

Interim Report
10th May- 10th July
At
HELP EARTH, Guwahati
On
Temple Turtles of Assam
Guwahati



©Debangini Ray (Black Softshell Turtle, Hajo)

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CERTIFICATE

This is to certify that the project report entitled _____
done by _____ for _____
is original work. It has been carried out as Summer Internship under my guidance
for partial fulfillment of M.A in Ecology, Environment and Sustainable Development.

Place: _____ **(Name of Supervisor)**

Date: _____ **Designation:**

Name of Organization:

ACKNOWLEDGEMENT

First, I would like to thank Dr. Jayaditya Purkayastha for giving me an opportunity to do an internship with the organization. It was a unique experience for me to stay in my city and study a relatively unique animal species. I am glad to have had the chance to work so closely with turtles, about which I had very little knowledge beforehand. I can now say proudly, I have quite some knowledge as well as experience working with the gentle, ancient creatures. It has helped ignite a passion in me to work for the conservation of freshwater pond turtles and has made me decide to carry this work forward, beyond this internship, for as long as it takes to taste success.

I would next like to thank my Course Coordinator, Dr. Pijush Kr. Dutta as well as my Department, for allowing me to do this wonderful internship as well as encouraging us to learn as much as possible from the internship.

Furthermore, I would like to thank the temple authorities, priests and caretakers of Ugratara Mandir, Kamakhya Mandir and Hayagriva Madhav Mandir who have extended their support, cooperation and most importantly, their time, to create an enjoyable working environment for the study.

At last, but never the least, I would like to thank the people of the community, the residents, shop owners and turtle lovers who have helped in the survey and made this fieldwork possible to a great extent.

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SUMMARY

The project “Temple Turtles of Assam” has extensively been done in Assam, covering three field sites, namely, Jorpukhuri of Ugratara Mandir, Kaso Pukhuri of Kamakhya Mandir and Madhav Pukhuri of Hayagriva Madhav Mandir. Most of us do not know that out of the 328 species of turtles found in the world, 29 species have been recorded in India, out of which 20 are found in Assam! It would have been a very happy fact, but unfortunately that cannot be the case at present. This is because almost 90% of the turtles here are facing some kind of threat. This is ironic, because turtles are worshipped and revered by the Hindu people and seen as an avatar of Lord Vishnu, namely the Kurma Avatar and this is the main reason turtles are kept in temple ponds. They are often donated by worshippers who visit the temple, often when a child is born in a family. This reason, religious though it is, has helped in the conservation of turtles in Assam. Since the population of these turtles in the wild is reducing drastically (one of the species being declared Extinct in the Wild by IUCN), it is these temple ponds across Assam which act as the last refuge for these gentle creatures, away from the butchers who are desperate to sell their flesh in the market. This, on the one hand is a good thing, since the temple ponds act as home for turtles and centers of education and awareness for students and people willing to observe and learn more about them; but also a bad thing since, if we the people of Assam continue to neglect the condition of turtles and remain ignorant of their plight, these creatures will be doomed in the near future.

The objective of this project, speaking broadly, was to observe the different species of turtles found in the field sites closely, study their environment and the human-turtle relations and community perceptions as well as aid in the welfare of turtles if they are facing difficulties in any field site.

The results were vast, some positive, some negative, and I concentrated on the negative because that is what we needed to change. Not all communities are well acquainted with turtles and those who are, have reverence for them. Temple authorities also play an important role in the conservation and welfare of these reptiles. The fact that basking is a crucial part for turtles to survive and thrive is not known to most of the people, as a result of which, basking spots are not available in most of the sites. At the end of my project, we have also managed to create basking spots for basking and breeding of the turtles, managed to make a sufficient amount of people aware about the existence of different species of turtles in the ponds and have a lot more going on at present for turtle conservation, which could not be covered in the report. The report is about the activities undertaken in the two months of June and July mostly, including the objectives of those activities, the methodology and the findings, along with photographs.

This internship has taught me patience, a good deal of it, and to listen to people, whatever they say, without judging them at every point. Because, all information, is useful information when it comes to research and conservation. I have also come to appreciate the diversity of my city a great deal more. I have tried my best to inculcate my learning in TISS, to the field work and research methods in the internship and I apologize in advance for any mistake I have made during my field work and in my report.

1) INTRODUCTION

1.1) INTRODUCTION TO FRESHWATER TURTLES AND THEIR PLIGHT

Turtles came into existence about 220 million years ago, in the late Triassic era. They were the first of the living reptilian group to appear in fossil records. Turtles and tortoises are amongst the most threatened groups of vertebrates on this planet. Of the 328 species of turtles worldwide, more than half are facing the threat of extinction. Apart from environmental factors and habitat degradation turtles also have to face the additional threat of illegal trade and human consumption. They are used as pets and are also part of traditional medicines. In India, 29 species of turtles have so far been recorded, out of which 20 species are found in Assam. Unfortunately 90% of the turtles in Assam are facing some kind of threat.

Turtles are also part of different cultures around the globe. Due to their long lifespan, they are a symbol of longevity and stability. Hindus believe turtles to be an incarnation of Lord Vishnu- “Kurma Avatar”, hence revere them. Even Hindu clan names are derived from turtle ancestors. Religious shrines in this region also accommodate turtles in their ponds. The turtles generally make their way to these ponds by way of devotees. It is seen that devotees donate turtles to a pond when a child is born in their family, with a belief that the new born attains a long life as that of the turtle. The turtles in these ponds are not harmed due to the religious ideologies associated with them. Even feeding these turtles is believed to be a noble act. In Northeastern India, noteworthy community temple ponds sheltering turtles include: Garakhia Gohair Than, Sorbhog; Hyagrib Madhab Mandir, Hajo; Dhareshwar Debalaya, Shilguri; Kamakhya Temple Pond, Guwahati; Ugratara Temple, Guwahati; Nagshankar Temple, Biswanath Chariali; Athkhelia Namghar, Golaghat; Barokhelia Namghar, Golaghat; Deopani Temple, Karbi Anglong and Teenkuniya Pukhuri, Tinsukia. These community ponds harbour even the most threatened turtles like *Nilssonia nigricans*. These ponds apart from being a repository of turtles, also act as a laboratory for conducting research on various aspects of turtles and also help educate people. Turtles, of late, have become such a rarity that for a common man these temple ponds are the only place where they can see a turtle.

Freshwater turtles may be carnivorous, feeding on live or dead animals, but mostly they are omnivorous. They can withstand a high concentration of carbon di oxide in blood. This characteristic feature enables them to remain under water for long without taking in of fresh air.

Turtles are oviparous, they lay eggs ranging from a single egg to around 200 eggs. In several species the eggs are laid in several clutches throughout the year or even in the same nesting season. In aquatic and semi aquatic specie, nests for laying eggs are constructed by excavating holes with the hind limbs. It has been determined recently that the sex of most species of turtle is determined by environmental factors most important of which is the temperature of incubation. The hatching depends upon the nest temperature and varies from species to species. It may take few weeks to more than a year. The hatchlings are miniature replicas of the adult and are independent. Most aquatic turtles’ hatchlings move towards the water after hatching.

Turtles play a very important role in ecosystem, being scavengers they clean the aquatic ecosystem by feeding on dead and decaying plant and animal materials, which help in cycling of matters by releasing

elements that are locked up in dead tissues. They also control aquatic weeds like water hyacinth which not only threatens to clog the water channels but also reduces the sun ray penetration in fresh water system reducing the productivity. Many turtles also eat insects and snails that are pests and by consuming the ill health fish help in maintaining healthy fish community. The turtle plays a major role in seed dispersal and also controlling weeds. Seeds of several species of plants require passing through the system of turtles, for germination. Researchers have recently revealed that ageing does not occur in many organs like liver, lung and kidney, of turtles. This has opened up a new vista of turtle genome research on longevity genes.

About half of the global turtle population is threatened with extinction. Hunting for human consumption is the greatest threat to their survival. Pet trade also has great influence on them. Most aquatic and semi aquatic turtles are facing the problems of reduction in nesting site, depletion of food stock specially fishes due to overexploitation by man, pollution, river traffic and sand mining. Damming of rivers, conversion of water bodies into agriculture land, seasonal drying up of streams and other water bodies are also posing as threat for the turtles. Cleaning of primary forest, habitat fragmentation, shifting cultivation are the major threats for the land dwellers.

1.2) INTRODUCTION TO FIELD SITES:

A) JORPUKHURI, UGRATARA MANDIR, GUWAHATI

Ugra Tara Temple is a temple dedicated to Goddess Tara located in the western side of Jor Pukhuri tanks in the eastern part of Guwahati city in the Lotaxil (Lataasil) locality in Northeast India. It is an important Shakti shrine. The present temple of Ugra Tara was built by Ahom King Shiva Singha in 1725 AD who had excavated a tank three years before he built the temple. The tank, known as Jorpukehuri, is situated to the east of the temple. The tank still exists, though the upper section of the temple was destroyed by a devastating earthquake. This was however rebuilt by a private citizen.

Jor means 'a pair' in Assamese and Pukhuri/Pukhuri stands for 'pond'. Jor Pukhuri is a pair of ponds which adds up to the residential value of the area. The two ponds, which was earlier just one became a pair when the canal connecting the Brahmaputra to the temple of Ugratara, in the times of Koch rulers was sealed and converted into a road called the Naujaan Road. Naujaan in Assamese means a canal for boats. The water of the ponds have an under source with the river Brahmaputra. Apart from the legendary significance this set of ponds depicts affinity to water for the earliest settlers of Guwahati in and around the pond surroundings. The pond, since a very long time is the home to a gaggle of Swans, Raj Haanh in Assamese, and their various humanly antics have become figs of various folklore and poetry of Assam.

Coordinates:

26°11'20"N 91°45'17"E

Elevation: 68 m

Length: 160 m

Breadth: 68 m

Area: 10880 sq. m



Jorpukhuri

B) MADHAV PUKHURI, HAYAGRIVA MADHAVA MANDIR, HAJO

Hayagriva Madhava Temple is situated on the Monikut hill which is situated in Hajo, Asaam which is around 30 km to west of Guwahati. The present temple structure was constructed by the King Raghudeva Narayan in 1583. According to some historians the King of Pala dynasty constructed it in 6th century. It is a stone temple and it enshrines an image of Hayagriva Madhava. Some Buddhists believe that the Hayagriva Madhava temple, best known in the group of Hindu temples, is where the Buddha attained Nirvana. At this imposing temple, the presiding deity is worshipped as the Narasimha incarnation of Vishnu by the Hindus. It is a stone temple and it enshrines an image of Hayagriva Madhav. There is a big pond known as Madhab Pukhuri at the bottom of the temple. This temple preaches both Hinduism and Buddhism, which attracts Buddhist Monks from far flung places.

Coordinates:

N 26°14'643", E 091°31'573"

Elevation: 60 m

Length: 172 m

Breadth: 85 m

Area: 14693sq. m



Madhav Pukhuri

C) KASO PUKHURI, KAMAKHYA MANDIR, GUWAHATI

The Kamakhya temple of Guwahati is one of the prime pilgrimage spots of India. Devotees from across the country as well as tourists throng this holy place. It is one of the oldest of the 51 Shakti Pithas.

A popular belief regarding turtles here is that, when a child is born, a turtle donated to the Kaso pukhuri endows the child with a long life. This belief is actually helping the conservation of critically endangered such as Black Softshell Turtle (*Nilssonia nigricans*).

Coordinates:

26° 05' to 26° 15' N and 91° 35' to 91 ° 55" E (Guwahati Metropolitan Development Authority, 2006)

Elevation: 180 m

Length: 38 m

Breadth: 29 m

Area: 1102 sq. m



Kaso Pukhuri

2) DESCRIPTION OF THE INTERNSHIP

2.1) ABOUT HELP EARTH

Help Earth is a Non-Governmental Organization established in the year 2006. It is a part of United Nation's Integrated Civil Society Organizations (ICSO) System. Since its inception, Help Earth has been actively involved in conservation of urban biodiversity. The organization has tried to communicate and reach out to as many people and authorities possible to voice concern regarding the almost pitiful state of the only biodiversity that a town dweller has the fate to observe- Urban Biodiversity.

Help Earth has engaged in several conservation programs including documentation of pitiful state of turtles in temple ponds of Assam, involving students of different educational institutes in the study of living conditions of turtles in the community ponds as well as providing support to several temple ponds in construction of breeding and basking sites.

The organization is an avid campaigner of saving wetlands, laying emphasis on the lone RAMSAR site of Assam: Deeporbeel. Saving Deeporbeel would ensure extended life and health of several birds, amphibians, reptiles etc. associated with it. Help Earth consistently supports the cause of amphibian conservation as can be observed from its promotion of the issue of amphibian conservation through organizing "Save the frogs day" involving popular brand names such as BIG BAZAR etc. In keeping with the spirit and to encourage future conservationists Help Earth also felicitates esteemed personalities associated with amphibian conservation.

To spread the awareness to masses Help Earth also conducts outreach programs such as face painting, T-Shirt painting, thematic drawing competitions among school and college students. The organization also has conducted awareness program on amphibians in All India radio. The organization has resource persons who visit different educational institutes to deliver lectures on various topics related to conservation of biodiversity. Several meetings and symposiums have also been conducted by Help Earth on various burning issues of wildlife biology and conservation. The organization also focuses on toxicological studies as well as various ethno veterinary aspects. Ecological study of birds along with amphibians and reptiles also form an important part.

Previously in the year 2013 Help Earth led by Dr. Jayaditya Purkayastha had done a study and published a report on the temple turtles of Assam titled "Study And Conservation Of Turtles In Temple Ponds Of Assam, India" with special focus on the *Pangshura sylhetensis* (Assam roofed turtle) which had been funded by The Mohammad bin Zayed Species Conservation Fund.

2.2) SWOT ANALYSIS

A SWOT Analysis was carried out at the beginning of the Internship to find out which project would be best suited for the same. The Strengths, Weaknesses, Opportunities and Threats of three projects were done, namely, Greater Adjutant Stork (*Hargila*) Conservation Program, Herpetofauna of Guwahati and Temple Turtles of Assam. Fate had me choosing the last one. This is the following SWOT analysis I did, for the project “Temple Turtles of Assam”

SWOT ANALYSIS	
STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> I am a local girl and can converse equally well in Assamese, Bengali, Hindi and English. My immense love for animals will help me dedicate myself completely to turtles and conservation My communication skills will help me converse with all kinds of people and gather a lot of useful information which I will be able to inculcate in our solutions and problems All the field sites of the project are in my own city and relatively near (except Hajo, which also is not very far) so living and travelling will not be a problem. All the field sites are well known to me since many years. My love for photography can prove a plus point as I can document a lot of important stuff including the different species of turtles found in different ponds. 	<ul style="list-style-type: none"> The heat in Guwahati might prove very overwhelming and can come in the way of continuous field work from morning to evening. I have certain health issues like low BP, and very low hemoglobin. Hajo is some distance away from Guwahati, so travelling there regularly for field work can be a problem.
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> Being in the same city where I live, this project will give me a lot opportunities to imbibe interest in my fellow mates, family and friends about the significance of my project. Also, most importantly, I can continue working for the turtle conservation under Help Earth even after the internship period ends 	<ul style="list-style-type: none"> The only threat I feel might be from people itself, for turtle meat is considered a delicacy in Assam and it will be very difficult to convince a majority of the section to conserve these creatures once we release a sizeable population into the wild and it increases. Lack of basking spots and breeding spots and unwillingness of temple authorities to let us create them. Less number of people wanting to work for conservation. Strict rules and interest, non-cooperation of authorities in some temples

2.3) METHODOLOGY

The methodology used was QUALITATIVE RESEARCH, which naturally proved to be very flexible and helped me meet all my objectives of the research. The following qualitative research methods were used-

2.3.1) Field Research

- a) Non-participant observation- In Non-participant observation, I observed the participants without actively participating. I used this method to understand the phenomenon and scenario in the temples and the temple ponds by entering the community and the social system, while staying separate from the activities being observed.
- b) Participant Observation- This is one of the most common methods for qualitative data collection, but it also very demanding. I had to become a participant in the context being observed. But in my case it was not that difficult since it did not require me to be accepted by the community because I was not studying a community at all. I just had to become a temple visitor, curious and excited to feed the turtles like them all and occasionally (in Jorpukhuri) , I had to act as a nearby hosteller who cares for turtles and comes to feed them before going off to college
- c) Direct Observation- Direct observation is distinguished from participant observation in a number of ways. First, a direct observer does not typically try to become a participant in the context. However, s/he does strive to be as unobtrusive as possible so as not to bias the observations. Second, direct observation suggests a more detached perspective. The researcher is watching rather than taking part. Consequently, technology can be a useful part of direct observation, like I have used. For instance, one can document the phenomenon. Third, direct observation tends to be more focused than participant observation. Finally, direct observation tends to take less time than participant observation. For example, I took less time to sit on a rock and observe the behavior of the turtles than I took, while acting like a visitor of the temple and feeding the turtles like visitors do at the same time observing the turtle behavior.
- d) Unstructured Interviews- Unstructured interviewing involved direct interaction with the respondents. It differs from traditional structured interviews in several important ways. First, although I may have some initial guiding questions or core concepts to ask about, there is no formal structured instrument or protocol. Second, I am free to move the conversation in any direction of interest that may come up. Consequently, unstructured interviewing proved particularly useful for exploring my topic broadly. However, there is a price for this lack of structure. Since each interview tends to be unique with no predetermined set of questions asked of all respondents, it is usually more difficult to analyze unstructured interview data, especially when synthesizing across respondents.
- e) Close-ended Questionnaire survey- I have conducted a survey in all the three field sites with the help of questionnaires I have created to collect information from the people, consisting of 10 questions with sub-questions. I have made the questions close ended with most of the questions having a

variety of responses for the respondents to choose from. There 30 questionnaires in total, divided between 3 field sites. I took 2 days per field site to complete the questionnaire survey.

- f) Field Notes- I have kept a journal throughout my entire field work and have recorded and noted down any point which struck me interesting or important, so that I could apply it whenever required later on.

2.3.2) Visual Research

- g) Visual Encounter Survey- in Visual Encounter Survey, I have selected a transect design, the area to be covered (it is the same area every time) and have noted the time of the beginning and end of the research. During the Visual Encounter Survey, I have noted the number of turtles I had spotted between those times. Most of my visual encounters have been between the time frame 8am-11am, 11am-2pm and 2pm-5pm in the field sites. I had to ensure that the sun was always behind me, so that during the period of basking (of the turtles), whether in full sunshine or part shaded areas, a turtle is in full or virtually uninterrupted vision, from 5-12 m away. Walking must be done steadily. Any other important information that may have affected the numbers sighted, e.g sudden rain, different vegetation type or change in habitat, survey joined by a further observer, human presence, etc have been recorded.
- h) Photography- I have used my camera Canon 1100D with Canon lenses 18-55mm, 55-250mm and Tamron lens 55-300mm to click photographs of the different species of turtles, the field sites, important elements present in the field sites, behavior of the turtles, activities in the field sites and flora and other fauna in the field sites.
- i) Videography- Similarly for videography too, I have used my camera Canon 1100D with Canon lens 18-55mm to record the movement of different species of turtles, behavior of the turtles and activities in the field sites.

2.4) INTERNSHIP ACTIVITIES

2.4.1) Learning about the different species of turtles found in the temple ponds, documenting them and their behavior, learning how to identify each species, feeding them, observing their behavior and reading about them, applying the knowledge on field

Objective: To learn to identify a freshwater turtle species and distinguish between the different species, to get accustomed to their behavior and to observe their movements

Findings: Turtles found in the three field sites are-

A) Spotted Pond Turtle (*Geoclemys hamiltonii*)

The **black pond turtle**, also known as the **spotted pond turtle** or the **Indian spotted turtle**, is a species of turtle endemic to South Asia. Its Head is brown with dots. The carapace is brownish blue or blackish with yellow spots. It is known as **Nal Dura** in Assam.

Global Distribution: India, Pakistan, Bangladesh.

IUCN Status: Vulnerable

IWPA Status: Schedule I



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B) Brown Roofed Turtle (*Pangshura smithii*)

The jaws of this turtle are serrated. The carapace is depressed, it is olive with mid dorsal brown or black stripe prominent anteriorly. The head and neck are also olive with an orange or red spot behind the eye. The lateral part of the neck has yellow or whitish stripes. It is known as Muga dura in Assamese.

Global Distribution: India, Pakistan, Bangladesh.

IUCN Status: Near Threatened

IWPA Status: Schedule IV

C) Assam Roofed Turtle (*Pangshura sylhetensis*)

The **Assam roofed turtle** (*Pangshura sylhetensis*), also known as **Sylhet roofed turtle** is a rare species known only from a few individuals. It is exploited for its meat and eggs for local consumption. Its carapace is olive or brown. The head is brown and a crescent orange mark is present behind the eyes. Neck stripes are few in number or almost absent. In the cooler months (from December to February), it basks during most of the day; individuals living in cooler hill-streams may do so year round. The turtle is shy and never basks on river banks, but only on emergent logs or rocks. At the slightest disturbance, it dives quickly into the water, hiding between rocks. It is known as Phulun dura in Assam.

Global Distribution: India, Bangladesh.

IUCN Status: Endangered

IWPA Status: Schedule IV



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D) Indian Roofed Turtle (*Pangshura tecta*)

It's a quiet and shy water turtle which loves to bask in the sun in the morning. Its jaw is strongly serrated and it has a pointed snout. The carapace is brown or brownish green with yellow or orange edge. The lateral part of neck has many yellow or white stripes (more than the Assam roofed and the Indian tent turtle). There is an orange spot present in temporal region. It is known as Futuki Salika Dura in Assam.

Global Distribution: India, Pakistan, Bangladesh, Nepal.

IUCN Status: Not Listed

IWPA Status: Schedule I



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E) Indian Tent Turtle (*Pangshura tentoria*)

It is similar to Indian roofed turtle (*Pangshura tecta*). The carapace is olive with yellowish marginal edges. Neck stripes are not as many in number as *Pangshura tecta*. Orange spot in the temporal region is faded or absent. It is known as Salika dura in Assam.

Global Distribution: India, Bangladesh.

IUCN Status: Not Listed

IWPA Status: Schedule IV



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F) Indian Narrow-headed Softshell Turtle (*Chitra indica*)

Indian narrow-headed softshell turtle (*Chitra indica*) is also known as **small-headed softshell turtle**. It is very large and feeds on fish, frogs and crustaceans which it ambushes. The carapace and head are olive grey. Grey lines with black border radiates from the behind its neck. Such lines form a reticulation pattern over the carapace. It prefers a clear, large or medium water body with sandy bottoms. It spends most of its time concealed below the sand, sometimes with only the tip of the nose exposed. Its known as Baghia Kaso in Assam.

Global Distribution: India, Pakistan, Nepal, Bangladesh.

IUCN Status: Endangered

IWPA Status: Schedule IV

G) Indian Flapshell Turtle (*Lissemys punctata*)

The “flap-shelled” name stems from the presence of femoral flaps located on the plastron of this turtle. These flaps of skin, cover the limbs when they retract into the shell. It is unclear what protection the flaps offer against predators. Its carapace is olive with yellow spots. There is a “V” shaped mark present behind the eyes on the dorsal surface of head. The Indian flapshell turtle was placed in Appendix II of CITES in 1975 at the request of Bangladesh. The shell of this species is believed to be of medicinal value in both China and India. The shell is burnt and ground with oil to produce a medicine in China used to treat certain types of skin diseases. In India, the shell is used to make a remedy believed to be a medicine for tuberculosis. It is known as Halodhia futuki Kaso in Assam.

Global Distribution: India, Pakistan, Sri Lanka, Nepal, Bangladesh, Myanmar.

IUCN Status: Least Concern

IWPA Status: Schedule I



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H) Ganges Softshell Turtle (Nilssonia gangetica)

The **Indian softshell turtle** (*Nilssonia gangetica*), or **Ganges softshell turtle** feeds mostly on fish, amphibians, carrion and other animal matter, but also takes aquatic plants. The carapace is olive green. The head is green with transverse stripes (generally in 3 pairs) on dorsal surface running from behind the eye to nape. It is known as Ganga kaso in Assam.

Global Distribution: India, Pakistan, Bangladesh, Nepal.

IUCN Status: Vulnerable

IWPA Status: Schedule I



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I) Peacock Softshell Turtle (Nilssonia hurum)

It is similar to Gangetic softshell turtle and Black softshell turtle, but is smaller in size. The head is narrower and smaller than the other two mentioned turtles. The carapace is olive green, the head has black reticulation. It is popularly known as Bor kaso in Assam.

Global Distribution: India, Nepal Bangladesh, Pakistan.

IUCN Status: Vulnerable

IWPA Status: Schedule IV



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J) Black Softshell Turtle (Nilssonia nigricans)

The **black softshell turtle** or **Bostami turtle** (*Nilssonia nigricans*) was long believed to be inbred individuals of the Ganges softshell turtle (*N. gangeticus*) or the Indian peacock softshell turtle (*N. hurum*), but while it is a close relative of the latter, it is a distinct species. Its carapace is olive green, the head has black reticulation. It is popularly known as Bormuria kaso in Assam.

Global Distribution: India, Bangladesh.

IUCN Status: Extinct in the wild

IWPA Status: Schedule IV



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2.4.2) Documenting the living conditions of the turtles, observing how they are fed, trying to find out if there are any challenges faced by them, observing the ecosystem around them and the characteristics of the ecosystems and other elements in their habitat.

OBJECTIVE: To study the status and condition of the turtles, the immediate ecosystem where the turtles live to find out if they face any problem in the ponds.

FINDINGS: The western pond of Jorpukhuri, my first field site, is rectangular in shape, and located behind Ugratara Temple. It has three gates leading inside the pond premises. One of them is the main entrance to the pond, which people mostly use after coming out of the temple from the back, a flight of stairs leads down to the pond. The entire vicinity is surrounded by an army of geese (a flock would have been an understatement) cackling, screeching, and doing all sorts of things. It can seem scary at first but then one will discover that the geese do not attack at all, in fact they are scared if you chase them. The pond is an excellent ecosystem, because the food pyramid seems very well maintained. There are algae in the pond and being almost a natural ecosystem, there is no dearth of food for the fish. The fish population is huge, there are all kinds of fish ranging from tiny to big fishes. There is an excellent gradient of carnivores in the form of the turtles (aquatic), geese (terrestrial) and birds (avian) like Pied kingfisher, Common kingfisher, Magpie robin, Pied sterling, Little cormorant and Cattle egret. They thrive well on the fish living in the pond. This also means that there are plenty of trees nearby and the birds reside there. There are reptiles other than turtles living in the pond, I have encountered the checkered keelback, non-venomous water snake, gliding in the water and occasionally coming out of the water with its catch – big fish, more than once.

The pond has been recently concretized and beautified, previous basking spots and breeding sites created for the welfare of the turtles, have been demolished. As a result of this, we cannot see any turtles on the banks of the pond or out of water. The only time we can see them is when someone feeds them. Now, during my entire stay at the field site during my field work, ranging from time as early as 8am to 6pm sometimes, I have not seen a single person from the temple coming to feed the turtles. But I have seen temple priests feeding “bhog” to the geese. The only people feeding the turtles are visitors to the temple, who most probably consider it a religious or a good deed to feed the turtles or to show their kids these creatures. Apart from this, there are few residents living nearby for whom it has become a habit (mainly because of their emotional attachment to the turtles and some because they consider it their chance to do a good deed) to come every morning and feed the turtles.

In fact, one of these regular visitors (and nearby residents) Mr Baruah, feels that the temple authorities are not taking proper care of the turtles and they are starving. He also feels that the amount of food fed to them by visitors is not enough, they should be fed properly. He further adds, that the pond has become unfit for the turtles to survive.

Coming to the food fed to the turtles, the visitors mainly feed them bread, which is available in the grocery shop right next to the temple. I have also seen “muri” and biscuits being fed. The food is thrown to the water and not long after, turtles surface to devour them. Shy and hesitant, the turtles of Jorpukhuri do not seem accustomed to human presence, only a couple of them are fearless enough to venture close to humans, the rest stay far, occasionally raising their snouts and devour the pieces of food floating close to them. The problem here often is, the geese do not let most people feed the

turtles, pecking and surrounding the people and urging them to give them the food instead. People are most often scared of these geese and give them all the food instead. It is mostly the Peacock Softshell Turtles, Black Softshell Turtles and the Gangetic Softshell turtles that come to the surface when they are fed. Assam roofed turtles, Indian roofed turtles and Indian tent turtles have been spotted swimming in the waters and trying to bask in floating coconut shells or coconut tree twigs which have fallen into the water, but shy as they are, they quickly jump into the water when approached. Many hatchlings and baby turtles have also been spotted swimming around. This is good news. The turtles have also reportedly been sighted (though very rare) to feed on geese/ducks.

Next, the cleanliness of the premises. As a matter of fact, out of all the three sites, I would say Jorpukhuri is the dirtiest. There are no garbage bins anywhere and due to some reason, people always choose the pond premises as their dumping ground. The worst part is, the visitors who come to feed the turtles bread, throw away the empty packets here and there. These packets almost always end up in the pond water when the wind blows. Not just this, there are endless alcohol bottles as well as plastic bottles and their caps floating in one corner of the pond. This has become a threat for the turtles as they might accidentally swallow small non-biodegradable components of the garbage or get entangled in the polythene. Also, there is illegal fishing going on in the pond. If this continues, who knows tomorrow they might come fishing for turtles.

The two main problems of Jorpukhuri therefore, is the garbage and litter in the pond as well as around it, the inability of the turtles to bask or breed as well as the type of food given to the turtles. Bread and biscuits are not the natural food which turtles are accustomed to having and we do not know what harm it might do to their food habits, food patterns and digestive tract. Also, in an interview with the Chief Doloi, Mr. Kamal Bhattacharya, it seems as though the pond has become overpopulated with turtles and there would not be sufficient space, food or oxygen if more were to come. It becomes clear then, that to prevent eutrophication, hatchlings can be released in the wild. This in turn will be possible only if there is breeding, and it will ensure an increase in the population of turtles in the wild, instead of being limited to just temple ponds.



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A checkered keelback devouring a fish in one of the steps leading to the pond in Jorpukhuri



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A cattle egret swooping down to keep watch on prey in Jorpukhuri



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Illegal fishing going on by little boys of the neighborhood in Jorpukhuri

Kaso Pukhuri in Kamakhya Mandir, is located beside the Bhairavi Mandir, to reach which, one has to go down a flight of at least a 100 steep stone stairs. Even then, it is surprising how many people actually go there to feed the turtles, the number is overwhelming. There is an old vendor who sells food for the turtles to people who want to feed them – two bananas and a packet of rice grains, “for the fish”, he says. The scenario is very different from that in Jorpukhuri. The only way to enter the pond is one gateway which has stone steps leading down to the pond, the final steps covered in water and a lot of garbage. Like the geese in Jorpukhuri, the element of trouble here are ram goats and monkeys. Though harmless, a majority of the people tend to panic when a monkey approaches them and more so when the huge rams barge into them urging them to drop the food they bring for the turtles. And so, more often than not, it so happens that most of the food is gobbled up by these troublesome monkeys, rams and goats.

Like Jorpukhuri, here too, there is plenty of littering in the pond, but mostly near the stairs, where the people after feeding the turtles, throw away the paper plastic-paper plates, and polythene pouches which contain the rice grains, into the water. Surprisingly though, here, the Black Softshell Turtles are very accustomed to human presence and let the visitors touch and fondle them. Here, in Kaso pukhuri, the Black softshell turtles readily devour the bananas which the visitors give them, not in the water, but attached at the end of a stick and held out for them to eat. As for the rice grains, more than fish, it is the Peacock Softshell Turtle and Indian Flapshell Turtles who delicately peck on the grains, which accumulate on the rocks of the pond after the visitors turn them over, into the pond water. Having said that, there is a sizeable amount of fish here too, they swim around in the water, the tiny ones very near the stone steps, looking for a chance to feed on the rice grains, and they are undisturbed by the turtles.

Unfortunately I have not even once, seen any Roofed Turtles maybe because there is absolutely no place to bask in the pond and it is very difficult to walk along the edges of the pond, because it is dangerous and full of entangled mass of vegetation and soft soil, a high risk to loose footing. There are small spotted pond turtles and Indian tent turtles swimming around. Therefore here too, the problem of litter and lack of basking spots is prevalent, though the food seems better than bread and biscuits.



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A Black softshell turtle emerging out of the littered mass of water to devour the banana offered to him by a visitor in Kaso Pukhuri



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A Black Softshell Turtle gobbling on a banana held out to him by a visitor in Kaso Pukhuri

Madhav Pukhuri, my third field site in Hayagriva Madhab Mandir in Hajo, is undoubtedly the best field site out of the three. There are too many positive points we can take in account when studying the scenario there and comparing it with the other two ponds. Madhav Pukhuri is a huge pond facing the Hayagriva Mandir. The Mandir is on top of Monikut hill, to reach which, one has to climb a long way. But the pond is at the foothill, and a dozen stairs lead down to the pond. The cleanliness of the place will astound anyone who goes there for the first time. The pond water seems green, which is actually a reflection of the innumerable trees, shrubs and plants surrounding the four sides of the pond. The most wonderful thing about the pond, is that unlike Jorpukhuri and Kaso Pukhuri, the embankments are not concretized and raised. Instead, it is sloping in nature, made with stones and rocks, which makes it easy for the turtles to climb up and lay their eggs. More so, because it is covered all around with shrubs and bushy plants which gives just the amount of privacy which turtles require to lay their eggs and cover them with sand. Not just this. The embankments are not accessible to visitors. Though it is possible to go there, it is done only by the caretakers and temple people. This is made possible by blocking of the whole embankment by walls. How then can people see the pond, apart from going down the stone stairs? Well, just before the stairs begin to descend into the pond, there at the right and left are two gates which lead to a kind of park meant for walks, which runs along the four sides of the pond, just higher up. This way people can view the turtles in the pond without scaring them or littering the pond.

The elements found in the vicinity of the pond are goats, pigeons and Common garden lizards. There are enough basking spots in the pond, for the turtles to bask. Bamboo shafts have been made and a natural scene where a huge tree has fallen over the pond, acts as just the perfect haven for the turtles. The most positive thing about the Madhav Pukhuri is that all kinds of market food is banned and cannot be fed to the turtles. A special kind of food tested and verified by the Food Ministry and Health Department, has been introduced for the turtles and the fish living in the pond, after which there have been no fish or turtle deaths. The food is a special mixture, of powdered mustard seeds, gram and some other grains along with a pinch of powdered medicine for the turtles which help them get rid of any germs or illness. This food is given in a plate and the contents turned over into the water. There too, like Kaso Pukhuri, the Black Softshell Turtles are quite accustomed to humans and let them touch their carapace as well as to stroke them out of affection. The Peacock softshell turtles are as usual, a bit reluctant to come near and keep their distance. There are abundant fish which can be seen swimming, gliding and even jumping in and out of the water. I have spotted many hatchlings and baby turtles swimming around in the clean waters, mostly spotted pond turtles. Indian tent Turtles, Assam Roofed turtles and Indian Roofed Turtles can be seen basking comfortably in the bamboo shafts. Also, there is a small tanked enclosure specifically for the purpose of keeping and protecting turtle eggs till they hatch. At present, there is a cluster of eggs there waiting to hatch.



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A cluster of Indian Tent Turtles (with an Assam roofed turtle) basking in the sun atop a log in Madhav Pukhuri



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The food prepared for and fed to the turtles in Madhav Pukhuri

2.4.3) Questionnaire survey of people living in and around the field sites and temple authorities, engaging in conversations with visitors who come to feed the turtles, observing the behavior of humans towards turtles, taking into account conservation efforts of people towards turtle welfare, engaging GEMS NPS students in a turtle awareness program.

OBJECTIVE: To find out about the community perceptions on turtles, to study the human-turtle relations in the three field sites and to find out about any conservation efforts/strategies adopted by communities living near field sites.

RESULTS/FINDINGS:

In Jorpukhuri, on one side of the pond overlooking the road, one can see some people leaning over the railing every single day hoping to catch a glimpse of the turtles. Also on that side is a small gate which is used regularly by the people who come to feed the turtles with bread and biscuits. Unfortunately, that gate is also used by kids to enter and catch fish even though it is prohibited by the temple authorities.

On asking a few resident onlookers if it was a regular phenomenon, they responded by saying that it was and the temple authorities do not take any action even if they see such goings-on. This is a sad development. Also throughout the month whilst I was on field, during various timings starting from morning 6 am till evening 6pm, I haven't spotted any person from the temple feeding the turtles. The only time any feeding goes on, is in the afternoon when someone turns out all the food "bhog" for the geese to feed. Also, there used to be breeding spots for the turtles created by Help Earth, which were destroyed to serve the purpose of "temple beautification".

Among the residents, many have moved in recently and do not have much knowledge about the existence of turtles in the pond in Jorpukhuri. In fact, most of the kids declare that there are no turtles any more in the pond and that they must have died out of starvation. The women of the area are more empathetically inclined towards the plight of the turtles living in the pond. Most of them say that the sightings have gone down drastically and that previously, nobody could miss seeing two or more turtles always basking on the rocks and in the sand embankments of the pond. The men seem less perturbed and shrug off the issue when asked about the bad condition of the turtles. They seem to spot turtles all the time and even go on to say that there are more than enough turtles in the pond and there is overpopulation.

One might wonder at this vast differentiation of opinions and views. I think it might be because the womenfolk living near the pond do not generally hang around the pond premises like the men do, and they do not pass by the pond every day. But they may be right about the sightings, since due to lack of any basking spots, there is almost zero sighting. The men on the other hand always notice people who come to feed turtles taking a keen interest if a turtle surfaces to feed. In fact, out of all the visitors who regularly come to feed the turtles, none of them is a woman.

I was told to act as a field guide to a bunch of students of GEMS NPS International School, for a project they had collaborated with Help Earth on Turtle Awareness and Conservation. The field site was Jorpukhuri. It was a successful program where I, had the opportunity to give them basic field knowledge and identification of turtles in the pond from what I had learnt till then as well as helped in their documentation and guided them in the survey they conducted in the locality. On that very day, we were lucky enough to spot a baby Gangetic Softshell Turtle which Dr Jayaditya Purkayastha managed to bring to us for a couple of minutes to help us watch it closely before releasing it back into the water. The students were attentive and very enthusiastic to learn about the turtles and at the end of the program, we also managed to clean a substantial amount of garbage from the pond by ourselves. One can only hope that they manage to conduct some projects in future for the welfare of these turtles.



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A baby Gangetic Softshell Turtle in Dr. Purkayastha's hands in Jorpukhuri



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GEMS NPS students busy cleaning the pond with sticks and their hands.

In Hajo, the sheer size of Madhav Pukhuri pond when one approaches the temple of Hayagriva Madhav Mandir will astound. The temple is on top of a hill, to which a very long of stone steps lead. The pond is located at the bottom, overlooking the temple, and the other side overlooking the road. The devotion of the temple visitors towards the turtles surprised me, because this is unlike what I have seen in Guwahati. More than that, is the reverence and love that the temple people have for the turtles. So much so, that they have banned bread and anything else to be fed to the turtles because those are not the natural food of the animals. They have installed a stall which sells the only kind of food allowed to be fed to the turtles, which has been created and recommended by the Health Department, which is a mixture consisting of ground mustard seeds, gram, and other powdered grains along with a dose of medicine.

The seller of this food, a man whose love for turtles I have seen with my own eyes, says proudly that there haven't been any turtle or fish deaths after they introduced this food to them. He said that the water is cleaned regularly and oxygen pumped into the water. Also there are natural basking spots created by falling of tree branches and logs, where the "small" turtles bask. When I went near the water where the steps ended, to see how the people feed the turtles, I was pleasantly surprised to see the turtles approaching without any fear or inhibition almost as if they have got completely used to the love and care of the people. Not only that, the people even pat the turtles on the back as a sign of affection. It is mostly, the Black Softshell Turtles and who venture out of the water to accept the food, the other turtles however aren't so fearless. Having said that, they do show their snouts occasionally and swim around in trepidation, most likely wary to tackle the bigger softshell turtles for food. Almost all the people call every turtle by the name "Mohan".

It seems, that the turtles even come out of the water and climb the stairs at night and roam around freely sometimes till morning until they are shooed back into the water again. Their eggs are kept in a tank specially built to keep the eggs and a net built around it for the protection. The turtle food seller, remarked that it is time now that the hatchlings are released somewhere else, since if more turtles are added to the pond, it will become way too overcrowded. The main person looking after the turtles, is Mr. Pranab Malakar, who I must say does a wonderful job, and his love and attachment to the turtles is evident.

On seeing the scenario of Madhav Pukhuri, it seems very clear, that the people there are well aware and empathetic towards the turtles, treating them as an important and sacred species, giving them the food they require, taking care of their eggs, supplying oxygen to the pond and banning plastic in the vicinity. Quite unlike the scenario in Ugratara Mandir of Guwahati. In Jorpuhuri, visitors come and go as they wish to feed turtles and feed them anything they like, mostly bread and biscuits. The turtles and the fish consume this. However the strewn about garbage, alcohol bottles, plastic bottles, polythene packets and other stuff littered around is posing a serious threats not only to the army of geese living there but mainly for the turtles, after the polythene and bottles drop to the water and float around. Fishing too is done regularly and nobody seems to really bother about the discipline or rules set for the temple vicinity. This is a sad story as compared to the scene in Hajo.

Almost all the people in Hajo, when asked about turtle sightings, have stated that sightings are regular and smaller turtles can be seen swimming around and basking, and the bigger ones always come to eat the food they give. Everybody there are well aware about how crucial the turtles and they religiously consider them sacred for the wellbeing of the land and the people. What I was left wondering was – who is more fearless, the turtles or the people? The turtles almost brushed against the people without

the slightest bit of fear and the people happily took selfies and photographs with the turtles, stroking them like one does to a puppy.



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Enthusiastic visitors documenting and feeding turtles in Madhav Pukhuri

In Kaso Pukhuri, Kamakhya Mandir, there is an overwhelmingly large number of visitors who throng the pond to feed the turtles. Most of the people seem attached to the turtles and hold them in reverence and consider them sacred for the temple. They believe that feeding these turtles is an act of good deed and must be done whenever someone visits the temple. People, in fact even children fearlessly reach out to the turtles and stroke them. This is a good sign, because if children develop a compassion in this early age, there is a chance it might develop further as they grow up. Visitors are also a lot from other states of Northeast and India, and they seem to know a lot less and care a lot less about turtles. They come out of curiosity and most use the term “tortoise” for them. What I have found after asking most of the visitors is that, the ones from Assam are well aware about the existence of turtles from before. There are no residents except the temple priests. The visitors naturally, visit very less and do not have much idea about how many turtles there are in the pond, but their enthusiasm to feed the turtles is evident. However, the visitors who are not from Assam or from Northeast, do not have any idea about the turtles and come here to feed them only because they have heard from someone that there are turtles in the pond. They scream and shriek with delight when they spot the big turtles coming out to eat the food. Almost all the visitors take selfies and photographs with the turtles. What is nice however, is when the visitors are little children, whose parents encourage them to go feed the turtles or give them knowledge about turtles. Unfortunately though, I am disappointed with the behavior of the temple priests. All of them remain busy or appear busy and are seemingly rude when spoken to. They seem least bothered about any turtle or the re condition and speak of them as if they are rocks and stones. Only two or three priests show reverence and faith towards the turtles and seem genuinely sorry about the sad state of affairs in the temple and the Kaso pukhuri.



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Visitors fondling a Black Softshell Turtle at Kaso Pukhuri

- 2.4.4) *Creating basking spots and breeding sites. Cleaning the pond. Installing hoarding for awareness, introducing long term solutions to threats faced by turtles and to increase their population in the wild.*

THE PROBLEM:

Basking is an important behavior that allows turtles to efficiently raise their body temperatures. At night turtles gradually take on the ambient temperatures of their surroundings. By morning they can be very sluggish. The quickest way for a turtle to jump start into the system is to crawl into the sun. When a turtle exposes itself to the sun, and radiant heat begins warming up its carapace, temperature sensors in the nervous system cause an increase in blood flow. Basking confers additional benefits too. It helps turtles synthesize Vitamin D important in shell growth. Basking lets the skin of turtles dry out, which may make leeches and other external parasites let go or fall off. Basking suppresses the growth of algae. Algae tufting the turtles' shell can slow the reptile down in the water, cause the shell to deteriorate and spread diseases that can weaken or kill an individual. Warming their bodies also promotes the production of eggshells containing the embryos developing in the female's reproductive systems. Turtles are poikilothermic, meaning that rather than keeping a steady body temperature like most endotherms (like mammals) or other ectotherms (like marine fish) their body temperature can fluctuate vastly. There are usually specific reasons for this in poikilotherms. In turtles, we see that it's largely to regulate metabolism. They heat up to speed up the metabolism, and to the other extreme, they cool down so much during brumation that they basically shut down entirely for months at a time. So now that we know how important basking is for turtles, the difficulty and dangers the turtles in Jorpukhuri and Kaso pukhuri face is also pretty clear. It stings the heart to sometimes find one or two roofed turtles floating on top of a coconut desperately in the middle of the pond to bask itself or clutching a twig which occasionally drops in the water, in an attempt to climb aboard to bask.



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An Assam roofed turtle desperately trying to climb aboard a broken coconut branch in Jorpukhuri



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An Indian Tent Turtle floating atop something which looks like an empty coconut shell in order to bask in Jorpukhuri

OBJECTIVE/THE SOLUTION

To create Turtle Welfare Spots for their basking as well as breeding in Jorpukhuri, plant bushes and shrubs to enable them to lay their eggs and install a hoarding to make people aware about the different species of turtles found in the pond.

RESULT

We have created basking spots by joining bamboo poles cutting them into half and making a shaft by tying them with jute rope and lowering them into the water in such a way that they remain slanted, halfway inside water and halfway outside leading straight to the sand filled embankments. This way the shafts can act as a basking spot for turtles to sit and bask in the sun, as well as breeding enablers, by which they can climb out of the water and lay their eggs.

After the creation of these spots, roofed turtles have been seen basking happily during the daytime on the shafts. We are still observing the progress and goings-on carefully of the Turtle Welfare Spots. We have also planted bushes and shrubs from the nursery, around the entire area of the pond inside, so that they grow and act as a curtain/veil to give the necessary privacy required by turtles to lay their eggs and protect them from predators like crows, other birds, geese and snakes. We have installed a hoarding which displays the names and pictures of the species found in the pond, which can be read by the people who visit the temple, passers-by and the residents of the community.



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Turtle Welfare Spots created for basking of the turtles and to enable them to lay eggs.



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DISCUSSION

What I have learnt throughout this entire project and internship; and what I feel is that, community involvement and participation is necessary if we want to conserve turtles. We cannot limit it to temple authorities and NGOs only. Temple authorities also need to be understanding about the fact that it is not enough to have a turtle pond at the back of the temple and have visitors going gaga over them. There is a lot more to this, when we have turtles in a pond. Temple authorities need to take responsibility of cleaning the ponds from time to time, there are so many creatures living in them—snakes, fishes of different varieties and so many species of turtles. They must ensure that the turtles can come up from the pond waters to lay their eggs. Not just that, the eggs must be protected from predators like birds, geese, monkeys, goats and most importantly, humans. They need to keep track of the population of the turtles in the pond, for if it becomes overpopulated with turtles, oxygen supply will become difficult and eutrophication will occur. As a result, all the turtle will start dying one by one along with other creatures of the pond. We come into the picture, as volunteers or NGO people to take the hatchlings and translocate them to bigger ecosystems like the rivers, to help increase their population in the wild.

The people living in and around the temple ponds must be made aware, scientifically or religiously, that these ponds are the last hope for turtles and we need to conserve them. People should participate in conservation by overseeing the activities of the temple authorities and stopping illegal activities like fishing in the ponds and littering the ponds. Having said that, we as visitors must not litter the pond premises by throwing away food packets after feeding the turtles.

I have heard during one of my unstructured interviews, that there is plan to create a recreational spot/park around the turtle pond (western pond) of Jorpukhuri. This is horrifying news. If that happens, turtles cannot come out of the water to bask, let alone lay eggs, because ‘being humans’ we all know the chaos people will create once a park is created around the pond. The least, we as citizens of Guwahati, can do, is stop such unwise activities from happening.

CONCLUSION

The most important thing which I have learnt at the end of my field work and as I am writing this report, is that if we really want to work towards conservation of a species, we cannot be time-bound. It is indeed a long-term process, and we cannot be in a hurry to taste success. A lot of patience, dedication and passion is required! Two months seemed a very long time when we first left for our internship from college, but now that it’s nearing an end, I feel pleasantly surprised at how much empathy and vision has been instilled in me after doing this internship. I have become addicted to turtle welfare and conservation and I have understood this, and also want to share with everyone reading this, that if we truly want to taste success, if we really want to work for conservation and biodiversity, we should never leave our work half done. Things that work in the long run, are bound to take a long term to begin functioning. I also take an oath that I will finish what I have started and not let it hanging in the name of internship and forget about it few months later.

During these two months, whatever I have shared in the social media, be it pictures, blog articles, I am pleasantly surprised at people’s response. Most of the people living here in Guwahati did not have a clue that turtles exist in their city! Positive remarks from senior citizens have also had a great positive impact in me, giving me hope that maybe in the coming months, we can generate enough awareness in the citizens about our responsibility towards these beautiful creatures called turtles.

I hope I have done that to a very small extent through this report.

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APPENDIX 1

TURTLE SURVEY IN TEMPLE PONDS OF GUWAHATI

(Help Earth, NGO, Guwahati)

Serial No.	
Age	
Sex	
Occupation	
Area	

- 1) How long have you been living here?

- 2) a) Do you have turtles in this pond?

- b) Have you seen any turtle?

- c) Can you tell us how many turtles must be living in this pond?

- d) How many turtles do you see in a day?

- 3) How often do the turtles come out of water?

- a) Do they come out more in summer/winter/monsoon?

- b) Do they come out more during the day/at night?

- 4) Do the turtles breed?

a) In which season/time does the breeding take place?

b) Where do they breed/ lay eggs?

c) Has the population increased during last couple of years?

5) a) How many kinds of turtles are there in this pond?

b) How do you differentiate between them/identify them?

Based on color/size/physical features/ other behavioral characteristics?

6) a) What do they eat?

b) Who feeds them?

7) Has any turtle died here recently?

8) Do the turtles cause any trouble to the geese residing here? If yes, in what way?

9) Do the turtles stray out of the pond area and venture towards the roadside?
(Often/Occasionally/ Rarely/Never)

10) Do you regard these turtles as significant/important to the temple or to this area? If yes, why? If no, why?
