Population status of mugger crocodile (*Crocodylus Palustris*) in moyar river, Tamil Nadu, Southern India

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Abstract

Mugger crocodile is "Keystone Species" species of aquatic ecosystem and is most common and widely distributed in India. Survey was carried out from October 2014 to April 2015 and April 2016 to October 2016 in Moyar River (36km river stretch of Belmeen Kadavu to Kallampalayam). Present study, we describe the current population status and basking behavior of Mugger crocodile in Moyar River in Tamil Nadu, Southern India. Survey period, a total of 81 (2.89 ± 0.41) individuals were recorded in a 63 sightings, of which 45 individuals were adults, 28 individuals were sub adults and eight individuals were juveniles. Most of the basking substrates was rocks (53 %) and frequently basked from 0900 hrs -1100 hrs. Muggers in Moyar River are unique example of man living in harmony with animals and suitable for the future conservation in Tamil Nadu.

Keywords: Basking, Moyar river, Mugger crocodile, Population, Rocks.

Accepted on 24 March, 2021

Introduction

Crocodilians are one of the largest living reptiles and widespread and dependent on aquatic habitats. There are 24 species of crocodilians currently recognized (The Reptile Database, 2016). Two families of the *Crocodylia* are known from Indian subcontinent (India, Nepal, Pakistan, Iran and Sri Lanka) such as Marsh or Mugger crocodile (*Crocodylus palustris*), saltwater crocodile (Corocodylus porosus) and Gharial (*Gavialis gangeticus*). The Mugger crocodile is a medium-sized crocodile (maximum length 4-5 m), and has the broadest snout of any living member of the genus *Crocodylus*. The Mugger major freshwater habitat is like rivers, lakes and marshes, reservoirs, irrigation canals and man-made ponds [1]. The Mugger can even be found in coastal saltwater lagoons and estuaries. Mugger crocodile is most common and widely distributed in India, and reported from over 10 states and the wild population is tentatively estimated at 3,000-5,000 adult animals. However near the late 1960s, their populations were exterminated to extremely low numbers, mainly due to uncontrolled hunting for skin trade. Habitat degradation through damming and channeling of river systems for irrigation, have caused severe fragmentation of habitats and populations throughout the species' distribution range in Tamil Nadu [2]. Conservation efforts for the revival of the species in the state were initiated in 1976 under the UNDP/FAO Crocodile Breeding and Management Project. Reintroduction of Mugger crocodiles in the different localities in the state was carried out till the mid-1980s. In 1985, 150 C palustris were released at ten different sites within this protected area. By 1986, a total of 372 animals had been reintroduced in six different locations in Tamil Nadu. This species is categorized under vulnerable category in 'IUCN Red List (2016) of Threatened Species and has the highest legal protection in India as it is listed in Schedule I of the Indian Wildlife (Protection) Act 1972 [3]. In this note we describe the current population status and basking behavior of Mugger crocodile in Moyar River in Tamil Nadu, Southern India.

Study area

Moyar River is one of the tributary of Bhavani in Tamil Nadu, South India. River Moyar originates in the Nilgiri mountain of Western Ghats, flowing west-east direction along the Tamil Nadu and Karnataka State border. One of the largest rivers in the Nilgiris, draining to Eastern Ghats, of its three major streams that confluences with the river basin such as Kedrahalla, Sigur and Kahanhalla are perennial. Its traverses around 90 km through Mudumalai and Sathyamangalam Tiger Reserves before joining in Bhavani River at Bhavanisagar Reservoir [4]. It has a relatively well-preserved state of riparian vegetation, wherein more than 100 woody angiosperm species were recorded along the river, including many riparian species like Salix tetrasperma, Vitex leucoxylon, Vitex altissima, Walsura trifolia, Homonoia riparia and Phyllanthus polyphyllus. It was found that the Moyar riparian zone is home to rich biodiversity, especially threatened species such as the Asian elephant, tiger, gaur, otter, Indian rock python, vultures, etc., nearly 120 species of birds and 90 species of fish have been reported from the river [5].

Methodology

Mugger crocodile survey was carried out in two deferent periods from October 2014 to April 2015 and April 2016 to October 2016 in Moyar River along with vulture nesting

habitat survey. A total of 28 days (2day /per month) surveys were done in the River. The survey was conducted in a 36km Moyar river stretch of Belmeen Kadavu (11.61318 N and 76.77034 E) to Kallampalayam (11.52481 N and 77.01493 E). During the early morning hours (0900hrs to 1300 hrs) and evening hours (1500 hrs to 1800 hrs) of the day, two or three field person are visited and data were recorded by walking on the river side [6]. The river was considered as transect and the Mugger crocodile was encounter along both side of the river. The presence of Mugger was confirmed on direct sightings as well as indirect evidence (scat, footprints, body and tail imprint) and populations were calculated based on direct sighting [7]. Basking behavior like time of basking and basking substrates (surface of water, on the rock, on the river bed) was also recorded. Mugger crocodile's size was visually categorized into size classes- above 2m as adults, below 2m as sub adult and below 1m as Juvenile. All the sighting locations was marked in the GPS and prepared a map with applying the Quantum GIS 1.7.1walcrow version computer software with using GPS field data. Encounter rate was calculated = no. of individuals / total km surveyed [8].

Results

A total of 81 (2.89 ± 0.41) individuals were recorded in a 63 sightings in a 36km Moyar river stretch of Belmeen Kadavu to Kallampalayam (Map 1). Maximum three individuals and Minimum one individual were recorded. A total of 37(46 %) individuals of crocodiles were recorded as floating in the water, on the other hand 44 (54%) individuals were recorded on river bed and on the rocks [9]. Size class data show that 45 (1.87 ± 0.79) individuals were adults, 28 (1.16 ± 0.63) individuals were sub adults and eight individuals (0.33±0.76) were juveniles. Juveniles were observed in month of July to August. A total of 53 basking behavior were recorded, most of the basking substrates was rocks (53 %) followed by river beds (30%) and surface of water (17%). The crocodiles were frequently basked between 0900 hrs -1100 hrs (53%), after that basking behavior was reduced [10].

Discussion

In Tamil Nadu, a total of 465 individuals of Mugger crocodiles are recorded from various rivers and dams. The Moyar river system was comprehensively and systematically surveyed in various years and it's a total of 178 individuals of Mugger crocodiles are recorded (Andrews, 1999) [11-16]. During the present survey a total of 81 individuals were recorded in a 36km Moyar river stretch of Belmeen Kadavu to Kallampalayam. More number of adult in this population and different size class distribution is indicated that health breeding population of Mugger in this river system [11]. Vijaykumar (1997) stated that during June-September is the breeding seasons of the species, similarly to juveniles were observed during June–September. Several factors are influence thermal behavior of crocodiles like climatic conditions, social interactions, circadian rhythms and reproductive state are present survey only basking substrate and time period data were recorded [17]. But data on ambient/water temperatures, air temperatures and substrate temperature were not collected. stated that thermal behavior and body temperatures of crocodiles are strongly influenced by ambient water temperature and its seasonal changes. Hence along with this factors didn't understand the basking behavior of Mugger in the Moyar river [18].

Moyar riparian zone is home to rich biodiversity like birds, mammals, and fishes. During the survey we are noticed muggers feed on the carcasses which are left by the carnivores like tigers. Moreover, Moyar is perennial river, water flows round the year lots of animals depend for the rivers as water for their life sources. These results are clearly indicating this river was provided good food facility and good shelter of Muggers. Andrews (1999) also suggest the Moyar River it is the last-remaining pristine habitat suitable for the future conservation and survival of Mugger crocodiles in Tamil Nadu [19].

Conclusion

Considering the total Mugger population and the extent of its habitat, the pressure is considerably lesser here than in other areas, as it falls within a protected sanctuary zone, thus providing for a well-managed conservation programme, with minimal cost and effort. Muggers in Moyar River are unique example of man living in harmony with animals. The present study is short term study and more longtime scientific study is needed in entire river system to understand current population trend, basking behavior and threat of Muggers in Moyar River, Tamil Nadu.

Acknowledgements

Our whole hearted thanks to the Principal Chief Conservator of Forests and Chief Wildlife Warden of Tamil Nadu state for giving us necessary permission to carry out the field work. Our special thanks are due to the District Forest Officer, Nilgiri North Forest Division for providing permission and all logistic supports to carry out the field work. This observation record is part of the long term study on the project entitled "Conservation strategies for securing critically endangered White-rumped Vulture Gyps bengalensis and Long-billed Vulture Gyps indicus species in the Tamil Nadu part of the Nilgiri Biosphere Reserve" funded by the Raptor Research & Conservation Foundation (RRCF). We thank our field assistant Mr. R. Bomman, B. Vishnu, B. Prabu and Mr. K. Manigandan for taking lot of pain in collecting field data in the forests amidst elephants.

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