

CONSERVATION STATUS OF FRESHWATER TURTLES IN MEINMAHLA KYUN WILDLIFE SANCTUARY AND VICINITY, MYANMAR

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ABSTRACT

We conducted a status survey of freshwater turtles in the southern Ayeyarwady Delta, Myanmar, from 15 January to 1 February 1999. The endemic Burmese eyed-turtle (*Morenia ocellata*) was the only species we found. *Morenia ocellata* are harvested in the delta for local use and export to markets in southern China, and perceptions of abundance vary. Estuarine terrapins (*Batagur baska* and *Kachuga trivittata*) were formerly reported to nest on beaches at the mouth of the Ayeyarwady and Bogale Rivers; however, we found no evidence to suggest the continued survival of extant populations. Descriptions of at least two additional species were obtained during interviews, but we were unable to secure specimens for identification. Extensive research on the chelonian fauna of the entire delta region is warranted.

Key words: conservation status, Myanmar, turtles

INTRODUCTION

At least 22 species of freshwater turtles and tortoises inhabit Myanmar, including six which are endemic (IVERSON, 1992; PLATT *ET AL.*, 2000). The current conservation status of most turtle species in Myanmar is unknown, and old, fragmentary observations remain the principal source of information (VAN DIJK, 1993). Little is known concerning the chelonian fauna of the Ayeyarwady Delta. Historic accounts indicate river terrapins (*Batagur baska*) and Burmese roofed turtles (*Kachuga trivittata*) nested on islands at the river mouth (MAXWELL, 1911), and a specimen of the Burmese eyed turtle (*Morenia ocellata*) was collected from the western Delta (IVERSON, 1992). The region remains largely closed to foreign researchers, but the scant evidence available indicates chelonian populations are now severely depleted with some species on the verge of local extinction (VAN DIJK, 1993, 1997).

STUDY AREA AND METHODS

The Ayeyarwady (also spelled Irrawaddy) River originates along the southern border of Tibet, and drains a large portion of northern and central Myanmar. Approximately

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90 km from the ocean, it splits into numerous channels that flow into the Andaman Sea. Among the largest of these is the Bogale River, which divides near its mouth to form Meinmahla Kyun Island (Fig. 1). This 136-km² island was initially declared a Reserved Forest in 1895 and gazetted as the Meinmahla Kyun Wildlife Sanctuary (MKWS) in 1994 (AUNG MOE, 1994). A number of other islands are present at the mouth of the Ayeyarwady and Bogale Rivers, including Kaingthaung Kyun, Kadonkalay Kyun, and Gayetgyi Kyun. The regional climate is tropical monsoonal, with heavy rains concentrated in a three month period from June to August (CAUGHLEY, 1980; SALTER, 1983).

The Ayeyarwady Delta is the most heavily populated region of Myanmar, with a mean population density of 170 persons/km² in 1983. The principal economic activities are rice farming, fishing, and cultivation of *Nipa* palm, betel nut and coconut. Mangroves are the predominant vegetation in the southern delta, but have been significantly degraded due to cutting for fuelwood and conversion to rice fields (TIN MAUNG KYI, 1992).

Data on the occurrence of freshwater turtles in MKWS and adjacent areas were gathered in conjunction with an estuarine crocodile (*Crocodylus porosus*) survey (THORBJARNARSON ET AL., 2000). Fieldwork was conducted from 15 January to 1 February 1999, a period coinciding with the initiation of nesting by *B. baska* and *K. trivittata* in the lower Ayeyarwady Delta (MAXWELL, 1911). Information on the current status of turtles in the delta is based largely on interviews of local inhabitants. We interviewed MKWS staff and rangers, and residents of Kadonkani, Tebinzek, Amar, Thaungkadun, and Sagalun Villages, scattered households in Kadonkani and Pyindaye Reserved Forests, and fishing camps along the Tawbaing, Pathi, and Kamahauk Rivers. We also interviewed Fisheries Department personnel and residents of Kadonkalay Kyun and Gayetgyi Kyun Islands where estuarine turtles previously nested (MAXWELL, 1911). Villagers were questioned about the presence of turtles in the area, and we asked to view any available shells, which were measured and photographed. Local residents are generally an excellent source of information and specimens (THIRAKHUPT & VAN DIJK, 1994). Furthermore, limited turtle trapping was conducted in Nepa Lake a shallow, brackish (salinity = 13 ppt in January 1999) lake at the southern tip of Meinmahla Kyun. MKWS rangers placed two bamboo fish traps baited with raw fish in the lake from 20 to 29 January (20 trap nights).

RESULTS AND DISCUSSION

Estuarine turtles

Two large estuarine turtles occur in Myanmar, *Batagur baska* and *Kachuga trivittata*, known locally as *taikleik bein*, and *taikleik set*, respectively. *Batagur baska* occurs from India eastward to Sumatra, peninsular Malaysia, and southern Vietnam (IVERSON, 1992). Populations have declined throughout this range due to a combination of egg-collecting, harvesting adults, and destruction of nesting habitat (DAS, 1997; MOLL, 1997). *Kachuga trivittata* is endemic to Myanmar, being found only in the Ayeyarwady and Salween Rivers (IVERSON, 1992), and nothing is known regarding its current status in the wild (VAN DIJK, 1997).

Historical accounts suggest *B. baska* and *K. trivittata* were formerly common in the Ayeyarwady Delta (THEOBALD, 1868; MAXWELL, 1911). MAXWELL (1911) conducted an

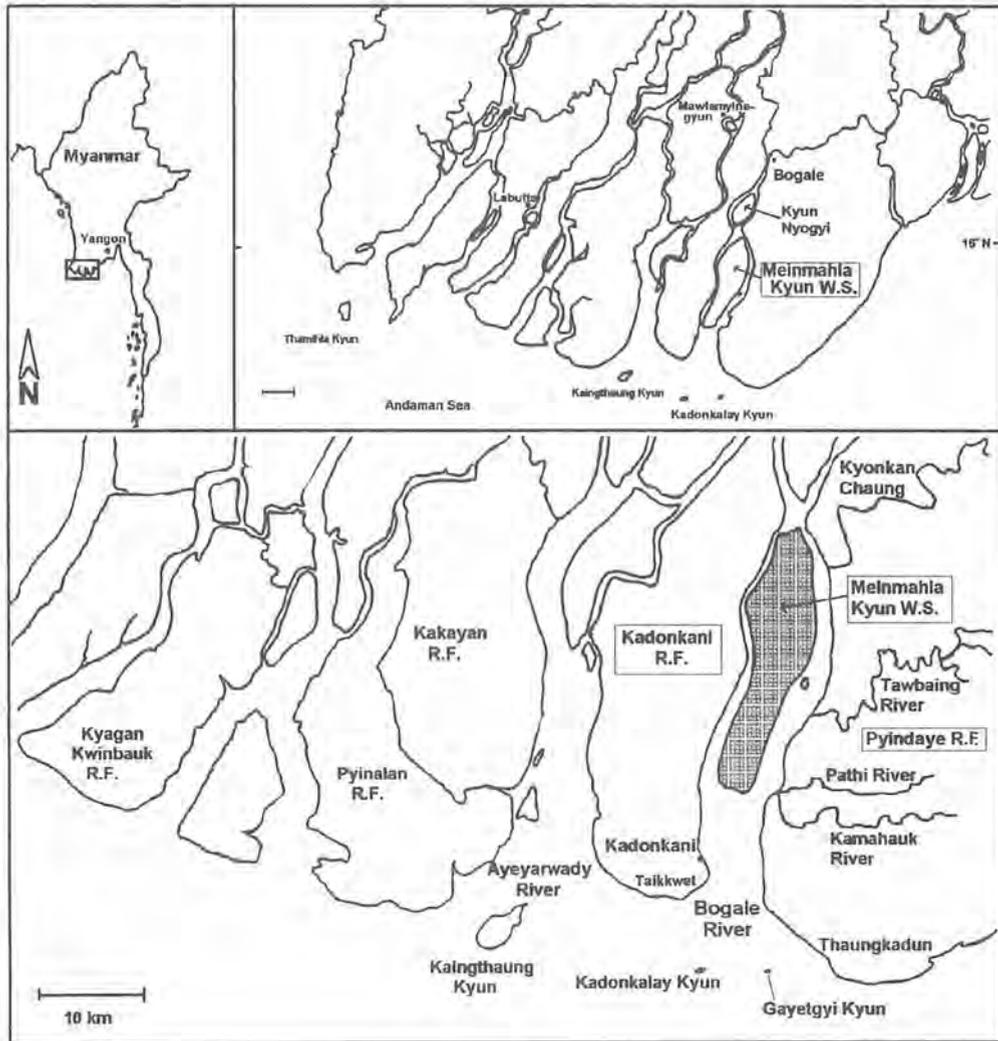


Figure 1. Location of the Ayeyarwady Delta in relation to rest of Myanmar (top right); lower Ayeyarwady Delta (top left); Meinmahla Kyun Wildlife Sanctuary and surroundings (bottom). Adapted from VAN DIJK (1993)

extensive investigation of the "turtle-banks" or nesting beaches of coastal Myanmar, as part of a review for the Burma Fisheries Act of 1902 (VAN DIJK, 1997), and provided a contemporary overview of turtle abundance and exploitation in the lower delta. Estuarine turtles previously nested on sandbanks as far upstream as Zalun Township, Hinthada (previously Henzada) District. However, due to increased agriculture and steamship travel in that region, by the early 20th century nesting reportedly occurred only at the mouth of the Bogale (referred to as the Dalla River) and Ayeyarwady Rivers. Nesting was concentrated at Thaungkadun, a mainland site on the eastern shore of the Bogale River mouth, Taikkwet, an island and mainland area extending from the west bank of the Bogale River mouth to the Ayeyarwady River, and Kaingthaung, a group of three islands at the mouth of the

Ayeyarwady River (Fig. 1). During the nesting season (mid-January to early March) adult females congregated in the surrounding waters and "herds" of 100 to 500 turtles could be seen basking along the beaches in late afternoon (MAXWELL, 1911). Based on egg harvests, MAXWELL (1911) estimated a nesting population of 1,175 *B. baska* and 225 *K. trivittata*.

The collection of both marine and estuarine turtle eggs has historically been an important economic activity in the lower Ayeyarwady Delta. Turtle nesting beaches were leased by the Colonial Administration to local businessmen, who hired laborers to harvest the eggs, which were later sold in local markets or taken to Rangoon (Yangon) or "Upper Burma" for sale (MAXWELL, 1911). According to MAXWELL (1911) an intensive egg harvest was conducted about 45 days after nesting commenced. After lessees thoroughly searched the beaches, local villagers were allowed to collect eggs in exchange for a certain percentage of their harvest. While egg collectors were legally required to leave 10% of all eggs *in situ*, this stipulation was largely ignored and every clutch found was harvested.

The estimated annual harvest of 165,000 eggs during the early 1890's had declined by 53% to approximately 77,000 by 1897-98 (MAXWELL, 1911) (Fig. 2). He concluded that contemporary levels of exploitation were unsustainable and predicted that unless conservation measures were enacted and enforced, estuarine turtle populations would soon be extirpated in the Ayeyarwady Delta.

Adult *B. baska* and *K. trivittata* were also caught in elaborate cage traps set in tidal creeks and baited with thame (*Avicennia officinalis*) leaves; trapping was particularly intensive when females left the nesting beaches (THEOBALD, 1868; MAXWELL, 1911). When a sufficient number were captured, the living turtles were transported to markets and sold for human consumption. A significant market for *B. baska* shells also existed among salt boilers who used them as ladles (MAXWELL, 1911). More recently, adult turtles were occasionally taken on lines baited with mangrove fruits while fishing for *ngadan* (*Pangasius pangasius*). Widespread fishing with monofilament gill-nets may have also resulted in the capture and drowning of adult turtles (THORBJARNARSON *ET AL.*, 1999). Considering the relatively small population size, loss of even a few breeding adults would have detrimental demographic consequences.

We found no evidence to indicate the continued survival of *B. baska* or *K. trivittata* populations in our study area. One individual we interviewed (U Chin), managed the estuarine turtle egg harvest at Thaungkadon during 1957 and 1958, and stated that only about 300 females nested annually during this period. With this single exception, no individual we interviewed was familiar with either species; fishermen who have resided in the delta for over 20 years reported never having encountered any large turtles other than marine turtles.

By the early 1980's only a few estuarine turtles continued to nest on Kadonkalay Kyun (SALTER, 1983). Estuarine turtles were last reported during 1986-1988 when two to three clutches were unearthed each year, and probably disappeared from the region around 1990 (Fig. 2). Given the chronic over-harvesting of eggs, the local extirpation of these turtles is not unexpected, and represents the culmination of a long-term population decline (Fig. 2).

Habitat loss probably played a hitherto undocumented role in the local extirpation of estuarine turtles in the vicinity of MKWS. Human settlement and expanding agriculture caused turtles to abandon upstream nesting beaches during the mid- to late 19th century (MAXWELL, 1911). Additionally, deforestation of upstream watersheds has greatly increased

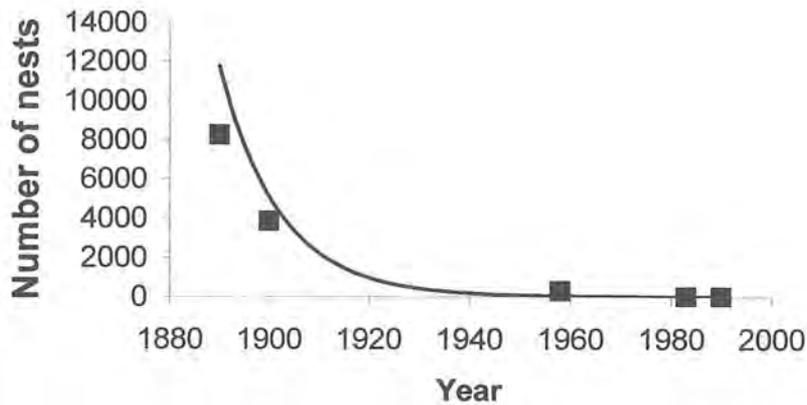


Figure 2. Decline of *Batagur baska* and *Kachuga trivittata* nesting at the mouth of the Ayeyarwady Delta. Based on MAXWELL (1911), SALTER (1983), VAN DIJK (1993, 1997), and this study.

the silt load of the Ayeyarwady, and deposition of mud on formerly sandy beaches may have forced abandonment of nesting beaches. According to long-time area residents, an extensive sandy beach was found at the southern tip of Meinmahla Kyun until the mid-1960s. However, siltation has since covered this beach and others with mud; consequently potential nesting beaches are no longer present on the island.

Elsewhere in Myanmar, *B. baska* has been reported from the Salween and Sittang Rivers (IVERSON, 1992), and records for *K. trivittata* are available for several upstream localities in the Ayeyarwady and Salween Rivers (IVERSON, 1992; VAN DIJK, 1993, 1994, 1997); however the current status of these populations is not known. According to VAN DIJK (1993), exploitation of *K. trivittata* populations in the upper Ayeyarwady and Salween is continuing and populations may be declining.

Burmese eyed turtle

Morenia ocellata, known locally as *sauk leik*, is endemic to southern Myanmar (IVERSON, 1992), and listed on Appendix I of CITES (BAILLIE & GROOMBRIDGE, 1996). Historically, these turtles have been exploited for food, and THEOBALD (1868) stated that "incredible numbers" were harvested in the wake of dry season grass fires. VAN DIJK (1993) believed *M. ocellata* was still relatively common based on the large numbers observed in temple ponds and markets. The natural history of *M. ocellata* remains poorly known (ERNST & BARBOUR, 1989).

M. ocellata was the only species of freshwater turtle found during this expedition. We obtained shells of six recently harvested adults (mean carapace length = 19.24 cm, $SD = 2.3$, range = 16.0 to 21.6 cm), and most people interviewed were familiar with the species. Perceptions of abundance vary; one farmer in Kandonkani Forest Reserve stated that during five years of farming he had encountered only one turtle, and in Tebinzek, a village of about 400 households, less than 10 turtles are reportedly harvested each year. However, at Sagalun, a somewhat smaller village, about 100 turtles are harvested annually. This harvest seems to be largely opportunistic, and most *M. ocellata* are collected from rice

fields, ditches, and irrigation ponds during routine farming operations. According to villagers, most turtles are consumed locally rather than being sold, although the shells may be purchased by middlemen for later resale. A large market for turtle shell exists in China where it is an ingredient of some traditional medicines (VAN DIJK, 1993; PLATT *ET AL.*, 2000). Live *M. ocellata* also are being exported to turtle markets in southern China, although this trade is difficult to quantify. A videotape taken in Guangzhou, China, in 1997 showed large numbers of *M. ocellata* being offered for sale (W. McCord, pers. comm.), and *M. ocellata* was the most numerous species found in the markets of Ruili, Yunnan Province, China, by KUCHLING (1995). According to villagers in Sagalun, most *M. ocellata* are collected during the wet season, including some gravid females containing 10 to 15 eggs.

Other freshwater turtles

Descriptions of at least three additional species of turtles were provided during our interviews. The *zin shaw leuk* is described as a softshell with a carapace length up to 30 cm, possibly *Lissemys* sp. This species is occasionally found in flooded rice fields. The two remaining species are somewhat enigmatic. The *thinbaung* or Phoenix turtle is a terrestrial species closely associated with dense stands of Phoenix palm (*Phoenix paludosa*). The thick nature of the vegetation and large thorns of the palm make the Phoenix turtle difficult to locate. The Phoenix turtle may refer to the Malayan box turtle (*Cuora amboinensis*), a species known to occur in aquatic habitats in Myanmar (IVERSON, 1992). The *leik khone* is a small semi-aquatic turtle found in shallow aquatic habitats and rice fields. Most people are not familiar with this species, and it was mentioned in only one interview. According to residents of Thaug Chaung Camp on MKWS, a softshell (probably *Lissemys* sp.) inhabits Nepa Lake; however, our attempts to trap a specimen for identification proved unsuccessful. Clearly, further surveys of the chelonian fauna in the Ayeyarwady Delta are warranted.

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