

American Crocodiles (*Crocodylus acutus*) in Florida¹

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Introduction

Alligators and crocodiles belong to a group of reptiles called crocodylians. Crocodylians are the largest of the living reptiles and have the most complex behavior. About two dozen species of crocodylians in several groups are found in wetland habitats throughout the world in tropical and subtropical areas. Two species of crocodylians are native to the United States. The American alligator (*Alligator mississippiensis*) occurs in the southeastern United States, and the American crocodile (*Crocodylus acutus*), a tropical species, includes in its northern-most range, the coastal mangrove areas of extreme South Florida including most of Florida Bay (Figure 1). Crocodiles have always inspired fear and fascination not only because of their large size and fearsome teeth, but because of the aggressive reputations earned by their distant cousins in Australia and Africa. In reality, the American crocodile is so rare and shy of man that conflict with people rarely occurs. The American crocodile is listed as an endangered species by the United States and the State of Florida, but despite protection efforts, the population of the crocodile in South Florida has remained small.



Figure 1. Map of the Southern Portion of Florida

Appearance

The American crocodile is a lizard-shaped reptile with a long, muscular tail and for short legs with five toes on the front feet and four on the rear. The back is covered with bony plates called osteoderms that form a dorsal armor. Adults are grayish-green on the back and tail and have white or yellowish undersides, and the young have dark crossbands on the back and tail. Crocodiles have narrow triangular shaped snouts and the fourth tooth on both sides of the lower jaw is exposed when the mouth is closed. The ear drums, protected by moveable flaps of skin are located at the top of the head behind the eyes, and the nostrils are set at the end of an elongated snout. Because of the

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location of the eyes, ears, and nostrils, a crocodile can be submerged with only the top of its head exposed and still be able to see, hear, and breathe. Male crocodiles are larger than females. In South America, a 23-foot (7 m) American crocodile was reported. In Florida, males can reach about 15 feet (4.6 m) but rarely exceed 14 feet. Breeding females are about 8.2 to 12.8 feet (2.5-3.9 m).

Is It A Crocodile Or An Alligator?

Alligators are more common in Florida. They are darkly colored, have broad snouts, and are usually found in fresh water habitats (Figure 1). Crocodiles are very rare and secretive creatures. They prefer coastal, brackish, and salt water habitats and are grayish-green in color. Crocodiles have more tapered, triangular-shaped snouts, and the fourth tooth on either side of the lower jaw is exposed when the mouth is shut (Figure 2). Also, the back and tail of a young crocodile is marked with dark crossbands, while bright yellow stripes and blotches mark a young alligator.



Figure 2. American Alligator



Figure 3. American Crocodile

Distribution and Habitat

The American crocodile reaches the northern end of its range in extreme South Florida and can be found on the islands of Cuba, Jamaica, and Hispaniola. They also occur along both coasts of southern Mexico and Central America, south to Ecuador on the Pacific coast, and Venezuela on the Atlantic coast of South America. The number of crocodiles in Florida has never been large; researchers estimate a population of perhaps only 400 to 500 individuals.

Crocodiles are found in large, shallow lakes, marshes, ponds, swamps, rivers, and creeks. Although crocodiles occur in estuarine areas (where salt and fresh water mix), they prefer lower salinities except for nesting activities.

Food and Growth

Crocodiles eat almost anything that moves and some things that do not, and the bigger the crocodiles, the bigger their prey. Hatchlings and young crocodiles eat small fish, snails, crustaceans, and insects. Adult crocodiles feed at night on schooling fish, crabs, turtles, snakes, and small mammals. Large crocodilians can crush turtles and prey upon deer and other unwary large mammals near the edge of water. Even stones and plant parts (especially red mangrove seedlings) are found in crocodiles' stomachs. It is not known if these items are consumed deliberately or incidentally to the capture of other prey. It is argued, but not demonstrated, that stones may benefit crocodiles by aiding in digestion.

The growth rate of crocodiles varies with food availability and temperature. Digestion is efficient only within a certain range of body temperatures. Generally, crocodiles grow more slowly near the limits of their ranges, but two factors may provide an explanation. First, it may be that the tropical American crocodile is better adapted for the warm South Florida environment. Second, food availability may be greater in their mangrove estuarine habitats.

Reproduction

Reproduction among crocodylians is the most advanced among reptiles. Courtship and nesting are protracted and complex. Sexual maturity depends on both the size and age of the animal. Unlike birds and mammals, the sex of embryos is not determined at fertilization, but by the temperature at which the eggs are incubated. It is likely that courtship occurs in late January and February and peaks 6 to 8 weeks before nesting. During this period, crocodiles remain in their inland habitats of mangrove swamps.

Crocodile courtship consists of a complex and varied sequence of behaviors that can last for minutes or hours and is performed repeatedly over the course of the courtship period which may last for several days. After courtship, the male and female part company and may seek other partners.

Crocodile courtship can be divided into three phases. The first phase is attracting a mate. Males initiate the courtship by a rapid series of head slaps. If the female is interested, she will lift her snout and arch her tail. The male responds by vibrating his body in a complex display. The next phase is pair formation, which consists of rubbing snouts, riding each other, blowing bubbles, and submerging. The third phase is copulation, which may occur repeatedly. After the courtship period, males go about their business and the fertilized females begin nest preparation.

The principle nesting site of the American Crocodile in Florida is Florida Bay (Figure 1). Nesting is a wet season activity occurring around the end of April and the beginning of May. Females lay between 20 to 60 eggs per clutch and the eggs will incubate for about 85 days, hatching in late July or early August.

American crocodile nests are constructed so that the eggs will be above the high water mark. Crocodylian eggs cannot survive flooding for more than 12 hours. Crocodiles build soil (sand, marl, or peat) nests on elevated, well-drained sites. Most of the habitats meeting the requirement for crocodile nesting are near higher salinity water (greater than 80‰ sea water, 29 ppt). Crocodile nests may be mounds or holes. After nest construction, female

crocodiles in Florida do not remain near the nest. However, toward the end of incubation, females visit the nest with increasing frequency. When hatching begins, the mother digs open the nest and may help some of the hatchlings emerge from their eggs. She also may assist the newly hatched crocodiles to water or nursery sites where they are released. Adult crocodiles leave the nesting areas within a day or two, leaving the hatchling crocodiles on their own. As a result, hatchling crocodiles disperse rapidly from their nest sites and fend for themselves.

Limiting Factors

Predation, hydrological regime, and habitat loss are the most important factors influencing the success of crocodiles in Everglades National Park. While adult crocodiles have no natural predators other than man, hatchlings have a high mortality rate primarily due to predation by raccoons, birds, and crabs. Alteration of salinity and water levels in Florida Bay (located in the southern part of Everglades National Park extending south to include the Florida Keys) and as a result of extensive drainage programs also may be a factor. Crocodile nests that are too wet or too dry (desiccated) result in mortality of eggs. While adequate nesting habitat remains, good year-round habitat has been lost with the development of the upper Florida Keys.

Conclusion

Crocodiles have inspired awe, respect, and fear. The feeling of fear, however, may be misplaced. The American crocodile is so rare and shy of many, few conflicts with people have occurred. The outlook for crocodiles in Florida is optimistic. The nesting population slowly is increasing, both in number and nesting range. Protection of the remaining crocodile habitat in Florida, and the enhancement of Everglades' ecosystems will ensure the survival of this endangered species.

What You Can Do

Support the National Park Service's attempts to restore a healthy Everglades ecosystem.

Never feed, tease, or in any way harass a crocodile. It is illegal and dangerous.