STUDY TITLE: Texas Barrier Islands Ecological Characterization

REPORT TITLE: Texas Barrier Islands Region Ecological Characterization Atlas: Socioeconomic and Natural Features Narrative, Texas Barrier Islands Region Ecological Characterization Atlas: Biological Resources Narrative, and Texas Barrier Islands Region Ecological Characterization Atlas: Mineral Resources and Selected Oil and Gas Infrastructures Narrative

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BACKGROUND: Coastal oil and gas development, affecting both natural and sociological systems, must compete with other industry, agriculture, fisheries, commerce, settlement, and recreation for space within the coastal zone. Economic and political pressure may also rise out of conflict over natural resource protection and resource use. This study was initiated to provide information which can aid in developing policies to facilitate this reconciliation process.

OBJECTIVES: (1) To compile and synthesize cartographically those known aspects of the natural and cultural features of the Texas coastal zone which might influence land use decisions.

DESCRIPTION: The Texas Barrier Island Region extends from the eastern end of East Bay, Texas to the U.S.-Mexico international border. The offshore boundary is the State-Federal demarcation line, while the inland boundary extends approximately 40 miles inland. Three sets of maps were produced to display information on natural and socioeconomic features, mineral resources and selected oil and gas infrastructures, and biological resources. Sixteen maps were compiled at a mesoscale (1:100,000) on U.S. Geological Survey (USGS) planimetric maps printed on Mylar. Information was derived from available published and unpublished maps and reports, personal files, aerial photographs, and field checks.

SIGNIFICANT CONCLUSIONS: Oil and gas infrastructure and mineral resources, socioeconomic and natural resources, and biological resources of the Texas coastal plain were individually mapped on a series of 16 USGS quadrangle maps at a scale of 1:100,000, creating a map set comprised of 48 individual maps.

STUDY RESULTS: The oil and gas infrastructure section includes information on onshore and offshore crude oil and gas pipelines; transfer, processing, and storage facilities for the oil and gas industry; and port and offshore facilities. Mineral resources topics included oil and gas fields; sand, clay, and gravel pits; sulphur wells or mines; geopressured-geothermal areas; and groundwater sources. While the entire Texas coast includes some oil and gas infrastructure, certain areas command the greatest development. Along the lower Texas coast, much of the oil and gas infrastructure was found on the Corpus Christi Quadrangle. Port Lavaca and Beeville regions represent infrastructure concentrations along the central coast, while the Houston-Galveston area represents major concentrations on the upper coast.

Socioeconomic and cultural themes mapped included conservation, preservation, and recreation areas; point source discharges, water quality and sewage facilities; public and military lands; historical sites and archeological areas; major transportation networks and major natural artificial waterways; and major dredge material disposal sites. Five national wildlife refuges and one national seashore are found within the study area. These resources front inland bay and canal waters except for the Padre Island National Seashore. Eighteen state parks and recreation areas occur in the study area. Trinity Basin has relatively few point source discharges, while Galveston Bay has been polluted by high bacterial concentrations discharging from the San Jacinto River. In general, central coastal river basins have acceptable water quality although high incidences of fecal coliforms caused by livestock operations are found in the Lavaca Basin. In the San Antonio and Nueces Basins, water quality is affected by high fecal coliform levels from municipal wastewater discharges and high total dissolved solids from open pit discharges of oil field brine and non-point source effluents. The Arroyo Colorado has low dissolved oxygen and elevated levels of fecal coliforms, nitrogen, phosphorous, and dissolved solids due to industrial, municipal, and agricultural wastes. Prison farms are located in Brazoria and Nueces Counties. Airports are found on all quadrangles of the coast except the Baffin Bay and Allyns Bight regions. Military airfields are found in the Houston and Corpus Christi area. Eleven U.S. Coast Guard stations are situated at the mouths of estuaries and along navigable channels.

Historically, American Indian settlements were distributed along the entire coast and were generally associated with riparian settings on high natural levees or river terraces. Most features on the National Register of Historic Places are found in Harris County, while region-wide a total of 93 features were mapped. Three historical parks, three historic sites, and two historic structures are also mapped. Interstate highways link Houston and Corpus Christi with other parts of the country. The State and local agencies maintained approximately 7,000 miles and 32,000 miles of roads in 1976. Galveston Island has more roads serving the population than any of the other coastal islands. Seven Class 1 line haul railroads and three Class 2 line haul railroads serve the study area. The greatest concentration of rail services occurs in the Houston, Angleton, and Galveston areas (62.6% of the total trackage). Houston is the major hub with important rail centers at Galveston, Corpus Christi, and Brownsville. Waterways carry the greatest volume of commercial transportation. Seven deep draft ship channels are found in Houston, Texas City, Galveston, Freeport, Matagorda, Corpus Christi, and Brownsville. The Houston Ship Channel accounts for 23% of the total traffic. Fourteen shallow draft channels are located in the region, mostly in the northern half of the coast. Six deep harbors are located at Houston, Texas City, Galveston, Freeport, Corpus Christi, and Brownsville. The Port of Houston is the largest in the area. The Gulf Intracoastal Waterway, longest of the artificial waterways, accounts for one third of the nation's total waterway length. Dredge deposition sites (i.e., from construction of drainage and irrigation canals) were also plotted.

Twenty-two different species or habitats representing resources of biological concern were mapped, including the Arctic peregrine falcon (sighted in 12 Texas counties). Upland game included white-tailed deer, quail, and furbearers. The white-winged dove is found in the lower Rio Grande Valley, while Atwater's prairie chicken and the bald eagle are both native to the coastal region. The majority of key finfish areas were adjacent to seagrass beds and marshes. The seagrass beds are dominated by shoal grass (*Halodule beaudettei*), widgeongrass (*Ruppia maritima*), manatee grass (*Cymodocea filiformis*), and turtlegrass (*Thalassia testudinum*). Oak mottes are the climax communities of the sandy ridges of the south Texas coastal plain and are important wildlife areas. Southeastern Texas bottomland hardwood forests are important habitat for wood ducks. Rio Grande subtropical woodlands support wildlife such as jagarundi, ocelots, and numerous bird species. Galveston Bay and Matagorda Bay are top ranked for oyster (*Crassostrea virginica*) harvests along the coast. Areas of ecological concern were determined to have high quality natural breeding and wintering habitat of current demonstrated importance to waterfowl and where a current or anticipated threat to the habitat exists. Over 90% of the world population of whooping crane winter in the Copano-Aransas and San Antonio Bay areas. Shrimp nurseries along the coast support white (*Penaeus setiferus*), brown (*P. aztecus*), and pink shrimp (*P. duorarum*). Unique wildlife ecosystems are found at Smith Woods, Matagorda Island, Welder Flats, Lamar Peninsula, and Southmost Ranch. Virgin brush habitat is found along the higher elevations of the Rio Grande floodplain, providing important habitat for key wildlife species.

STUDY PRODUCTS: Kimber, C. T., K. L. White, and F. S. Hendricks. 1984. Texas Barrier Islands Region Ecological Characterization Atlas: Socioeconomic and Natural Features Narrative. A final report by the U.S. Fish and Wildlife Service for the U.S. Department of the Interior, Minerals Management Service Gulf of Mexico OCS Region, Metairie, LA. NTIS No. PB85-188076/AS. MMS Report 84-0005. FWS/OBS-82/15. Contract No. 14-12-0001-29011. xiii + 89 pp.

Johnston, J. B. (ed.). 1984. Texas Barrier Islands Region Ecological Characterization Atlas: Biological Resources Narrative. A final report by the U.S. Fish and Wildlife Service for the U.S. Department of the Interior, Minerals Management Service Gulf of Mexico OCS Region, Metairie, LA. MMS Report 84-0005. FWS/OBS-82/16. Contract No. 14-12-0001-29011. v + 20 pp.

Kimber, C. T., K. L. White, and F. S. Hendricks. 1984. Texas Barrier Islands Region Ecological Characterization Atlas: Mineral Resources and Selected Oil and Gas Infrastructures Narrative. A final report by the U.S. Fish and Wildlife Service for the U.S. Department of the Interior, Minerals Management Service Gulf of Mexico OCS Region, Metairie, LA. NTIS No. PB85-188134/AS. MMS Report 84-0005. FWS/OBS-82/17. Contract No. 14-12-0001-29011. x + 85 pp.

Study products included 48 topical map sheets (1:100,000 scale) of socioeconomic and natural features; biological resources; and mineral resources and oil and gas infrastructures within 16 coastal areas (i.e., Allyns Bight, Anahuac, Angleton, Baffin Bay, Beeville, Brownsville, Corpus Christi, El Campo, Freeport, Galveston, Goliad, Harlingen, Houston, Port Lavaca, Port Mansfield, San Antonio Bay). Separate volumes of Synthesis Papers (i.e., one ecological synthesis volume, one socioeconomic synthesis volume) and a single Data Appendix were also prepared under this contract.

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