

Status survey of *Batagur baska* and *Pelochelys cantorii* in the state of Odisha, east coast of India

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Introduction

The chelonian fauna of Odisha comprises 17 species, of which four are marine, eleven are freshwater turtles and two are land tortoises. The first documentation of freshwater turtles in Odisha dates back to Annandale (1907). Since then many researchers have worked on several species of freshwater turtles and tortoises in Odisha to document their ecology, status and distribution (Smith 1931; Biswas *et al.* 1978; Vijaya 1982; Dutta & Acharjyo 1990, 1993 & 1997; Chadha & Kar 1999; Biswas & Acharjyo 1984a; Biswas & Acharjyo 1984b; Singh 1985; Dutta *et al.* 2009). However, in comparison to the enormous amount of research carried out on marine turtles, research on freshwater turtles in the state has not attracted the attention it deserves.

Batagur baska (the northern river terrapin) and *Pelochelys cantorii* (Asian giant softshell turtle) are critically endangered and endangered respectively (Asian Turtle Trade Working Group 2000) and are reported to occur in the northern Odisha river system and Mahanadi delta of Odisha. As per section 38 of the Biological Diversity Act, 2002 (18 of 2003), the Government of India notified *B. baska* as a threatened species in Odisha but to date little information has been available on distribution of the species. Early literature, verbal reports, and museum specimens suggest that *B. baska* were more widespread in West Bengal and Odisha regions than other parts of the country. Specimens were collected from Subarnarekha and Brahmani rivers of Odisha (Annandale 1912; Vijaya 1982; Das 1987; Moll *et al.* 2009). There are concerns that the species has become vulnerable due to extensive exploitation of its flesh and eggs accompanied by habitat alteration, but fishers reported that *B. baska* were abundant in the estuarine systems of the Mahanadi delta about a decade ago and Prashchag *et al.* (2008) interviewed a boatman who collected eggs (possibly of *B. baska*) on the



Fig. 1. Map showing the coastal region of Odisha. Map developed by Adikanda Ojha, ICZMP.

Devi River, a tributary of the Mahanadi river, Odisha. Therefore, it is possible that viable populations may still exist.

Pelochelys bibroni from Odisha (Vijaya 1982; Das 1987; Chadha & Kar 1999) are now referred to as *P. cantorii* (Webb 1997; Das 2008). The species is found in estuaries and sea coasts in Odisha. Das (1987) mentioned the distribution of the species in the Brahmani-Baitarani delta at Bhitarkanika Wildlife Sanctuary, where it was reported to be nesting. Chadha & Kar (1999) reported it occurring in the Patasala area of Brahmani, Baitarani, Dhamra and Kharasrota rivers. There is a possibility of the presence of *P. cantorii* in the Chitrotpala and Luna rivers in Kendrapara district (pers. comm. with Dr Pratyush Mahapatra, Scientist, ZSI). This species was not uncommon in Bhitarkanika (Chadha & Kar 1999), but more recently has been considered rare in many parts of the Indian subcontinent, including Odisha, as its occurrence has not been reported since 2009 (Mahapatra *et al.* 2009). *P. cantorii* appeared to be tolerant to marine conditions, and it is the only species of soft shell turtle from India which often enters the sea. An earlier study reported the species migrating from the fresh water of Brahmani and Baitarani rivers in the Bhitarkanika area to nest on the shore at Ekakula, sharing the same nesting beach with olive ridley sea turtles (Mishra *et al.* 1996). The reproductive biology of the species is poorly known. Clutch size varies from 20-28, egg diameter

30mm. Nesting takes place between December and March and is similar to species like *B. baska*.

The present study was undertaken to address the ecological status and distribution of *B. baska* and *P. cantorii* in Odisha to fill some of the knowledge gaps described above.

Materials and methods

The state of Odisha, with a geographical area of 155,707km², represents 4.74% of the total geographical area of the country. The actual forest cover in the State is 51,345km² (Forest Survey of India, 2017), which is 32.98% of the State's geographical area. Odisha has unique bio-geographic features, its physiography an amalgamation of different bio-geographic provinces like the Chhotanagpur Plateau, Eastern Highlands, Lower Gangetic Plain and Eastern Coastal Plain, and supports a large diversity of animal life. The coastal region is the combination of several deltas of various sizes and shapes formed by major rivers, including the Subarnarekha, Budhabalanga, Baitarani, Brahmani, Mahanadi and Rushikulya (Fig. 1).

The mountainous region of Odisha covers about three-quarters of the state and can be broadly divided into two groups, the Similipal Massif and Eastern Ghats. Due to abundant supplies of perennial fresh water, the state has many reservoirs, lakes, rivers and streams, which serve as ideal habitats for freshwater turtles. Many species of turtles also inhabit forests, hill streams, and still water in ponds and ditches.

The present study was carried out from August 2017 to July 2018 with the aim to record the distribution and conservation status of *B. Baska* and *P. cantorii* in Odisha. Field surveys were carried out at random locations throughout the major regions of their occurrence in the state, mainly the northern Odisha river system including the deltaic region of the Subarnarekha, Brahmani and Mahanadi rivers upto 50km inland from the river mouth. We also visited Puri and Jagatsinghpur districts and surveyed the river Devi near the Devidola region. Some mangrove areas were also surveyed for evidence of the species including Bhitarkanika Wildlife Sanctuary. Refugia including bushes, leaf litter, gaps between large rock boulders and spaces within the roots of large trees were searched for hiding or hibernating turtles. River banks were surveyed for turtle tracks, following which sometimes yielded specimens. Fishers and other local community members were also interviewed to identify turtle species caught as bycatch. The photo-elicitation method, a widely known and frequently used technique based on the principle of using one or more types of images (photos, videos, paintings or any other type of visual representation of the species) in a public interview was applied when asking informants to share their knowledge on the occurrences of species (Fig. 2). Das (2002) was followed as a field guide to identify the freshwater turtle species.



Fig. 2. Photo-elicitation methods being used during a questionnaire survey among fishers. Photos by S. Behera.

Results

In Subarnarekha river mouth and the adjacent available fishing villages of Balasore district, there was no evidence of either tracks or crawl marks of *B. baska* on the river bank. Surveys with 36 local fishers at nine fishing villages and three jetties (Table 1) revealed that *B. baska*, locally called 'Baligada', was observed in the 1990s but not in the last one and a half decades. The informants believed that the species became at risk due to indiscriminate poaching by local inhabitants for its meat. They find the northern river terrapin's flesh is soft and tasty, so people hunt turtles in the river while fishing and sell them in the local market.

The occurrence of *P. cantorii* was not confirmed in this area. However, we found the Indian roofed turtle (*Pangshura tecta*) in local village ponds along the coastal region of Balasore district and one juvenile Indian narrow-headed softshell turtle (*Chitra indica*) entangled in a monofilament gill-net; the latter was released with the help of local fishers.

Similarly, we surveyed upstream and downstream of the Mahanadi River in the Cuttack district of Odisha and used a country boat to survey inland waters. We ventured nearly 50km up the river from the estuary and found no evidence of our targeted species. Other species of fresh water turtles



Fig. 3. Devotees offering sweets and biscuits to *Nilssonina gangetica* in a temple pond.

were recorded during the survey, including the Indian tent turtle (*Pangshura tentoria*), Indian peacock softshell turtle (*Nilssonina hurum*), Indian softshell turtle (*Nilssonina gangetica*), Indian flapshell turtle (*Lissemys punctata*) and *C. indica*. Interviews and photo-elicitation were conducted with 42 people. Two informants (temple priests) responded that they had seen an umbrella-like turtle basking near a sand bar 30m away from the temple during the last quarter of September 2017; sighted on the bank of the river Mahanadi at Vattarika in the Narasinghpur block of Cuttack district, the species was probably *P. cantorii*.

We received similar information from various sources about the predominance of *N. gangetica* in a small pond adjacent to a God Shiva Temple in Champeswar village near the Badamba block of Cuttack district. Upon examination, the population of *N. gangetica* was visually estimated to be more than 100 in the pond. Around 52 turtles were observed swimming on the surface of the water at around 11:00 a.m. As it was winter, around 20-25 turtles were also basking on the bank of the pond. Many turtles appeared to have a curved carapace length of more than 30cm and were presumed to be adult. Three to six juveniles were also spotted swimming in the middle of the pond. We attempted to document the story behind the presence of these turtles by interacting with priests of the temple and local inhabitants of the region, but even the oldest person present could not

tell us how long these turtles had been there or their origin, nor whether they had migrated from the nearby river Mahanadi, 4-5km away from the pond. Natives of the village further informed us that the turtles sometimes emerge from the pond, crawl in nearby paddy fields and feed on snails, other invertebrates, frogs etc. Otherwise their diet depends upon devotees visiting the temple who feed biscuits and other sweet offerings to the turtles (Fig. 3). The turtles appeared to be sensitised to people and usually approach the bank of the pond when they sight humans, expecting some food.

In the mangrove area of Bhitarkanika Wildlife Sanctuary, direct evidence of turtles was not found, but substantial information was gathered from local inhabitants and fishers through the photo-elicitation method and questionnaire. *B. baska* had been sighted in tributaries of the Brahmani and Baitarani rivers in the last decade. The species might have since been extirpated due to habitat destruction and intensive poaching. However, a 10-12kg specimen of *P. cantorii* was last caught in fishing net in the mouth of the river Maipura in July 2017 (pers. comm. with Forest Department personnel).

When we surveyed the river Devi near the Devidola region using photo-elicitation methods, local people and fishers reported that both *B. baska* and *P. cantorii* occurred in the river. Local people described to us an umbrella-like specimen (probably meaning *P. cantorii*) present in the deep area of the river and not frequently observed. However, we were unable to photograph the species nor confirm its presence.

Finally, when we investigated the presence of our targeted species in Astaranga near the Devi river mouth we spoke with local fishers and people in the fish market. Many reported they had not seen either species, but three men said they had observed *B. baska* in the river Devi during 2009. However, the populations might be sparse and small. Some blurred field photos taken from a long distance illustrated the species presence upstream near Devidola. One photo (Fig. 4) showed an animal trying to climb a steep area in sandbar on the Devidola river, 40-50km distant from the river mouth.

We observed that both species have suffered a high threat due to heavy loss of nesting habitat through sand mining, commercial sand removal for construction, local consumption of turtle eggs and flesh and indiscriminate stone patching near river banks and in the estuary region (Fig. 5).

Discussion

Wild populations of the northern river terrapin *B. baska* have been decimated to such an extent that the species has been considered as locally extirpated. Hunting for its flesh, egg harvesting and habitat reduction were considered to be the main reasons for its drastic demise; it formerly inhabited rivers and estuaries in eastern India, Bangladesh and Myanmar (Weissenbacher *et*



Fig. 4. Probable occurrence of *Batagur baska* in the river Devi, Odisha (extreme left).

al. 2015; Moll & Moll 2004; Kalyar & Thirakhupt 2007; Platt *et al.* 2008). Observations during the present study indicate there has been a severe loss of nesting habitat through sand mining and removal, indiscriminate stone patching, and consumption of turtle eggs and meat. However, we established the occurrence of both species upstream of the Devi river in the Jagatsinghpur district, where they had been also found by Praschag *et al.* (2008). In this present study, a distant photograph showed *B. baska* on a sandbar of the Devidola river 40 to 50km inland from the river mouth.

In an earlier study, Moll *et al.* (2009) corroborate the same ecological phenomena of *B. baska*, portraying the females migrating 50-60km during the breeding season to reach their sandbank nesting sites. To support our field observation, this earlier literature states male are typically caught in the estuaries and along the coastline near river mouths, whereas females inhabit more upstream habitats, especially in nesting seasons. Praschag (2008) reported a potential hitherto unknown population from the Devi river, a tributary of the Mahanadi river, as a local boatman living upstream of the Devi river mouth had harvested three nests, possibly of *B. baska*, in 2006 but only one in 2008. The present study could not establish a strong evidence for this population.

The extant population of *B. baska* is believed to be extremely small. Unless a previously unknown viable population is discovered, it is difficult to create a breeding group. Dealing with such a small number of animals, an *ex situ*



Fig. 5. Stone patching (above) and sand mining (below) pose threats to the nesting activities of fresh water turtles in Odisha.

breeding programme, established with the last remaining specimens, will probably provide the only opportunity to ensure the survival of the species into the future (Magin *et al.* 1994; Snyder *et al.* 1996). It is difficult to form a breeding group as the source population size is very small, and it will take a time to maintain a viable population *in situ*. The preferred approach for recovery of *B. baska* is a combination of *ex situ* conservation techniques (i.e. hatcheries, captive breeding and head-starting) coupled with protected areas to maintain the wild population and its natural habitat (Praschaget *et al.* 2008).

A recent record of *P. cantorii* in the Maipura river mouth in Bhitarkanika Wildlife Sanctuary by forest department personnel confirms the species' occurrence there. The major threats to the species are different modern fishing activities in the river mouth and estuarine area.

Collective information about reptilian diversity was not readily available for a long time. However, the first global analysis of the extinction risk in reptiles was recently reported by Böhm *et al.* (2013), highlighting habitat loss as the major threat to reptile species including turtles. The Geoemydidae constitute the most threatened (88%) reptile family (Böhm *et al.* 2013). In India, destructive activities already mentioned have reduced the habitats of fresh water turtles. Local consumption of meat and inter-state trading for meat are further recorded threats to India's fresh water turtles and these activities all pose serious threats to survival of these species. The alarming trend of biodiversity loss in fresh water turtle species needed a collaborative approach to develop a project-based study on vulnerable species such as *B. baska* and *P. cantorii*. This pilot study reports the occurrence of the species in the Mahanadi delta including the river Devi and it is believed a small viable population of *B. baska* exists in the Odisha river system. Therefore, there is an urgent need to use the few surviving specimens of the northern river terrapin *B. baska* to establish a sustainable breeding programme with the goal of returning individuals to the wild and protecting their natural habitat.

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