

Research Article

PUBLIC ATTITUDE TOWARDS THE WATER MONITOR LIZARD (*VARANUS SALVATOR*) IN A PERI-URBAN AREA OF NARAYANGANJ, BANGLADESH

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ABSTRACT

Varanus salvator, potentially inhabits in the Sundarbans, some isolated parts of northeast and southeast forest, and few populations survive with potential anthropogenic threats in two peri-urban areas of Munshiganj and Narayanganj district near capital city Dhaka. This species faces severe risk of wildlife-human conflict in Bandar Upazila, Narayanganj, to share a common ecological habitat with humans. The present study focused on finding out public attitudes towards the *V. salvator* through a questionnaire survey among the local inhabitants living near this lizard's habitats. More than half of the interviewed participants (51%) recognized *V. salvator* as a reptile but wrongly stated it as a snake. While (47%) of the total participants thought the lizard was a potential threat, a large portion (60%) believed it provides critical ecological services. The majority (88%) of the participants agreed that the lizard's population has declined in the past ten years and stated habitat destruction (62%) as the primary cause for their population declination. A more significant portion (80%) of the participants agreed on urgent conservation measures for this threatened lizard, and half of them suggested relocating and initiating ex-situ conservation approaches to increase their population. A significant portion (around 42%) also believed that targeted educational outreach events and providing foods and protecting habitat would improve their survival chance in the existing areas.

Keywords: *Water Monitor, Varanus salvator, peri-urban area, public attitude*

Introduction

The water monitor, also known as the "ring lizard," is the largest of three monitor lizards found in Bangladesh. This semi-aquatic species occupied a wide range of habitats close to water bodies and reported inhabiting in the human-disturbed and polluted areas to some extent (Traeholt 1994; Uyeda 2009). The largest population of water monitor occurs in the coastal mangrove forests of the Sundarbans, with several isolated populations in the southeast and northeast forests. Apart from these natural habitats, two small populations of this species inhabit interrupted Manikganj

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and Narayanganj districts (Rahman *et al.*, 2017). Wildlife living in the vicinity of human-populated areas is prone to human-wildlife conflict resulting from different anthropogenic factors and developmental activities that enhance threat to their survival. According to IUCN Bangladesh (2015), the habitat of water monitors is shrinking due to anthropogenic factors and development activities, and their population is also decreasing day by day for the same reasons.

Monitor lizards are the source of fascination and fear all over Bangladesh (Rahman *et al.*, 2017). The fear and negative attitudes towards the water monitor could be due to their predation on the domestic animals, especially chicks and ducklings in the village areas, and lack of knowledge on the ecology of this threatened wildlife. Folklore and negative attitudes toward amphibians and reptiles are considered significant obstacles to conserving these species (Ceríaco 2012). In a human-dominated ecosystem where wild animals live in close vicinity of people, there is an urgent need for a change in the public attitudes toward animals to ensure coexistence. While negative attitudes about wildlife create difficulties in their conservation, public support could make it successful (Alves *et al.*, 2012; Alves *et al.*, 2014; Knapp *et al.*, 2011; Sarasola *et al.*, 2010; Miller and Hobbs 2002; Rosalino and Rosalino 2012). Human attitudes toward animals are becoming of increasing importance in conservation and welfare (Batt 2009). Attitudes encompass both feelings and beliefs and are directed toward decision-making and important elements of perception (LaHart 1978).

As the communities play a vital role in biodiversity conservation (Berkes 2007), it is essential to engage them in the conservation and management of wildlife species. For developing a community-based management and conservation plan, it is essential to know the people's perception and attitude towards the water monitor lizard. The assessment of public attitude towards water monitor also paves the way to develop an effective communication strategy to increase awareness among the local inhabitants about the importance of water monitor. As the water monitor lizards in the Narayanganj area live in close contact with the local inhabitants, the study focused on finding out people's perceptions and attitudes through a questionnaire survey to deeply understand the underlying causes of water monitor's and human conflict and generating recommendations for conservation measures.

Materials and Methods

The present study was conducted in a peri-urban area of Bandar Upazila of Narayanganj district (23.632285°N, 90.524397°E), a pre-historic location where the water monitor is co-existing with the human residents (Fig. 1). Our pilot survey revealed five potential sites covering an area of 2843 ha, where the water monitor inhabits. All the sites were characteristically dominant water bodies, polluted with waste discharged by nearby dwellers and industries within at least one-five meters distance, and did not have dense homestead forest within five meters on the perimeter of the water bodies except for site 1. The present study was conducted to assess the public attitude towards water monitor by a questionnaire survey from January to December 2018 beside the study to assess the activity budget of *V. salvator*. A total of 60 randomly selected local inhabitants residing near study sites, including male and female participants of different age groups, partook in the questionnaire survey. A set of questions were developed following the guidelines of Gault, 1907 to measure the perceptions of local inhabitants on *V. salvator*, learn about the interactions and conflicts with the locals, assess the threats to their survival, and generate recommendations for conservation measures. Data were analyzed using the software "Minitab 18.1" and "Microsoft

Excel, 2010” to compare changes in perception in the five study sites and to select a priority site or sites for the potential relocation of this threatened species in the face of increased anthropogenic threats.

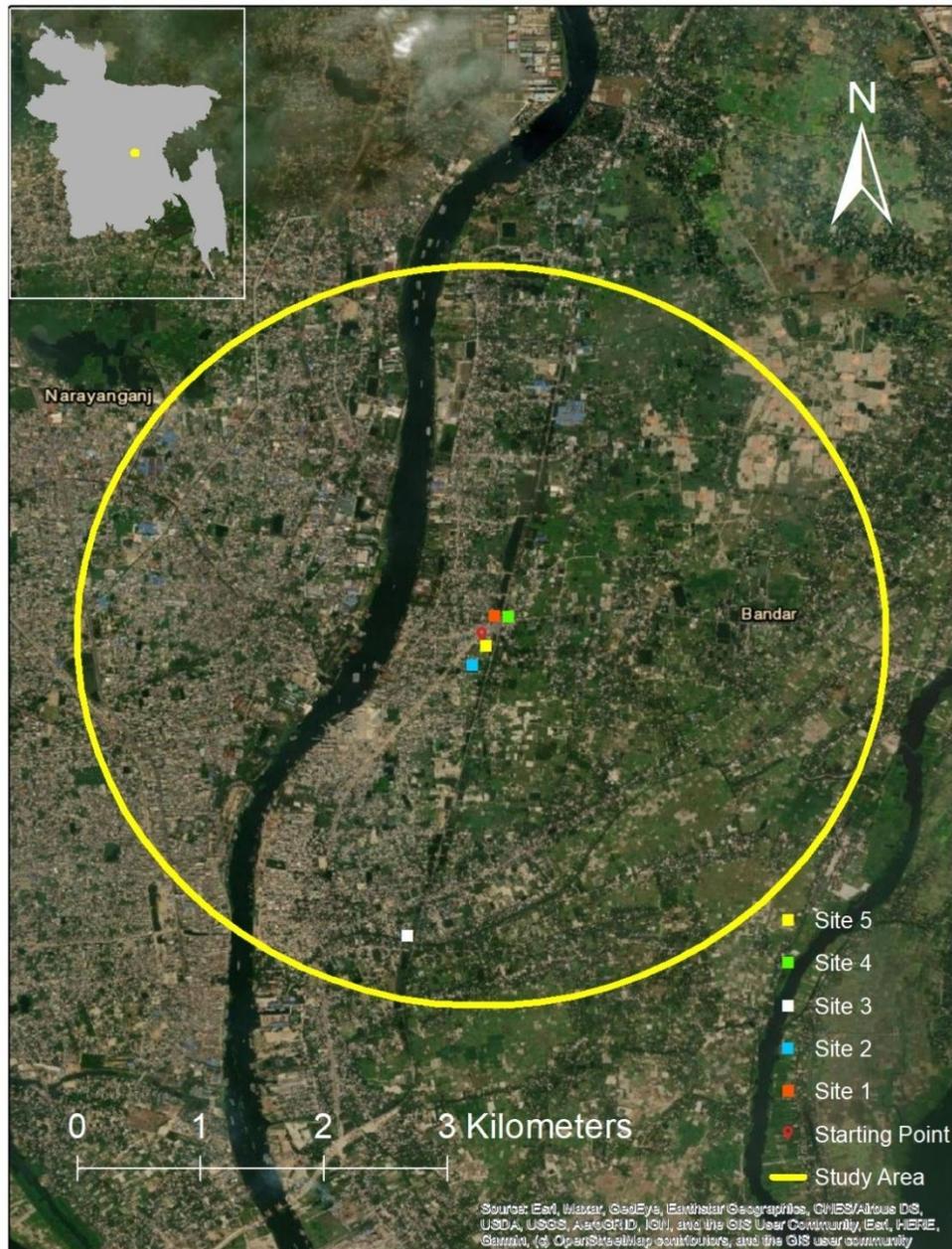


Fig. 1. A satellite view of the study location showing the coexistence of *V. salvator* in a human-dominated ecosystem and location of the five sites where *V. salvator* inhabits.

Results and Discussion

A total of 60 participants (65% male and 35% female) of various professions, including students, job holders, housewives aged between 16 to 72 years, were interviewed from the study sites to assess their knowledge on and attitude towards the water monitor (Fig. 2).

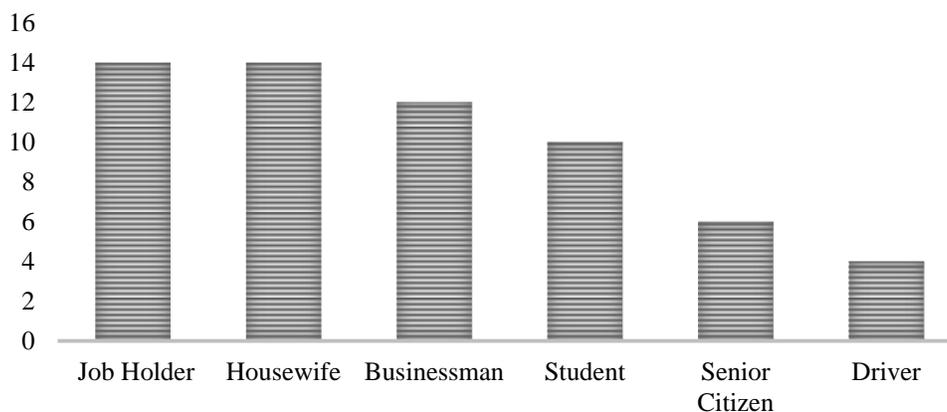


Fig. 2. Local inhabitants of different professions were selected randomly for the interview, the highest percentage being represented by the job holders (23%) and housewives (23%), followed by businessmen (20%), students (17%), senior citizens (10%) and lowest by drivers (7%) of different local vehicles.

The local habitants called the water monitor "Guishap" which is also the local name for both the Yellow monitor *V. flavescens* and Bengal monitor *V. bengalensis* (IUCN Bangladesh, 2015), but they distinguished the water monitor as "Boro Guishap" due to its larger size than the other two. All the participants recognized water monitor as a reptile while half of them wrongly identified it as a snake and another half correctly as a lizard.

The water monitor resided in this mentioned area for over 50 years, stated by 80% of the total respondents who have either experienced by themselves or listened from senior citizens. Of the total respondents, 60% reported that the population size of the water monitor comprising over 100 individuals in the entire study area, while another 40% reported that the population size is between 50-100 individuals; according to the respondents, the average highest population of water monitor inhabited in site 2 followed by site 1, 4 and 5 and the lowest in site 3 (Fig. 3).

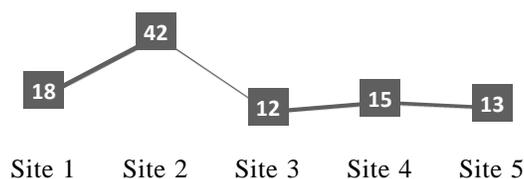


Fig. 3. The average population size of water monitor at different study sites as reported by the respondents (n=60).

88% of total interviewees (48 persons) opined that the population of the water monitor had been decreased in the past ten years, while only a few (12%) said that their number has increased. The majority (62%) of the respondents identified habitat destruction as the primary cause of water monitor's population declination. They stated that rapid changes in the water bodies due to developmental activities and continuous pollution had changed the characteristics of these water bodies, which were once suitable for different aquatic and semi-aquatic animals to thrive on. The participants identified scarcity of food as the second major (mentioned by 34% of participants) and intentional killing as the third major (mentioned by 4% participants) cause for the declination of water monitor population (Fig. 4).

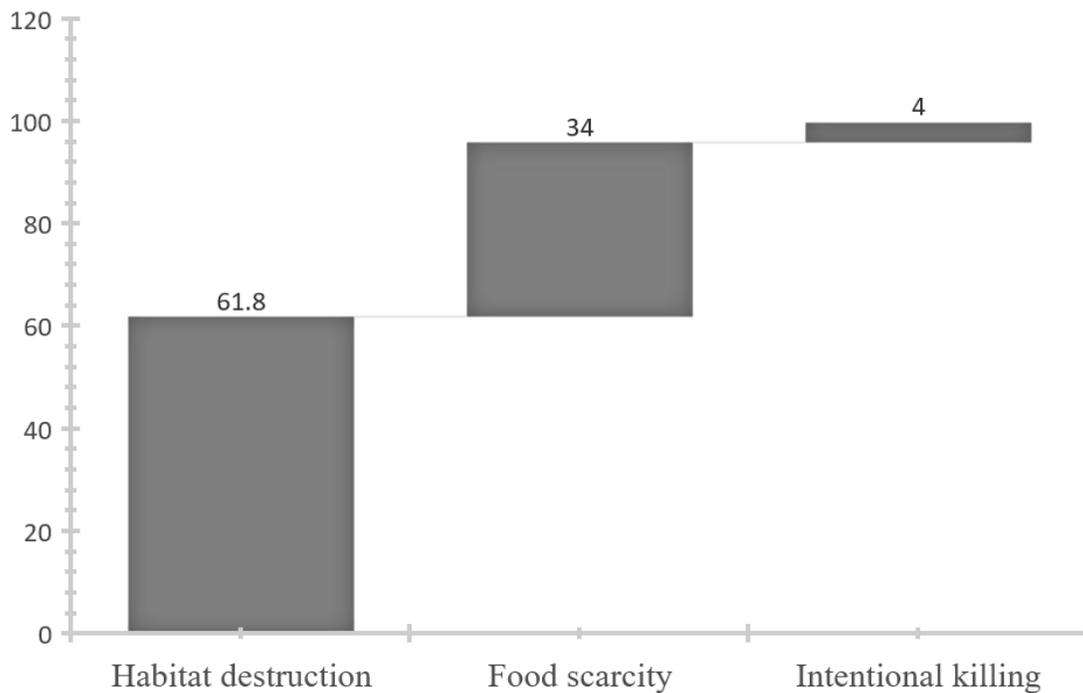


Fig. 4. Responses of the interviewees (n=60) on the reasons of water monitor population declination revealed that habitat destruction is the primary cause followed by food scarcity and intentional killing.

More than half of the respondents (53%) believed water monitor to be harmless and a non-venomous animal, while a significant portion (47%) believed it to be venomous and harmful to the people. The majority (77%) of the people who believed water monitor as venomous also believed in the false myth that its tail contains venom and a single strike of it can gradually kill an animal or a person. A few (23%) believed that they have venomous teeth and that their bite can cause death. The belief in such false myths is the evidence of a lack of knowledge on the ecology of water monitor that results in a negative attitude towards them and increases the chances of potential conflicts with the local inhabitants. Such a negative public attitude was also mentioned in a study conducted by Rahman *et al.*, 2017 at the Karamjal area of Sundarbans mangrove forests.

To learn about the potential conflicts with the local inhabitants, we assessed the information on attacks by water monitor to the nearby households and domestic animals. Of the total respondents, only 8% reported that they had experienced an attack on their households, 70% reported that the water monitor attacked their domestic animals, and 3% reported that they injured humans. On the contrary, only a few (4%) of the total respondents claimed local inhabitants are involved in the intentional killing of water monitor. The intentional killing was not specified but maybe they see the water monitor as a threat to humans or built-in superstition.

As many as 60% of the respondents acknowledged that water monitor plays a vital role in maintaining ecological balance as a scavenger, while a significant portion (40%) did not recognize its importance in maintaining a healthy ecosystem. Whether essential or not, 80% of the respondents (n=48) believed that the water monitor requires urgent conservation measures. Almost half of them suggested initiating ex-situ conservation approaches, while another half believed that the population of water monitor could be increased by keeping them in their current habitat. Of the people who proposed to keep the animal in their current habitat, 41% suggested for targeted educational outreach event will significantly reduce potential threats to water monitor and ultimately help to increase their population, 21% suggested for effective implementation of existing laws or to improve laws for their protection, 20% suggested for providing foods and another 16% suggested for habitat protection (Fig. 5).

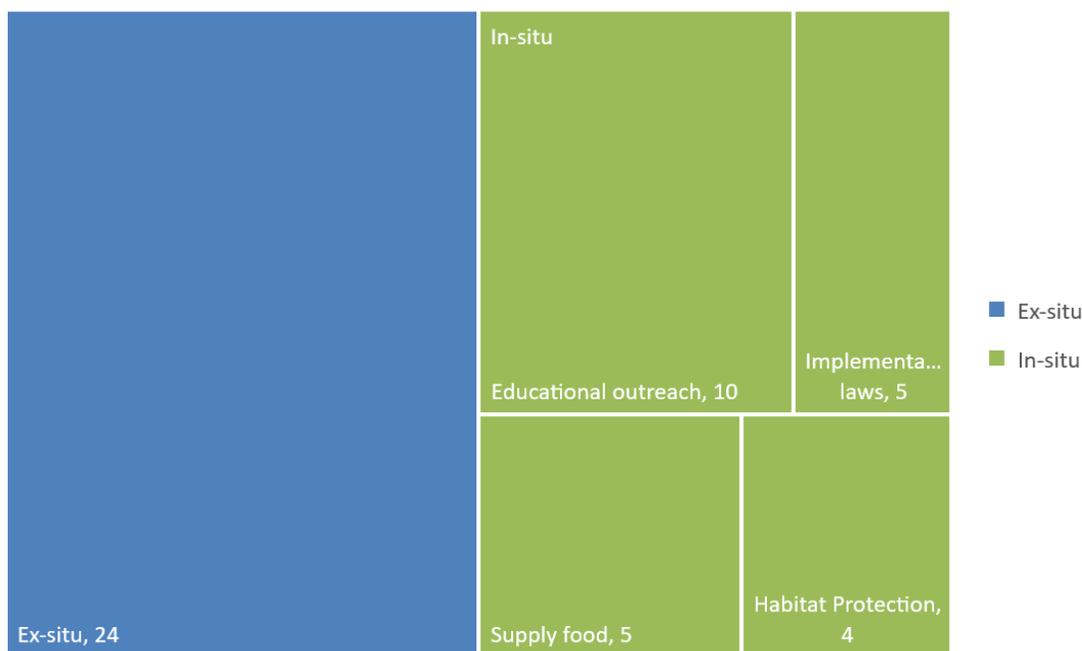


Fig. 5. Among the responders (n=48) who suggested taking urgent conservation measures, half of them (n=24) suggested ex-situ conservation and another half (n=24) suggested in-situ conservation.

Conclusion

Though the water monitor (*V. salvator*) is least concern (LC) globally, it is vulnerable (VU) in Bangladesh and their population trend is decreasing (IUCN Bangladesh 2015). The decreasing trend of the population of water monitor is also a significant threat evident in the Bandar Upazila, as mentioned by the local inhabitants and the majority of them reported habitat destruction as the primary reason. The rapid developmental activities, negative perception towards wildlife, pollution from the industries and household activities cause habitat destruction and thus challenges the survival of dependent wildlife species, including water monitor in the Bandar Upazila. Though a significant portion of the local inhabitants considered water monitor (*V. salvator*) harmful to people, most of them urge urgent conservation measures to reduce the chances of increased conflicts between water monitors and increase their survival chances. Effective conservation strategy and targeted education outreach event will bring positive changes in knowledge, attitude, and behavior, which will help mitigate existing anthropogenic threats and increase compliance with the national regulations. National acts and international commitments must be projected through these educational outreach events and practicing existing laws and regulations must be ensured to stop the intentional killing of these threatened species. Habitat protection and restoring ecosystem for the remaining water monitor population in these areas should be ensured and the probability of possible relocation should be measured by robust scientific investigation. We suggest empowering local people by involving them in the monitoring and conservation of the water monitor population. This co-management approach, together with educational outreach events, habitat protection and implementation of laws, will increase the chance of a thriving population of water monitor in the Bandar Upazila of Narayanganj.

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