Ecology and Conservation of the American Crocodile in Florida

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The American crocodile (*Crocodylus acutus*) is primarily a coastal crocodilian that occurs in parts of Mexico, Central and South America, the Caribbean, and at the northern end of its range in southern Florida. As for other species of crocodilians, hunting, for hides, meat, collections, and fear, and habitat loss (direct and/or due to degradation) have made the American crocodile endangered throughout its range. In Florida, habitat loss from human development in the rapidly growing coastal areas of Palm Beach, Broward, Dade, and Monroe Counties has been the primary factor in endangering the United States population. This loss of habitat principally affected the nesting range of crocodiles, restricting nesting to a small area of northeastern Florida Bay and northern Key Largo by the early 1970's. At that time most of the remaining crocodiles (about 75% of known nests) were in Florida Bay in Everglades National Park. When crocodiles were declared endangered in 1975 (Federal Register 40:44149) scant data were available for making informed management decisions. Field and laboratory data that were available suggested that low nest success, combined with high hatchling mortality, provided a dim prognosis for survival of crocodiles. Results of intensive studies conducted by the National Park Service, Florida Game and Fresh Water Fish Commission, and Florida Power and Light Company resulted in a more optimistic outlook for crocodiles in Florida. Largely based on these studies and recovery efforts by the U.S. Fish and Wildlife Service, the U.S. National Park Service established a crocodile sanctuary in northeastern Florida Bay in 1980, Crocodile Lakes National Wildlife Refuge was created, and Florida Power and Light Company began a long term management and monitoring program. Crocodiles have continued to respond positively to these activities.

Currently, new issues face crocodiles in Florida. Florida Bay has undergone a number of changes that have caused a great deal of concern for the ecological health of this ecosystem. Efforts have been, and continue to be, made to improve Florida Bay and Biscayne Bay. Monitoring and research studies also have continued on crocodiles with the dual purposes of assessing the status of the population and evaluating ecosystem restoration efforts. An important aspect of evaluating ecosystem restoration efforts has been increasing our understanding of hydrological relations of crocodiles. Conspicuously, more crocodiles have been discovered in more places now than even ten years ago.

Crocodiles are now known from Biscayne Bay, Broward County, and in several areas in Southwest Florida, between Shark River to Sanibel Island. However, virtually nothing is known about the population structure, distribution, and habitat use of crocodiles in these areas. Once again we lack data for making informed management decisions. In these locations negative impacts of projected land uses, the positive potential of restoration efforts, and an increasing number of human/crocodile encounters will likely be the most important factors affecting crocodiles.

In South Florida we have the unique opportunity to integrate endangered species conservation with ecosystem restoration and management. Certainly this is not always the case, and we are fortunate here. American crocodiles thrive in healthy estuarine environments, and in particular are dependent on freshwater deliveries. In this regard crocodiles can be used to evaluate restoration alternatives, and set success criteria for Florida and Biscayne Bays. Crocodiles also can be used as an indicator of

negative impacts of freshwater diversion due to coastal development in Dade, Collier, and Lee Counties.

Perhaps even more importantly, we have an opportunity to reevaluate the status of the American crocodile. This naturally provides an excellent opportunity to spotlight the success of an endangered species recovery effort. Continued research and monitoring will be an essential component of this effort.

Recovery of the American crocodile in Florida will require an integration of habitat enhancement for an endangered species with environmental education. As crocodiles benefit from a restored freshwater flow into estuaries, their numbers will increase. It is important to recognize that an increase in the presence of crocodiles will exacerbate a growing problem concerning interactions between humans and crocodiles. The challenge of integrating a recovering population of the American crocodile with an ever increasing use of coastal areas by humans will require a proactive education program and will be the final challenge in the successful recovery of this once critically endangered species.

The objectives of this project are to determine the relative abundance, distribution, and habitat relations of crocodiles in Florida; to monitor the nesting ecology, growth and survival of crocodiles in Florida; and to develop an educational program to increase the appreciation of crocodiles as an exciting natural history benefit and decrease the perception of them as a problem or nuisance.

In all areas population surveys and monitoring include nesting effort and success, growth and survival of crocodiles. In areas with recently observed crocodile activity, additional survey effort will be expanded to determine population structure, relative abundance and habitat relations. Crocodile nesting effort and success is determined by searching known and potential nesting habitat during April and May (effort), and July and August (success) for activity (tail drags, digging or scraping) or the presence of eggs or hatchlings. When nests are located their vegetation, substrate, distance from shore, dimensions (lxwxh), and salinity of adjacent waters are recorded. Hatched eggshells or hatchling crocodiles are evidence of successful nests. The number and cause of egg failure are noted whenever possible. Distribution, growth, survival, relative abundance, and habitat relations of crocodiles are assessed by quarterly survey and capture efforts.

The educational program will focus on the status and recovery of this endangered species (a success story in progress), the natural history of the American crocodile (especially its mild manner), and the appropriate behavior towards crocodiles (don’t feed them).

For the first time since its discovery in Florida the American crocodile is being studied throughout its US range. The results of this study will be used to reevaluate the status and distribution of the American crocodile in Florida, and will become the foundation for the reassessment of the listing status of this species. This project continues to monitor the response of crocodiles to habitat alterations from ecosystem restoration or commercial development. This study will provide a rationale for evaluating restoration alternatives and for setting restoration success criteria. A new brochure “The American Crocodile: Recovering an Endangered Species in an Endangered Ecosystem” will be premiered at the GEER Conference.

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