

## Showcasing Urban Herpetofauna: A Conservational Effort through Community Participation



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All the Photographs (Animals) used within are by Jayaditya Purkayastha except *Nilssonina hurum* by M. Firoz Ahmed (Plate 4 C)

## PROJECT TEAM



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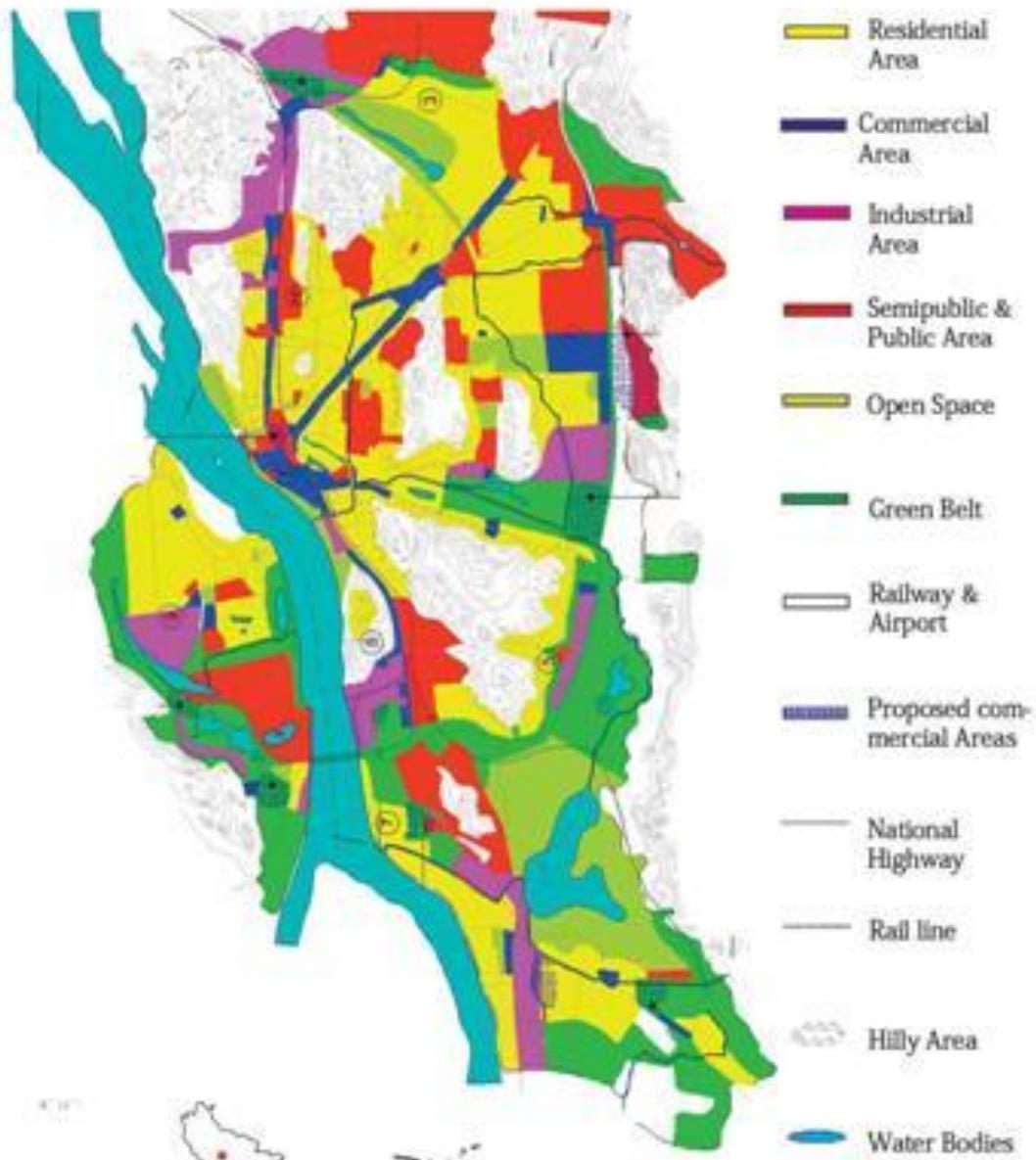
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**Student Research Team**



Map of Guwahati showing different municipal zonation  
 Insert: Map of India

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## **Introduction**

Herpetofauna comprises collectively of amphibian and reptilian fauna. The study of this group of animals is called Herpetology. The term “herpetology” is derived from the Greek word “herpes” which means creeping things- an attribute of the way the animals move. Among vertebrates, this group of animals are the least worked on.

Our India has a rich diversity of herps comprising of about 800 known species (Uetz, 2012). North-eastern India is one of the prominent regions of India in terms of its rich biodiversity. The North-eastern Indian region is also a part of Indo Burma bio geographic hotspot. The environmental conditions and forest type existing in the region makes it extremely conducive for the existence of amphibians and reptiles. From this region 272 species of herps are reported till date (Ahmed et al., 2009) with even more waiting to make it to the record books, with the highest concentration found in undisturbed natural habitats. Unfortunately, however no organised data exists on the herpetofauna residing in urban environments of the country. Since many representatives of this group of animals are apt enough to take advantage of the urbanised condition, a study of the herpetofauna in the light of urbanised setup becomes imperative for long term conservation measures and risk assessment.

## **Urban Herpetofauna**

Since urban habitats are different from a typical wild animal abode, only the specialised animals can utilize the resources that an urban setup provides. Those species that can adapt to such challenges have a better chance of thriving as they have to withstand far less competition in the future. From the evolutionary perspective too, urban species are very important. Urban areas are evolutionary laboratories. For example, Johnston and Selander (1964) found that the House Sparrows (*Passer domesticus*) introduced into the United States in 1879, evolved into new races within 50 years.

Since only specialized organisms can live here, so either one has to be born specialized to take advantages as we human beings do, or one has to develop it, allowing some modifications in body design, food requirement and so on leading to a change. One such highly adaptable group of animals is perhaps the herpetofauna. Almost nothing is known about effect of urbanisation on herps. For most, the word wildlife is generally confined to big, illustrious and charismatic animals like

mammals, birds etc and their conservation becomes a source of national concern and tops the list of conservational agenda. The herps and such other ignored and overlooked animals receive the least scientific and conservational attention. In fact the diversity of herps in an urban settlement is far than that of any other so called illustrious animals. Some of the herps such as common toads, wall lizards and such other species thrive in urbanized setup. Thus, ample scope still remains for these opportunistic species in such environments.

Urbanisation, where in one hand destroys the habitat of some organisms, at the same time makes way for certain other groups to survive. In fact urban setup may provide high food supply (including feeding by people), a large variety of new ecological niches and the lack of predators attracting animals to these centres.

Thus, the terminology "*Habitat Destruction*", which is flashed and highlighted in the field of conservation, must be rather used selectively. The term "*Habitat Destruction*", in broad sense should rather be discouraged. Rather, "*Habitat alteration*" is a better selection of word when we wish to address habitat broadly.

The rate at which, urbanisation is griping the world, a well documented study is imperative to assess its impact on the non human inhabitants. But the problem with such studies is lack of collaboration and co-ordination between conservationists and developers. Developers are rather weary of conservationists believing that the latter may suddenly pop up a species in their work site that would require immediate attention from conservational point of view thereby jeopardizing their work progress and causing them economic loss. Also the development and economy are very closely related and are interdependent on one another. The study site being tagged as the gateway of north-eastern India becomes of more importance in terms of economy and development of the state. Thus, addressing the issue of conservation of herps and habitat becomes of prime importance. Apart from these obstacles, there is also an urgent need to learn more about the effects of urban development on wildlife, so the effects can be mitigated in the future.

Unsurprisingly, a search in IUCN red list for *Homo sapiens* (Human) shows that we human beings are categorised under the "*least concern*" group as our population shows an increasing trend. From this we can summarise that our population is not going to decrease any time soon. So, the only way to minimise the effect of urbanisation on biodiversity is to reduce resource utilisation to the extent possible so as to leave some for our neighbouring wild life. It has been said that the battle

for life on earth will be won or lost in urban areas and indeed this is the only biodiversity that many people experience. Furthermore green patches in urban areas are also very important for human beings, offering valuable and much appreciated opportunities for exercise, social interaction, relaxation and peace.

If we fail to retain green areas, there will be negative impacts on ecological systems, to the extent that in coming decades we may face an ecological system that is totally flawed in function. Not that the deterioration has not already started, but the rate at which the whole alteration process is going on, more drastic events awaits us in near future.

### **About Guwahati**

Guwahati (26.1859°N, 91.7477°E) is the capital city of the state of Assam with a total area of 216.79 sq. km. having a population of around 1,100,000 with a population density of 2695.43 per sq km. It is a city striving restlessly to make it to the list of metro cities in India. It is also the largest metropolis in the North-eastern region of India. It is said to be the "Gateway" of the North East Region as well as the business capital of the region. Ecologically as well the city is important, as it is a part of Indoburma bio geographic hotspot. Guwahati enjoys a tropical monsoon climate and receives about 1,600 mm annual rainfall, with an average annual temperature of 23°C. Certain patches of forest still exist within the city. The overall habitat type mainly comprises of forest patches, scrublands, grasslands, plantations, wetlands, agricultural lands and human settlements. The forest patches are of moist deciduous type. The city is surrounded by eighteen hills along with an internationally acclaimed wetland, the Deeporbeel, which is a RAMSAR site. Status of herps in Guwahati: The city has a wide diversity of herpetofauna accounting for at least 63 species in and around it. Because of the wide diversity of species present here, the conservational issue is of much importance. Apart from the core reason – urbanisation, there are many other reasons about which herps and the people devoted to their conservation need to worry. One of the most unfortunate of these is the misinformation and superstitions that exists amongst the masses regarding herps (mainly snakes) that is in the way of their conservation.

### **Important threats faced by the herps of Guwahati:**

- Filling up and pollution of water bodies resulting in a lack of breeding ground, mainly for amphibians.
- Cutting down of remaining green patches and mining activities.
- Construction activities such as building of roads mainly the national highways which causes fragmentation of forests.
- Malicious killing mainly because of ignorance and superstition.
- Human consumption mainly of turtles is decimating turtle population.
- Other reasons include tarring of roads, accidental road kills, and gillnet fishing.
- Fertilisers and pesticides cause major threats to amphibians.
- In the urban environment, another problem that herps, more specifically amphibians face is the lack of breeding grounds as most of the land is concretized with no terrestrial water bodies. Also the temporary potholes within the city acts as death traps for the tadpoles as these holes dry up very rapidly.

Due to ecological imbalance, the prey and predator ratio is getting out of proportion. Thus, many snakes venture into human habitation areas for easy procurement of food. This human snake encounter has three potential outcomes. In most cases it results in the death of the snake, or if the animal is lucky enough, it is rescued. The rescue process has its own short comings as most of the rescued snakes are released in the same spot leading to artificial population rise of that species in that particular area, making the snake again move back to human habitation areas, starting a cycle of release and recapture. The third consequence and the rarest one are human casualties because of snake bite.

### **Material and Methods**

The study was conducted from September 2011 to July 2012. The field survey was carried out during both day and night, and four man hours was invested per survey. The survey was carried out in the morning mostly from 06:00h till noon and in the evening mostly from 17:00 to 20:00h. Few late night surveys extending up to sunrise were also conducted to find nocturnal species. Visual Encounter Survey (Crump and Scott, 1994) employing randomized walk (Lambert, 1984) was

carried out along with active searches. Specimen were collected, photographed, identified using literature and field guide (Smith 1931, 1935, 1943; Ahmed, Das and Dutta 2009) and released. Few specimens were preserved in 10% buffered formalin and are in personal collection of first author. For survey purposes the city was divided into three groups:

**Commercial Areas:** Panbazar (26.1859°N, 91.7477°E), Fancy Bazar (26.1830°N, 91.7429°E), and Christian Basti (26.1552°N, 91.78°E).

**Residential Areas:** Lachitnagar (26.1695°N, 91.7563°E), Lokhra (26.1106°N, 91.7465°E), Kala Pahar (26.1519°N, 91.7465°E), Geetanagar (26.1750°N, 91.7952°E), Bhangagarh (26.1620°N, 91.7672°E), Maligaon (26.1556°N, 91.6906°E), Hatigaon (26.1278°N, 91.7855°E), and Kamakhya (26.1642°N, 91.7076°E).

**Forested Areas:** Amchang Reserve Forest (26.1891°N, 91.8464°E), Hengrabari Reserve Forest (26.1618°N, 91.7843°E), Jalukbari Reserve Forest (26.1441°N, 91.6614°E), Deeporbeel Wildlife Sanctuary (26.13055N, 91.6591E), and Sarania Reserve Forest (26.1769°N, 91.7599°E). The classification of the commercial and residential areas was done as per Guwahati Municipal Corporation (GMC) regulations and Forest Reserves are considered under Forest Areas.

**Acronyms used:** GMDA: Guwahati Metropolitan Development Authority, GMC: Guwahati Municipal Corporation, CA: Commercial Areas, RA: Residential Areas, FA: Forested Areas, RF: Reserve Forests, IUCN: International Union for the Conservation of Nature and Natural Resources, IWPA: Indian Wildlife Protection Act, EW: Extinct In Wild, VU: Vulnerable, LC: Least Concerned, LR-nt: Lower Risk/near threatened, LR-lc: Lower Risk/least concerned, DD: Data Deficient, NE: Not Evaluated, NS: Non Scheduled, I: Schedule I, II: Schedule II, IV: Schedule IV, C: Common, M: Moderate and R: Rare.

Awareness campaigns were carried out through talk shows, presentations, workshops, seminars and field trips. Both electronic and print media was used to promote our mission. Awareness and promotional materials such Mugs, t-shirts, stickers with conservation message were made and distributed. A book on Urban Herpetofauna was prepared.

### **Scientific Findings:**

In this study we found 63 species of herpetofauna. Amphibians constituted of 17 species belonging to 7 families and reptiles of 46 species belonging to 11 families. Among the amphibians the most commonly encountered was *Duttaphrynus melanostictus*, found in and around small, water bodies with or without vegetation cover. *Hylarana leptoglossa* was sighted in the marshes of the residential areas (Lachitnagar, Bhangagarh, Hatigaon) during the initial phase of the study. However with the filling up of these water bodies, they disappeared from the residential areas and could be encountered only in the forest areas exhibiting an extremely patchy distribution, with fewer sightings. *Humerana humeralis* and *Hylarana leptoglossa* displayed a similar distributional pattern. *Microhyla ornata*, *Fejervarya teraiensis*, *Fejervarya nepalensis*, *Fejervarya pierrei* and *Polypedates leucomystax* were located in patches in few of the residential localities (Lachitnagar, Lokhra, Geetanagar, Maligaon, Hatigaon). Interestingly *Polypedates leucomystax* was found around some of the swimming pools in the study site. *Duttaphrynus melanostictus*, *Fejervarya syhadrensis* and *Euphlyctis cyanophlyctis* were found to be hardy and were encountered in most of the areas including the commercial areas. *Leptobrachium smithi* and *Clinotarsus alticola* were encountered only in and around the streams in forest areas. Their tadpoles were found in aggregation in slow flowing parts of streams amidst aquatic vegetation. *Hylarana tytleri* was sighted moderately only in the littoral forest and among water hyacinth (*Eichornia crassipes*) of Deeporbeel. Amongst reptiles, the most commonly sighted lizard species was *Hemidactylus frenatus*. We observed five species of lizards in all the three classes of study area. However, *Gekko gecko* was observed only in some old trees of commercial and residential areas showing a patchy distribution in the study sites. *Varanus bengalensis* was extremely rare (2 sightings). *Ptyctolaemus gularis*, *Hemidactylus garnotii*, *Hemidactylus platyurus*, *Eutropis macularia* and *Sphenomorphus maculatus* along with a *Draco* species were encountered only in the forest areas. *Draco* sp. was encountered only once and considered as extremely rare. *Hemidactylus flaviviridis* was encountered only in some pockets of commercial areas (Purkayastha and Das, 2009). *Cnemaspis assamensis*, *Cyrtodactylus khasiensis* and *Lygosoma albopunctata* are found mostly in forested areas. Though *Cyrtodactylus khasiensis* and *Lygosoma albopunctata* were occasionally seen in residential areas, *Cnemaspis assamensis* which is thought to be primarily a forest dwelling lizard was once encountered on the wall of a residence in Kamakhya area.

Amongst snakes, *Xenochrophis piscator* was the most commonly encountered species. We observed eight species of snakes that appeared to have more or less uniform distribution, occurring in all the three classes of study sites (see table 1). Of these, the sighting rates of *Lycodon aulicus* increased during the study period and the species was rescued frequently from buildings (mostly from gaps in between the bricks of un-plastered wall of buildings) in residential areas and the commercial area. With clearing of secondary forests and bushes, and also the disappearance of thatched houses, this species was probably forced to move to the buildings in search of food and a secure place to reside and retreat. Eight species of snakes were found both in residential and forest areas and six species were recorded only from the forest areas. Interestingly we could encounter (once) *Pareas monticola* only in the residential area and due to paucity of data we failed to provide a logical explanation for this pattern of distribution but presume that it could have been released by the snake charmers. Among terrapins, we found *Nilssonia nigricans*, *Aspideretes gangeticus*, *Nilssonia hurum* and *Pangshura sylhetensis* in the temple ponds of Kamakhya, which in all likelihood could find their way to these water bodies through offerings by the devotees to the deity. *Morenia petersi* were also reported from the study area more specifically from Deeporbeel (Das and Sengupta, 2010; Baruah and Sharma, 2010). Among the study sites, Deeporbeel was found to be most species rich with 38 species and found to support rare and least known species like *Xenochrophis cerasogaster*, *Xenochrophis schnurrenbergeri* and *Morenia petersi*.

## A list of Amphibians and Reptiles encountered in our Survey

### Amphibians

#### Frogs and Toads

##### Family: Bufonidae

*Duttaphrynus melanostictus* (Schneider, 1799) Common Asian Toad

##### Family: Megophryidae

*Leptobrachium smithi* (Matsui, Nabhitabhata and Panha, 1999) Red-Eyed Frog

##### Family: Microhylidae

*Microhyla ornate* (Duméril and Bibron, 1841) Ornate Narrow-mouthed Frog

##### Family: Rhacophoridae

*Philautus garo* (Boulenger, 1919) Garo Hills Bush Frog

*Polypedates teraiensis* (Dubois, 1987) Six-lined Tree Frog

##### Family: Dicroglossidae

*Fejervarya nepalensis* (Dubois, 1975) Nepal Cricket Frog

*Fejervarya pierrei* (Dubois, 1975) Pierre's Cricket Frog

*Fejervarya syhadrensis* (Annandale, 1919) Small Cricket Frog

*Fejervarya teraiensis* (Dubois, 1975) Terai Cricket Frog

*Euphlyctis cyanophlyctis* (Schneider, 1799) Skittering Frog

*Hoplobatrachus tigerinus* (Daudin, 1802) Indian Bullfrog

##### Family: Ranidae

*Clinotarsus alticola* (Boulenger, 1882) Assam Hills Frog

*Hylarana tytleri* (Theobald, 1868) Theobald's Ranid Frog

*Humerana humeralis* (Boulenger, 1887) Bhamo Frog

*Sylvirana leptoglossa* (Cope, 1868) Cope's Assam Frog

<i>Amolops assamensis</i> (Sengupta et al., 2008)	Sengupta's Cascade Frog
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## Caecilian

### Family: Ichthyophiidae

<i>Ichthyophis garoensis</i> (Pillai and Ravichandran, 1999)	Garo Hills Caecilian
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## Class: Reptilia

## Lizards

### Family: Agamidae

<i>Calotes versicolor</i> (Daidin, 1802)	Common Garden Lizard
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<i>Ptyctolaemus gularis</i> (Peters, 1864)	Blue-throated Lizard
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### Family: Gekkonidae

<i>Hemidactylus frenatus</i> (Duméril and Bibron, 1836)	Common House Gecko
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<i>Hemidactylus brookii</i> (Gray, 1845)	Brook's House Gecko
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<i>Hemidactylus garnotii</i> (Duméril and Bibron, 1836)	Garnot's House Gecko
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<i>Hemidactylus platyurus</i> (Scheider, 1792)	Flat-tailed House Gecko
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<i>Hemidactylus flavoviridis</i> (Rüppell, 1835)	Yellow-bellied Gecko
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<i>Hemidactylus aquilonius</i> (McMahan and Zug, 2007)	Northern House Gecko
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<i>Gekko gecko</i> (Linnaeus, 1758)	Tokay Gecko
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<i>Cnemaspis assamensis</i> (Das and Sengupta, 2000)	Assamese Day Gecko
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<i>Cyrtodactylus khasiensis</i> (Jerdon, 1870)	Khasi Hills Bent-toed Gecko
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### Family: Scindae

<i>Eutropis multifasciata</i> (Kuhl, 1820)	Many Lined Skink
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<i>Eutropis macularia</i> (Blyth, 1853)	Bronze Skink
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<i>Sphenomorphus maculates</i> (Blyth, 1853)	Spotted Forest Skink
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### Family: Varanidae

<i>Varanus bengalensis</i> (Daudin, 1802)	Bengal Monitor Lizard
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## Snakes

### Family: Typhlopidae

*Ramphotyphlops braminus* (Daudin, 1803) Brahminy Blindsnake

*Typhlops diardii* (Schlegel, 1839) Diard's Blindsnake

### Family: Boidae

*Python bivittatus* (Kuhl, 1820) Burmese Python

### Family: Colubridae

*Enhydris enhydris* (Schneider, 1799) Rainbow Water Snake

*Lycodon aulicus* (Linnaeus, 1758) Common Wolf Snake

*Pareas monticola* (Cantor, 1839) Assam Snail Snake

*Ptyas mucosa* (Linnaeus, 1758) Rat Snake

*Ptyas korros* (Schlegel, 1837) Indo-Chinese Rat Snake

*Rhabdophis subminiatus* (Schlegel, 1837) Red-necked Keelback

*Dendrelaphis proarchos* (Wall, 1909) Painted Bronzeback

*Oligodon albocinctus* (Cantor, 1839) White-barred Kukri Snake

*Amphiessma stolatum* (Linnaeus, 1758) Buff Striped Keelback

*Boiga gokool* (Gray, 1835) Eastern Cat Snake

*Xenochrohis piscator* (Schneider, 1799) Checkered Keelback

*Xenochrohis schnurrenbergeri* (Kramer, 1977) Bar-necked Keelback

*Xenochrohis cerasogaster* (Cantor, 1839) Painted Keelback

*Psammodynastes pulverulentus* (Boie, 1827) Common Mock Viper

*Coelognathus radiates* (Schlegel, 1837) Copper-headed Trinket Snake

*Ahaetulla nasuta* (Laçèpede, 1789) Long-nosed Whip Snake

*Chrysopelea ornata* (Shaw, 1802) Ornate Flying Snake

### Family: Elapidae

*Naja naja* (Linnaeus, 1758) Binocled Cobra

*Naja kaouthia* (Lesson, 1831)

Monocled Cobra

*Bungarus fasciatus* (Schneider, 1801)

Banded Krait

## **Turtles and Tortoises**

### **Family: Trionychidae**

*Nilssonina gangeticus* (Kuvier, 1825)

Ganges Soft-shelled Turtle

*Nilssonina nigricans* (Anderson, 1875)

Black Soft-shelled Turtle

*Nilssonina hurum* (Gray, 1831)

Peacock Soft-shelled Turtle

### **Family: Geoemydidae**

*Pangshura sylhetensis* (Jerdon, 1870)

Assam Roofed Turtle

*Pangshura tentoria* (Gray, 1834)

Indian Tent Turtle

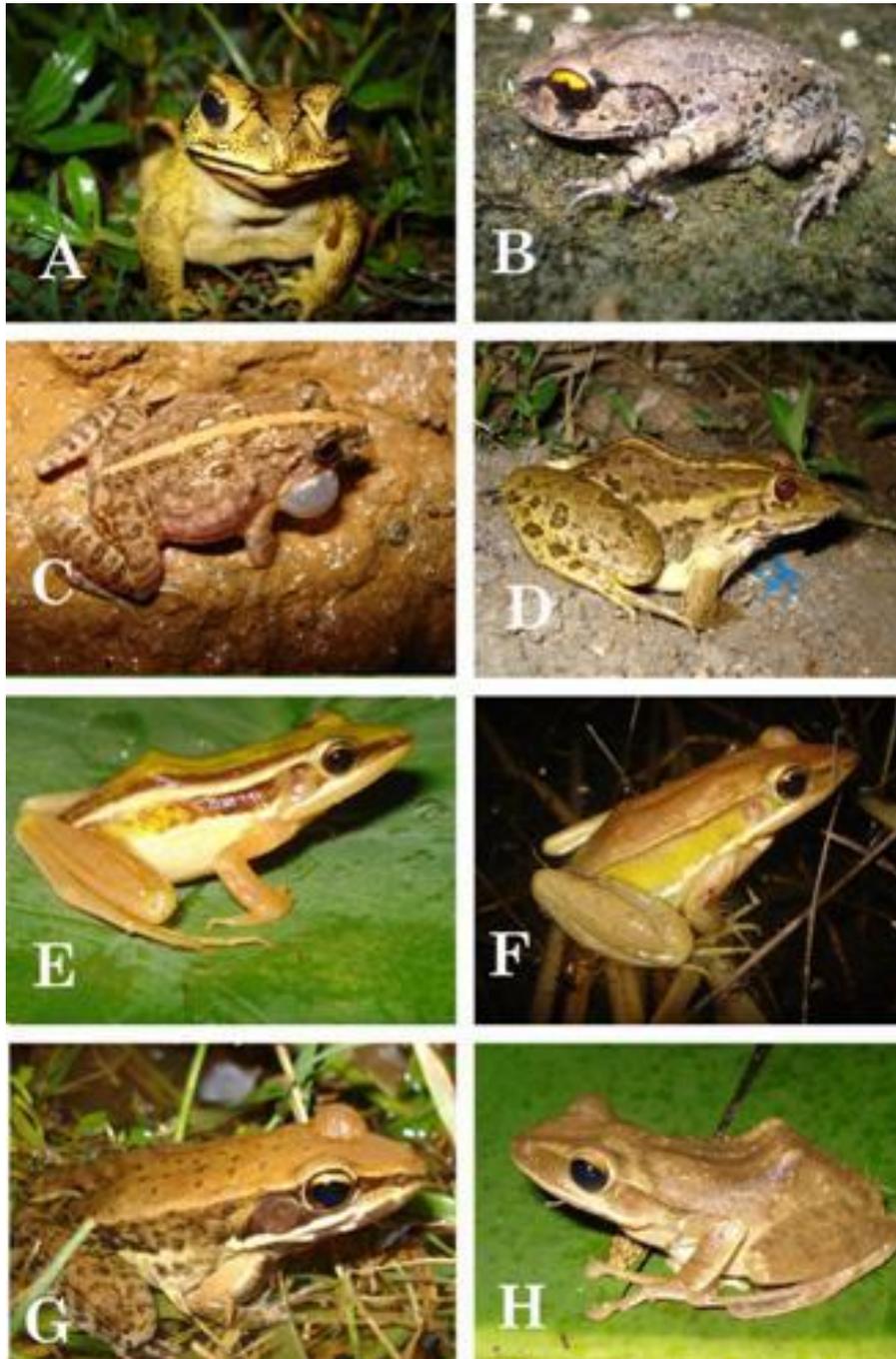
*Pangshura tecta* (Gray, 1831)

Indian Roofed Turtle

*Morenia petersi* (Anderson, 1879)

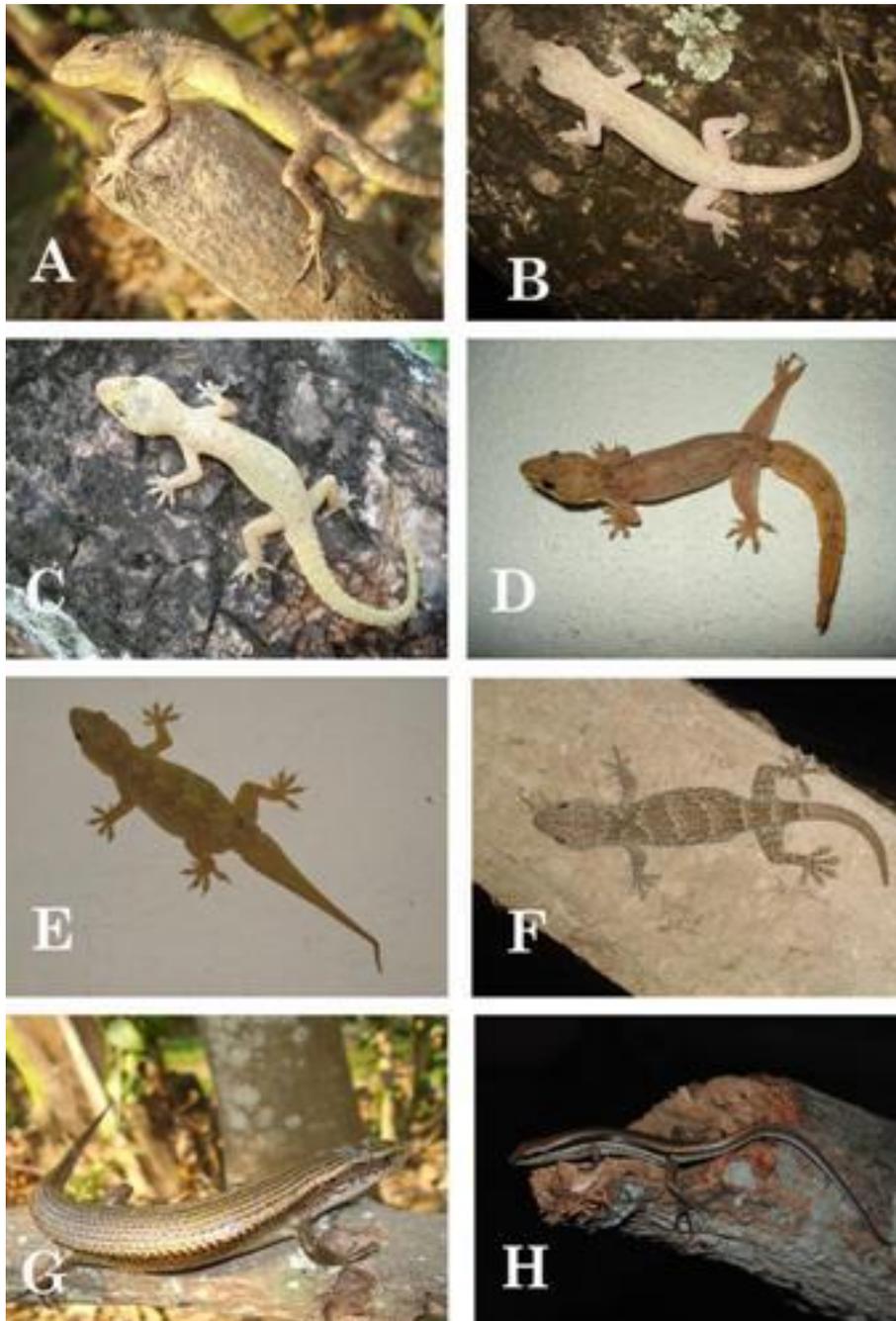
Indian Eyed Turtle

**Plate 1: Some of the frogs of Guwahati, Assam, India**



A: *Duttaphrynus melanostictus*; B: *Leptobrachium smithi*; C: *Fejervarya pierrei*; D: *Hoplobatrachus tigerinus*; E: *Hylarana tytleri*; F: *Humerana humeralis*; G: *Hylarana leptoglossa*; H: *Polypedates teraiensis*.

**Plate 2: Some of the lizards of Guwahati, Assam, India**



A: *Calotes versicolor*; B: *Hemidactylus frenatus*; C: *Hemidactylus brookii*; D: *Hemidactylus platyurus*; E: *Hemidactylus flaviviridis*; F: *Gekko gecko*; G: *Eutropis multifasciata*; H: *Sphenomorphus maculatus*.

**Plate 3: Some of the snakes of Guwahati, Assam, India**



A: *Enhydris enhydris*; B: *Xenochrophis schnurrenbergeri* C: *Xenochrophis cerasogaster*; D: *Rhabdophis subminiatus*; E: *Amphiesma stolatum*; F: *Chrysopelea ornate*; G: *Boiga gokool*; H: *Bungarus fasciatus*.

**Plate 4: Some of the turtles of Guwahati, Assam, India**



A: *Nilssonia nigricans*, B: *Nilssonia gangeticus*, C: *Nilssonia hurum*, D: *Pangshura sylhetensis*, E: *Pangshura tecta*, F: *Pangshura tentoria*

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## **Publications**

### **Book**

“Urban Herpetofauna”: Amphibians and Reptiles of Guwahati, A Pictorial Guide.

### **publication during the period**

- i. Das, M, Brahma, R.K., Purkayastha, J. (2011): More in our mind than in their mouth? A preliminary inspection inside the oral cavity of two house Geckos: *Hemidactylus frenatus* Schlegel, 1836 and *Hemidactylus aquilonius* McMahan & Zug, 2007. *Herpetology Notes* (4) 303-306
- ii. Das, M., Purkayastha, J. (2012): An insight into hemipenial morphology of five *Hemidactylus* Oken, 1817 (Reptilia: Gekkonidae) species of Guwahati, Assam, India. *Hamadryad* 36(1) 32-37
- iii. Purkayastha, J., Purkayastha, A. (2012): A case of White-breasted Kingfisher (*Halcyon smyrnensis*) Preying on a Gecko (*Hemidactylus aquilonius*). *Asian Journal of Conservation Biology* 1(1) 45-46
- iv. Purkayastha, J., Matsui, M. (2012): A New Species of *Fejervarya* (Anura: Dicroglossidae) from North-eastern India. *Asian Herpetological Research*. 3(1) 31-37
- v. Jayaditya Purkayastha, Ahmed Mahmadul Hassan, Hasanul Islam, Jessica Das, Manoj Sarma, Mituseela Basumatary, Nilakshi Sarma, Nishant Chatterjee, Sachin Singha, Vishnupriya Nair, Arundhati Purkayastha, Jayashree Dutta, Madhurima Das: On the turtles of the temple pond of Kamakhya, Assam, India. (In review, *Reptile Rap*)
- vi. Jayaditya Purkayastha, Madhurima Das, Gernot Vogel: Comments on *Xenochrophis cerasogaster* (Cantor 1839) (Serpentes: Natricidae) with remarks on its natural history and distribution. (In Preparation)

vii. Saibal Sengupta, Jayaditya Purkayastha, Madhurima Das, Binod Baruah: Herpetofaunal assemblage of Deeporbeel Ramsar Site, Assam, India. (In Preparation)

### **Popular Write Ups**

i. Fang Facts (in English), Horizon, The Assam Tribune

ii. Sohure Bonno Jibon[Urban Wildlife] (In Bengali), Shangbad Lohori

iii. Shaper Shombondhe [On Snakes] (In Bengali), Shangbad Lohori

**Awareness and conservational efforts:**



**Survey of the urban landscape of Guwahati is being continued to extract more data.**



**T-shirts were printed and distributed.**



**Student trip to Deeporheel**



**Student Herpetofaunal awareness trip**



**Student at Guwahati State Zoo**



**Herpetofaunal awareness trip to Garbhanga RF**



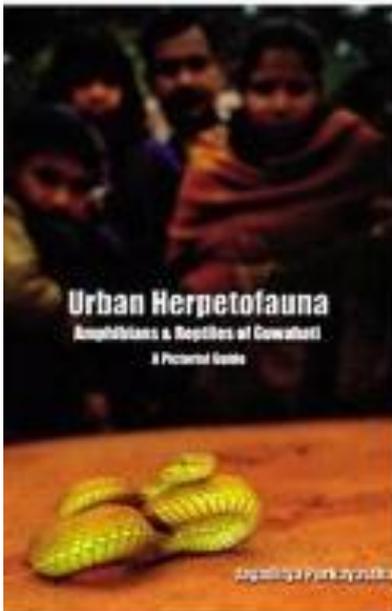
**Student hands on experience with snake**



**Student Amphibian survey at Deeporheel**



**In a workshop with mother of a victim who lost life due to snake bite**



**Book Release Programme**



Snake bite awareness camp



Kids camp "I love snakes and frogs"



Seminar on herpetofaunal awareness



Quiz competition on herpetofauna involving students and book distribution



Snake bite management programme



Interaction with village school students



Deeporbeel fishing community snake awareness programme



Save the frogs day celebration and herpetofaunal awareness programme with felicitation of Dr. Sabitry Bordoloi (amphibian expert)



Prizes for competitions



Promotional materials cup and T-shirts



Save Deeporbeel save herpetofauna rally



Workshop and herpetofaunal display gallery



**Research activity initiated involving students at Kamakhya turtle pond, Guwahati**



## **Links of newspaper articles during the project period**

- [http://www.telegraphindia.com/1120316/jsp/northeast/story\\_15257222.jsp#.UDnhLMEgdn4](http://www.telegraphindia.com/1120316/jsp/northeast/story_15257222.jsp#.UDnhLMEgdn4)
- <http://economictimes.indiatimes.com/environment/flora-fauna/guwahati-reptiles-withstand-urbanization-onslaught/articleshow/11729221.cms>
- <http://www.assamtribune.com/scripts/detailsnew.asp?id=feb0312/at042>
- [http://articles.timesofindia.indiatimes.com/2012-04-28/guwahati/31451748\\_1\\_amphibians-frog-s-day-new-species](http://articles.timesofindia.indiatimes.com/2012-04-28/guwahati/31451748_1_amphibians-frog-s-day-new-species)
- <http://www.assamtribune.com/scripts/details.asp?id=apr3009/City3>
- <http://sevensisterspost.com/ngo-takes-frogs-leap-to-save-earth/>
- [http://articles.timesofindia.indiatimes.com/2012-06-06/guwahati/32078068\\_1\\_saplings-world-environment-day-tree-plantation](http://articles.timesofindia.indiatimes.com/2012-06-06/guwahati/32078068_1_saplings-world-environment-day-tree-plantation)
- [http://articles.timesofindia.indiatimes.com/2012-03-20/guwahati/31214745\\_1\\_frog-species-new-species-joint-research](http://articles.timesofindia.indiatimes.com/2012-03-20/guwahati/31214745_1_frog-species-new-species-joint-research)

## **Book “Urban Herpetofauna: Amphibians and Reptiles of Guwahati, A pictorial guide” is available at following links**

- [http://www.chimaira.de/gp/product\\_info.php/language/en/info/p77237\\_Urban-Herpetofauna---Amphibians---Reptiles-of-Guwahati--A-Pictorial-Guide.html](http://www.chimaira.de/gp/product_info.php/language/en/info/p77237_Urban-Herpetofauna---Amphibians---Reptiles-of-Guwahati--A-Pictorial-Guide.html)
- <http://www.dkagencies.com/doc/from/1063/to/1123/bkId/DK7332332171652582263883371/details.html>

From The Desk Of  
District Commissioner (Kamrup Metro)

ASHUTOSH AGNIBHOTRI, IAS  
District Commissioner  
Kamrup Metropolitan Council  
Dispur, Assam



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*Message*

*Frags belong to a class amphibian. Amphibians are the first vertebrates to get on to the land, but to complete their life they still needed water. The term Amphibia itself means two modes of life, the aquatic mode (larval stage) and the terrestrial mode (adult stage). Hence they need both land and water to survive. Inhabiting wherever water is found, amphibians are the ones to get directly affected. Thus amphibians are good indicators of the health of an ecosystem.*

*Unfortunately, over time of amphibians worldwide are threatened with more than hundred species of amphibians already gone extinct. We are in a very critical and concerning amphibian conservation. If some action is not immediately taken up, we may lose even greater number of frog species. This event "Save the Frog Day" organized by Help Frogs is a step towards the goal of conserving our such irreplaceable assets. The Frogs.*

*I wish the event a grand success and hope this will lead to a better future for the frogs and the nature as a whole.*

*Agnibhotri*  
(Ashutosh Agnibhotri)

Amphibians and Reptiles - The "Jumpers" and the "Crawlers"

See Them! Love Them!! Save Them!!!

