

Project Update: June 2016

The project entitled "A Wetland of International Importance in Bhutan: Diversity and Abundance of Terrestrial Small Mammals in Bumdeling Ramsar Site, Trashigang, Eastern Bhutan" was commenced from April 28, 2016 to May 28, 2016. Bumdeling Ramsar Site is defined by eight major land use types such as agricultural land, Fallow Land, open grassland, marsh, water bodies, pastures and settlement. However, for this research, habitats were classified into six major habitat types based on vegetation and land use types. The six habitat types were agricultural land, Fallow land, *Alnus* dominated forest, open grassland, riparian and oak dominated forest. Six transect lines of 155 metres each were drawn with 102 Sherman Live traps (17 live traps per transect) at an interval of 15 metres. The Live traps were used to capture both ground and arboreal non-flying small mammals like squirrels, mice, mouse, rat and shrews. The traps were baited with flour dough, crush bread, biscuits mixed with canned fish and dry fish supplemented by banana, apple, grapes and groundnut. Slices carrot were also provided to enhance moisture content and reduce mortality of trapped animal.

The intensive live trapping exercises were conducted through closed population method for the period of 30 days and for three consecutive nights per transect. The deployed traps were inspected twice daily in morning before dawn and afternoon before dusk to record both diurnal and nocturnal species of small mammals. The traps were re-baited for next trap night if the baits were found to be eaten or spoiled by rain and ants. All trapped individuals were identified to species, sex, age class, breeding status, weighed with Pesola spring balance of 100 (g) and 200 (g). Morphometric measurements (ear length, head body length, tail length and hind foot length) of each individual were recorded. Each captured individual were marked with temporary marker pen at ventral surface and taken the photograph of animal for documentation. It was finally released at the same ecological point after recording all necessary information.

The vegetation and habitat assessment were carried at all the captured and un-capture trap stations. Vegetation layer like canopy cover (tree) and under-storey (shrubs) cover were assessed by laying plot sizes of 10 × 10 metres and ground cover (herbaceous) of 1 × 1 metre. Key ecological variables like altitude, slope, aspect and microhabitats (rocks, gravels, piled stones, down logs, wood debris, litters, litter depths, exposed soil, grasses, herbaceous, shrubs and tree buttress) were recorded. Temperature and GPS coordinates were recorded further to provide additional information. Both vegetation and ecological variables cover percentage were observed visually to determine the correlation between cover percentage, abundance and distribution of small mammals.

The conservation threat assessments were carried in a plot of 10 m × 10 m in all the trap locations in Bumdeling Ramsar Site (BRS) to assess the disturbance faces by small mammals. Anthropogenic activities like livestock grazing, fire remnant, stone collection, timber/pole extraction/felling, litter collection, road and feral dog were recorded. Mammals/ungulates, carnivores and raptors sign and evidences were also recorded to supplement detail information of the threats. The degree intensities of disturbance were classified into low, medium and high depending on severity of the threats.

Results and Discussion

Trapping over 306 trapping nights from 6 transects of six different habitat types resulted in captured of 26 individuals of small mammals belong to seven species. Five species that includes rat (*Rattus* sp.), Soft-furred metad (*Millardia meltada*), Indian gerbil (*Tatera indica*), House mouse (*Mus musculus*) and Wood mouse (*Apodemus sylvaticus*) were belonged to the rodent family muridae and two shrew species such as Himalayan shrew (*Soriculus nigrescens*) and Himalayan mole (*Talpa micrura*) belonged to the family soricidae. Species diversity and richness varied among habitat types, being highest in agricultural field and lowest in the *Alnus* dominated forest, open grassland and riparian habitat. The farm bushes, dry grasses, crop residues, piled stone, temporary sheds and fences dominated the microhabitat types in agricultural field. The warm broadleaved species *Alnus nepalensis*, *Quercus griffithii*, *Betula* sp., *Michelia* sp., *Acer* etc. are dominated species in two different forest habitat types. The under-storey is made by *Rhododendron* sp., *Corylopsis himalayana*, *Elaeagnus parvifolia*, *Artemisia*, *Berberi.*, *Daphne* sp., and *Clerodrendron* species. Leave litters, mosses, *Peteridium* sp., *Sellaginella* sp., and *Lycopodium* species dominated the ground cover.

The small mammals in all the six habitat types were threatened by 100 % free livestock grazing. Stone collection, litter collection, timber/pole extraction/felling, fire, road and feral dog in Ramsar Site could be further threatened the small mammals.

Study area

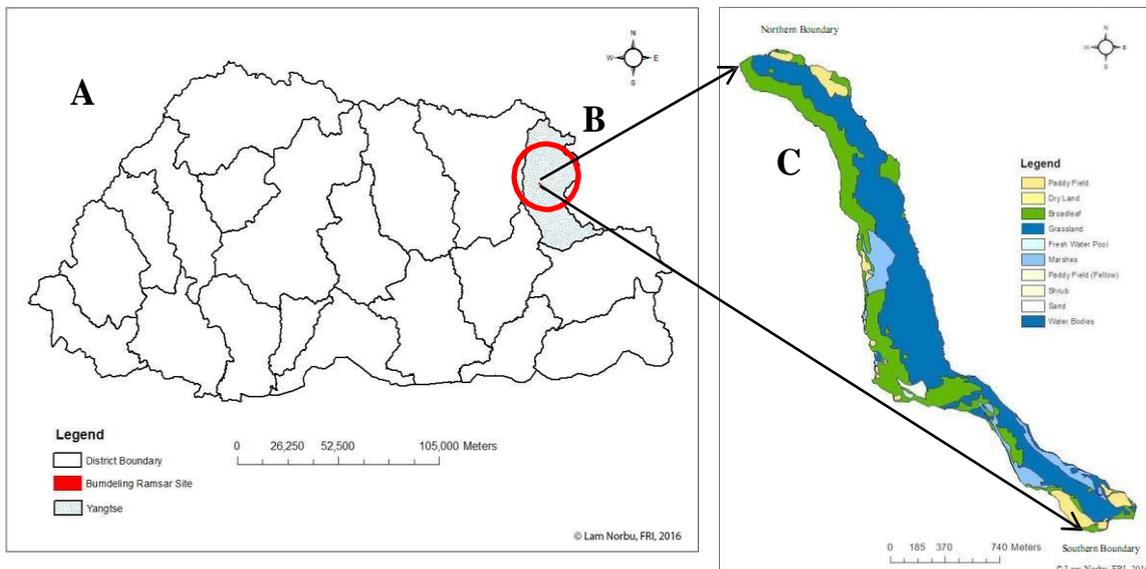




Figure 1: (A) Bhutan Map showing location of Trashi Yangtse district and Bumdeling Ramsar Site, (B) Trashi Yangtse district, (C) Bumdeling Ramsar Site land used types and (D) BRS showing six habitats type.

Live trapping activities





Figure 2: (A) Marking transect, (B) Setting baits in Sherman Live trap, (C) Deployed trap under log microhabitat, (D) Trap inspection, (E) Transferring trapped animal in handling bag, (F) Weighing by Pesola spring balance, (G) Morphometric measurement, (H) Sexing, (I) Marking, (J). Habitat and vegetation assessment, (K) Recording morphometric data and key environmental variables and (L) Cleaning traps.

Types of small mammal species captured from Bumdeling Ramsar Site.





Figure 3: (A) *Talpa micrura*, (B) *Soriculus nigrescens*, (C) *Millardia meltada*, (D) *Tatera indica*, (E) *Mus musculus*, (F) *Apodemus sylvaticus*, and (G) *Rattus* species.

Types of Conservation threats in Bumdeling Ramsar Site



Figure 4: (A) grazing, (B) Vehicular moment, (3) Feral dog and (4) Felling/pole extraction

Habitat types in Bumdeling Ramsar Sites



Figure 5: (A) Agricultural land, (B) *Alnus* dominated forest, (C) Open grassland and (D) Riparian habitat