped by the TPWD from aerial photography of various dates and levels of accuracy. Some large surface reefs show up on NOAA maps.

Several habitats or plant assemblages were mapped based on information from the meetings, National Wetland Inventory data created by the USFWS, the Texas Natural

Heritage Program database, and other sources. These included areas of aquatic vegetation, marsh types, algal flats, black mangrove, and a few grasslands and rice fields. The GLO hopes to map plant assemblages in greater detail on future spill response maps.

The Bureau of Economic Geology (BEG) was subcontracted by the General Land Office to classify and map the shores and shoreline habitats of the project area. Shoreline types were mapped on U.S.G.S. topographic quadrangles (1:24,000) using recent vertical aerial photographs, low-altitude color video surveys taken in 1997, oblique color slides taken in 1992, and previous field experience. The maps were spot-checked in May 1998 from the ground. The Matagorda to Corpus Christi region was selected for the second phase of ESI mapping in Texas because it contains densely industrialized areas and diverse shore types, extant wetlands are environmentally sensitive, and a large volume of oil is transported through major shipping channels and the Intracoastal Waterway of the region. The shoreline maps and digitial databases represent a significant component of ESI maps used for oil spill response and contingency planning by the State trustee agencies.

STUDY RESULTS: More than 2,000 separate records of animals and plants were collected, including occurrences of more than 200 species. The resulting datasets may be considered an initial survey of macrofauna and habitats that should be considered during oil spill planning and response activities on the central Texas coast. Further refinement of the data layers is expected as future cartographic and data products evolve to support spill response.

The finished biological datasets will be modified for use in ARC/INFO and ArcView applications to query species data and produce ESI maps. The GLO and NOAA are cooperating to distribute ESI data for the upper Texas coast in a CD-ROM and hardcopy atlas, incorporating species distribution, concentration, and seasonality.

SIGNIFICANT CONCLUSIONS: Comprehensiveness of the estuarine fauna dataset is limited by the methods of capture used, accessibility of areas to sampling, and inconsistencies in sampling procedures within the region. Most surveyed species are widely distributed throughout all or part of the project area; in most cases, these species were only recorded in regions in which relatively high numbers of animals were reported or captured by TPWD. Information gathered in the meetings was entirely anecdotal and general; in general, little negative information was given (for example, the absence of a species). The limitations of anecdotal information are obvious and include the difficulty of human access to coastal areas, the interest and effort devoted to a species (information about red drum or whooping cranes, for example, is more extensive than for non-commercial or unmanaged species), and other factors.

STUDY PRODUCTS: The Texas component of the Gulf-Wide Information System, an on-line database to be managed jointly by the U.S. Minerals Management Service and other entities, possibly including Louisiana State University and the Texas Natural Resources Information System.

*P.I.'s affiliation may be different than that listed for Project Managers.