

An analysis of the illegal trade of non-marine chelonians in West Bengal, India: Study based on a seven-year confiscation history

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ABSTRACT – This study of the illegal trade in non-marine chelonians (NMC) in West Bengal is based on 133 confiscation reports from various online news sources and from Divisional Forest Department Offices obtained in the period 2017–2023. A total of 33,317 NMC seizures were identified, spanning nine different species, three Endangered, three Vulnerable, one each of Near Threatened and Least Concern, and one invasive alien. The vast majority of seizures were of two species, the Indian flapshell turtle *Lissemys punctata*, which is a soft shelled species and accounted for 94% of identified seizures, and the Indian star tortoises *Geochelone elegans* that accounted for 5.2% of NMC. Confiscations were from 15 districts of West Bengal of which North 24 Parganas district was found to be a particular hotspot accounting for 57% of cases. The supply chain of *L. punctata* extended beyond West Bengal to Uttar Pradesh (50%) and Odisha (25%), whereas *G. elegans* were smuggled exclusively from Tamil Nadu. Additionally, 349 kg of body parts were seized. All confiscated items were meant either for domestic consumption or for illegal supply to markets in Bangladesh. Significantly more confiscations were recorded during the winter season. NMC seizures remained more or less constant throughout the COVID-19 pandemic with an increase in the involvement of women in illegal trading. West Bengal is a significant hub for the illegal trade of NMC and stringent conservation measures are required, in collaboration with various stakeholders, to prevent regional extinction of the species involved and the detrimental impacts of the local release of seized NMC.

INTRODUCTION

Globally, non-marine chelonians (NMC) are the most commonly trafficked group of reptiles among illegally traded wildlife (Rosen & Smith, 2010; Auliya et al., 2016). There is a vast and developing market in East and Southeast Asia for the trading of NMC (Chen et al., 2009; Harrison et al., 2016; Sy & Lorenzo, 2023) and unrestricted trade presents the greatest threat to the majority of Asian chelonian species (Cheung & Dudgeon, 2006; Rhodin et al., 2018; Stanford et al., 2020). They are traded for a variety of purposes such as food, traditional medicine and as pets (Shepherd et al., 2020). More than 50% of Asian NMC are currently threatened with extinction despite their protection under national laws, and their inclusion in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) appendices (Cheung & Dudgeon, 2006). With the evidence of both illicit domestic and international trade of NMC, India holds significant responsibility to address the ongoing Asian chelonian crisis (Mendiratta et al., 2017).

India, a megadiversity country, has the sixth highest freshwater turtle and tortoise biodiversity in the world, with the lower Gangetic plain being recognised as a turtle diversity hotspot (Buhlmann et al., 2009; Mittermeier et al., 2015). Over 78% (22 species) of Indian NMC are in threatened categories of the IUCN Red List (Mendiratta et al., 2017). All these species are also protected under the Wild Life (Protection) Act, 1972 of India (WPAI) so that the harvesting and trading of these species, whether presented

as live, dead or as body parts, are punishable offenses (Bhupathy et al., 2014; Mendiratta et al., 2017). More than 11,000 NMC were illegally traded in India every year from September 2009 to September 2019 (Badola et al., 2019), with one study reporting that 54% of the Indian NMC species have been traded illegally (Mendiratta et al., 2017).

Soft-shell turtles (Family Trionychidae) are primarily hunted and traded for their meat (Krishnakumar et al., 2009), whereas hard-shell turtles (Family Geoemydidae) and tortoises (Family Testudinidae) harvested in India are trafficked largely for commercial pet markets in Southeast Asia and China (D'Cruze et al., 2015; Leupen, 2018). Three major trade routes are known to exist in India and one of the most active and popular is from Kolkata to Bangladesh and other Asian countries (Bhupathy et al., 2000). Despite being a well-known turtle trade route and a part of the Gangetic plain in the Kolkata zone of West Bengal, there are no scientific reports regarding the rates of NMC trade or seizure. The aim of the present study was to identify the species of NMC that are seized, their frequency, volumes, trading hubs, routes, and trade networks in West Bengal.

MATERIALS & METHODS

A thorough Google search was undertaken of online bulletins for information on seizures of NMC from West Bengal in the period January 2017 to December 2023. A variety of sources, including published literature, online media reports, blog posts, YouTube videos and other social media platforms and

records from non-governmental organisations (NGOs) were explored to find reports of NMC confiscations. Additionally, during the specified period, the Wildlife Crime Control Bureau (WCCB) eastern region was visited along with several Divisional Forest Offices (DFO) and range offices, for the collection of data on seized NMC. The search terms used were ‘confiscated turtle’, ‘turtle seizure’, ‘confiscated tortoise’, ‘tortoise seizure’, ‘wildlife trade’, ‘turtle poaching’ and ‘tortoise poaching’ in West Bengal, and also included were searches in the Bengali language (such as ‘kochhop bajepto’ = chelonian confiscation, ‘kochhop kenabechea’ = chelonian trade, ‘bonnoprani bajepto’ = wildlife confiscation in Paschim Bongo = West Bengal). Reports written in the English language and reports translated from the Bengali language into English were retained for further scrutiny. All reported seizures were carefully checked to avoid duplication. Whenever contradictory data were encountered in reports on the same seizure from different sources, the most comprehensive data sources were accepted for further analysis and duplicates were disregarded. Essential details from each record were extracted, such as the date and location of seizure, species seized, type of commodity (live or dead animals, meat or body parts), product quantity (number or kilograms), the intended purpose of trade (meat, pet or traditional medicine) and the routes of trafficking, if available. Furthermore, to record the exact location of each seizure, we documented additional information such as the mode of transportation and final destination of the cargo. Animals seized from public transport, pet stores, warehouses or markets were classified as part of the commercial trade. In cases where species identity could not be verified, it was designated as ‘unidentified’. From the seizure records, sources of origin and sites of poaching were compiled. The data from Divisional Offices can be found in the Supplementary Material A.

Data on the geographic locations of confiscations and their collection points were used to generate maps illustrating trading hubs and routes. Arc GIS 10.8.2 software was employed for analysing and plotting the collected data, and graphical representations of results were generated in MS Excel 2019. To test for statistically significant difference between the three seasons, namely summer (March–June), monsoon (July–October) and winter (November–February); and between the 15 districts of West Bengal, NMC confiscations were subject to the non-parametric Kruskal-Wallis test using SPSS-26, this showed heterogeneity between both seasons and districts which justified pairwise post-hoc testing using the Mann Whitney U test.

RESULTS

Between January 2017 to December 2023, 133 confiscation reports of NMC involving West Bengal were obtained and analysed which accounted for seizures of 33,317 individuals from a total of nine species. Dead turtles numbered 1,666, while 420 specimens could not be identified due to being incomplete body parts (Table 1). The greatest number of confiscations was recorded in 2017, and the lowest in 2018 (Fig. 1). From 2019 onwards the rate was relatively constant

Table 1. Non marine chelonians (NMC) confiscated in West Bengal, 2017–2023 and IUCN Red List status

Species	No. of individuals confiscated	No. confiscated as % of all identified NMC	IUCN Red List category (updated 2024)
<i>Lissemys punctata</i>	30,872	93.84%	Vulnerable
<i>Geochelone elegans</i>	1,712	5.20%	Endangered
<i>Nilssonina gangetica</i>	268	0.81%	Endangered
<i>Nilssonina hurum</i>	36	0.11%	Endangered
<i>Pangshura tentoria</i>	1	0.003%	Least Concern
<i>Pangshura tecta</i>	3	0.009%	Vulnerable
<i>Chitra indica</i>	2	0.006%	Near Threatened
<i>Pangshura smithii</i>	2	0.006%	Vulnerable
<i>Trachemys scripta elegans</i>	1	0.003%	Invasive alien species
Total identified	32,897		
Unidentified	420		
Grand total	33,317		

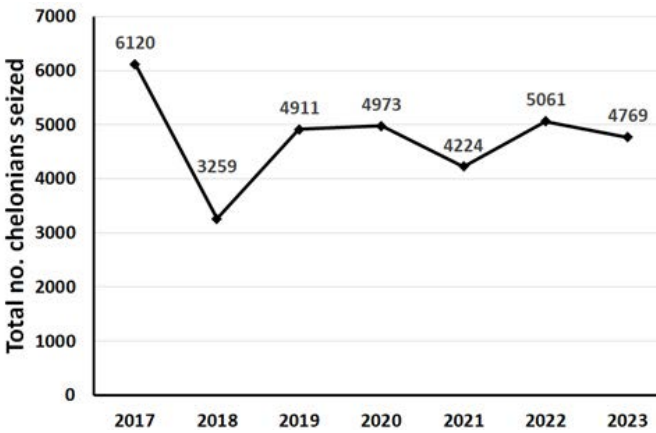


Figure 1. Number of non-marine chelonians confiscated in West Bengal, 2017–2023

suggesting that there was no impact of the COVID pandemic on the seizure rate (Fig. 1). The Indian flap-shelled turtle *Lissemys punctata* was the most frequently confiscated turtle, accounting for 93.87% of all identified NMC, followed by the Indian star tortoise *Geochelone elegans* which accounted for 5.20% (Table 1). The remaining seven species made up less than 1% of the identified NMC and included a single specimen of the invasive alien species *Trachemys scripta elegans*, which was confiscated in Siliguri. Of the eight native confiscated species, three *Nilssonina gangetica*, *Nilssonina hurum* and *Chitra indica* are categorised as Endangered, three *L. punctata*, *Pangshura tecta* and *G.*

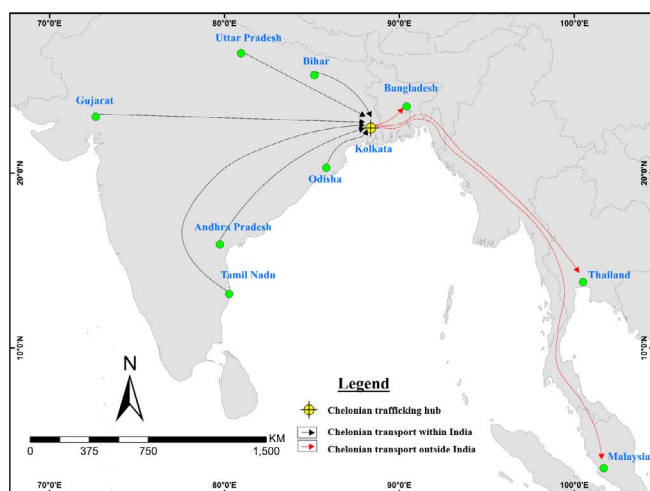


Figure 2. Transport routes of the illegal non-marine chelonian trade within and outside India

Table 2. Number and percentage of non-marine chelonians (NMC) illegally entering in West Bengal from other Indian states, 2017–2023

NMC source state	No. of confiscated NMC originating outside West Bengal	% of confiscated NMC from identified source states
Uttar Pradesh	22	55%
Tamil Nadu	4	10%
Andhra Pradesh	1	2.5%
Gujarat	1	2.5%
Orissa	10	25%
Bihar	2	5%
Total NMC from identified source states	40	
Total NMC from unidentified source states	93	
Grand total confiscated NMC	133	

elegans as Vulnerable, and *Pangshura smithii* as Near Threatened and *Pangshura tentoria* as Least Concern as per IUCN Red List (Table 1). A full listing of the conservation status of these species is give in Supplementary Material B Table 1S.

All the NMC were confiscated from markets, fish transport vehicles, rail stations, bus terminals and trucks, where they were stored secretly. In one instance, two individuals of *L. punctata* were seized from a marquee of the Goddess Durga where they had been displayed but were not for sale and so were categorised as non-commercial. The majority of the confiscated wild turtles were imported to West Bengal from different states of India (Fig. 2). Uttar Pradesh accounted for most of the identified imports (55%) followed by Odisha (25%) and Tamil Nadu (10%). The states of Bihar, Andhra Pradesh and Gujarat together accounted for the remaining

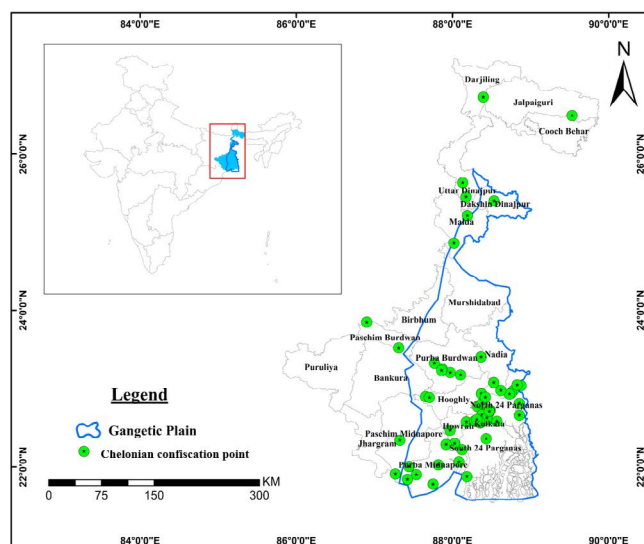


Figure 3. Non-marine chelonian confiscation points in West Bengal identified during the current study

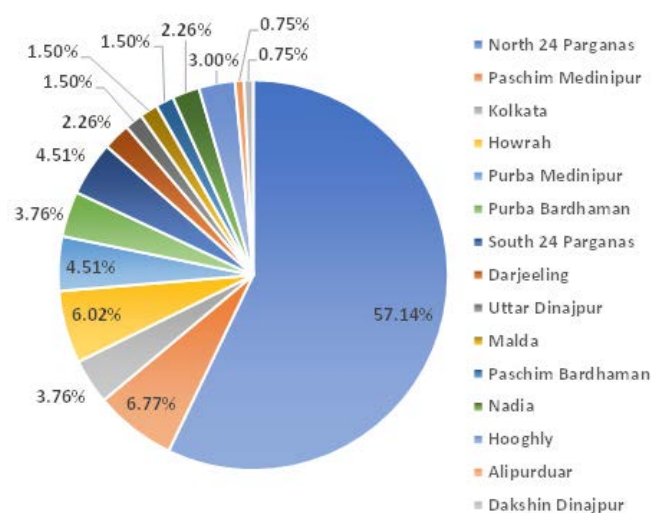


Figure 4. Percentage of non-marine chelonian seizures among the various districts of West Bengal, 2017–2023

10% of the identified sources (Table 2). All the confiscated tortoises in West Bengal originated from Tamil Nadu, the southernmost state of India. Among all NMC seizures in West Bengal, 86.47% were from the lower Gangetic plain, and more than 67% of those were from districts sharing an international border with Bangladesh (Fig. 3).

Seizures were reported across 15 districts in West Bengal. North 24 Parganas district in southern West Bengal accounted for over half (57.14%) of all incidents (Fig. 4). There was a statistically significant difference in the number of confiscated NMC among the 15 districts (Kruskal-Wallis, $H = 40.651$, $p < 0.001$), and pairwise comparisons revealed that North 24 Parganas district accounted for significantly more confiscations when compared to other districts (Fig. 5) and the heat map further reinforces this finding (Fig. 6). More than half of the seizures (59.26%) were of NMC consignments

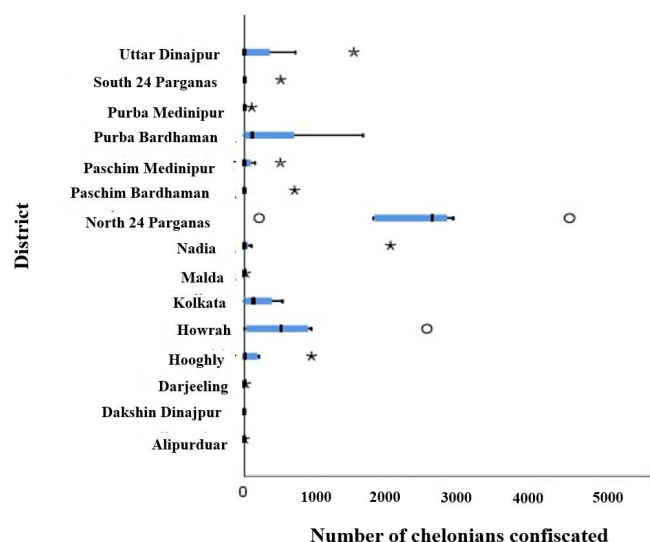


Figure 5. Number of non-marine chelonians confiscated in various districts of West Bengal 2017–2023, ° = outlier, * = extreme outlier

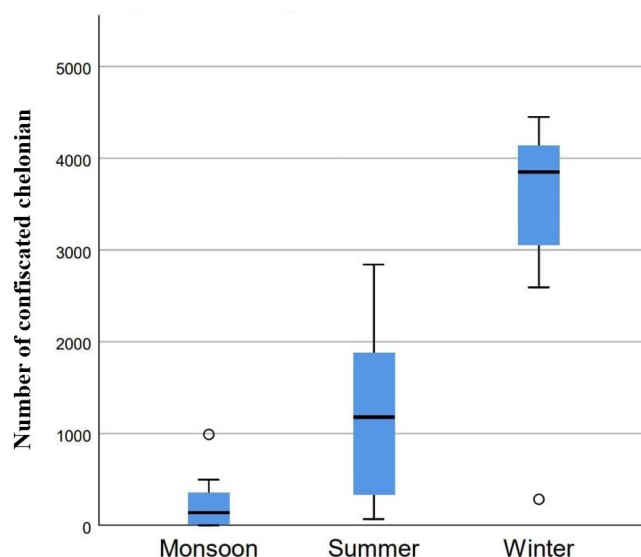


Figure 7. Number of non-marine chelonians confiscated during different season in West Bengal, 2017–2023, ° = outlier

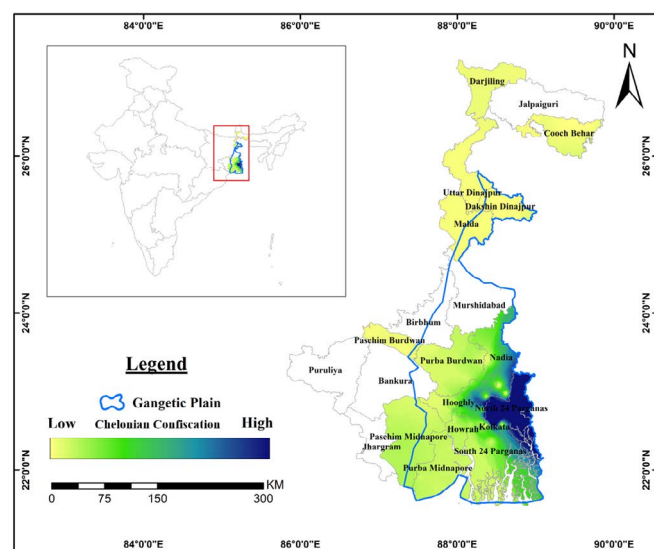


Figure 6. A heat map of non-marine chelonian confiscations from the districts of West Bengal, 2017–2023

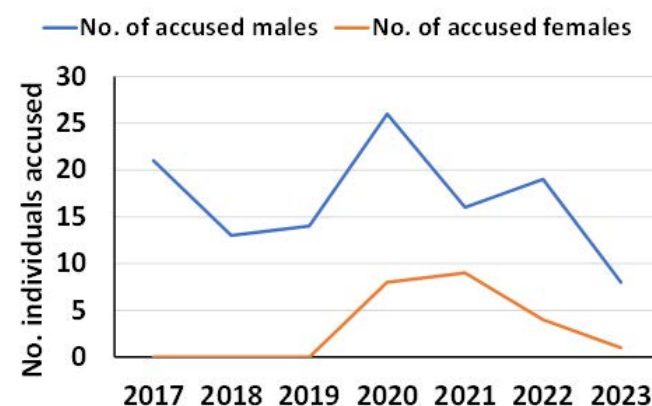


Figure 8. Gender split of people accused of involvement in non-marine chelonian trafficking

in transit by road (38.89%) and rail (20.37%). The remaining 40.74% were confiscated from markets, residential houses, hotels or warehouses. Of the 17 consignments confiscated in transit, 14 were destined for Bangladesh, two for Thailand, and one for Malaysia (Fig. 2). Three confiscations, one each in Kaliachak (Malda district), Bangaon (North 24 Parganas district) and Gangarampur (Dakshin Dinajpur district) resulted in the confiscation of a total of 349 kg of body parts, intercepted while being smuggled to Bangladesh. There was a statistically significant difference in the number of confiscated NMC between seasons (Kruskal-Wallis test, $H = 11.896$, $p < 0.003$), and pairwise comparisons indicated that the number of confiscations was significantly higher during the winter season (Fig. 7).

Both men and women were involved in the trafficking of turtles. In 2020, more people, particularly women, were

involved in turtle trafficking in comparison to other years (Fig. 8) with a rise in women's participation from 2020 to 2022 which more or less coincides with the period of the COVID pandemic.

DISCUSSION

The lower Gangetic plain has been recognised as a priority area of NMC conservation (Mittermeier et al., 2015) and the results of the present study has highlighted it as a significant hub for national and international NMC trafficking and markets (Figs. 2, 3 & 6). Demand for them as food, traditional medication and as pets, has accelerated the decline and extinction of over half of the known species of NMC (Stanford et al., 2020), yet this has received little attention from conservation biologists and remains understudied (Stengel

et al., 2011; Stanford et al., 2020). In India, during a five year period (2011–2015) there were 223 confiscation reports with seizures totalling 58,442 live NMC (Mendiratta et al., 2017) while in a seven year period (2013–2019) there were 268 reports with seizures totalling 74,000 live or dead individuals (Sengottuvel et al., 2024). In the present study covering the seven year period 2017–2023, West Bengal alone accounted for 133 confiscation reports detailing the seizure of 33,317 individuals that included six Vulnerable/Endangered species (Table 1).

In the present study *L. punctata* accounted for about 94% of identified seizures; it is likely that these were being trafficked for food. This species is currently listed as Vulnerable on the IUCN Red List (Rahaman et al., 2021), protected under Schedule I of the WPAI, and is widely harvested and trafficked for its meat and supposed medicinal value in India and in other Asian countries (Das, 1991; Choudhury et al., 2000; Krishnakumar et al., 2009; Bhupathy et al., 2014; Mendiratta et al., 2017; Mandal et al., 2024). It is now the most traded species, potentially due to its non-aggressive behaviour and small size. It might experience a fate similar to *Batagur baska* that was once an abundant species in the mangroves of West Bengal and Odisha (Mallick et al., 2021), which being very palatable was over-exploited in these regions (Moll et al., 2009); *B. baska* is listed as Critically Endangered on the IUCN Red List (Praschag & Singh, 2019) being limited to Sundarban area and likely extirpated from Odisha (Mallick et al., 2021). In this context, conservation of *L. punctata* should be prioritised.

Geochelone elegans, which accounted for about 5% of all identified seizures, is largely trafficked for the international pet trade (D'Cruze et al., 2015). Smuggled *G. elegans* in West Bengal originated exclusively from Tamil Nadu. There are indications that the smuggling route of this species is currently shifting (Stoner & Shepherd, 2020). Once commonly trafficked through Chennai (Sengottuvel et al., 2024), *G. elegans* is now rerouted to Kolkata, and subsequently to Malayasia (where it is an exotic species) either directly or via Bangladesh, most likely due to increased detection risk in Chennai (Stoner & Shepherd, 2020).

In West Bengal, North 24 Parganas is the largest hub of illegal trading, accounting for 57.14% of identified seizures and has also emerged as a soft-shell turtle trafficking hub because this district shares 280 km of international border with Bangladesh (Sengottuvel et al., 2024). Other important trafficking centres are Paschim and Purba Medinipur, Howrah and Kolkata districts. West Bengal is evidently a major hub for meat trading rather than for the pet trade. Approximately 150 kg of turtle meat is traded daily in the local fish markets of Purba and Paschim Medinipur districts (Bindra, 2023). Moreover, *L. punctata* are illegally harvested and sold in Paschim Medinipur district for their meat (Mandal et al., 2024). It was also found that the bulk of the supply of soft-shell turtles in West Bengal originated outside the state with 50% from Uttar Pradesh and 25% from Odisha. This confirms recent suggestions that Uttar Pradesh is the major supplier of soft-shelled turtles to consumers across India (Sengottuvel et al., 2024). Historically, the primary transportation methods of soft-shell turtles reported for West Bengal was

by road (Choudhury & Bhupathy, 1993). The present study has demonstrated that this is still the case. However, rail transport has been also suggested as an easier route of entry due to the lack of trained personnel at entry and exit points (Shepherd et al., 2007) coupled with inadequate scanning equipment at railway stations (Emogor et al., 2021). Significantly more turtles were confiscated during the winter season, likely because an increase in demand during the festive season in West Bengal when indigenous people consume turtle meat. Moreover, the capture of ectotherms is easier in the winter season due to their lowered metabolic rate and activity level (Litzgus & Hopkins, 2003). Likely because of the lack of alternative sources of income during the COVID pandemic, turtle trafficking saw an increased participation of women during this period. In contrast, there was apparently a remarkable decrease in poaching cases of NMC in India during the lockdown period, even though the total number of wildlife poaching cases more than doubled between pre-lockdown (10 February to 22 March, 2020) and lockdown periods (23 March to 3 May, 2020) (Badola, 2020).

From 2018 to 2020, the red-eared slider *T. s. elegans* was traded in large quantities in India at very low prices (USD 0.36 to USD 0.48 per individual) due to ready availability and their better survival rate and small size which make them suitable for clandestine transportation (Pragatheesh et al., 2021). This North American species is recognised as one of the top 100 most invasive species worldwide (Dupuis-Desormeaux et al., 2022). In India, it has also been reported from Gujarat, Karnataka, West Bengal, Punjab, Hyderabad, Rajasthan and Goa (Chaudhuri et al., 2018; Jadhav et al., 2018; Vyas, 2019), and has been reported as a predator of native turtle species (Vyas, 2020). Although only one case of trade in this turtle was recorded in this study, the presence of *T. s. elegans* might have a profoundly destructive impact on the local ecosystem. Similar observation has also been made in Rajarhat wetland, Kolkata (Chaudhuri et al., 2018).

The present study unequivocally indicates that West Bengal serves as a significant hub for the illegal trade of NMC, with North 24 Parganas district as its epicentre. As such, enhanced anti-poaching measures are imperative in West Bengal, encompassing advanced poacher identification techniques such as patrol dogs, conducting efficient searches in trains, rail stations, trucks and airports using modern devices and quick response enforcement strategies. Trafficking of NMC shells, both carapace and plastron, to meet the increasing demand for traditional medicines in Southeast Asia and China is well known (Compton, 2000; Sundar, 2004; Chen et al., 2009; Das & Singh, 2009). The confiscation of body parts, however, is far more difficult compared to live specimens as it demands good species identification skills, which are a clear training need.

It is crucial to note that following seizure many live turtles are released into local water bodies, which could potentially have detrimental impacts on the ecosystem. It is essential to establish adequate infrastructure for housing and rehabilitating confiscated turtles. Authorities must conduct thorough assessments of the health and source of origin of the confiscated individuals before release to mitigate the risk of disease transmission, disruption of population genetics,

and adverse effects on local biodiversity. Harvesting for illegal trafficking, along with other threats such as climate change, threaten the extinction of these chelonians in the wild. As a contribution to the long-term survival of these species, trafficking must be controlled and coupled with thorough monitoring and implementation of national conservation legislation.

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