

BIODIVERSITY SURVEY OF TANINTHARYI REGION



Biodiversity And Nature Conservation Association

July 2014

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Funded by



BANCA

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Dr. Thiri Dae We Aung
Program Manager
(Research and Conservation Department)

Abstract

This is a report about the biodiversity survey conducted in Tanintharyi division, Southern Myanmar which was funded and conducted by BANCA. There were five survey teams (Mammal, Bird, Insect, Herpetofauna and Flora) in this survey. The survey area was Ngawun Reserve Forest. The total number of bird species recorded was 122, of which one is an endangered species and another three are vulnerable species when using the the IUCN Red List. A total of 20 mammal species, one endangered and one vulnerable, were recorded in Ngawun Reserve forest. A total number of 14 herpetofauna species including two tortoises (Endangered) were recorded. A total of 71 different butterfly species (363 individuals) were recorded. In total 29 tree species and 12 bamboo species were recorded in study area. The survey was conducted for a period of 27 days which started on 15 May and ended on 27 May 2014. The findings are presented in the below report.

1. Introduction

Tanintharyi Division lies at the southern end of Myanmar. The Division borders Thailand in the east and south-east, to Mon State to the north, and to the Andaman Sea in the west. The area of the Division is 16,735 square miles. A report of Nature Wildlife Conservation Division (NWCD), which was published on-line, stated that in agricultural the main crops are paddy, betel nut, coconut, rubber and nipa palm (dhani). Moreover, tapioca, rambutan, durian and mango trees are also grown on a large scale. Oil producing oil palm is being grown in a special project. The forest type in Tanintharyi is mainly Tropical evergreen forest also called Tropical Rain forest or evergreen forest (The Burmese forest). The lowland rainforests in Tanintharyi are part of the Sundiac region (*Biome AS 14: Sundiac lowland forest and SA 086: Peninsular Thailand lowland forests*). A good indicator of species diversity is the type of forest. Tanintharyi has extensive sundiac lowland forests which is the forest type hosting one of the richest biodiversity. The recent years has seen a rapid decline in lowland forest cover, especially areas below 150m above sea level, since there are the preferred landscapes for oil palm plantations.

Tanintharyi has a tropical climate with temperature ranging from 20 °C to 38 °C and receives the south-west monsoon starting from mid-May till the end of September. The dry season is much shorter as compared to the rest of the country and the total annual rainfall is also greater.

The extensive relatively intact forests in this region support several threatened species such as the Plain-pouched Hornbill *Aceros subruficollis* and the majority of the world population of Gurney's Pitta *Pitta gurneyi*. Gurney's Pitta is listed as endangered on the IUCN Red list. This bird is considered to be found only in Sundiac level lowland forest. It is the only bird species endemic to Peninsula Thailand and the Tenasserim Range (Lambert and Woodcock 1996).

Populations of Gurney's Pitta and other fauna continue to be declining throughout the year due to the establishment of commercial oil palm estates. This is the principle threat to the wildlife species in Myanmar. Another threat is Myanmar's growing population which results in loss of forest and an increase in hunting activities. .

In order to assess the population and distribution of biodiversity in Tanintharyi Division, this survey was carried out from 15th May to 27th May 2014.

2. Objectives

The general objective of this research was to conduct a biodiversity survey with special focus on the Gurney's Pitta in Tanintharyi Division. The specific objectives of the research were as follow:

- To know the status of population and distribution of fauna and flora
- To collect current status of habitats
- To make an assessment of the threats facing the different species

3. Materials and Method

Site selection was based on previously visited sites. Thereafter the sites were refined with the help of satellite images. Sites were selected on the basis of their vegetation types. Field surveys were undertaken in Lenya and Ngawun Reserve forest from 15th May to 27th May 2014 by a biodiversity survey team from BANCA. There were six subjects represented (Mammal, Bird, Herpetofauna, Insect and Flora) in the biodiversity team. Surveys were conducted on foot following existing trails and tracks and by following routes across the

forest floor using the knowledge of local guides. We usually worked in one group or two groups of seven (two local guides and five researchers). Bird calls were broadcast regularly at approximately >100 m intervals using a Sony MP3 player connected to a sound box. The geographic coordinates for each location were recorded using Garmin 60 Cx (GPS). All bird and other animals observed and heard were also recorded in writing or by photograph or video. Human activities and impact was also noted.

The presence of birds is one of the indicators of biodiversity richness in the forest. Therefore, the threats assessment was calculated based on the threats to bird species.

Ranking threats

To rank threats BirdLife International has developed criteria against which each threat is assessed. In this survey this method was adopted. In this method threats are scored according to their timing, scope and severity, in relation to how likely they are to affect the ‘trigger’ (globally threatened) bird species at the site. Depending on the circumstances and the information available, the threat assessment may be based on either on information on threats that affect one or more ‘trigger’ species (for which there is good information) or each ‘trigger’ species assessed individually (then applying the ‘weakest link’ approach). Knowledge about the site (and especially the key habitats on which the ‘trigger’ species depend) as a whole.

Timing, scope and severity scores are then combined to give an impact score

Impact score of threat = timing score + scope score + severity score

Photos were taken during the survey and survey activities were documented by video as well.

The scientists of BANCA are:

Avifauna (Bird) : U Tin Aung Tun

Mammal : U Thaw Zin

Herpetofauna : U Myint Kyaw Thura, U Min Thein

Entomology (Insect) : Daw Naing Naing Win

Flora : U Khaing Tun Soe

4. Results

4.1 Avifauna

4.1.1 Introduction

Tenasserim, Burmese **Tanintharyi**, narrow coastal region, South-eastern Myanmar (Burma), bordered to the east by Thailand and to the west by the Andaman Sea. Tenasserim is dominated by the Tenasserim Range, which reaches a height of 6,801 feet (2,074 m), and is bisected by the Great Tenasserim River, which flows south to the Andaman Sea. Swamp forests are found on the east coast. The Tenasserim plains to the north are drained also by short and rapid rivers, which enter the Gulf of Martaban. The ethnic composition of the area consists of Karens in the west and north, Thai in the south, and Burmese who speak a unique dialect of Burmese in the other areas. Paddy rice is cultivated in the river valleys of Tenasserim, particularly near Daewi. Vegetables, coconuts, rubber, and teak are grown, and salt fields are worked. Soil erosion has been a problem on the upland ridges of the region. Wood and bamboo products are manufactured in Daewi. Tin, tungsten, and iron-ore mines operate near Daewi and Myike, and there is a tin purification plant in Heinda that is powered by a hydroelectric station in Phaungtaw. A coastal paved road has branches that run into Thailand.

4.1.2 Objectives

- To know the current status of bird species
- To investigate the main threat of the birds and other wildlife species
- To organize extension programmes to educate the public on the importance of ecosystem and public participation in conservation activities

4.1.3 Materials and Method

Forest Types and Vegetation Types

These regions include not only areas of Tropical Rain Forest but also some Tropical Mixed Evergreen and Deciduous Forests on the areas having less than 90 inches rainfall. Also the Coastal Mangrove Swamps occur along many parts of the coast, and there are Inland Swamp Forests over river floodplains and other lowlands.

Participants

Survey participant was Tin Aung Tun who is a species conservation officer in Biodiversity and Nature Conservation Association (BANCA) and Royal Society for Protection of Birds (RSBP).

Method

Field observations were conducted each day during the survey period between 6:30 and 11:30 am and between 3:00 and 6:00 pm. The survey area was accessed by foot using different

paths originating from the base camp. The population status of bird species and their habitats were recorded by point count method.

Location Map

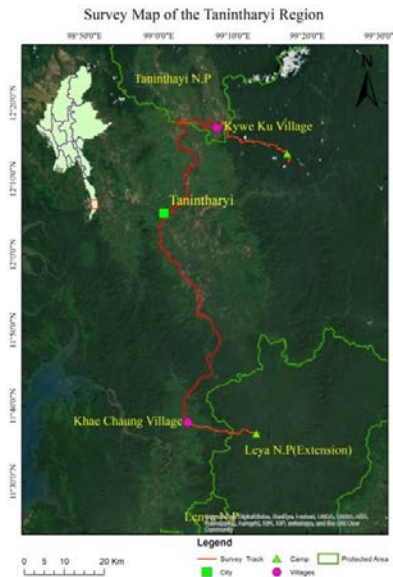


Fig.1 Map of the Bird survey site

4.1.4 Result of Avifauna Survey

A total of 122 bird species of 91 genera belonging to 44 families under the 27 orders were recorded during the survey period (Table 1). Four globally threatened species were found in Lemya National Park (Extension). (Table 2)

Endangered (EN)

1. Gurney's Pitta (*Pitta gurneyi*)

Four male Gurney's Pittas (*Pitta gurneyi*) were encountered in Lemya National Park (Extension). They were sighted at respectively N11.60799 E99.21643, N11.60866 E99.21727, N11.60991 E99.21747 and N11.61091 E99.21802. According to the IUCN Redlist, this species is Endangered (EN).

Vulnerable (VU)

1. Large Green Pigeon (*Treoncapellei*)

Eighth Large Green Pigeon (*Treoncapellei*) was recorded near NgaWun Camp in Lemya National Park (Extension).

2. Plain-pouched Hornbill (*Acerossubruficollis*)

Over one hundred Plain-pouched Hornbills (*Acerossubruficollis*) were recorded near NgaWun Camp. They flew around several times above our camp. According to the local hunter, it was feeding her young ones.

3. Great Slaty Woodpecker (*Mulleripicuspulverlintus*)

Seven Great Slaty Woodpeckers (*Mulleripicuspulverlintus*) were recorded.

Near Threatened (NT)

1. Lesser Fish Eagle *Ichthyophagahumilis*

A pair of Lesser Fish Eagle (*Ichthyophagahumilis*) was sighted in the air.

2. River Lapwing *Vanellusduvaucelii*

When survey team went up along the Tanintharyi River, five River Lapwings (*Vvanellusduvaucelii*) were encountered.

3. Blue-rumped Parrot *Psittinuscyanurus*

Flying above the forest five Blue-rumped Parrots (*Psittinuscyanurus*) were recorded.

4. Chestnut-bellied Malkoha *Rhopodytessumatranus*

Near the Phoephoegy Campong individual of Chestnut-bellied Malkoha (*Rhopodytessumatranus*) was sighted.

5. Great Hornbill *Bucerosbicornis*

Six individual Great Hornbills (*Bucerosbicornis*) were sighted when they were feeding in a tree in Leya National Park (Extension).

6. Red-crowned Barbet *Megalaimaraffesii*

Three individuals of Red-crowned Barbet were recorded.

7. Green Broadbill *Calyptomenaviridis*

Survey team sighted Green Broadbills (*Calyptomenaviridis*) two times. In total four individuals. The first time one individual and the second time three individuals were recorded.

8. Black and Yellow Broadbill *Eurylaimusochromalus*

Two Black and Yellow Broadbill (*Eurylaimusochromalus*) were recorded.

9. Dark-throated Oriole *Oriolusxanthonotus*

Two Dark-throated Orioles were recorded.

10. Maroon-breasted Philentoma *Philentoma velata*

Maroon-breasted Philentomas (*Philentoma velata*) were recorded in Leya National Park (Extension).

4.1.5 Main Threats to birds and other wildlife species

The main threats to this region are logging, hunting and establishment of palm oil plantations. Several companies are contracted by the Local or National Government to log trees. One of the companies based in Myikegot is permitted to log trees equivalent to 8000 tons per year. In addition, if they want to cut the log, need to pay 100,000 Kyats per month to the Karen National Union (KNU).

Also palm oil plantations are a threat to the habitat of bird and other wildlife species. Most companies came and get the permit to grow the palm oil plant. After receiving the permit they clear the forest and extract the trees. The remaining vegetation and trees are burnt.

Hunting is also one of the threats to bird and other wildlife species. During the survey period, the survey team encountered a lot of hunters. Every hunter uses the Black Powder Gun. Some time local hunters encounter hunters from Thailand. Hunters from Thailand cross the border by car.

4.1.6 Conclusion

Tanintharyi Region is a suitable area for conducting a bird survey. The results of this survey will be essential for the conservation of the birds and their habitat.

According to the survey, several companies have been logging, establishing palm oil plantations and hunting in this region. They were contracted by the National Government. Habitats of birds and other wildlife have been being quickly lost because of logging, hunting and establishing palm oil plantations. Effective control of the area is needed as soon as possible to protect the biodiversity of Tanintharyi Region.

Also local people rely on the forest for their livelihoods. To reduce the pressure on the forest alternative livelihood opportunities, such as animal husbandry, community forestry and agro-forestry, should be developed for local people.

People should be educated about the value of biodiversity and persuaded to participate in conservation activities. The Local Government, Ministry of Environmental Conservation Forestry and Karen National Union (KNU) should cooperate to control the illegal logging. Furthermore, a protected area should be designated as special conservation zone for Gurney's Pitta and other wildlife species such as Tiger (*Panthera Tigris*), Asian Tapia (*Tapirus indicus*), Asian Elephant (*Elephas maximus*) and Leopard (*Panthera pardus*).

4.2 Mammal

4.2.1 Introduction

Mammalogy is the study of mammals and their diversity and distribution on earth. Vertebrate animals (those with backbones) that have hair and produce milk for their newborns make up the class Mammalia. Over 5,400 living species of mammals exist in the world and can be divided in 29 different orders, such as carnivores, whales, bats, rodents, and primates.

The mammalogy team conducted a survey in the Nga Wun Extension Reserved. In that area, mammal animals are known to be abundant. But, the population of some species has decreased gradually due to hunting and trapping. The animals form a source of food for the communities. The Kyat Reserved Forest region is under the control of the armed group Karen or Kayin National Union (KNU). The hunting of White-handed Gibbons is banned by the KNU. People adhere to this ban since the KNU may use force when a hunter is discovered. That is good news for the conservation of White-handed Gibbons which is Endangered (EN) according to the IUCN Red List (2013).

Unfortunately, there are timber companies in the area which are logging trees. They have constructed many roads. These roads in the forest can be compared to a spider's web. This makes hunting in the jungle more convenient for the hunters. Taking advantages of this network of roads hunting activities have increased. In addition hunting has increased because employees of these logging companies are involved in hunting.

Both local people and people from Thailand have been hunting wild animals for food and for sale in the market. The roads that give access to the jungle were built by Thai and Myanmar companies.

4.2.2 Objectives of the study

The objective of the survey is

- (1) to search for wild mammals and identify and record all the species found;
- (2) to compile a baseline of wild mammals living in the region which can be used in later studies.

4.2.3 Materials and Methods

Participants

The surveyor is Thaw Zin who is a mammalogist in BANCA.

Survey area

The survey area is situated beside the Nga Wun stream. The survey was carried out around base camp and along the trails. The coordinates of site is N11.60634° and E 99.21844°. The forest type is primary but degraded type.

Methods

Observation (with GPS readings) was recorded in writing and with photographs. Different techniques were used to investigate the presence and habitat of the mammals. The survey also included interviewing local people on the use of mammals. Photographs were taken with a Cannon Sx280 HS digital camera. General observation and assessment of vegetation cover and human impact were also undertaken.

Specimens were collected for later identification. Dead animals and their body parts were collected from local people (present and former hunters).

Interviews with local villagers and hunters were made to obtain second hand information about the presence of fauna species in that area together with information on their exploitation.

- If there were any specimens collected or live animals seen, identification of the taxon was recorded in references to the following field guide books: "Large Mammals of Myanmar", Tin Than, 2006.;
- "Wild Animals of Myanmar", Tun Yin, 1993;
- "A Field Guide to the Mammals of Thailand and South-East Asia", Francis, C.M. 2008..

Signs - footprints, scratches and resting sites

Evidence of a species' presence in the survey area could be obtained from the signs such as scats and tracks (footprints) on the ground. These signs were mainly found on and beside the trails and roads in the surrounding area of the factory.

All encountered tracks and scats were examined, photographed and their width and length measured. The data was recorded together with the date. Also other signs were observed such as resting sites in dense shrubs and herbs vegetation, near water and other possible habitats for specific mammal species.

Interview method

Despite the assumed abundance of mammal species in the survey area, it is very difficult to encounter mammals. Hence, interviews were conducted to supplement the data. Many questions were asked to local people, who have knowledge about terrestrial as well as aquatic mammal species.

Materials

- Binocular (Olympus 10x50 DPS I)
- GPS locations were recorded using an Etrex GPS map 30
- Photographs were made using a Cannon Sx280 HS digital camera
- A digital calliper and tape measure were used for measurements

4.2.4 Result

Through direct signs a total record of 20 mammal species belonging to 11 families of 5 orders were recorded during the study period of 5 days. The mammal species were confirmed through 10 sightings and other evidence viz. alive, footprint and scratches etc. The recorded mammal fauna were of the following orders:

- Proboscidea: one species belonging to families Elephantidae;
- Carnivora: species belong to two families (Mustelidae and Viverridae);
- Rodentia: two species belonging to two different families, namely Sciuridae and Hystricidae;
- Primates: three species belonging to three different families, namely Lorisidae, Cercopithecidae and Hylobatidae;
- Artiodactyla: three species belonging to three families, namely Suidae, Cervidae and Bovidae.

Status and species conservation: According IUCN Red List 2013, two species can be classified as Endangered (EN) (White-handed Gibbon *Hylobates lar* and Asian Elephant *Elephas maximus*), four species as Vulnerable (VU) (Slow Loris *Nycticebus coucang*, Stump-tailed Macaque *Macaca arctoides*, Sambar *Rusa unicolor* and Southern Serow *Capricornis sumatraensis*), one species as Near Threatened (NT) (Hog

Bagder *Arctonyx collaris*), four species as Least Concern (LC) (Banded Linsang *Prionodon linsang*, Eurasian Wild Pig *Sus scrofa*, Indochinese Ground Squirrel *Menetesberdmorei* and Asiatic Brush-tailed Porcupine *Atherurus macrourus*) and one species as Data Deficient (DD) (Lesser Oriental Chevrotain *Tragulus javanicus*).

Among them three species: White-handed Gibbon *Hylobates lar*, Asian Elephant *Elephas maximus* and Slow Loris *Nycticebus coucang* in Appendix I were listed in CITES (2013).

4.2.5 Conclusion

A total of 20 species of mammalian species under 11 families and 5 orders were recorded by mean of sighting and other evidences. Based on the surveys and the revised version of 2013.1 IUCN Red Data list of Threatened Animal and Wildlife, at least 12 species of mammal species recorded from the survey area are included in the list; two species of Endangered, four species of Vulnerable, one species of Near Threatened, four species of Least Concern and one species of Data Deficient.

According to result, small mammals were more found than large mammals during the survey period.

In this project, the information from the villagers was not included in the report because their information was all of the mammals included in the guide book. Therefore, only encountered and observed mammals were described in this report.

The dead body of the civet was found from the local people. But, these species could not be identified down to species. No seen in guide books.

The footprints of Asian Elephant were observed during the survey period. Around the footprints of Asian Elephant were broken branches and fallen leaves which were the result of beating by the trunk of elephant and stomping by its feet.

As human activities continue to fragment natural communities and ecosystems worldwide, it becomes imperative that we understand the biotic processes affecting the restructure and diversity of natural community remnants.

4.3 Herpetofauna

4.3.1 Introduction

Tanintharyi Division is one of the regions in Myanmar and is the southernmost one. Tanintharyi Region is shaped by the north-south mountain range, with its highest peak standing at 2070 meters. The eastern most ridge of this range defines the national boundary with neighboring Thailand at peak elevations between 800 - 1400 meters. But the border of the southernmost portion (i.e. Kawthaung Township) is defined by Pakchan River. This Tanintharyi mountain range is cut by drainages into north south flowing Greater Tanintharyi River and south north flowing little Tanintharyi and Lenya rivers. The mountain range

gradually rolls down to the west up till the coastal area which is characterized by mangrove ecosystem and multiple offshore islands called Myeik archipelago, consisting of more than 800 islands.

The herpetology (the study of amphibians & reptiles) survey was conducted in Tanintharyi division. To our knowledge no herpetology survey was conducted in the area before. The survey area was Lenya extension Reserve Forest.

The survey period was about 12 days including travelling and studying. The study period alone was about 5 days.

Habitat fragmentation is one of the most serious threats to global bio-diversity.

4.3.2 Objectives of the survey

The objective of this survey is to identify and record all the herpetofauna found and compile a baseline data for further study. The baseline data can also be use for the protection and management of the biodiversity (such as reptiles and amphibians).

4.3.3 Materials and Methods

Participants

Two members, Myint Kyaw Thura and Min Thein Htet participated in the survey.

Survey area

The survey conducted in a 2 km radius around the basecamp, located beside Nga Wun stream. The coordinates are (N 11.60634° E 99.21844°). The forest type is primary but a degraded one. Illegal loggers who extracted good timber from this area were responsible for the degradation of the jungle.

Methods

The field survey was done randomly by walking in the forest and mountain areas, along the stream and foothills and other areas where herpetofauna was likely to be found. Surveys were made twice a day (during day and night). Scanning among the trees, holes in the ground, digging through leaf litter, turning over logs and stones near the stream were done for visual encounters. Diurnal walks had been carried out for the live sighting of these species and they were photographed using a Cannon Sx280 HS of focal length 4.5-90.0 mm. Latitude and longitude of collected localities were recorded using a Garmin GPS map 78s. Then, recorded specimens were released back into their original place. No specimens were collected for preservation during this survey.

Materials

- Long stick clipper to catch snakes

- Another stick for suppressing and controlling snakes for closer study Rubber band to shoot lizards and skinks Digital camera (Cannon Sx280 HS) Garmin GPS map 78s Caliper and measuring tape Data forms Torches with rechargeable batteries



4.3.4 Results

A total of 18 species of herpetofauna were captured or observed during the survey period. These included 8 species of frog, 6 species of lizard and 4 species of snake.

Status and species conservation: According to the conservation status of the IUCN Red List (2013), 7 species of frogs are listed as Least Concern (LC). No other globally threatened species were found.

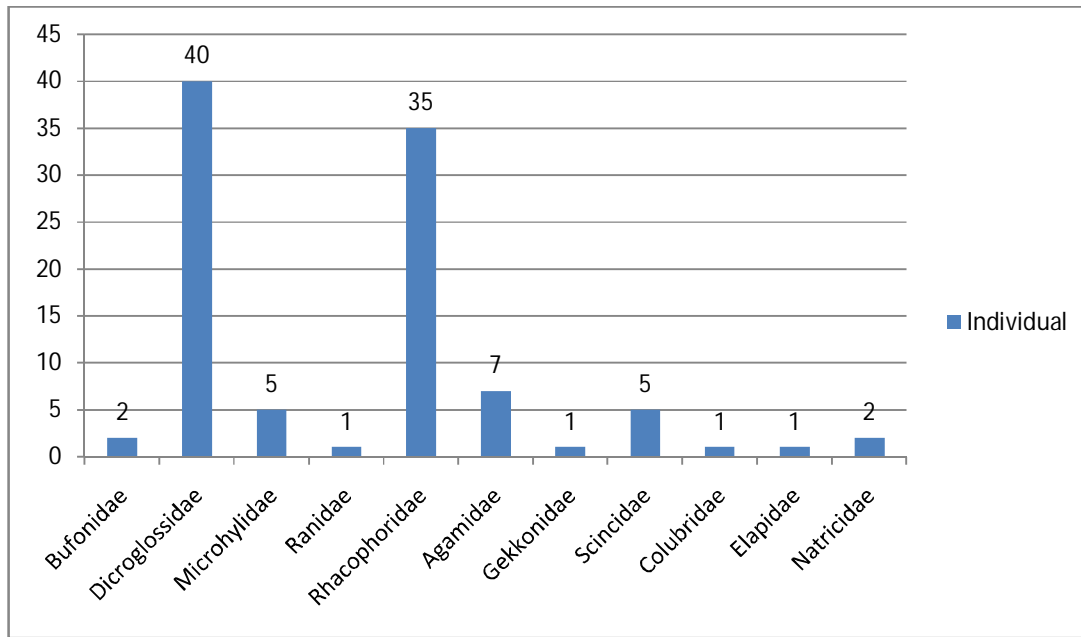


Figure 2 Number of individuals found in each family

4.3.5 Conclusion

A total of 18 species of amphibian and reptile belonging to 11 families of 16 genera were recorded. All of these are 8 species of frogs, 6 species of lizards and 4 species of snake.

Among all the species found, seven species of frog are listed as Least Concern (LC). They are the *Phrynoidis aspera*, *Fejervarya cancrivora*, *Fejervarya limnocharis*, *Occidozyga martensii*, *Microhyla ornata*, *Hylarana nigrovittata* and *Polypedates leucomystax*. The frogs were observed with nests in the pond. *Polypedates leucomystax* and *Fejervarya limnocharis* were the most widely distributed species in the survey area. During the survey these species were encountered in the field.

During the survey, amphibians were more often seen than reptiles. As the study time was during the monsoon it is suitable for a herpetofauna study.

Turtles and tortoises were not found. Among three species of snake one species, *Bungarus wanhaotingiis* a venomous snake. The voice of species *Gekko gekko* was heard near the camp at night but was not seen physically. In other regions of the country, especially at the Myanmar-China border areas, geckos were illegally treated as wildlife species of very high price. In this study area, it does not get any information about this species since wildlife trade is kept as a secret matter.

The local community consumes the meat of many species of reptiles and amphibians. Some of them are highly valued as food such as turtles and tortoises. This is similar to other parts of the world. That is the main reason why tortoises have become an endangered species.

Also, evidence of fragmentation of habitat due to illegal logging was witnessed during this trip.

4.4 Entomology (Insect)

4.4.1 Introduction

Insects are the largest group of animals in the world. There are about 1.8 million species of plants and animals on this planet earth, of which 0.85 million are insects. Butterflies belong to one of the taxonomic groups of insects. Entomology or the study of insect is therefore, a very wide subject. No one entomologist can study all the species of insects even in a major taxonomic group of insect due to the huge number of species. Invertebrates in general and insects in particular play a big role in the health of any given ecosystem. This is not only due to their role in the food webs and nutrients recycling but also as indicators of ecosystem changes. Their abundance, diversity and distribution often reveal a lot of information about a given ecosystem that is normally very critical for the management of such ecosystems.

The studying of insects in this part of the world will never be finished as long as the green forests are still there. Butterfly is a type of insect. The entomological survey team focussed mainly on the butterflies in Tanintharyi Division.

The butterflies are a good source of food for a variety of birds and other small animals. The survival of these pollinators largely depends on the survival of many flowering plants in the streams. Butterflies are major indicators for the health of ecosystems.

The forest type of NgaWun Extension Reserved Forest is primary degraded. Up to very recent years it was impossible to conduct fauna study in this region due to insurgency and lack of security. Recently a cease fire agreement was signed between the government and the armed group and thus the civil war or insurgency was stopped in those areas.

4.4.2 Objectives of the survey

- To know what species of butterfly inhabit this area
- To identify all the species found
- To compile baseline data of the butterfly species for further study which will include various aspects of ecological study

4.4.3 Materials and Methods

Participants

The surveyor was Naing Naing Win who is scientist from BANCA.

Surveyarea

The surveyarea is situated beside NgaWun stream and the surveywas conducted around the basecamp and along the trails. The coordinates of site are N 11.60634° E 99.21844°. The forest type is primary and degraded one.

Method

A standard survey method was conducted randomly around the survey area and along the trails or pathways in the area. Identification of Butterfly species was primarily donedirectly in the field. In some cases, if the encountered butterflies were not identified directly in the field, they were collected by using the local made long-handled aerial nets (140 cm PVC pipe, net patch 1 millimetre, ring size 15 inches diameter made by aluminium - local made). And then at the camp the collected specimens were observed and recorded for their morphological characters such as patterns, spots, stripes and colour. The mouth parts were carefully examined and the body and wing's length, measured. Also photos were taken by using a Cannon Sx280 HS with lens 20 x IS camera. After that, the specimens were released back onthe original place. Unidentified species were kept separately in triangle envelopes and the collection date and the location (GPS coordinates by using *GarminGPSmap 78s*) were recorded on the envelopes. All separated envelopes were preserved in airtight plastic containers to avoid humidity. Inside the containers mothballs were placed to prevent from the growth of mould.

Materials

- Aerial nets with long-handled made locally
- Digital camera (Cannon Sx280 HS)
- Garmin GPS map 78s
- Data forms



4.4.4 Results

A total of 71 different butterfly species (363 individuals) belonging to 8 families and 44 genera under the order Lepidoptera were recorded in the first study area, representing families of Papilionidae (16 species of 5 genera), Pieridae (12 species of 9 genera), Danaidae (15 species of 5 genera), Satyridae (3 species of 3 genera), Nymphalidae (18 species of 14 genera), Amathusiidae (1 species of 1 genera), Lycaenidae (4 species of 4 genera) and Hesperidae (2 species of 2 genera) during the survey period of 5 days.

Conservation Status: According to the IUCN Red data list 2013, 5 species of butterfly are listed as Least Concern (LC), namely *Eurema andersoni*, *Euploea core*, *Tirumalagautama*, *Junonia hierta* and *Junonia almana*.

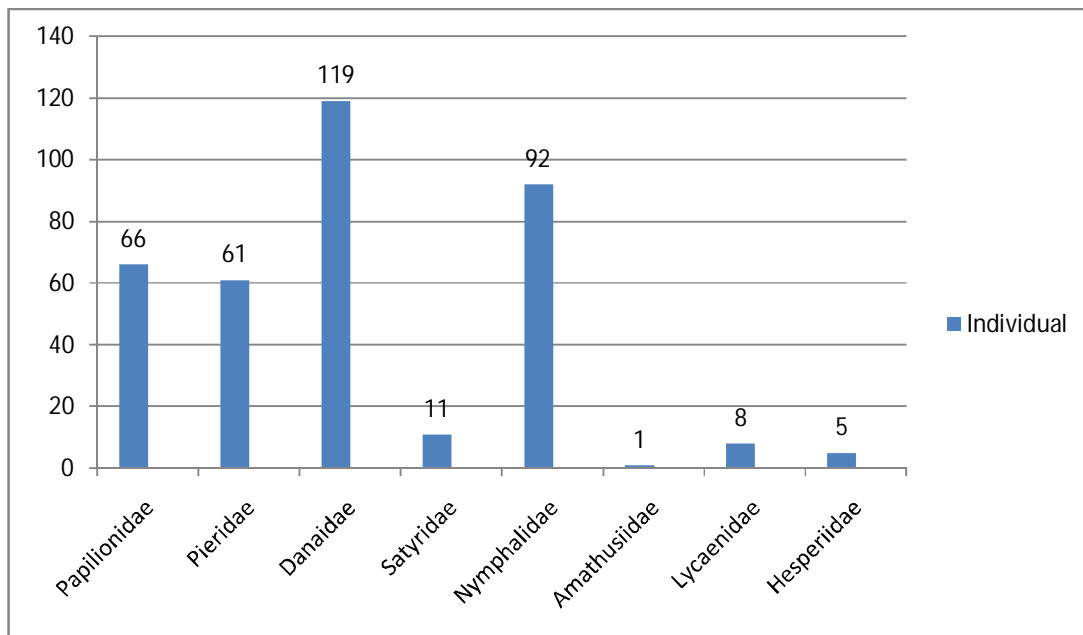


Fig 4 Total individuals of butterfly species from the study area

4.4.5 Conclusion

In the survey area, a total of 71 species of butterfly were observed. Out of which, 5 species are listed as Least Concern (LC) according to the IUCN Red List (2013).

The Euploeadiocletianus under the family Danaidae was the most frequent found species during the survey. From family Papilionidae *Pachliopta coon* was found in smallest number. In previous studies these species have not been found before in the wild.

Most butterflies were observed along the trails. Some species were found in the bush. Most butterflies were found on bad smell producing materials such as feces of animals.

Butterflies that were simply listed as Species (sp) were those species that were seen while flying and could not be caught. Therefore, they could not accurately be identified.

The butterflies are excellent pollinators and play a very important role in the pollination, reproduction and therefore the perpetuation of plants. On the other hand the survival of these pollinators largely depends on the survival of many flowering plants. They are a good source of food to a variety of birds and other small animals. Many butterfly species are colourful and are of great aesthetic beauty and great attraction for mankind.

4.5 Forest Condition

4.5.1 Objectives

- To study the biodiversity situations
- To study the forest types and forest degradation

4.5.2 Materials and Method

Participant : Khaing Tun Soe, who is forester.

Survey Area

The survey area was Nga Wun reserved forest near Khe Chaung village in Boat Pyin Township. We went from Tanintharyi to Khe Chaung by car and from Khe Chaung to the survey area by motor bike. The survey area can be reached within one day.

Method

The village leader and local people were interviewed to gather information about their livelihoods, economic situation, their attitude towards the forest and how to establish community forests. Natural features, culture and their lifestyles for ecotourism were recorded. Also, the forest type, tree species and bamboo species were recorded and studied about wildlife.

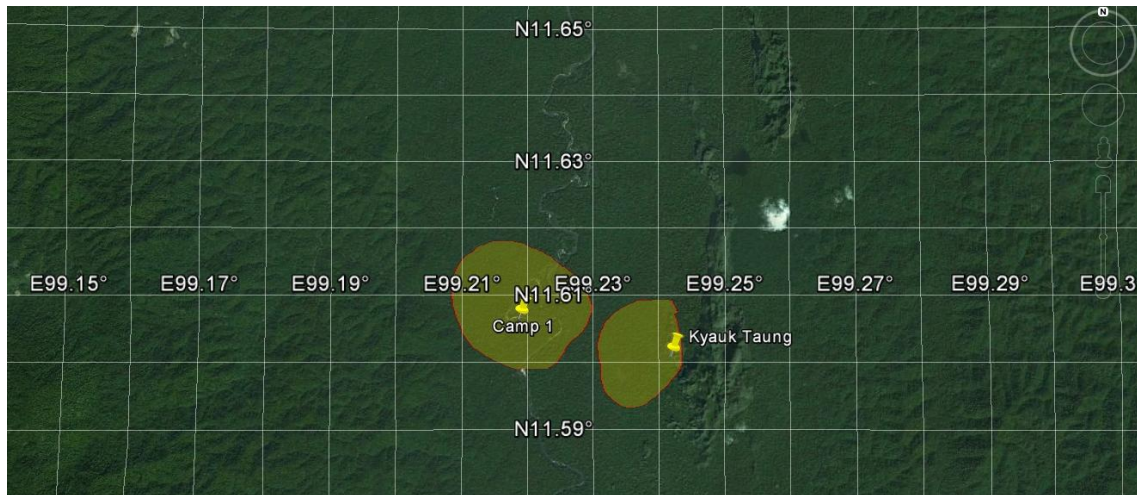


Fig 6 The camp sites and survey area of the research team on Google maps

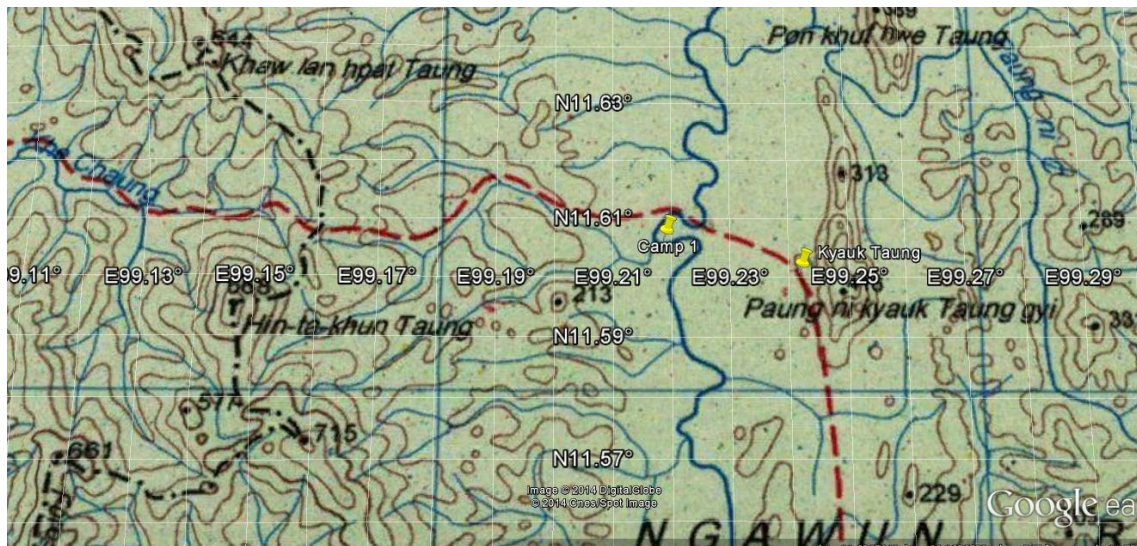


Fig 7 The camp sites and survey area of the research team on 250 K map

4.5.4 Result

4.5.4.1 Forest Type

The forest type is Evergreen Forest. The forest is still in good condition. So wildlife species can live freely. There is a lot of wildlife. Some of the species living in the area are endangered. In this forest, bamboo is very common and the main tree species are Kanyin(Se), Gangaw, Thingan(Mauk Kalay) and Taung Khaye.

The list of tree and bamboo species can be found in Table 9 and 10.

4.5.4.2 Difficulties for the Establishment of Community Forest

The village leader and some local villagers were interviewed to observe the general situations to found community forest. The following issues were identified for the establishment of community forest.

- 1) The forest area is too far from the village to be effectively managed.
- 2) There are a lot of private uplands and gardens in the forest area.
- 3) Local people depend on the forest for their livelihood.
- 4) The forest boundary is difficult to define.
- 5) This forest area is under the control of the KNU.
- 6) Due to the scattered nature of the village households, organizing the community is a bit difficult.
- 7) There are still some conflicts and mistrust between the authority and community.

It is possible to establish a community forest but it will not be easy and may take a long time. The forest is still in good condition. Another difficulty is the extraction of timber. In this region Pyae Phyo Tun company has a permit for timber extraction. It is a major issue for establishing a Community Forest. Moreover, the education and knowledge of local people is poor and need to be improved. Due to these issues, the establishment of community forest may take a long time.

4.5.4.3 Difficulties for Ecotourism

The natural features of this area are not unique enough to make it interesting for eco-tourism. There are also some other issues related to ecotourism. First of all, the site is remote and reaching the area is not easy. Secondly, means for communications are limited. Thirdly, there is no traditional cultural heritage to attract tourists. Other potential attractions such as home stays and home museums are not possible at present. The main issue is the lack of security. This site is regarded as a brown area and under KNU control. Finally, if there were to be an accident, there is no hospital for medical treatment.

5. Issue And Threats

Major issues and threats observed during the field surveys in Lenya National Park, Tanintharyi Region indicated that the following threats are currently exerting adverse impacts on Lenya National Park.

- Hunting
- Trapping herpetofauna and mammals for food
- Trading of Turtles and Snakes to China
- Land encroachment (Oil Palm, Betel Nut and Rubber Plantation)

- Fuel wood collection
- Population growth
- Exploitation of a timber companies
- Logging

Assessment of Threats

No.	Threats	Severity	Scope	Timing	Total	Rank
		(0-3)	(0-3)	(0-3)		
1.	Hunting	3	3	3	9	Very High
2.	Trapping herpet fauna and mammals for food	3	2	3	8	Very High
3.	Trading of Turtles and Snakes to China	3	2	3	8	Very High
4.	Land Encroachment (Oil Palm, Rubber and Betel Nut plantations)	3	2	3	8	Very High
5.	Fuel wood collection	2	1	3	6	High
6.	Population Growth	2	1	3	6	High
7.	Exploitation of a timber Company	3	2	3	8	Very High
8.	Logging	3	2	3	8	Very High
9	Climate Change	2	1	3	6	High

Source: *Impact Score* = *Severity Score* + *Scope Score* + *Timing Score* (BirdLife International)

Priority Ranking of Assessment of Direct Threats

Sr.	Rank Scores	Priority Ranking	Remarks
1.	0	Low	
2.	3-5	Medium	
3.	6-7	High	
4.	8-9	Very High	

Very High	High
Hunting	Fuel wood collection
Trapping herpet fauna and mammals for food	Population Growth
Trading of Turtles and Snakes to China	Climate Change

Land Encroachment (Oil Palm, Rubber and Betel Nut plantations)	
Exploitation of a timber Company	
Logging	

6. Discussion

A total of 122 bird species, 71 different butterfly species, 20 mammal species, 6 species of lizard, 8 species of frog, 4 species of snake, 29 tree species, 12 bamboo species and forest types were recorded during the survey. The previous survey of 2010 and 2012 focussed mainly on bird and in particular on the Gurney's Pitta. Yet some information about other wildlife information was collected. In this survey, globally threatened species of bird and mammals were recorded. According to the IUCN Red List (2013), two species can be classified as Endangered (EN), White-handed Gibbon *Hylobates lar* and Asian Elephant *Elephas maximus*, four species as Vulnerable (VU), Slow Loris *Nycticebus coucang*, Stump-tailed Macaque *Macaca arctoides*, Sambar *Rusa unicolor* and Southern Serow *Capricornis sumatraensis*. According to the IUCN Red List (2014), one species can be classified as Endangered (EN), Gurney's Pitta *Pitta gurneyi*, and three species as Vulnerable (VU), Large Green Pigeon *Treon capellei*, Plain-pouched Hornbill *Aceros subruficollis* and Great Slaty Woodpecker *Mulleripicus pulverulentus*.

During the survey, we observed fewer species of herpeto fauna and mammal than bird and butterfly species. In addition the Red-whiskered Bulbul, the most common bird in the country, was not recorded. This Bulbul and the Asian Paradise Flycatcher were hunted or captured by both local people and people from other regions by using mist-nets for trading to Thailand. Many logging or conversion lands were found in the survey areas.

Currently, local communities know that they are facing more flooding, more sedimentation, and drought due to the climate change. But they don't know how to solve the problems

because they are very poor and they do not have any environmental and biodiversity conservation knowledge.

The regions, controlled by ethnic armed forces, are the safe for some birds and mammals. One thing to keep in mind is that almost all villagers are hunters. Ethnic armed forces enforce the law in order to protect some animals such as the Lar Gibbon and Hornbills which were observed many times during the survey.

Conservation activities should start as soon as possible in these areas and the government should be stimulated to designate the areas as protected area. All actions should be taken in cooperation with the Karen National Union (KNU) and local villages and to encourage the oil palm companies and villages to restore the natural forest for protecting the habitats of Gurney's Pitta and other wildlife species.

7. Recommendation

7.1 Recommendation for Fauna

- There is a need to control logging activities in order to reduce habitat loss for birds and other wildlife species.
- The law should be enforced around Tha Get Reserve Forest and Lenya National Park (Extension).
- There is a need to control illegal hunting by both local hunters as well as by hunters who are coming from Thailand.
- The slash and burning method used by palm oil plantations need to be reduced.
- Further study should be done to gather more information about bird and other wildlife species.
- Environmental awareness rising should be done in the communities so that they know the value of the nature in the region.

7.2 Recommendation for Forest Conservation

First, the economy and standard of living of local people needs to be improved. More training and environmental awareness rising are needed for community development. In this area, bamboo can become a main product for the economy. Instead of selling bamboo as a raw condition, selling bamboo as value added products is better. So it is needed to support technology and training to allow people to produce quality value added products. If the local people can produce more bamboo furniture more widely, their

economicsituation will improve. Another alternative is producing bamboo charcoal. Local people still use a lot of firewood for fuel and this is damaging theforest. Bamboo charcoal may be a solution for this problem. But it needs to introduce the technology needed for preparing bamboo charcoal making.

Aserious problem is timber harvesting by the companies. This causes deforestation. So it is needed to change the government policy to limit the number of permits provided.

The next problem is shifting cultivation. Forests are seriously destroyed bycultivation. Local people clear the forest for their farms. It can cause soil erosion and deforestation. Therefore, it is needed to educate and train local people in sustainable agricultural methods and introduce agro-forestry for local people.

To establish community forest, there are many problems and it is not easy to get a certificate. But these forests need to be protected from timber harvesting in order to sustain the ecosystem and wildlife. In fact that forest should be reserved especially for bamboo and wildlife.

In this forest birds and wild animals are very diverse because their habitats are still in good condition. So, it needs to be protected their habitat. Bamboo species is also diverse in this region. Other tree species can also be reserved. Endangered wild animals and birds can be found in this forest. Therefore, these forests should be protected as a specific research area.

If these forests are protected as a specific research area, it can attract scientists, birds and wildlife enthusiasts for their study. There are a lot of bird species in this area, so it can become a bird watching site. So, these forests should be protected as a research area and based on this, it can be made into adventuretourism without damaging the existing ecosystem.

Finally, to protect the forests, wildlife and ecosystem of this area, it will need to become a joint management area in close cooperation with the community, other non-governmental organizations and the government.

8. References

8.1 Reference for Bird

1. Robson, C. 2005. *New Holland field guide to the birds of South-east Asia*. New Holland Publisher, London, 304 pp.
2. Robson, C. 2008. *New Holland field guide to the birds of South-east Asia*. New Holland Publisher, London, 304 pp.
3. Robson, C. 2011. *New Holland field guide to the birds of South-east Asia*. New Holland Publisher, London, 544 pp.

4. IUCN 2010. *IUCN Redlist of threatened species. Version 2010*.www.iucnredlist.org Downloaded 14 May 2010.

8.2 Reference for Mammal

1. CITES, 2013. Convention on International Trade in Endangered Species of Wild Fauna and Flora, Appendices I, II and III.
2. Francis, C.M. 2008. A Field Guide to the Mammals of Thailand and South-East Asia. Asia books Co., Ltd. Thailand. pp 392.
3. IUCN. 2013. IUCN Red List of Threatened Species. Version 2013.1 (online). Available: www.iucnrelist.org.
4. Parr, J.W.K. A Guide to the Large Mammals of Myanmar.

8.3 Reference for Herpetofauna

1. Chan-ard, T. 2003. A photographic guide to Amphibian in Thailand. Se-education Public Company Limited. Thailand. pp 176.
2. CITES, 2013. Convention on International Trade in Endangered Species of Wild Fauna and Flora, Appendices I, II and III.
3. Cox, M.J, Dijk, P.P.V, Nabhitabhata, J and Thirakhupt, K. 2006. A photographic guide to Snakes and other Reptiles of Thailand and South-East Asia. Asia books Co., Ltd. Thailand.
4. Das, I. 2010. A field guide to the Reptiles of Thailand & South-East Asia. Asia books Co., Ltd. Thailand. pp 376.
5. IUCN. 2013. IUCN Red List of Threatened Species. Version 2013.1 (Online). Available: www.iucnrelist.org.
6. Kalyar, Platt. S. G, Win KoKo, KhinMyoMyo, Kyaw Moe and Me Me Soe. 2012. Photographic Guide to the Freshwater Turtles and Tortoises of Myanmar. Turtle Conservation Team for Educational Purposes. pp 54.
7. Zug, G. R. A field guide to Tanintharyi Amphibians and Reptiles (2014). National Museum of Natural History, Smithsonian Institution.

8.4 Reference for Insect

1. CITES, 2013. Convention on International Trade in Endangered Species of Wild Fauna and Flora, Appendices I, II and III.
2. IUCN. 2013. IUCN Red List of Threatened Species. Version 2013.1 (Online). Available: www.iucnrelist.org.
3. Kehimkar, I. 2013. The book of Indian butterflies. Published by Bombay natural history society. pp. 497

4. Kinyon, S. 2004. An illustrated checklist for the butterflies of Myanmar. Zoology Department of Yangon University.
5. Singh, A, P. Butterflies of India. Printed in India (2011). pp. 183
6. Walters, M. 2010. The complete illustrated World Encyclopedia of insects. pp. 256

Appendix

Table 1. Recorded bird species of orders, families and total species

No.	Orders	Families	Species
1	GALLIFORMES	PHASIANIDAE	1
2	ANSERIFORMES	ANTIDAE	2
3	CICONIIFORMES	ARDEIDAE	6
4	PROCELLARIIFORMES	PHALACROCORACIDAE	1
5	FALCONIFORMES	FALCONIDAE	6
6	GURIFORMES	RALLIDAE	1
7	CHARADRIFORMES	PLUVIALIDAE	1
8		VANELLIDAE	2
9		SCOLOPACIDAE	1
10	COLUMBIFORMES	COLUMBIDAE	4
11	PSITTACIFORMES	PSITTACIDAE	3
12	GURIFORMES	CUCULIDAE	8
13	STRIGIFORMES	STRIGIDAE	3
14	CAPRIMULGIFORMES	CAPRIMULGIDAE	1
15	APODIFORMES	APODIDAE	5
16	TROGONIFORMES	TROGONIDAE	1
17	CORACIIFORMES	CORACIDAE	2
18		ALCEDINIDAE	6
19		MEROPIDAE	2
20		BUCEROTIDAE	4
21	PICIFORMES	RAMPHASTIDAE	3
22		PICIDAE	7
23	PASSERIFORMES	EURYLAIMIDAE	4
24		PRIONOPIDAE	1
25		AEGITHINIDAE	1
26		RHIPIDURIDAE	1
27		MONARCHIDAE	2
28		CHLOROPSEIDAE	1
29		STENOSTIRIDAE	1
30		TAMALIIDAE	3
31		CISTICOLIDAE	2
32	CICONIIFORMES	DICRURIDAE	3
33		CORVIDAE	2
34		NECTARINIIDAE	5
35		IRENIDAE	1
36		ESTRILDIDAE	1
37		SITTIDAE	1
38		STURNIDAE	4
39		MUSCICAPIDAE	3
40		PARIDAE	1
41		PYCNONOTIDAE	9
42		PITTIDAE	3

43		CAMPEPHAGIDAE	1
44		ORIOLOIDAE	2

Table 2. Recorded globally threatened Bird species in Tanintharyi Region

No.	Family	Scientific name	Common Name	IUCN Status
1	PITTIDAE	<i>Pitta gurneyi</i>	Gurney's Pitta	EN
2	COLUMBIDAE	<i>Treoncapellei</i>	Large Green-Pigeon	VU
3	BUCEROTIDAE	<i>Acerossubruficollis</i>	Plain-pouched Hornbill	VU
4	PICIDAE	<i>Mulleripicuspulverlintus</i>	Great Slaty Woodpecker	VU

Table 3 List of Bird species in Tanintharyi Region

Sr.no	Family	Scientific name	Common New Name	Site 1	Site 2	Site 3	IUCN Status
1	PHASIANIDAE	<i>Gallus gallus</i>	Red Junglefowl		1	3	
2	ANTIDAE	<i>Dendrocygna javanica</i>	Lesser Whistling-Duck	27		4	
3		<i>Anas querquedula</i>	Garganey	4			
4	ARDEIDAE	<i>Gorsachius melanolophus</i>	Malaysian Night-Heron			1	
5		<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron	3			
6		<i>Butorides striata</i>	Little Heron	4			
7		<i>Ardeola spp</i>	Pound-Heron	4	2	1	
8		<i>Bubulcus coromandus</i>	Eastern Cattle Egret	14			
9		<i>Egretta garzetta</i>	Little Egret	6			
10	PHALACROCORACIDAE	<i>Phalacrocorax niger</i>	Little Cormorant	9			
11	FALCONIDAE	<i>Microhierax caerulescens</i>	Collared Falconet			2	
12		<i>Elanus caeruleus</i>	Black-shouldered Kite	2			
13		<i>Ichthophaga humilis</i>	Lesser Fish-Eagle		2		
14		<i>Spilornis cheela</i>	Crested Serpent-Eagle	1	4	5	
15		<i>Accipiter trivirgatus</i>	Crested Goshawk		1	1	
16		<i>Accipiter badius</i>	Shikra			1	
17	RALLIDAE	<i>Amaurornis phoenicurus</i>	White-breasted Waterhen	3			
18	PLUVIALIDAE	<i>Pluvialis fulva</i>	Pacific Golden Plover	19			
19	VANELLIDAE	<i>Vanellus duvaucelii</i>	River Lapwing	5			
20		<i>Vanellus indicus</i>	Red-wattled Lapwing	4			
21	SCOLOPACIDAE	<i>Actitis hypoleucos</i>	Common Sandpiper	2			
22	COLUMBIDAE	<i>Columba livia</i>	Rock Pigeon	17			
23		<i>Streptopelia chinensis</i>	Spotted Dove	8			

24		<i>Chalcophaps indica</i>	Emerald Dove	1	1	1	
25		<i>Treon capellei</i>	Large Green-Pigeon			8	VU
26	PSITTACIDAE	<i>Loriculus vernalis</i>	Vernal Hanging-Parrot		17	6	
27		<i>Psittinus cyanurus</i>	Blue-rumped Parrot		5		
28		<i>Psittacula alexandri</i>	Red-breasted Parakeet	9			
29	CUCULIDAE	<i>Cuculus micropterus</i>	Indian Cuckoo	2	4		
30		<i>Cacomantis merulimus</i>	Plaintive Cuckoo			2	
31		<i>Surniculus lugubris</i>	Drongo Cuckoo			2	
32		<i>Eudynamys scolopacaceus</i>	Asian Koel	A			
33		<i>Rhopodytes sumatranus</i>	Chestnut-bellied Malkoha		2		
34		<i>Zanclostomus javnicus</i>	Red-billed Malkoha		1		
35		<i>Zanclostomus curvirostris</i>	Chestnut-breasted Malkoha		1		
36		<i>Centropus sinensis</i>	Greater Coucal	4	8	3	
37	STRIGIDAE	<i>Strix leptogrammica</i>	Brown Wood-Owl			A	
38		<i>Glaucidium brodiei</i>	Collared Owlet	A	A	A	
39		<i>Glaucidium cuculoides</i>	Asian Barred Owlet	A			
40	CAPRIMULGIDAE	<i>Caprimulgus spp</i>	Nightjar	1			
41	APODIDAE	<i>Aerodramus fuciphaga</i>	Edible-Nest Swiftlet	C			
42		<i>Hirundapus giganteus</i>	Brown-backed Needletail	4			
43		<i>Cypsiurus balas</i>	Asian Palm-Swift	C		C	
44		<i>Apus affinis</i>	House Swift	8			
45		<i>Hemiprocne comata</i>	Whiskered Treeswift		7	5	
46	TROGONIDAE	<i>Harpactes orekios</i>	Orange-breasted Trogon			1	
47	CORACIIDAE	<i>Coracias benghalensis</i>	Indian Roller	11			
48		<i>Eurystomus orientalis</i>	Dollarbird	2	13	17	
49	ALCEDINIDAE	<i>Lacedo pulchella</i>	Banded Kingfisher		1		
50		<i>Pelargopsis capensis</i>	Stork-billed Kingfisher		2	2	
51		<i>Halcyon coromanda</i>	Ruddy Kingfisher		2		
52		<i>Halcyon smyrnensis</i>	White-throated Kingfisher	4			

53		<i>Alcedo meninting</i>	Blue-eared Kingfisher			1	
54		<i>Alcedo atthis</i>	Common Kingfisher	3			
55	MEROPIDAE	<i>Nyctornis amictus</i>	Red-bearded Bee-eater		3	2	
56		<i>Merops orientalis</i>	Little Green Bee-eater	7			
57	BUCEROTIDAE	<i>Ptilolaemus tickelli</i>	Southern Brown Hornbill		21	14	
58		<i>Anthracoceros albirostris</i>	Oriental Pied Hornbill		10	11	
59		<i>Buceros bicornis</i>	Great Hornbill		4	2	
60		<i>Aceros subruficollis</i>	Plain-pouched Hornbill	6	32	150	VU
61	RAMPHASTIDAE	<i>Megalaima lineate</i>	Lineated Barbet	4			
62		<i>Megalaima raffesii</i>	Red-crowned Barbet		3		
63		<i>Megalaima asiatica</i>	Blue-throated Barbet	2			
64	PICIDAE	<i>Micropternus brachyurus</i>	Rufous Woodpecker		2		
65		<i>Picus vittatus</i>	Laced Woodpecker			2	
66		<i>Dinopium Javanese</i>	Common Flameback		1		
67		<i>Chrysocolaptes lucidus</i>	Greater Flameback			2	
68		<i>Meiglyptes tristis</i>	Buff-rumped Woodpecker		1		
69		<i>Hemicircus canente</i>	Heart-spotted Woodpecker		2		
70		<i>Mulleripicus pulverintus</i>	Great Slaty Woodpecker		2	5	VU
71	EURYLAIMIDAE	<i>Calyptomena viridis</i>	Green Broadbill			4	
72		<i>Serilophus lunatus</i>	Silver-breasted Broadbill		15		
73		<i>Eurylaimus javanicus</i>	Banded Broadbill		2		
74		<i>Eurylaimus ochromalus</i>	Black-And-Yellow Broadbill		2		
75	PITTIDAE	<i>Pitta sordid</i>	Hooded Pitta		8	12	
76		<i>Pitta moluccensis</i>	Blue-winged Pitta		11	10	
77		<i>Pitta gurneyi</i>	Gurney's Pitta			4	EN
78	CAMPEPHAGIDAE	<i>Coracina fimbriata</i>	Lesser Cuckooshrike		2		
79	ORIOOLIDAE	<i>Oriolus xanthonotus</i>	Dark-throated Oriole		2		
80		<i>Oriolus xanthonus</i>	Black-hooded Oriole		1		
81	PRIONOPIDAE	<i>Philentoma velata</i>	Maroon-breasted Philentoma		4	6	

82	AEGITHINIDAE	<i>Aegithina lafresnayei</i>	Great Iora		2	2	
83	RHIPIDURIDAE	<i>Rhipidura aureola</i>	White-browed Fantail		2		
84	DICRURIDAE	<i>Dicrurus aeneus</i>	Bronzed Drongo	5	12	11	
85		<i>Dicrurus remifer</i>	Lesser Racket-tailed Drongo		2		
86		<i>Dicrurus paradiseus</i>	Greater Racket-tailed Drongo	5	8	13	
87	MONARCHIDAE	<i>Hypothymis azurea</i>	Black-nape Monarch		11	9	
88		<i>Terpsiphone paradisi</i>	Asian Paradise-Flycatcher		6	4	
89	CORVIDAE	<i>Corvus splendens</i>	House Crow	4			
90		<i>Crypsirina temia</i>	Racket-tailed Treepie	2			
91	NECTARINIIDAE	<i>Aethopyga siparaja</i>	Crimson Sunbird		2	1	
92		<i>Chalcoparia singalensis</i>	Ruby-cheeked Sunbird		2	2	
93		<i>Arachnothera affinis</i>	Grey-breasted Spiderhunter			1	
94		<i>Arachnothera magna</i>	Streaked Spiderhunter		2	1	
95		<i>Arachnothera longirostra</i>	Little Spiderhunter		2	2	
96	CHLOROPSEIDAE	<i>Chloropsis cochinchinesis</i>	Blue-winged Leafbird		3	4	
97	IRENIDAE	<i>Irena puella</i>	Asian Fairy-Bluebird		7	4	
98	ESTRILDIDAE	<i>Lonchura striata</i>	White-rumped Munia		4		
99	SITTIDAE	<i>Sitta frontalis</i>	Velvet-fronted Nuthatch		4		
100	STURNIDAE	<i>Acridotheres fuscus</i>	Jungle Myna	18			
101		<i>Acridotheres tristis</i>	Common Myna	6			
102		<i>Gracupica contra</i>	Asian Pied Starling	11			
103		<i>Gracula religiosa</i>	Common Hill-Myna	2			
104	MUSCICAPIDAE	<i>Cyornis banyumas</i>	Hill Blue Flycatcher		4		
105		<i>Copsychus saularis</i>	Oriental Magpie-Robin	4			
106		<i>Copsychus malabaricus</i>	White-rumped Shama		C	C	
107	PARIDAE	<i>Melanochlora</i>	Sultan Tit		7		
108	STENOSTIRIDAE	<i>Culicicapa ceylonensis</i>	Grey-headed Canary-Flycatcher		3		
109	PYCNONOTIDAE	<i>Pycnonotus atriceps</i>	Black-headed Bulbul		C	C	
110		<i>Pycnonotus flaviventris</i>	Black-crested Bulbul		6		

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111		<i>Pycnonotus finlaysoni</i>	Stripe-throated Bulbul			7	
Continue							
112		<i>Pycnonotus flavescens</i>	Flavescent Bulbul			2	
113		<i>Pycnonotus goiavier</i>	Yellow-vented Bulbul		2		
114		<i>Pycnonotus erythroptalmos</i>	Spectacled Bulbul			4	
115		<i>Iole virescens</i>	Olive Bulbul		2	2	
116		<i>Tricholestes criniger</i>	Hairy-backed Bulbul			8	
117		<i>Alophoixus ochraceus</i>	Ochraceous Bulbul		7	11	
118	TAMALIIDAE	<i>Sachyridopsis rufifrons</i>	Rufous-fronted Babbler		6	5	
119		<i>Macronus gularis</i>	Pin-Striped Tit-Babbler			5	
120		<i>Pellorneum ticklhi</i>	Buff-breasted Babbler			2	
121	CISTICOLIDAE	<i>Orthotomus atrogularis</i>	Dark-necked Tailorbird		6	2	
122		<i>Orthotomus sutorius</i>	Common Tailorbird	2	8	11	

Table 4 List of mammals found in the study area

Sr. no.	Order	Family	Common Name	Scientific Name	IUCN Red list	CITES	Type of evidence	Visual	Track & Sign	Sound	Dead Body
1	Primates	Lorisidae	Asian Slow Loris	<i>Nycticebus bengalensis</i>	VU		sighting	√			
2		Cercopithecidae	Stump-tailed Macaque	<i>Macaca arctoides</i>	VU		sighting	√			
3			Phayre's Langur	<i>Trachypithecus hayrei</i>			hearing			√	
4		Hylobatidae	White-handed Gibbon	<i>Hylobates lar</i>	EN		sighting, hearing	√		√	
5	Carnivora	Mustelidae	Hog Badger	<i>Arctonyx collaris</i>	NT		sighting, footprint	√	√		
6		Viverridae	Common Palm Civet	<i>Paradoxurus hermaphroditus</i>			footprint, scat	√	√		
7			Civet	?			dead body				√
8			Banded Linsang	<i>Prionodon linsang</i>	LC		sighting	√			
9	Proboscidea	Elephantidae	Asian Elephant	<i>Elephas maximus</i>	EN		footprint		√		
10	Artiodactyla	Suidae	Eurasian Wild Pig	<i>Sus scrofa</i>	LC		footprint		√		
11			Lesser Oriental Chevrotain	<i>Tragulus javanicus</i>	DD		sighting, footprint	√	√		
12		Cervidae	Red Muntjac	<i>Muntiacus muntjak</i>			footprint		√		
13			Sambar	<i>Rusa unicolor</i>	VU		dead body				√
14		Bovidae	Gaur	<i>Bos frontalis</i>		I	footprint		√		
15			Southern Serow	<i>Capricornis sumatraensis</i>	VU	I	scat		√		
16	Rodentia	Sciuridae	Black Giant Squirrel	<i>Ratufa bicolor</i>		II	sighting	√			
17			Myanmar Striped Squirrel	<i>Tamias maclellandii</i>			sighting	√			
18			Phayre's Squirrel	<i>Callosciurus phayrei</i>							
19			Indochinese Ground Squirrel	<i>Menetes berdmorei</i>	LC		sighting	√			
20		Hystricidae	Asiatic Brush-tailed Porcupine	<i>Atherurus macrourus</i>	LC		sighting	√			

Table 5 List of amphibians and reptiles from study area

No.	Family Name	Scientific Name	Common Name	Qty	IUCN
1	Bufo	<i>Phrynoidis aspera</i>	River Toad	2	LC
2	Dicroglossidae	<i>Fejervarya cancrivora</i>	Crab-eating Grass Frog	25	LC
3		<i>Fejervarya limnocharis</i>	Paddy Frog	28	LC

4		<i>Occidozygamartensii</i>	Floating Frog	7	LC
5	Microhylidae	<i>Microhylaornata</i>	Ornate Narrow-mouthed Frog	5	LC
6	Ranidae	<i>Hylarananigrovittata</i>	Dark-sided Frog	1	LC
7	Rhacophoridae	<i>Rhacophorus</i> sp.	Flying Frog	5	
8		<i>Polypedatesleucomystax</i>	Common Tree Frog	30	LC
9	Agamidae	<i>Calotesemma</i>	Forest Crested Lizard	6	
10		<i>Draco taeniopterus</i>	Narrow-lined Flying Lizard	1	
11	Gekkonidae	<i>Gekko gekko</i>	Tocky Gecko	1	
12	Scincidae	<i>Eutropismacularia</i>	Bronze Grass Skink	1	
13		<i>Eutropismultifasciata</i>	Common Sun Skink	1	
14		<i>Sphenomorphusindicus</i>	Indian Forest Skink	3	
15	Colubridae	<i>Boigacyanea</i>	Green Cat Snake	1	
16	Elapidae	<i>Bungaruswanghaotingi</i>	Many Banded Krait	1	
17	Natricidae	<i>Rhadophischrysargos</i>	Speckle-bellied Keelback	1	
18		<i>Xenochrophispiscator</i>	Chequered Keelback Water Snake	1	

Table 6 List of butterfly species from survey area

No.	Family name	Scientific name	Qty	IUCN
1	Papilionidae	<i>Troidesamphrysus</i>	2	
2		<i>Troides</i> sp.	2	
3		<i>Pachliopta coon</i>	1	
4		<i>Papiliodemoleus</i>	2	
5		<i>Papilionephelus</i>	2	
6		<i>Papiliohelenus</i>	5	
7		<i>Papiliopolytes</i>	6	
8		<i>Papiliomemnon</i>	5	
9		<i>Papilio</i> sp.	2	

10		<i>Chiliasaclytia</i>	1	
11		<i>Graphiumcloanthus</i>	4	
12		<i>Graphiumsarpedon</i>	7	
13		<i>Graphiumeuryplus</i>	13	
14		<i>Graphiumagamemnon</i>	6	
15		<i>Graphiumarycles</i>	6	
16		<i>Graphiumantiphates</i>	2	
17	Pieridae	<i>Leptosianina</i>	8	
18		<i>Deliasdescombi</i>	2	
19		<i>Ceporaiudith</i>	2	
20		<i>Ixias pyrene</i>	4	
21		<i>Hebomoia glaucippe</i>	13	
22		<i>Catopsilia pomona</i>	3	
23		<i>Catopsilia scylla</i>	3	
24		<i>Pareronia valeria</i>	16	
25		<i>Gandacaharina</i>	2	
26		<i>Eurema andersoni</i>	3	LC
27		<i>Eurema sari</i>	3	
28		<i>Eurema simulatrix</i>	3	
29	Danaidae	<i>Ideopsis similis</i>	10	
30		<i>Danaus genutia</i>	12	
31		<i>Danaus limniace</i>	9	
32		<i>Danaus chrysippus</i>	5	
33		<i>Danaus septentrionalis</i>	5	
34		<i>Tirumalagautama</i>	2	LC
35		<i>Parantica aspasia</i>	3	
36		<i>Parantica aglea</i>	5	

37		<i>Paranticasita</i>	4	
38		<i>Euploeamodesta</i>	3	
39		<i>Euploea camerale zemon</i>	5	
40		<i>Euploeasylvester</i>	10	
41		<i>Euploeamidamus</i>	5	
42		<i>Euploeadiocletianus</i>	36	
43		<i>Euploea core</i>	5	LC
44	Satyridae	<i>Ethopehimachala</i>	3	
45		<i>Mycalesis</i> sp.	5	
46		<i>Ypthima</i> sp.	3	
47	Nymphalidae	<i>Ariadne ariadne</i>	7	
48		<i>Pseudergolis wedah</i>	2	
49		<i>Cuphaerymanthis</i>	10	
50		<i>Phalantaphalanta</i>	5	
51		<i>Vagranusegista</i>	2	
52		<i>Cirrochroa malea</i>	2	
53		<i>Cethosiabiblis</i>	1	
54		<i>Junonia lemonias</i>	3	
55		<i>Junonia hierta</i>	14	LC
56		<i>Junonia iphita</i>	2	
57		<i>Junonia almana</i>	3	LC
58		<i>Junonia atlites</i>	13	
59		<i>Kallimalimborgii</i>	4	
60		<i>Moduzaprocris</i>	2	
61		<i>Tanaecia flora</i>	3	
62		<i>Pathenossylvia</i>	15	
63		<i>Bassarona dunya</i>	2	

64		<i>Chraxes aristogiton</i>	2	
65	Amathusiidae	<i>Fauniseumeus</i>	1	
66	Lycaenidae	<i>Loxura atymnus</i>	2	
67		<i>Eliotajalindra</i>	2	
68		<i>Suasalisides</i>	1	
69		<i>Rapalamanea</i>	3	
70	Hesperiidae	<i>Hasoravitta</i>	3	
71		<i>Pseudocaladeniadan</i>	2	

Table 7 Tree species found in the survey area

No.	Species name	Local name	Scientific name
1.	Bonmeza	Thit Taw	<i>Albizia chenensis</i>
2.	Duyin	Duyin	<i>Durio zibethinus</i>
3.	Gangaw	Gangaw	<i>Mesua ferrea</i>
4.	Kaung-hmu	Kaung-hmu	<i>Anisoptera scaphula</i>
5.	Kanyin-ni	In se	<i>Alecrites moluccana</i>
6.	Kanyin-ywet-the	Se ywet the	<i>Dipterocarpus costatus</i>
7.	Kanyin-wet taung	Se wet thar	<i>Dipterocarpus turbinatus</i>
8.	Kanyin-gok	Se ywet kye	<i>Dipterocarpus obtusifolius</i>
9.	Letpan	Letpan	<i>Bombax ceiba</i>
10.	Lunbo	Lunbo	<i>Buchanania lanzn</i>
11.	Mau-lettan-she	Mau	<i>Anthocephalus cadamba</i>
12.	Padauk	Padauk	<i>Pterocarpus macrocarpus</i>
13.	Peinne	Peinne	<i>Artocarpus heterophyllus</i>
14.	Pyinma-ni	Pyinma-ni	<i>Legerstroemia speciosa</i>

15.	Pyinma-phyu	Pyinma-phyu	<i>Legerstroemia floribunda</i>
16.	Sagwe	Sagwe sie	<i>Ixora tomentosa</i>
17.	Shaw	Shaw	<i>Sterculia spp</i>
18.	Tama	Tama	<i>Azadirachta indica</i>
19.	Taw-kyetmauk	Taw-kyetmauk	<i>Dimocarpus longan</i>
20.	Taw-thabut	Taw-thabut	<i>Momordica cochinchinesis</i>
21.	Taw-thabye	Taw-thabye	<i>Syzgium fruticosum</i>
22.	Thinbaw	Thinbaw	<i>Carca papaya</i>
23.	Thingan	Thingan	<i>Hopea odorata</i>
24.	Thit-ya	Thit-ya	<i>Shorea obtusa</i>
25.	Thit-pyu	Thit-pyu	<i>Wendandia glabrata</i>
26.	Thit-min	Thit-min	<i>Podocarpus wallichianus</i>
27.	Taung-kaye	Taung-kaye	<i>Dialium indum</i>
28.	Taung-peinne	Taung-peinne	<i>Artocarpus chaplashal</i>
29.	U ban	U ban	<i>Shorea farinosa</i>

Remark-Tree species is not diverse.

Table 8 Bamboo species found in the survey area

No.	Species name	Local name	Scientific name
1.	Kyathaungwa	Kyathaungwa	<i>Bambusa polymorpha</i>
2.	Wabo	Wabo	<i>Dendrocalamus hamillonii</i>
3.	Waya	Waya	<i>Oxytenanthera nigrocihata</i>
4.	Thaikwa	Thaikwa	<i>Bambusa tulda</i>
5.	Wapyauk	Wapyauk	<i>Na</i>
6.	Tamyinwa	Kamyinwa	<i>Dendrochloa distans</i>
7.	Tinwa	Tinwa	<i>Cephalostachyum pergracile</i>
8.	Thaputwa	Thapotwa	<i>Neohouzeaua stricta</i>

9.	Tapintiewa	Tapintiewa	<i>Bambusa longispiculata</i>
10.	Kyatkhakwa	Khakwa	<i>Bambusa arundinacea</i>
11.	Kalwewa	Kalwewa	<i>Na</i>
12.	Wangwe coke	Wangwe	<i>Dinochloa compactiflora</i>

PHOTOS

Some bird photos recorded in Lenya national Park (Extension)



Asian Paradise Flycatcher (*Tchitrea paradisi*)



Banded Broadbill (*Eurylaimus javanicus*)



Banded Kingfisher (*Lacedo pulchella*)



Blue-eared Kingfisher (*Alcedo meninting*)



Grey-headed Canary Flycatcher (*Culicicapa ceylonensis*)



Hairy-backed Bulbul (*Tricholestes criniger*)

Some bird photos recorded in Lenya National Park (Extension)



Hooded Pitta (*Pitta sordida*)



Stork-billed Kingfisher (*Pelargopsis capensis*)



Lesser Whistling Duck (*Dendrocygna javanica*)



Red-bearded Bee-Eater (*Nyctornis amictus*)



Red-billed Malkoha (*Zanclostomus javanicus*)



Silver-breasted Broadbill (*Serilophus lunatus*)

Main threats of the Wildlife in Tanintharyi Region



Photo : Tin Aung Tun (BANCA)

The photos of mammal survey and recorded mammal species



Interviewing



Hog Badger



Lesser Oriental Chevrotain



Red Muntjac



Sambar



Gaur

The photos of recorded Herpetofauna species



Phrynoedisaspera



Microhylaornata



Draco taeniopterus



Eutropismaularia



Boigacyanea



Bungaruswangaotingi

Continued-

The photos of recorded insect species

