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STUDY TITLE: Southwest Florida Shelf Coastal Ecological Characterization

REPORT TITLE: The Ecology of the Mangroves of South Florida: A Community Profile

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KEY WORDS: Straits of Florida; Eastern Gulf; Southwest Florida Shelf; Florida; baseline; biology; characterization; mangroves; community; life history; terrestrial; ecosystem; productivity; impacts; coastal zone; literature review; synthesis

BACKGROUND: Mangroves form a distinct habitat with an estimated total acreage in Florida between 430,000 and over 500,000 acres. Mangrove communities are important for shoreline protection and stabilization, creation and maintenance of wildlife habitat, and as an ecological transition zone between terrestrial and marine habitats. It is estimated that 90% of Florida's mangroves are located in the four southern counties (i.e., Dade, Monroe, Lee, and Collier). To maintain and understand the mangrove community, it is important to present information concerning the role and interrelationships of this habitat with various factors, natural as well as man-induced (e.g., oil spills), affecting the overall ecology of south Florida mangroves.

OBJECTIVES: (1) To describe mangrove species (e.g., life histories) and characterize ecological communities with a mangrove component; and (2) to evaluate the value of mangrove communities and factors affecting these communities.

DESCRIPTION: The report provides information needed to understand the mangrove community and its role in the south Florida ecosystem. The primary geographic area of mangrove habitat extends along the east coast between Cape Canaveral to Tarpon Springs on the west coast. The report is a summary of previously documented

information concerning mangroves. Data relating to mangrove biology, ecology, community structure, and management are discussed. This synthesis of data serves as a reference source of known data concerning mangrove ecology as it relates to south Florida.

SIGNIFICANT CONCLUSIONS: Mangroves are highly adapted to colonizing the transitional environment between terrestrial and marine habitats. This mangrove colonized zone is exposed to many stress factors, which effectively eliminate competition with other vascular plants. Numerous vascular plants are associated with the mangrove communities; however, the actual number of species in a particular location is relatively low. Mangroves form transition zones which are very productive. Mangrove environments harbor large populations and high diversity of animals. Mangrove ecology is very complex and, at the same time, very sensitive. Mangroves play an important role in inter-community exchange, such as providing habitat for juvenile marine fauna, migratory avifauna, and many transient species.

Man-induced factors such as oil spills can be very detrimental to mangroves. By affecting the mangrove community, the environmental and economical implications can be far reaching. Various aspects of mangrove ecology are lacking (e.g., nutrient cycling, planktonic community structure), but with more research their interrelationship with the community can be elaborated. The opinion given in this report is that preservation of mangroves and adjacent ecosystems is by far the best management practice.

STUDY RESULTS: Mangroves dominate approximately 75% of the world's coastline between 25°N and 25°S Lat. Along the Florida coast, red and white mangroves extend north to 29°10'N Lat, while the black mangrove extends as far north as 30°N Lat. Climate, saltwater, tidal fluctuations, and substrate appear to be the physical factors limiting distribution and development of mangrove ecosystems. Salinity is not mandatory for mangrove growth, although it is important in reducing species competition with other vascular plants. Mangroves can grow on many substrates and have the ability to alter existing substrates by peat deposition and limestone degradation.

Representative estimates of gross primary production show that mangrove ecosystems are highly productive. High productivity is due in part to efficient light interception by the mangrove leaf canopy. The high leaf canopy comprises the vast majority of leaf biomass. Mangrove ecosystems are considered nutrient sinks that accumulate nitrogen, phosphorus, trace elements and heavy metals. Mangrove systems are also large oxygen consumers.

Various zonation patterns are evident among mangrove communities. Interspecific mangrove zonation appears to be due to an interaction of physical and chemical factors and possibly tidal sorting of mangrove propagules. Vertical biological zonation of numerous invertebrates and algal species occurs on mangrove prop roots. Arboreal zonation of insects, crustaceans, and birds occurs in mangrove systems.

Mangrove communities are very elaborate ecosystems that provide numerous niches for a large diversity of species. Fish are important components of four of the six mangrove community types. Twenty-four amphibian and reptile species are listed as inhabiting mangrove systems during some life cycle stage. One hundred eighty-one bird species utilize Florida mangroves because varied habitats provide areas of feeding, nesting, and breeding. Birds also are very important to nutrient cycling within the ecosystem. Forty-five mammal species occur in Florida mangroves.

Because of the intricate relationships that exist between mangrove communities and adjacent ecosystems, it is man's responsibility to limit induced impacts. Mangrove destruction throughout the State has not been substantial, however, losses in specific areas, particularly urban areas, has been appreciable. Mangrove destruction has occurred due to land filling, diking, flooding, and introduction of pollutants (i.e., herbicides and oil spills).

STUDY PRODUCT: Odum, W. E., C. C. McIvor, and T. J. Smith, III. 1982. The Ecology of the Mangroves of South Florida: A Community Profile. 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 Office, Metairie, LA. NTIS No. PB82-256108. FWS/OBS-81/24. Contract No. 14-12-0001-30036. 144 pp.

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