Status of Saltwater Crocodiles in the Andaman Archipelago

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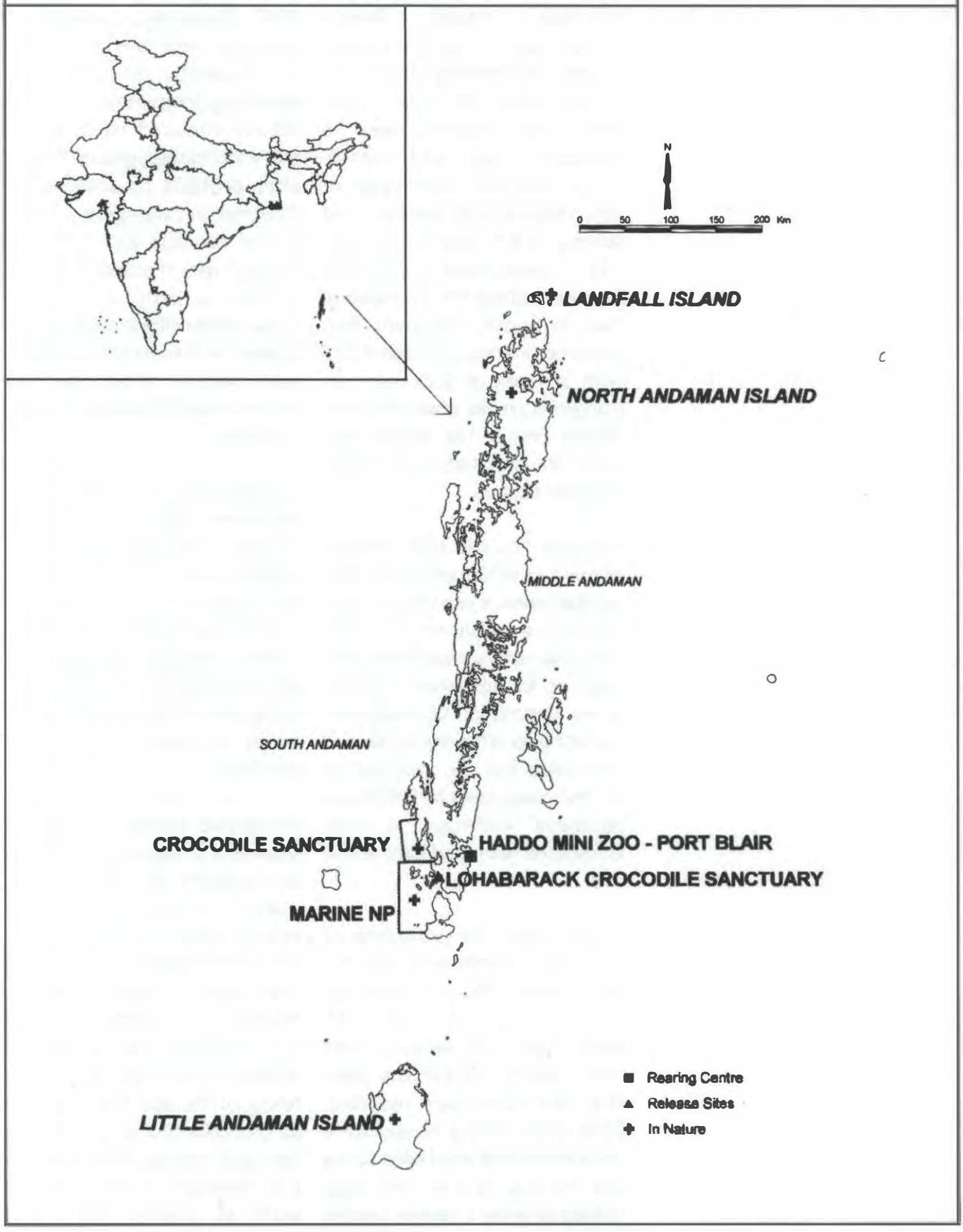
THE ANDAMAN AND NICOBAR archipelago, consisting of over 550 islands, islets and rocky outcrops, with land area of 8,213sq. km and a coastline of 1,962km, lies between 6° 45'N and 13° 41'N and 92° 12'E and 93° 57'E . The saltwater crocodile (*Crocodylus porosus*, Schneider, 1801) was once common and found throughout the Andaman and Nicobar Islands, occurring in the mangrove habitats, considered to be one of the world's largest mangrove ecosystems.

The main habitats of the saltwater crocodile included mangrove creeks, closed bays and freshwater marshes, now scarce and restricted to the island of Little Andaman. The North Reef Island contained an extensive freshwater marsh until 1995, which has turned saline due to sea-water intrusion into the land from the south-western portion of the island. Although an abundance of crocodiles was reported, population estimates for the species could not be substantiated for these two island ecosystems.

Hunting of the species for the skin trade was reported to be rampant during the 1950s and 1960s, until enforcement of the Indian Wildlife (Protection) Act in 1972. Initial crocodile surveys to estimate the saltwater crocodile population for North Andaman Island began in 1975 (Whitaker & Whitaker, 1978). Subsequently, Choudhury & Bustard (1979) conducted a comprehensive nest survey in North Andaman Island, which provided a more realistic estimate of the population (Choudhury, 1980). The authors reported large scale hunting for the commercial skin trade, prior to 1972, as a major cause for the initial decline in crocodile numbers, in addition to the rapid encroachment of nesting habitats for agricultural practices, killing of nesting females and large scale egg collection by settlers. Surveys conducted in 1993 and 1994 indicated a further decline due to the rapid increase and influx of immigrants and encroachment of flat wetland areas comprising ideal crocodile nesting habitat, intensive mechanized boat traffic and fishing in the creeks, which was taking its toll on the last remaining population (Andrews, 1994 & 1997).

A detailed report on the population dynamics, ecology and movement patterns of *C. porosus* in the Andaman Islands is under preparation.

Figure 4 - Crocodiles in the Andaman Islands



Conservation efforts

In 1976, the Andaman and Nicobar Islands Forest Department initiated a captive rearing and breeding programme at the Haddo Mini Zoo in Port Blair. The objective was to establish a 'rear and release' programme for restocking of crocodiles in wild habitats, and farming of the surplus stock. In 1981, Lohabarrack, a northern extension of the Marine National Park in South Andaman, was declared a crocodile sanctuary with an area of 2,221ha. Five mangrove creeks drain into Port Mouat, one of the largest bays within the sanctuary area, where fishing is allowed.

However, the mid-1980s saw an increase in settlements along the bay that extends into the sanctuary area. As a result, most of the crocodile nesting habitat has been taken up for agriculture, resulting in the destruction of mangroves and silting up of the creeks, bay and coral reefs. The bay, once used as an anchorage point by British and Japanese warships, is now landscaped with mud flats, at low tide.

In the 1970s, the population of saltwater crocodile in the area that now form the Lohabarrack sanctuary was estimated at 15 adults. Eight nests were recorded in the area, and by the mid-1980s only two nests were reported. Most of the nesting females were reported to have been killed during the nesting season and eggs utilized by settlers. Several juvenile crocodiles trapped in fishing nets were also killed by fishermen (Khan, *pers.com.*). In 1986 and 1987, 18 yearling crocodiles were released into this sanctuary. Subsequently, the crocodile restocking programme, which was initially intended to cover the entire archipelago, ground to a halt after protests by settlers and fishermen. An average of 3-4 man-animal conflicts and 6-7 cattle attacks were reported per year, putting a stop to further conservation efforts and crocodile releases in the islands. No efforts were made to translocate these animals, most often killed by baiting methods.

Crocodile Survey in the 90's

Between 1993 and 1999, the Madras Crocodile Bank field research unit conducted two to three surveys every season. Further, some freshwater marshes where crocodiles are difficult to spot required four to five surveys during the dry and wet season in order to assess the marsh condition.

Mangrove creeks, freshwater streams and bays were surveyed on a motorboat and freshwater marshes on foot to assess the current status of these habitats and for the presence of old nests. Day counts were carried out in the mangroves and freshwater creeks during low tide and repeated at different times depending on the timing of the tide. Methods used for crocodile counts included spot lighting at night for eye-shines with a 6V flashlight. Indirect evidence such as tracks, old nests, interviews with local fishermen,

farmers, settlers and the Forest Department were also recorded. Day and night surveys averaged at the rate of 14-16hrs per day, depending on the extent of the creek system. Each habitat was surveyed over different seasons.

Crocodiles have also been often sighted in the open sea, swimming between islands into mangrove creeks and freshwater streams. Tracks and spores have been observed on beaches in several islands covered during the survey.

Results

The population of *C. porosus* in North Andaman Island in mid-1970s was estimated at 15 breeding females and 100-200 individuals (Whitaker & Whitaker, 1978). However, realistic population estimates for this large island was known only by late 1978 (Choudhury, 1980; Choudhury & Bustard 1979). The authors reported 39 animal sightings and 30 nests, estimating the breeding population at 50 females.

Intensive surveys conducted in 1993 and 1994, recorded the adult population to be 95 (Andrews & Whitaker, 1994), excluding Landfall Island where the population was later estimated to be around 38 adults. Later, surveys conducted in North Andaman Island during the nesting season in 1994, showed a drastic decline in the population, mainly due to the intrusion of Thai poachers in May and June, who were reported to be involved in the trapping of adult animals for shipment to farms in Thailand. North Andaman Island, North Reef Island and Interview Island were extensively surveyed, covering a total of 198 creek systems and 16 bays. A total of 31 adult crocodiles were encountered and 10 nests located, which were found raided, possibly by the North Andaman settlers.

The areas surveyed in Middle Andaman Island comprise the north-eastern, south-eastern and south-western habitats. (The western side falls within the Jarawa Tribal Reserve.)

Surveys conducted in late 1994 and subsequently in 1997 and 1998, estimated the total crocodile population for Middle Andaman Island at 17 adults, 9 sub-adults and 15 juveniles. The entire north-eastern, southern and south-western portion up to Port Mouat in South Andaman Island, was surveyed during 1996-1998. *C. porosus* habitats in Rutland, Tarmugli and Hobday islands were assessed. A total of 19 adults and 35 sub-adults were encountered (Andrews, 1997). Several islands in the Ritchie's archipelago were also assessed. Sub-adult animals were observed migrating from Middle and South Andaman into two creeks south of Havelock Island, and two other creeks located north and south of Outram Island. The habitats were assessed to be less extensive and inadequate for supporting a viable population. The 1.6sq. km flat land in South Sentinel Island, surveyed in 1997 and 1998, was found to be devoid of suitable crocodile habitat.

Crocodile attacks on humans

by *Ajai Saxena*

Among the major threats the saltwater crocodiles face in the Andaman islands are poaching for commercial gains, both by local settlers as well as foreign poachers, and a negative attitude of the local people towards their conservation, mainly because of crocodile attacks on human beings and cattle, and the resultant retaliatory killings.

Between 1986 and 1993, ten cases of crocodile attacks on human beings were reported - all from the Andaman group of islands. Locationwise, four cases were reported from North Andamans (Kalighat 1, Kishorinagar 2, Paschimsagar 1), three from South Andamans (Tirur Creek 1, Shoal Bay Creek 1), and three from Middle Andamans (Kadamtala Creek 1, CFO Nallah 1 and Rangat Nallah 1). In three of these cases, three persons lost their lives, while in the remaining seven cases, eight persons were injured.

Habitat destruction and sharing of the same habitat by humans and crocodiles are the major reasons for such man-animal conflict. Forest Department stopped the cutting of mangrove for any purpose in the late eighties, which has resulted in considerable improvement in mangrove forest cover of these islands. But increasing human activites such as fishing in the mangrove areas and crossing the creeks without adequate protection result in such crocodile attacks on humans.

Considering that these islands still provide the best home for saltwater crocodiles in India, there is an urgent need to mitigate the man-animal conflict. This can be done through educating the people, adopting safer fishing and navigational practices as well as providing viable economic alternatives to the local settlers. A better overall protection to the mangrove habitat and crocodiles and reviving captive breeding and restocking programme for saltwater crocodiles, will assure a safer home for this endangered species on a long-term basis.

Little Andaman Island comprises one of the most extensive mangrove creek systems as well as freshwater creeks and streams, including extensive freshwater and saline marshes. One of the freshwater marshes situated on the western side, is a 2.5km long stretch with 1m tall floating vegetation. This is the only island in the Andamans consisting of extensive freshwater creek systems. The entire creek system, streams and marshes on this island were surveyed over a period of four years, during different seasons (Andrews, 1997). The crocodile population on this large island, with extensive habitats was estimated to be 27 adults, 11 sub-adults and 26 animals in the 1m size-class.

Little Andaman Island was estimated to contain one of the most stable and largest *C. porosus* populations up to early 1992. By mid-1992 and late 1993, Thai poachers were systematically involved in the poaching of live animals of various size classes. Holding enclosures and pens constructed with mangrove poles were set up in the marshes for the purpose. Remnants of these can still be seen in several major mangrove creeks. The last two years have seen an evident decline in the *C. porosus* population in Little Andaman Island, by organised poaching of crocodiles by local poachers from settlements that have mushroomed on the eastern side. In addition, there is a flourishing trade in crocodile skins, fat and internal organs on this island.

Problems and recommendations

The main problems faced in North, Middle and South Andaman Islands is the loss of flat lands adjacent to freshwater sources, comprising prime crocodile nesting habitat, to settlements and agriculture, resulting in the silting up of freshwater streams.

These three island ecosystems are currently assessed to be unsuitable for further conservation efforts. In comparison, most of the habitat in the Little Andaman Island is still pristine, and so, is in urgent need of protection. Restocking the crocodile habitats on this island would ensure a quick recovery of crocodile populations that have been decimated over the years. Crocodiles for releasing could be obtained from the local zoo. There is also an urgent need for the Forest Department to establish a ground staff for protection, law enforcement and monitoring of the last stronghold of the saltwater crocodile on this island.

Other problems include: (a) killing of nesting females at nest sites; (b) poaching for skin, fat and collection of eggs by local settlers; (c) intensive fishing and boat traffic in all the mangrove creeks; and (d) remoteness and inaccessibility of these areas, lack of staff, funding, adequate boats and equipment, which make management and monitoring activities difficult for the Forest Department .

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