



Biodiversity survey of Thumbikulama Tank Anuradhapura District, Sri Lanka

Healthy Landscapes Project

2024

Biodiversity Survey of Thumbikulama Tank Anuradhapura District, Sri Lanka



Healthy Landscapes Project of the South Asia
Co-operative Environment Program



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Acronyms

CR	Critically Endangered
CTVS	Cascaded Tank-Village System
EN	Endangered
GR	Grasslands / Dry (Damana)
HG	Home Gardens
HLP	Healthy Landscapes Project
IAS	Invasive Alien Species
LC	Least concern
MOE	Ministry of Environment
NBSAP	National Biodiversity Strategies and Plans
NT	Near Threatened
PL	Forest Plantations
SF	Secondary Forests
TS	Thorn Scrublands (Dry Deciduous)
VU	Vulnerable

Executive summery

The Cascaded Tank-Village System (CTVS) in the dry zone of Sri Lanka integrates several man-made water tanks together by connecting the outflows of the upper-area tanks as the inflows to the lower-area tanks so that the lower tanks are filled with the outflows of the upper tanks under the gravity. The whole CTVS system acts as mega irrigation systems for vast land areas including cultivations, home gardens, villages as well as many natural systems such as forests, water bodies, aquatic habitats and marsh lands. CTVS resolve the water scarcity for agriculture in dry areas while the elevated water-table by the CTVS enhances the forest growth and habitat improvement by ensuring food supply for the wildlife and aquatic fauna. Owing to breaching the bund, Thumbikulama Tank in Bellankadawala Cascade System, Anuradhapura was abandoned for 26 years period for irrigational uses and subsequently, the tank bed was covered by forest vegetation colonized from the surrounding Thumbikulama Forest Reserve. With the mediation of the Healthy Land Scape Project (HELP), the tank was restored to its full capacity and following to the restoration project, a biodiversity assessment was conducted in a 1.6 km circle around the tank. The study revealed that the area has secondary forests, dry deciduous thorn scrublands, dry (Damana) grasslands, marshlands, aquatic ecosystem in the tank, riverine evergreen forests, water canals, mono-culture Teak plantations, paddy lands, chena and home gardens as different ecosystems. The area holds total of 322 plant species including 5 alien invasive plant species, 8 endemic and 7 threatened species as sensitive species where the secondary forests play greater role of sustaining the sensitive flora. The hotspots having aggregated sensitive floral species have been plotted on the provided zonal map in this report and immediate conservation priorities are recommended for those hotspots. The study reported 374 total faunal species including 31 endemics and 23 threatened species where the total fauna included 8.1% endemic and 6.2% nationally threatened species. The threatened species include 3 Critically Endangered species, 7 Endangered species and 13 Vulnerable species. The highest number of endemics were reported among the birds with nine species. The area has higher ethnobotanical value, traditional food types, cultural practices, natural environment, tank, forest, elephants, birds and other animals have higher potentials to develop eco-tourism, sustainable use and livelihood development. Preparation of traditional food and beverages, arts, crafts, medicinal products and home gardens can be linked with ecotourism and income generation activities. Other than some regulated fishing activities, the tank water is not used by the humans directly for any cultivations as the tank is located in the middle of Thumbikulama Forest Reserve however, some of the abandoned previous paddy lands near to the tank could be restored after necessary permitting clearances. The current study confirmed that, the restored Thumbikulama Tank encompasses vast social, livelihood and economic potentials while it essentially sustains aquatic and terrestrial biodiversity across large array of aquatic and terrestrial ecosystems and habitats.

Chapter 1 – Introduction

The Cascaded Tank-Village System (CTVS) in the dry zone of Sri Lanka is a unique and intricate system of interconnected water reservoirs, known as tanks that serve multiple purposes and support a variety of ecological features.

The CTVS consists of a series of man-made tanks, which are essentially small to medium-sized reservoirs constructed by ancient civilizations for water storage and irrigation purposes. These tanks are interconnected through channels, forming a cascading effect where water flows from one tank to another. The tanks play a crucial role in water management in the dry zone by capturing and storing rainwater during the monsoon season and providing a reliable water supply for agriculture during the dry months.

The bunds of the tanks help regulating water flow and prevent excessive flooding or water loss. The tanks and their surrounding areas within the CTVS provide habitats for a variety of terrestrial plants, aquatic plants, fish species, birds and invertebrates. Additionally, the tanks attract wildlife such as mammals, reptiles, and amphibians that rely on these water sources. The water stored in the tanks is used for crop irrigation and social use while the CTVS also has deep socio-cultural significance in Sri Lanka. The CTVS helps regulating the water cycle by storing rainwater and replenishing groundwater resources. The CTVS in the dry zone of Sri Lanka showcases a harmonious integration of human activities with nature, providing livelihoods, biodiversity conservation, and vital water resources for the local communities.

Following the proposal submitted to the International Forum and Award ceremony for new Globally Important Agricultural Heritage System (GIAHS) sites held on 19 April 2018 in Rome, the traditional agrarian system called “Ellanga Gammana” or Cascaded Tank-Village systems (CTVS) functioning in the dry Zone of Sri Lanka was designated as Globally Important Agricultural Heritage System (GIAHS) (FAO 2018). CTVS in Sri Lanka are ancient systems that connect several tanks together across vast areas of agro and natural landscapes through water canals that had running water under gravity.

Such system is complex and hence require frequent maintenance for eroding/breaching tank bunds during rainy seasons, reaping sluice gates and cleaning the canals and tank bottoms for silts. Lack of such regular maintenance have lead some parts of some cascade systems to collapse, for instance, the breeched bund had made the Thumbikulama Tank of Bellankadawala Cascade System (Figure: 01 and 02) nonfunctional for 26 years until it was rehabilitated by the Healthy Landscapes Project (HLP) in 2022 (Figure 03, 04 and 05).

Chapter 2 - Description of the project.

2.1 The Healthy Landscapes Project (HLP)

The Healthy Landscapes Project (HLP) primarily engages on implementing management strategies to strengthen the restoration and sustainable management of Cascade Tank-Village Systems (CTVS) in Sri Lanka, with the aim of enhancing the ecosystem services, protecting biodiversity and human wellbeing. The project envisions the development and validation of a *model VTCS management system* that can be scaled up for practicing in other cascade landscapes across the country. In line with an ecosystem/landscape approach, the project seeks to better comprehend and manage the linkages between biodiversity, agriculture, food safety and human health, emphasizing the Eco-Health approach. It recognizes the concept of social-ecological resilience, acknowledging the interdependence between people and nature within this context.

The project encompasses four components:

- i. Implementation of biodiversity-based options to enhance sustainable landscape management in socio-ecologically sensitive areas.
- ii. Strengthening institutions, policies, and integrated landscape planning of Cascade Tank-Village Systems (CVTS) in socio-ecologically sensitive areas.
- iii. Partnerships, awareness raising, and capacity building to support improved ecosystem services and eco-health outcomes through better sustainable integrated landscape management.
- iv. Knowledge, information management, and monitoring and evaluation.

2.2 Rehabilitation of Thumbikulama Tank by the Healthy Landscapes Project (HLP)

Bellankadawala Cascade System is located mainly within the Palugaswewa DS Division (Demunnewa, Horiwila, Kelewa and Vaayaulpotha GN Divisions), Anuradhapura District while a small area of this system falls within Dambulla DS Division, Matale District (Siyambalawa GN Division) Thumbikulama Tank is situated within the Waya Ulpotha Grama Niladhari (GN) Division in the Palagala Divisional Secretariat (Figure: 01).

Thumbikulama Tank is said to be built during King Elara in the Bellankadawala Cascade System and this tank connects with Bulana Tank for its water inputs and at the upper, the tank connects with Bellankadawala Tank for its water discharge at the lower gradient (Figure: 02) Thumbikulama Tank is situated in the Thumbikulama forest reserve and the tank had been abandoned since 1996 up to 2022 owing to breaching the bund and lack of maintenances to its physical structure such as anicut and canals. Thus the tank basin had been colonized by nearly 26 years old forest vegetation (Figure 3). Similarly, the paddy lands irrigated by the tank were also abandoned (Figure 6 and 7). The HLP played a fundamental role in the Rehabilitation of the long-abandoned Thumbikulama Tank in Bellankadawala Cascade System, transforming it into a village tank with repairing its bund, (Figure 8) spillways (Figure 9), and reconstruction of two sluice gates. After the restoration, the tank basin became filled with water flooding the forest vegetation and gradual decrease of that vegetation is seen within the tank basin. Some of the water-tolerant species are still surviving even in deeper water, however they are also expected to die in long-run (Figure 5). Meanwhile, the previously abandoned paddy lands have not yet been permitted for farmers as those are located within the Thumbikulama Forest Reserve.

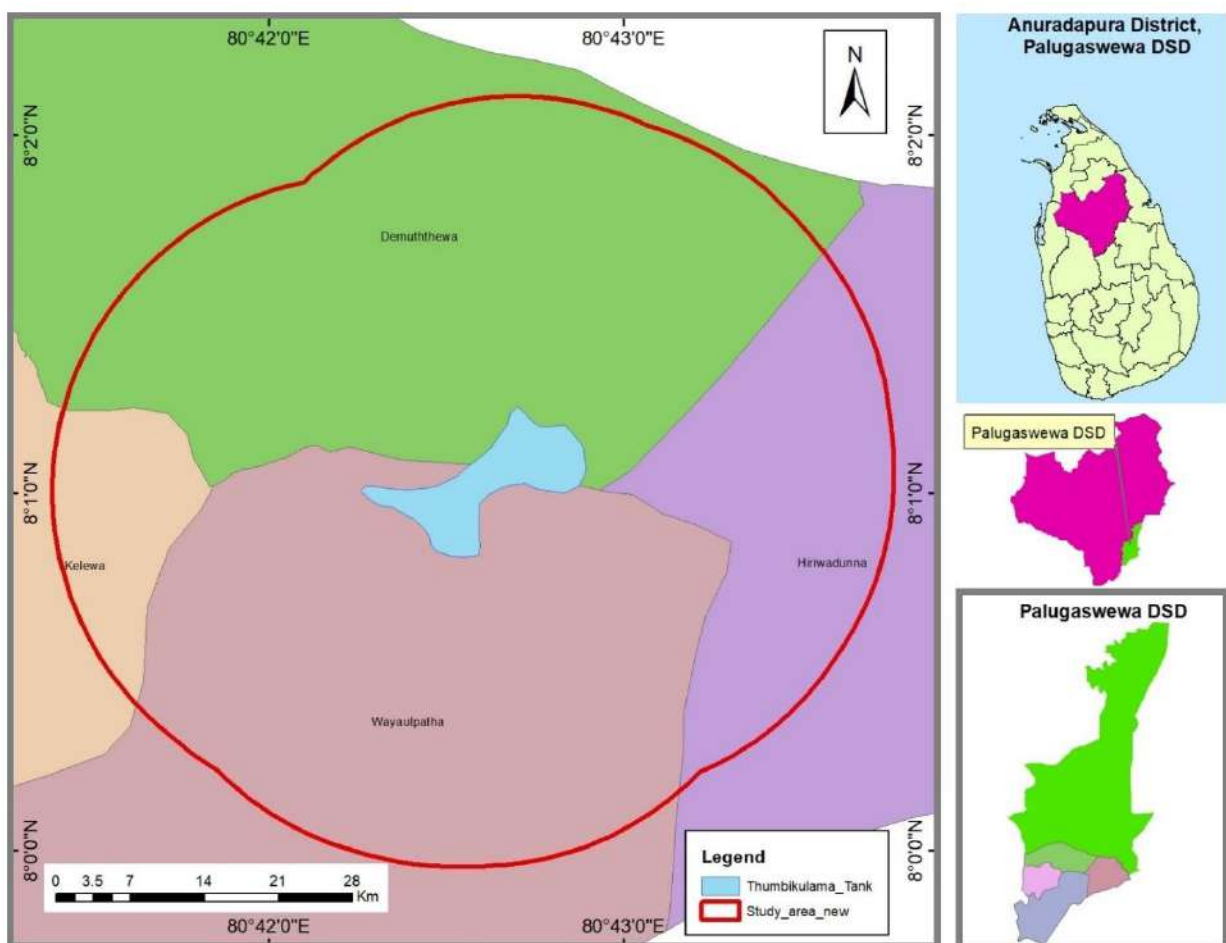


Figure 1: Map of the Thumbikulama Tank with the 1.6 km study circle used for the study

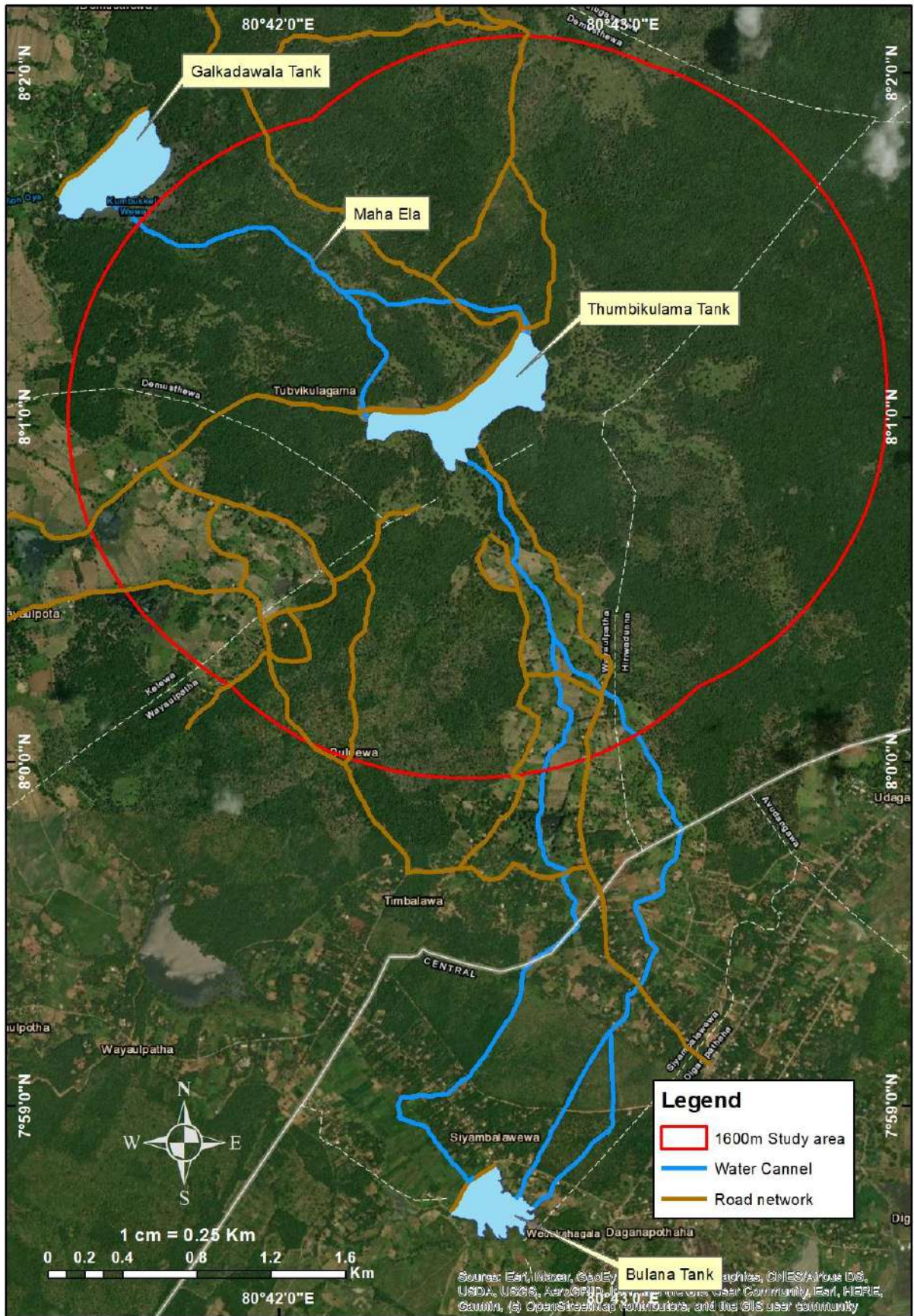


Figure 2: Position of the Thumbikulama Tank in the Bellankadawala Cascade system



Figure 3:
Satellite view of
Thumbikulama
Tank during
abandoned
period (©Google
Earth 2010)



Figure 4:
Satellite view
Thumbikulama
Tank after
restoration by HLP
project (©
Google Earth
2023)



Figure 5:
Site view of
Thumbikulama
Tank after
restoration (2024)



Figure 6:
Remains of previous irrigation canal structures from Thumbikulama Tank (2024).



Figure 7:
Some abandoned paddy lands inside Thumbikulama Forest Reserve (2024).



Figure 8:
Repaired bund
of Thumbikulama
Tank



Figure 9:
Repaired
spillway of
Thumbikulama
Tank. (The spilled
water runs to
Bellankadawala
Tank)

Restoration of Thumbikulama Tank certainly elevates the groundwater table making positive impacts on surrounding plant communities and thereby associated wildlife while the storing water in the tank also benefits various wildlife species, aquatic species and birds. Such positive biodiversity and species changes are expected to occur in long run however, obtaining baseline biodiversity and species information of this restoration project would be heavily useful in future comparisons and success assessments. As this tank restoration would obviously be a useful role model for many such future restorations, those baseline biodiversity and species information would be useful as important scientific information for future research, conservation and management initiatives in the cascade system context.

Therefore, the HLP planned to conduct a detailed biodiversity survey of the Thumbikulama Tank shortly after its restoration for documenting those biodiversity and species information within the impacting zone around Thumbikulama Tank.

2.3 Aims and objectives of the study

The study aimed to study and document the current biodiversity status of the newly restored Thumbikulama Tank and its surrounding 1.6 km study area (figure 1 and 2) as necessary information for initiatives focusing livelihood development, environmental conservation, research and climate-change-adaptations in particular.

The objectives to be covered from the given study area were:

- (a) To identify/characterize the various ecosystems and their habitats within the study area
- (b) Assessing the floral diversity, sensitive species, their status and threats using stranded scientific methods.
- (c) Assessing the faunal diversity, sensitive species their status and threats using stranded scientific methods.
- (d) Surveying and documenting the ethnobotanical species and information in the study area.
- (e) Providing recommendations and possible conservation measures for better sustaining this important landscape

Chapter 3 - Description of the existing environment

3.1. General geography

Location: Thumbikulama Tank is located in Palugaswewa Divisional Secretariat Division in Anuradhapura District as a part of Bellankadawala Cascade System. The nearest township is Habarana and the site can be accessed from A9 road at 110km post (Figure 10).

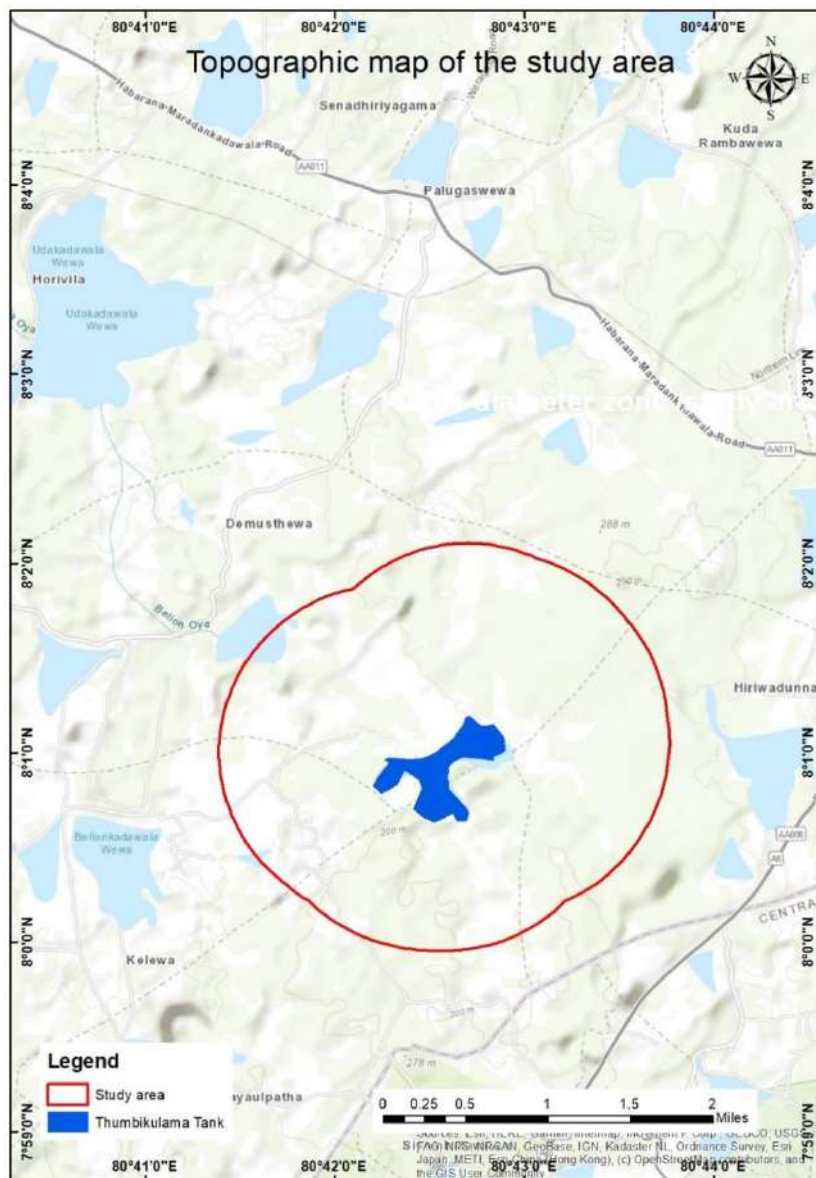


Figure 10:

Location of Thumbikulama Tank and the 1.6 km study circle used.

Climate: The site is coming under one of the dry zone agro climatic areas of Sri Lanka. According to Survey Department (1988), the entire study area has a mean annual rainfall of 1250mm, which is derived mainly from the Northeast Monsoon. Consequently, the area experiences a prolonged moisture deficit period of 4 to 7 months from March to September.

Topography: Undulating lowland terrain at 190m-200m Mean Sea Level (MSL) with low hills towards south east (outside the study area) reaching up to 300m MSL. The dominant feature of the larger landscape as a part of dry zone lowlands is the extensive plain, which stretches across vast areas. These plains are generally flat, with gentle slopes and occasional shallow depressions. In some parts, the terrain is interrupted by isolated rocky outcrops or inselbergs that rise abruptly from the surrounding plains. These rocky formations add diversity to the landscape and provide habitats for unique flora and fauna.

Geology: The area is within the Highland complex and dominated by complex of gneisses known as Polonnaruwa-Mahiyangana Gneisses which includes Migmatized and Charnokitized black and white layered Orthogenesis, Charnokitic Biotite Gneisses and Garnet Biotite Hornblende Gneisses. All the rock bands are trending north-south direction and dipping westerly with 75° to 30° (Jayasingha, 2009).

Soil: The area lies in the soil type zone consisting Reddish Brown Earth (RBE) and their drainage associates. RBE is the main soil type in dry zone of Sri Lanka (Panabokke, 1996).

3.2. Main ecosystems and habitats of the study area

Diverse array of ecosystems and habitats extend across the study area covering terrestrial and aquatic components. Those include Secondary forests, dry deciduous thorn scrublands, dry (Damana) grasslands, marshlands, aquatic ecosystem in the tank, riverine evergreen forests, water canals, mono-culture Teak plantations, paddy lands, chena and home gardens.

3.2.1 Secondary forests: The site is part of dry zone vegetation of the country. The dry zone vegetation of Sri Lanka is characterized by a unique array of plant species that have adapted to the dry climate and low rainfall in this region. Undisturbed areas are covered with **dry evergreen forests**. They are characterized by the presence of trees that retain their leaves throughout the year, such as palu (*Manilkara hexandra*), weera (*Drypetes sepiaria*), and satinwood (*Chloroxylon swietenia*). According to Ashton and Gunatilleke (1987), the area is within Floristic Region 2: Dry and arid lowlands. Many hundred years of human activities in the dry zone of Sri Lanka has largely altered the environment. Clusters of interconnected village tanks and associated wetlands are remarkable feature popularly known as the Cascaded Tank-Village Systems.



Figure 11:

Secondary forests in the study area

3.2.2 Dry deciduous thorn scrublands: In addition, scrublands are existing side by side with forests, which are characterized by low-growing vegetation. These areas have often experienced high disturbances. Overall, the dry zone vegetation of Sri Lanka showcases a remarkable adaptation to the challenging environmental conditions of this region, with a diverse range of plant species that contribute to its unique biodiversity.

3.2.3 Dry (Damana) grasslands: Grassland blocks surrounded by forests or scrublands, apparently, historical paddy land areas. They have a simple vegetation ranging between 0.1m-0.5m in height.



Figure 12:

Dry deciduous thorn scrublands



Figure 13:
Dry (Damana)
grasslands

3.2.4 Marshlands: Marshlands with shallow water pools are located in the lowland areas below the bund (kattakaduwa) of the tank including Kattakaduwa area.



Figure 14:
Marshlands below the
bund (kattakaduwa)
area

3.2.5 Aquatic ecosystem in the tank: The waterbody (Water Spread Area at Full Supply Level is 101 ha) of the tank provides aquatic habitats for various flora and fauna types.



Figure 15: Aquatic ecosystem in the tank

3.2.6 Riverine evergreen forests: Along the tank outflow (spillway and sluice canals), poorly developed riverine forests are seen along the canal bank.

3.2.7 Water canals: The water canals running in to the tank from Bulana Tank, the spill water and sluice water canals running from Thumbikulama to Galkadawala provides habitats for various aquatic species.

3.2.8 Mono-culture Teak plantations: Older Teak plantations (18m-22m height) at the edge of Thumbikulama forest reserve act as a manmade ecosystem for spices (Figure 17).

3.2.9 Paddy lands: Small paddy lands are present within the study area as pockets (Figure 18).

3.2.10 Chena: Some Chena cultivations in various scales are seen as scatted blocks (Figure 19)

3.2.11 Home gardens: Various types of vegetables, fruits, crop species, timber species and ornamental plants grown in the home gardens.



Figure 16: Riverine evergreen forests along a water canal



Figure 17: Mono-culture Teak plantations



Figure 18: Paddy lands



Figure 19: Chena cultivations

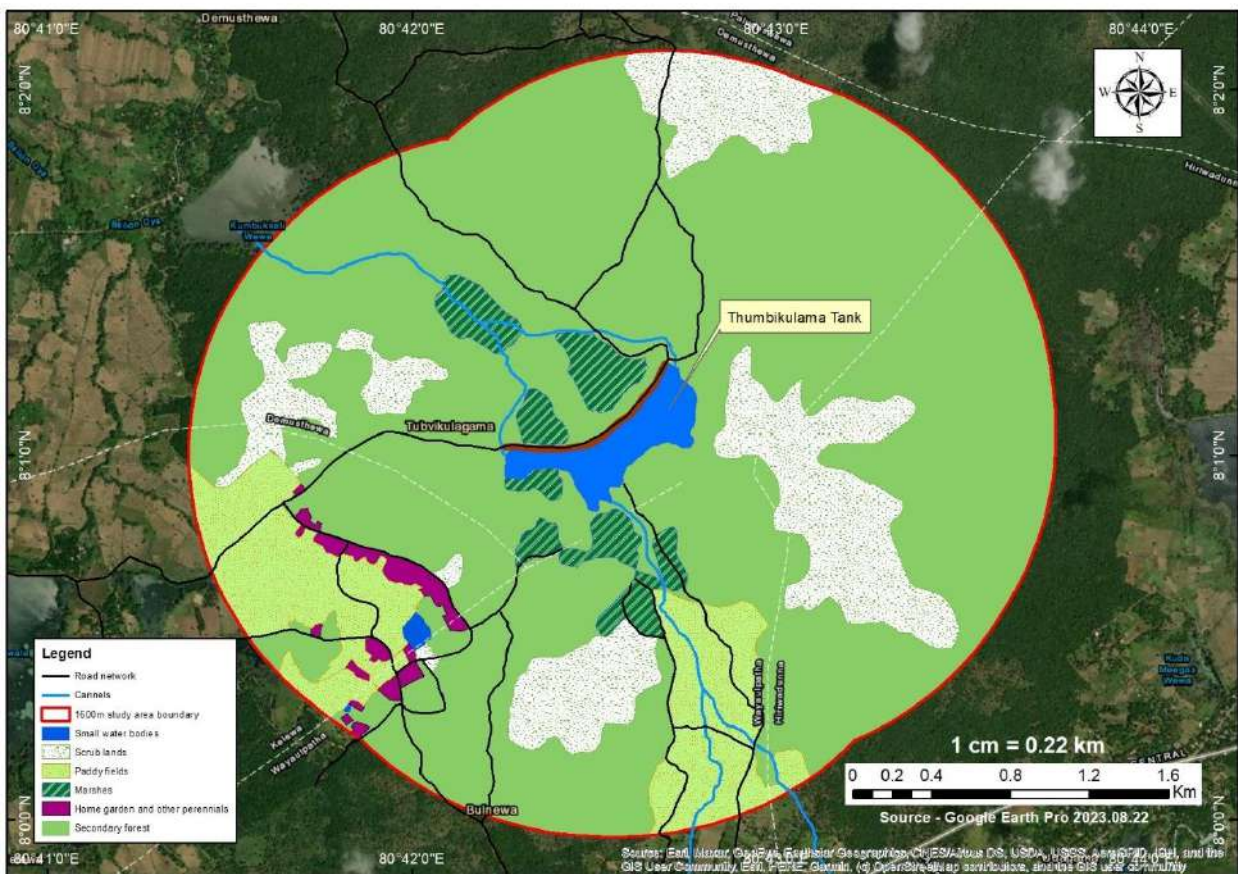


Figure 20: Land use patterns in the study area

Chapter 4 - Methodology of the study.

4.1 Study area

As the HLP tank restoration activity could influence the flora and fauna at considerable distance around the tank, the Thumbikulama Tank and its surrounding 1600m area was surveyed during the study (Figure 21).

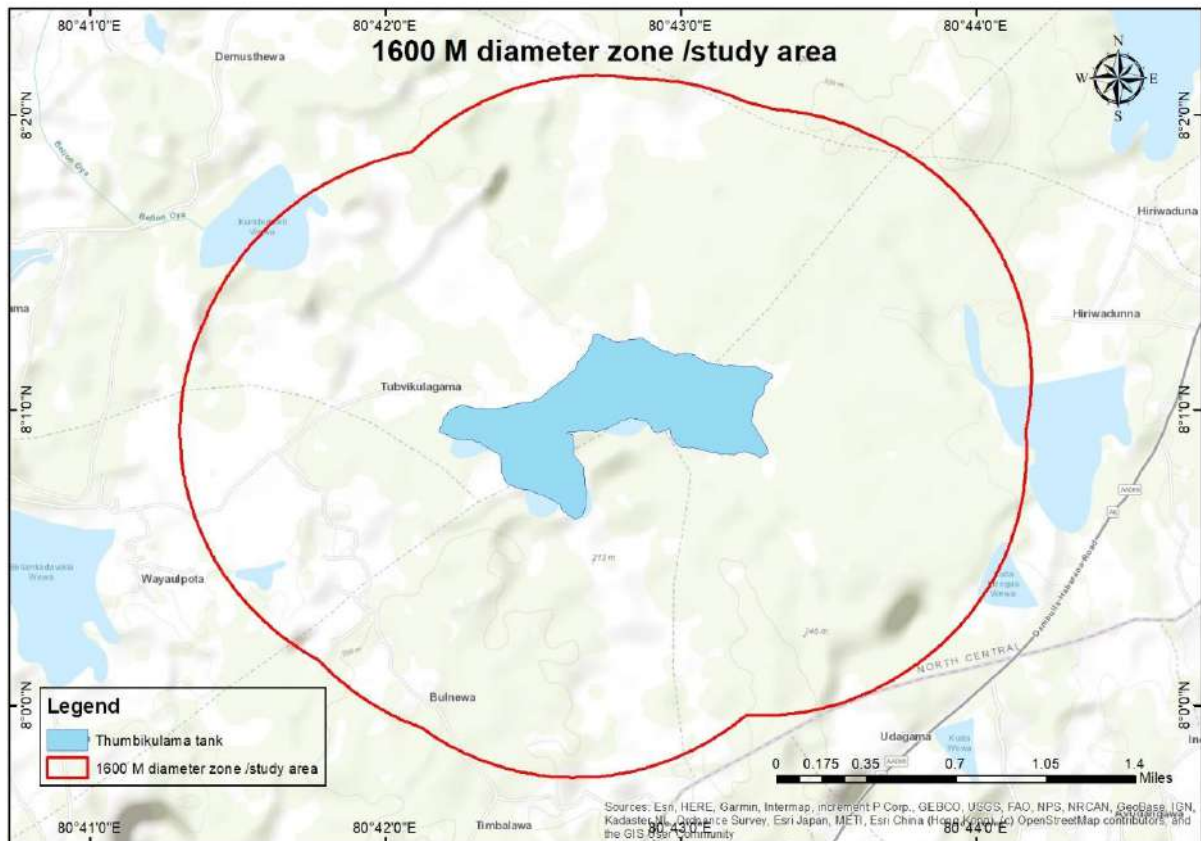


Figure 21: Study area for flora and fauna: Thumbikulama Tank and its surrounding 1600m area

4.2 Study methods

4.2.1 Floral sampling methods

Initially, a reconnaissance visit was made to understand the present situation of Thumbikulama Tank and its surrounding area. The reconnaissance helps for;

(a) Familiarization of the territory and biodiversity using pertinent references viz; road maps, aerial photographs, geological and geographical maps (Figures 1, 10, 20 and 21), previous knowledge of the biodiversity, climate data etc.

(b) Ground survey of the territory; the proposed study area was traversed to:

- i. familiarizes with the territory and accessibility.
- ii. get the knowledge of biodiversity in general and its status.
- iii. engage local community and develop social contacts necessary for the survey.

The detail flora study was planned according to the ground situation examined.

4.2.2 Flora sampling and data analysis

The species diversity of higher plants in diverse vegetation types, found in and around Thumbikulama Tank was studied using standard scientific techniques, with appropriate modifications to suit field conditions. Field based study identified eight distinct habitat types in the study area; Secondary Forests, Home Gardens, Forest Plantations - Monoculture (Teak), Tank, Dry Deciduous Thorn Scrub Lands, Riverine Evergreen Forests, Dry (Damana) grasslands and Marshes. Habitats were identified in line with NBSAP (2016). Vegetation of different habitats were sampled using 400m² sampling areas as per Luttmerding et al (1990). Diverse plant species (trees, shrubs, climbing plants and herbs) were documented in each sampling areas through Visual Encounter Survey (VES) method (Crump, M. L. and N.J. Scott, Jr., 1994: Figure 22).

Floral sampling parameters were as:

Sapling intensity: 20 samples

Secondary forests: 400m²x5 replicates

Home gardens: 400m²x2 replicates

Plantations: Monoculture (Teak): 400m² x 4 replicates

Aquatic ecosystem in the tank: 400m² x 2 replicates

Dry deciduous thorn scrub lands: 400m² x 2 replicates

Riverine evergreen forests: 400m² x 1 replicate

Dry (Damana) grasslands: 400m² x 2 replicates

Marsh land: 400m² x 2 replicates

Sampling Month: December 2023



Figure 22: Observing a sample during the floral survey

Identification of plants was done using standard taxonomic keys and photographic data; several references were used). A descriptive account of different habitats along with vegetation composition was made to characterize different systems. Field based information including photographic data were supported in;

- Preparing the species inventory, including their conservation status.
- Recording important, endemic, critical, or protected species etc.

4.2 Faunal sampling methods

Fauna of the study area were sampled in all major habitat types including the Secondary Forests, Home Gardens, Forest Plantations - Monoculture (Teak), Tank, Dry Deciduous Thorn Scrub Lands, Riverine Evergreen Forests, Dry (Damana) grasslands and Marshes in December 2023. The focal taxonomic groups in the survey were butterflies, dragonflies and damselflies, spiders, land snails, freshwater fish, amphibians, reptiles, birds and mammals.

Assessment of fauna diversity was done using both primary data collection through field sampling methods and secondary data collection through literature surveys and informal interviews with the local community (Table 1). Different sampling methods were selected to assess different faunal groups based on the applicability and convenience of sampling. Field sampling covered all different major habitat types present in the area and the distribution of sampling locations in and at the vicinity of the study area were mapped.



Figure 23: Observing a sample during the faunal survey

Table 1: Sampling methods used for different faunal taxa in the present study.

Taxonomic Group	Methods applied
Butterflies	100m × 5m line transects were conducted in each major terrestrial habitat. visual encounter surveys throughout the study area were also carried out to supplement the transect data.
Dragonflies and Damselflies	100m × 5m line transects were conducted along the tank bund and other aquatic habitats. visual encounter surveys throughout the study area were also carried out to supplement the transect data.
Land Snails	Visual encounter surveys supplemented with active searching of suitable microhabitats under litter, rocks and logs were conducted. surveys were conducted both during day and night.
Spiders	visual encounter surveys were conducted in both day and night to sample the species diversity of spiders in the area.
Freshwater Fish and Crabs	Freshwater fish were sampled using sweep nets, cast nets and bankside observations. night time bankside observations were made to record any nocturnal fishes. catch of the local fishermen and reliable information provided by them were also used in the assessment as supplementary data. The bank areas and shallow water areas of the water canals , reservoir and marsh areas were observed for freshwater crabs
Amphibians	Visual encounter surveys supplemented with active searching of suitable microhabitats under litter, rocks and logs were conducted. surveys were conducted both during day and night.
Reptiles	Visual encounter surveys supplemented with active searching of suitable microhabitats under litter, rocks and logs were conducted. surveys were conducted both during day and night. reliable information from local community were also gathered through informal interviews as evidence for the presence of well-known species.
Birds	Variable circular plot surveys were done to sample the avifauna in both terrestrial and aquatic habitats in the area. night sampling was conducted to record nocturnal birds. two pairs of binoculars (a Nikon monarch 8 × 42 and an opticon explorer wide angle 8 × 42) were used for the survey. indirect evidences such a calls, feathers and nests were used in the survey.
Mammals	Visual encounter surveys coupled with indirect evidence such as calls, scat, body parts, footprints etc., were used for detecting the mammals in all terrestrial and aquatic habitats. Nocturnal spot light surveys were conducted in the forest, tank area and agricultural areas. Two trap lines of 5 standard household rat traps each were employed for the small mammal surveys. Trapping was conducted on two consecutive nights using ripe banana and burnt coconut as baits. Magenta Bat5 digital bat detector was used for sampling the bat fauna. Surveys were conducted during the dusk and nighttime and detected calls were identified to species level using the frequencies. Reliable information from local community were also used as supplementary data as evidence of well-known species.

All species observed were identified to the finest possible taxonomic level using most updated taxonomic literature. Conservation status of the species follows the latest conservation assessments including the specific taxa.

4.3 Ethnobotany Study

The following methodologies were used to collect data;

1. Literature review.
2. Formal discussions with knowledge holders.
3. Informal discussion with knowledge holders.
4. Field surveys.

Discussions were conducted with persons who are having traditional knowledge about the study area. During the data collection period, the tank was at its full supply level and the tank bed was completely inundated. The data collection was mainly focused to the 1.6 km study circle including upstream section of the tank bund, downstream section of the tank bund and the peripheral area. For the tank bed and inundated sections, data were collected through discussions with knowledge holders. All the data collections were completed in December 2023.

Chapter 5 - Results of Biodiversity Survey

5.1 Results of Floral Survey

Sampling done in 20 sites (Annex 1) recorded 322 plant species and among them 8 are endemic (Annex 2) and 7 species are threatened (EN-2 and VU-5) (Annex 3). In addition, 5 species are Invasive Alien Species (IAS). Details are given in Table 2 and Annex 1.

Table 2: Statistics of flora

Total plant species recorded from all the 08 habitats	322
Endemic plant species recorded from all the 08 habitats	8
Threatened plant species recorded (EN-2, VU-5) recorded from all the 08 habitats	7
Alien Invasive plant species recorded (IAS) recorded from all the 08 habitats	5
Plant records in different habitats	
SF: Secondary Forests	166
PL: Forest Plantations - Monoculture (Teak)	93
TS: Dry Deciduous Thorn Scrublands	113
GR: Dry (Damana) Grasslands	93
HG: Home Gardens	149
TN: Tank	22
RF: Riverine Evergreen Forests	69
MR: Marshes	54

5.1.1 Status of existing ecosystem types

The Thumbikulama Tank and its immediate surrounding area is almost devoid of natural habitats and whatever remaining ecosystems are highly influenced by human presence. The existing habitats show considerable micro-climatic differences within a relatively small spatial area of the project site. Habitats are highly modified since historical times. There are 8 key ecosystem types (05 terrestrial ecosystems and three wetland ecosystems) represented in the study in line with NBSAP-National Biodiversity Strategies and Plans (2016) national ecosystem classification.

Following five terrestrial ecosystem types were observed within the study site;

1. Secondary forests

Large scale spread around Thumbikulama Tank.

2. Forest plantations –

Monoculture (Teak) - Exists side by side with secondary forests but not exceeding the area compared to secondary forests.

3. Dry deciduous thorn scrub lands –

A small scale habitat in the vicinity of the tank. Poorly developed *Eucalyptus* sp plantation is now in the form of a scrub land.

4. Dry (Damana) grasslands - Shows a patchy distribution among tall vegetation.

5. Home gardens - Scattered and isolated systems.

The following three represent the wetland ecosystems in the area;

6. Tank - The newly renovated Thumbikulama tank with open water body.

7. Riverine evergreen forests - A habitat of highly limited to small area in immediate down stream of Thumbikulama Tank.

8. Marshes - Abandoned paddy lands and Kattakaduwa area of dam toe flat lands.

Characteristic features of those ecosystems are as follows.

5.1.1.1 Secondary forests

As expressed by local inhabitants, the area had a rich tract of Dry-mixed evergreen forests some 4 decades ago. During 1980's illegal timber felling was rampant in the area. Shifting cultivation by local community was also practiced by local community. All such human interventions resulted in severe degradation in the forest structure and composition.

Naturally, dry-mixed evergreen forests are dominated by Palu (*Manilkara hexandra*) and Weera (*Drypetes sepiaria*) trees. However, those trees are now extremely rare among the tree community. Palu is demanding timber while Weera is much sought after for its good fire wood quality. Both species have been heavily extracted and their natural regenerations have failed to give a significant recovery.

Together with heavy disturbance and subsequent abandoning, the natural forest restoration process has move on developing secondary forests of various types along the time line depending on further disturbances in specific locations. Local community has used the secondary forests for subsistence level timber needs and Chena cultivation throughout the last several decades.

Currently, the secondary forest (Figure 23) has continuous canopy reaching up to 12m-18m with 2 lower strata of shrubs (~3m) and herbs (~0.5m).

Species composition and structure of secondary forests are significantly deviated from those of natural forests. Emergent layer is lacking. Pioneer tree species are common. Shrubs up to 3 m and herbaceous plants below 1 m occur with significant high density compared to natural forests.

Common tree layer species include *Bauhinia racemosa*, *Bridelia retusa*, *Premna tomentosa* and *Pterospermum suberifolium*. Below that, shrubs such as *Atalantia ceylanica* (Yakinaran), *Benkara malabarica* (Pudan), *Carissa spinarum* (Heen-karamba), *Clausena indica* (Migon-karapincha), *Ehretia microphylla* (Hin-thambala) and *Glycosmis mauritiana* (Dodampana) are found. Woody lians and stragglers e.g. *Toddalia asiatica*, *Ziziphus oenopolia*, *Combretum ovalifolium* (Kaduru-ketiya Wel), *Derris parviflora* (Kala-wel) and *Ventilago maderaspatana* (Yakkada Wel) are entangled both in tree layer as well as shrub layer.

Thickets of lianas are found in more disturbed sites where they have taken the opportunity of canopy opening to establish themselves by clinging and raising on the surrounding trees. The forests play a significant role in controlling soil erosion and functioning as a catchments of the tank.

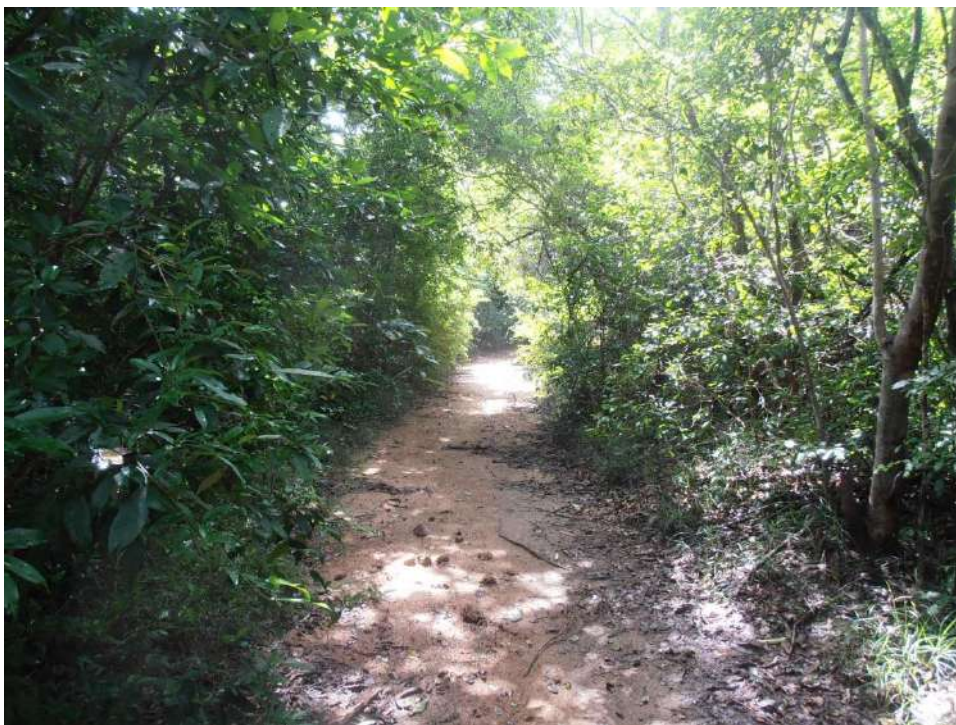


Figure 24:
Secondary
forests

5.1.1.2 Forest plantation - Mono-culture (Teak)

After severe disturbances, some areas of forests, have been planted with Teak (*Tectona grandis*) by the Forest Department. Currently, those Teak trees are at mature stage reaching 18m-22m height. There the dense growth of Teak trees forms the main canopy layer with almost 80% canopy cover. In some locations, the undergrowth is extremely poor and scattered native species occur while in some other locations, some Teak trees have been fallen by elephants (Figure 51). Forest structure is significantly heterogeneous.

In certain pockets native plants have recruited abundantly e.g. *Dimorphocalyx glabellus* (Weliwenna), *Flueggea leucopyrus* (Heen katu pila), *Acronychia pedunculata* (Ankenda), *Allophylus cobbe* (Bu-kobbe), *Alseodaphne semecarpifolia* (Wewarana) and *Bauhinia racemosa* (Maila). Additionally, weedy plants such as *Chromolaena odorata* (Podi Singno Maran) and *Panicum maximum* (Gini Tana) are common. The notorious invasive plant *Panicum maximum* occupy a dominant cover in many places.



Figure 25:

Teak forest
plantation

5.1.1.3 Dry deciduous thorn scrub lands

There is a poorly managed *Eucalyptus citriodora* (Karupantine) plantation area in the tank catchment area which has almost lost its plantation character and now it can be best described as a Dry deciduous thorn scrub land. Scattered *Eucalyptus* trees, showing retarded growth, have failed to provide canopy cover. As a result, the open lands have now invaded with Dry deciduous thorn scrub land vegetation. Isolated native trees are also there



Figure 26:

Dry deciduous thorn scrublands (Above) and Images from the poorly managed *Eucalyptus citriodora* (Karupantine) plantation in the catchment area (Below)

The scrub land vegetation is dominated by a thick, impenetrable thorny or spiny and woody flora growing up to 2m-3m in height. Two major strata can be recognized; the shrub canopy and the herbaceous (up to 0.5m) plants growing underneath.

The ground layer abounds with herbaceous life forms since it receives adequate sunlight. The common shrub species in scrub lands include; *Carissa spinarum* (Karamba), *Dichrostachys cinerea* (Katuandara), *Flueggea leucopyrus* (Katupila), *Phyllanthus polyphyllus* (Kuratiya), *Trema orientalis* (Gedumba), *Benkara malabarica*, *Glycosmis mauritiana* (Dodampana), *Hugonia mystax* (Bokere), *Lantana camara* (Hinguru), *Memecylon umbellatum* (Kayan), *Scutia myrtina*, *Streblus asper* (Nithul), *Tarenna asiatica* (Tharana), *Toddalia asiatica* (Kudumiris) and *Ziziphus oenoplia* (Eraminiya). Some herbs include *Cynodon dactylon*, *Desmodium heterophyllum* (Maha-undupiyaliya), *Eragrostis ciliaris*, *Hemidesmus indicus* (Iramusu), *Tephrosia purpurea* (Gam pila), *Vernonia zeylanica* (Wal-Pupula).

5.1.14. Dry (Damana) grasslands.

Historical human presence in the area has resulted in using lands for various purposes such as Chena cultivation, Paddy cultivation and settlements. After long term abandoning of such lands and grazing pressures due to wild animals or domestic cattle, some pockets establishes as grassland blocks surrounded by forests or scrub lands.

Apparently, the existing grasslands are historically paddy cultivation areas. They have a simple vegetation structure; just closely grown grassy cover ranging between 0.1m-0.5m in height. Often, isolated and scattered shrub (up to 3m) species can also be seen. Common grass includes *Alloteropsis cimicina* (Bundeni-tana), *Apocopis mangalorensis*, *Bothriochloa pertusa*, *Digitaria ciliaris* (Guru-tana), *Digitaria longiflora*, *Eragrostis ciliaris*, *Aristida setacea* and *Cynodon dactylon*. Many other herbs such as *Abutilon hirtum*, *Achyranthes aspera* (Karalsebo), *Ageratum conyzoides* (Hulanthala), *Alysicarpus vaginalis* (Aswenna), *Senna tora* (Thora), *Sida cordifolia* and *Urena sinuata* (Pattaepala) occur scattered. The dense structure of short vegetation is an excellent cover against erosion caused by run off and strong winds. Nearby, there are farming cattle and buffaloes (Figure: 49) and such grazing lands are valuable resource areas for local herders.

The sloping sides of the dam of the tank also has vegetation representative of grasslands. Common grass flora include *Digitaria longiflora*, *Eragrostis japonica*, *Isachne kunthiana*, *Melinis repens*, *Digitaria longiflora*, *Alloteropsis cimicina* (Bundeni-tana), *Apocopis mangalorensis*, *Chloris barbata* (Mayurutana) and *Eragrostis ciliaris*. They are well adapted to dry condition where water retention is very low due to elevated ground.

Among grasses many broad leaf herbs such as *Abutilon hirtum*, *Ageratum conyzoides* (Hulan tala), *Alysicarpus vaginalis* (Aswenna), *Mimosa pudica* (Nidikumba) and *Scoparia dulcis* (Wal koththamalli) occur. Occasionally, some trees and shrubs are also found growing on sloping sides; *Azadirachta indica* (Kohomba), *Bauhinia racemosa* (Maila), *Chukrasia tabularis* (Hulanhik), *Flueggea leucopyrus* (Heen katu pila), *Grewia damine* (Daminiya), *Grewia orientalis* (Wel-keliya), *Holoptelea integrifolia* (Goda-Kirilla), *Ixora pavetta* (Maha-rathambala) and *Terminalia arjuna* (Kumbuk).



Figure 27: Dry (Damana) grasslands

5.1.1.5 Home gardens.

There are some houses scattered in the study area. The crop dominated cultivation found immediately around homesteads is home garden, and is the result of long-term manipulations. Generally, home garden vegetation is poorly maintained and settlers are more involved with farming cash crops away from the house.

This vegetation is really a semi-natural system where crops as well as wild plants occur side by side. The effective area of the Home Garden unit is approximately 0.25 acre and larger units are not uncommon. Home gardens provide several daily needs as subsistence produces; fruits, spices, nuts, yams, flowers, vegetables, medicines, firewood, timber etc. throughout the year. Since the existing home gardens in the area are not well managed, full potential benefits are not received from the land. General structure shows that multi-purpose trees, shrubs, herbs and climbers are deliberately intermixed.

The appearance varies depending on the farming practices employed. Generally, there are several poorly developed plant layers: a canopy (15m), a sub canopy (10 m) and a shrub/herb layer (2 m or below). Number of crop species are found in this habitat; *Annona reticulata* (Anoda), *Artocarpus heterophyllus* (Kos), *Carica papaya* (Pepol), *Citrus medica* (Dehi), *Cocos nucifera* (Pol or Coconut), *Mangifera indica* (Amba), *Musa x paradisiaca* (Kesel), *Punica granatum* (Delum) and *Sesbania grandiflora* (kathurumurunga). Coconut is found in almost all home gardens.

The home garden is also an important faunal habitat providing animals with feeding and nesting sites. The home gardens vegetation gradually mix with forests or scrub lands in surrounding area.



Figure 28: A home garden

5.1.1.6 Tank

The open water body of the newly renovated tank has few aquatic flora species. Still its aquatic vegetation succession is at an early stage. Many large terrestrial trees e.g. *Grewia damine* (Daminiya), *Holoptelea integrifolia* (Goda-Kirilla), *Ixora pavetta* (Maha-rathambala), *Terminalia arjuna* (Kumbuk) existed in the dilapidated tank bottom before the renovation and are to be seen at present. Such trees had grown under fully terrestrial conditions experienced several decades when no more water retained in this ancient tank. *Utricularia aurea* is the most visible lentic macrophytic occupying the euphotic zone; upper layer of the water body well illuminated by sun light.

The zone around the margins of the water body which consists of shallow waters (littoral zone) having few rooted moisture loving plants such as *Cyanotis axillaris*, *Cyperus compressus*, *Fimbristylis cinnamometorum*, *Fuirena capitata*, *Panicum repens* (Etor), *Phyla nodiflora* (Herimana-detta) and *Aeschynomene indica* (Diya-siyambla). Apart from that, no significant aquatic vegetation is visible, except some floating algae.



Figure 29:

Tank
environment

5.1.1.7 Riverine evergreen forests.

Some 50m downstream the tank outflow stream, begins to appear the poorly developed riverine forests. Nearby there are blocks of abandoned paddy fields, where marshy substrate supports a low growing grassy community. Riverine evergreen forests in stream bank strip form the inter phase between water environment and adjacent terrestrial habitats.

It does not cover a large area but protects stream bank from erosion due to water currents. Root system of trees and shrubs acts as a protective cushion covering the banks. The distribution of this vegetation type is narrow. Canopy height is about 30m and canopy is not continuous. *Terminalia arjuna* (Kumbuk) is the tallest trees with other companion woody flora include species such as *Diospyros malabarica* (Thimbiri), *Madhuca longifolia* (Mee), *Margaritaria indica* (Karawu), *Nauclea orientalis* (Bakmee), *Hydnocarpus venenata* and *Pongamia pinnata*. Ground vegetation is mostly moisture loving species; *Fimbristylis cinnamometorum*, *Fuirena capitata*, *Panicum repens* (Etor) and, *Ludwigia adscendens* (Beru-diyaniilla).



Figure 30:
Riverine
evergreen
forests

5.1.1.8 Marshes.

Marshes in the area are a type of wetland ecosystem characterized by poorly drained soils (boggy lands) and by plant life dominated by grasses or sedges (herbaceous forms). There are two land areas with marshlands; Kattakaduwa (Dam toe) and abandoned paddy lands near tank outflow.

Both marshlands receive a steady supply of water to keep the soil well saturated throughout the year. Marshy area formed by abandoned paddy fields is dominated by graminious moisture loving plants (grasses and sedges); *Fimbristylis cinnamometorum*, *Fuirena capitata*, *Panicum repens* (Etora), *Paspalum conjugatum*, *Cyperus iria* (Wel-hiri), *Echinochloa crusgalli* (Maratu), *Brachiaria mutica* (Diya-tana) and *Cyperus difformis*. Although *Pennisetum polystachion* (Illuk) is an upland weed, it is also growing abundantly taking the dry season opportunity. The present stable vegetation is a thick mat (25cm-75cm).

Kattakaduwa is a flat area with varying micro topography. Accordingly, marshy boggy areas as well as ponding areas occur. Monocot plants, mainly Cyperaceae and Poaceae, well suited to the marshy habitat form tufts of vegetation cover (0.25m-0.75m) on the marshy substrate e.g. *Panicum repens*, *Cyperus compressus*, *Fimbristylis cinnamometorum*, *Panicum repens* (Etora), *Paspalum conjugatum*, *Cyperus iria* (Wel-hiri), *Echinochloa crusgalli* (wel-marukk), *Bothriochloa pertusa* and *Brachiaria mutica* (Diya-tana). Patches of *Typha angustifolia* (Hambu-pan) is growing as the tallest sedge (1.5m).

In shallow ponds, some partly submerged plants are rooted in muddy substrata but their leaves and flowering shoots on or above the surface of water e.g. *Ludwigia adscendens* (Beru-diyaniilla), *Eriocaulon quinquangulare* (Heen kokmota), *Nymphaea pubescens* (olu). Plants like *Utricularia aurea* (Diya-pasi) and *Bergia capensis* (Geta puruk wila) have most of their parts underwater.



Figure 31:

Marshes in the Kattakaduwa area, Thumbikulama Tank

5.1.2 Sensitive plants (endemic and threatened), sensitive habitats and their distribution.

Endemic and threatened plants as per The National Red List 2020 can be regarded as sensitive species in account of their need for additional conservation efforts for survival. Unlike wet zone, dry zone has lesser number of endemic species and following list of sensitive species were encountered during the survey.

5.1.2.1 Endemic species

As endemic species, *Derris parviflora* (Kala-wel), *Hydnocarpus venenata* (Makulu), *Micromelum minutum* (Wal-karaphincha), *Rhinacanthus polonnaruwensis* (Heen anitta), *Uvaria sphenocarpa*, *Strychnos trichocalyx* (Gona-karamba), *Sauropus rigidus* (Ginihiriya), and *Vernonia zeylanica* (Pupula) were reported. All those species were encountered in the secondary forest (Annex 2). Other habitat types represented lesser number of endemic species.

5.1.2.2 Threatened flora

Seven threatened flora species: *Salacia oblonga* (Himbutu), *Chloroxylon swietania* (Burutha), *Dichaetaria wightii*, *Dioscorea spicata* (Gonala), *Naringi crenulata* (Wal-beli), *Phyllanthus emblica* (Nelli), *Trichopodium zeylanicum* (Bimpol) were presorted which were largely represented in secondary forests, except *Phyllanthus emblica* (Nelli) which is cultivated in a home garden. Except for *Salacia oblonga* (Himbutu) and *Naringi crenulata* (Wal-Beli) which is of higher threatened category of EN, the rest are in VU category.

Among different habitat types there, the existing secondary forests have greater role of sustaining the sensitive (endemic and threatened) flora species (Annex 3, Figure 32 and Figure 33). Sensitive biodiversity plays a crucial role in our ecosystems and is of significant importance for several reasons. For example, *Manilkara hexandra* (Palu) which is rare now in secondary forests, is an emergent tree in mature forests. Such structural arrangement is characteristic feature in better performing forest habitats supporting diverse species. threatened species contribute to the overall balance and stability of ecosystems. They often have unique ecological roles, such as being keystone species or providing crucial ecosystem services. Their presence helps maintain the health and functioning of ecosystems.

Wild genetic resources of food plants, e.g. *Dioscorea spicata* (Gonala) possess unique genetic traits that can be essential for use in genetic improvements cultivated *Dioscorea* while they contribute to the overall genetic diversity, which is vital for the long-term resilience of ecosystems in the face of environmental changes. Some sensitive species have been found to possess medicinal properties and are used in traditional medicine e.g. *Salacia oblonga* (Himbutu)-EN, *Naringi crenulata* (Wal-beli), *Phyllanthus emblica* (Nelli) and *Trichopodium zeylanicum* (Bimpol). They provide a potential source of new drugs and remedies that can benefit human health.

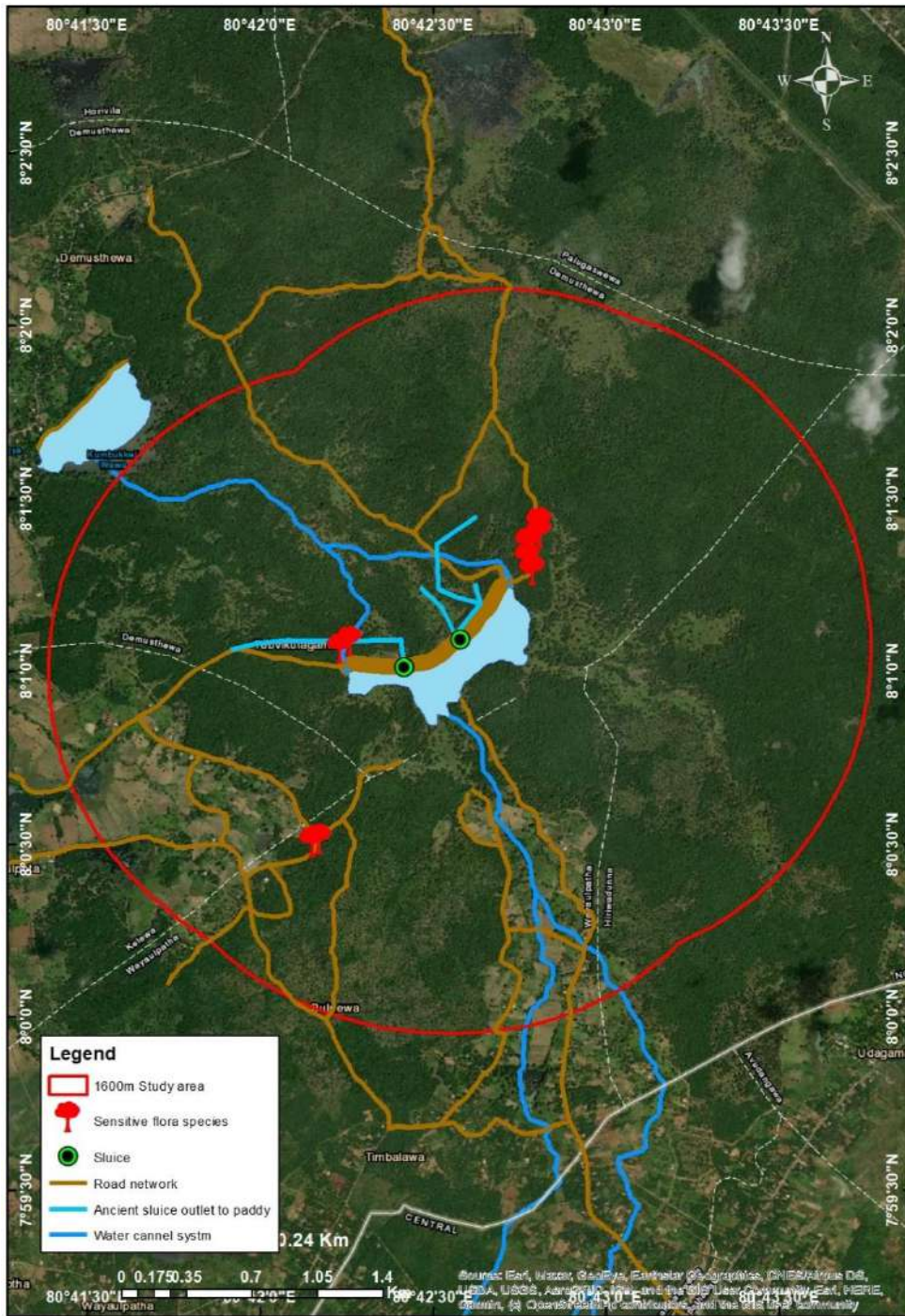


Figure 32:

Map locations where aggregations of sensitive flora species were encountered

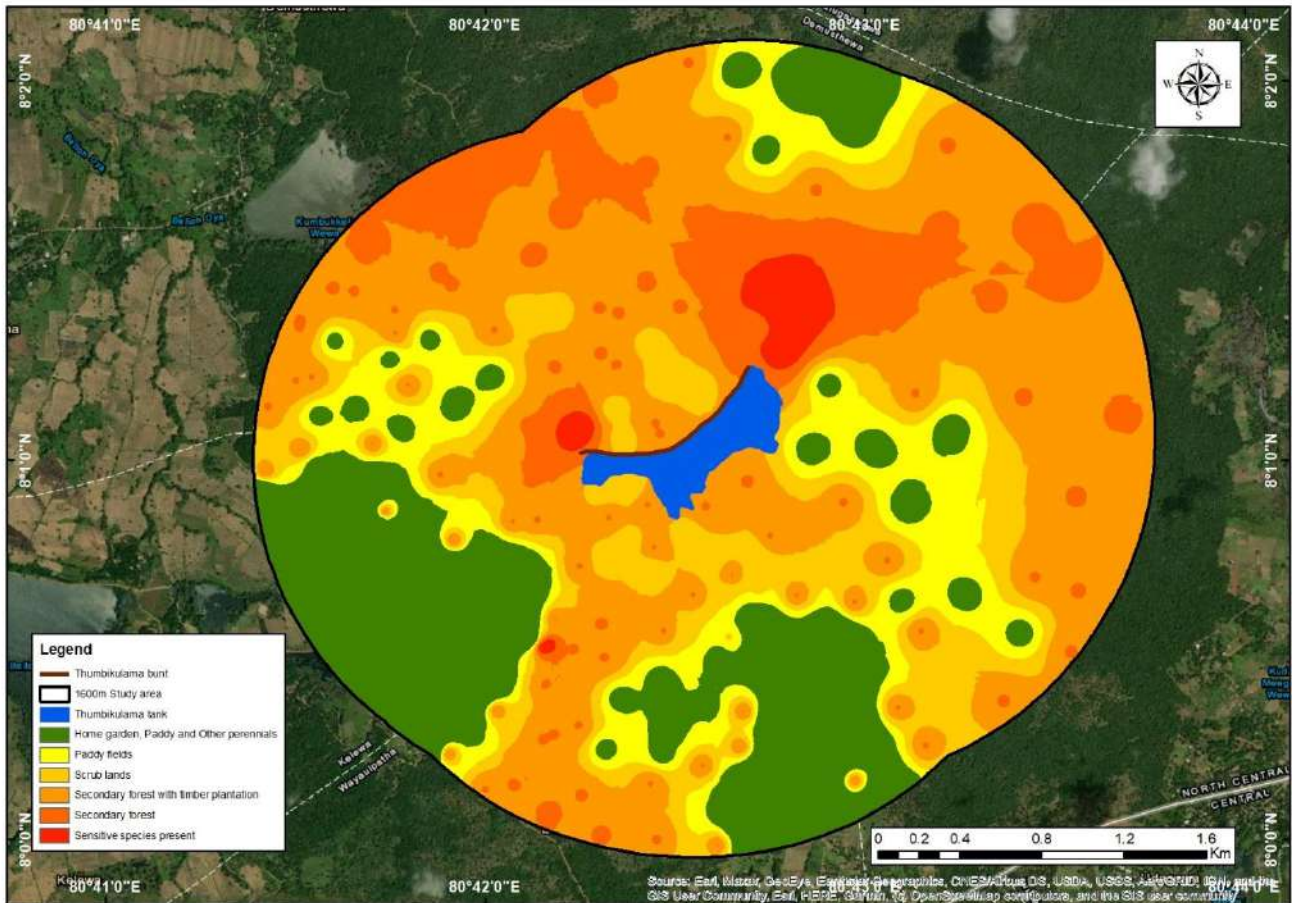


Figure 33: Zonal map showing locations of secondary forests and aggregation of sensitive flora species (Red color) in the study area.

5.1.2.4 Invasive Alien Plants (IAS) and their distribution.

Alien invasive plants in Sri Lanka refer to non-native plant species that have been introduced to the country and have the ability to spread rapidly, out competing native plants and negatively impacting the local ecosystem. Several such plant species: *Ageratum conyzoides* (Hulanthala), *Chromolaena odorata* (Podisinnomaran), *Panicum maximum* (Ratathanakola), *Pennisetum polystachyon* (Illuk) and *Lantana camara* (Gandapana) are encountered within the study area (Figure 32).



Figure 34:

Common
Invasive Alien
Species (IAS)
recorded
from the study
site

Panicum maximum (Ratathanakola)

Lantana camara (Gandapana)-A

Chromolaena odorata (Podisinnomaran)-B

Among them *Chromolaena odorata* and *Panicum maximum* are causing a significant impacts on native biodiversity within the area.

Chromolaena odorata: commonly known as Podisinnomaran, is a highly invasive shrub that thrives in disturbed habitats, forest edges, and agricultural lands. It forms dense thickets, preventing the growth of native plants and reducing biodiversity. Immediate surrounding area of Thumbikulama Tank, where land disturbance has taken place due to renovation works, is largely infested with this plant.

Panicum maximum (Ratathanakola): *Panicum* grass is a fast-growing grass species that has become invasive in Sri Lanka exceeding the spread of any other IAS. It spreads rapidly, out competing native grasses and reducing biodiversity in wherever it spreads. Its dense growth can impede seriously quality of natural habitats. Occurrence is very prominent in Teak plantation and edge areas of secondary forests.

In future, there is a high risk of spread of *Salvinia molesta* and *Eichhornia crassipes* (Japanjabara) in the tank. Both aquatic plants are highly invasive that form dense mats on water bodies. These mats can block sunlight, hinder water flow, and deplete oxygen levels, leading to adverse effects on aquatic life, water quality, and irrigation systems.

The impacts of Invasive Alien plants in Sri Lanka are far-reaching. They can disrupt ecosystem processes, reduce biodiversity, alter habitats, and degrade natural resources. Invasive plants often compete with native flora for resources such as sunlight, water, and nutrients, leading to a decline in native plant species. This, in turn, invasive plants affect the wildlife that depends on these plants for food and shelter.

Invasive plants can also have economic impacts by reducing agricultural productivity, impeding water flow in irrigation systems, increased risk of forest fire, and increasing costs associated with control measures. Furthermore, some invasive plants pose health risks as they may be toxic to livestock or humans.

Efforts are being made in Sri Lanka to manage and control these Invasive Alien plants through various means such as manual removal, biological control using natural enemies of the plants, and public awareness campaigns. It is important to prevent the further introduction and spread of invasive species to protect the native ecosystems and maintain the ecological balance.

5.2. Results of Faunal Survey

The faunal diversity of Thumbikulama and surrounding habitats largely represents a typical dry zone faunal assemblage found in Sri Lanka. The following profiles provides an assessment of its diversity based on the faunal diversity surveys conducted during January 2024.

5.2.1. Terrestrial vertebrates

5.2.1.1 Amphibians

Most of the amphibians associated with dry zone tank ecosystem and surrounding habitats were observed during the study. Fourteen species of amphibians were observed including two endemic species. All of these species are common species widely distributed throughout dry lowlands. Since amphibians are often associated with water bodies, highest number of species were observed around the tank and marshy areas in other terrestrial habitats.

Two species of Vulnerable amphibians according to The National Red List of Sri Lanka (2012), namely Variegated Ramanella (*Uperodon rohani*) and Polonnaruwa Shrub Frog (*Pseudophilautus regius*), were reported during the assessment. Variegated Ramanella generally associates human habitations in dry lowlands and Polonnaruwa Shrub Frog is found in home gardens, agricultural lands, scrublands and forest edges. Both these species are generally common in areas such as Thumbikulama.



Sri Lankan Bull Frog (*Uperodon taprobanicus*)



Short-headed Burrowing Frog (*Sphaerotheca breviceps*)

Figure 35:
Common
Amphibians
recorded from
the study site

5.2.1.2 Reptiles

Twenty-nine species of reptiles were recorded from the study area. These includes some wetland associated species such as the Mugger (*Crocodylus palustris*), Sri Lanka Flap shell turtle (*Lissemys ceylonensis*) and Black Turtle (*Melanochelys trijuga*) and many such species generally associated with forests, agricultural areas and human settlements in the dry lowlands of Sri Lanka.



Mugger Crocodile (*Crocodylus palustris*)



Common Garden Lizard (*Calotes versicolor*)

Figure 36:
Common
Reptiles
recorded from
the study site



Sri Lankan House Gecko (*Hemidactylus parvimaculatus*)



Thammanna Skink (*Eutropis thammanna*)
Endemic



Forsten's Cat Snake (*Boiga forsteni*)



Star Tortoise (*Geochelone elegans*)

Freshwater associated reptiles were generally observed in the tank and marshland habitats while other species were distributed throughout other terrestrial habitats. Presence of several venomous snakes were also reported during the assessment.

The reported reptilian fauna represented four endemic species. However, no threatened species of reptiles according to the most updated National Red List Assessment of the country (2012) were observed. Four Near Threatened species namely Mugger Crocodile, Star Tortoise (*Geochelone elegans*), Forsten's Cat Snake (*Boiga forsteni*) and Boulenger's Bronze-back (*Dendrelaphis bifrenalis*), were reported from the area.

5.2.1.3 Birds

Tank ecosystems are important habitats for the bird fauna in the dry lowlands of Sri Lanka. Thumbikulama Tank and surrounding wetlands also support a considerable diversity of wetland birds while the other terrestrial habitats in the area supports a good number of dry lowland birds. A total of 86 species of birds were observed during the assessment including several endemics and migrant species.

The wetland birds were observed aggregating around the tank and some species were even observed roosting on the standing trees in the inundated area. No nesting colonies were observed, but it is not unlikely for some of the species to nest in the area in future. The tank and surrounding wetlands provide important feeding ground for the wetland birds such as Herons, Ibises, Spoonbills, Storks and Pelicans.

No threatened species of birds were identified in the present work. However, six Near Threatened species namely, Jungle Owlet (*Glaucidium radiatum*), Brown Wood Owl (*Strix leptogrammica*), Grey-headed Fish Eagle (*Haliaeetus ichthyaetus*), Large Cuckooshrike (*Coracina macei*), Ashy Woodswallow (*Artamus fuscus*) and Thick-billed Flowerpecker (*Dicaeum agile*) were reported from the area. Nine of the observed species, i.e; Sri Lanka Black-capped Bulbul (*Pycnonotus melanicterus*), Sri Lanka Woodshrike (*Tephrodornis affinis*), Sri Lanka Barbet (*Psilopogon zeylanicus*), Sri Lanka Grey Hornbill (*Ocyrceros gingalensis*), Sri Lanka Green Pigeon (*Treron pompadora*), Sri Lanka Brown-capped Babbler (*Pellorneum fuscocapillus*), Sri Lanka Lesser Flameback (*Dinopium psarodes*), Sri Lanka Swallow (*Cecropis hyperythra*) and Sri Lanka Junglefowl (*Gallus lafayetii*), are endemic birds to the country.

Thumbikulama also supports many species of common migrant birds. These includes several wetland birds and forest birds as well. None of the observed migratory birds are threatened at the global scale.



Crested Serpent Eagle (*Spilornis cheela*)



Green Imperial Pigeon (*Ducula aenea*)



Green Bee eater (*Merops orientalis*)



Black-headed Ibis (*Threskiornis melanocephalus*)



Common Kingfisher (*Alcedo atthis*)



White-throated Kingfisher (*Halcyon smyrnensis*)



Rose-ringed Parakeet (*Psittacula krameri*)



Sri Lanka Grey Hornbill (*Ocyrceros gingalensis*) - Endemic

Figure 37:
Common birds recorded from the study site (Part I)



Sri Lanka Woodshrike (*Tephrodornis affinis*) – Endemic



Greater Coucal (*Centropus sinensis*)

Figure 38:
Common
birds
recorded
from the
study site
(Part II)



White-bellied Sea Eagle (*Haliaeetus leucogaster*)



White-rumped Shama (*Kittacincla malabarica*)

5.2.1.4 Mammals

The forests and scrublands around Thumbikulama Tank are occupied by a diverse dry zone mammalian fauna. Forty-seven species of mammals were recorded through direct and indirect evidences from the landscape. These includes several endemic fauna and multiple threatened species.

Sri Lanka Golden Dry Zone Palm Civet (*Paradoxurus stenocephalus*), a medium sized endemic mammal generally distributed in the dry zone forest areas was recorded from the forests surrounding Thumbikulama Tank. This species is the only Critically Endangered mammal (National Red List 2012) reported during the present survey. In addition to this, the Sri Lanka Toque Monkey (*Macaca sinica*) and Sri Lanka Mouse Deer (*Moschiola meminna*) are the only other endemic mammals recorded from the area.

The nationally threatened species reported from Thumbikulama landscape represents five Endangered species including Asian Elephant (*Elephas maximus*), Leopard (*Panthera pardus*) and Fishing Cat (*Prionailurus viverrinus*), as well as seven Vulnerable species including Eurasian Otter (*Lutra lutra*), Black-bearded sheath-tailed Bat (*Taphozous melanopogon*), False vampire Bat (*Megaderma lyra*) and Long-tailed Tree Mouse (*Vandeleuria oleracea*).

The tank and other marshes surrounded by forest and scrublands is a good habitat mosaic to support many mammals including the Asian Elephant. The area might not have resident large carnivores but Leopards, probably dispersing individuals, have been observed by the local people in the past. The area is suitable for both Fishing Cats and Otters as well as other small carnivores. The bat fauna was also observed to be diverse and there are places like culverts where day roosting of bats were observed.



Asian Elephant (*Elephas maximus*)



Eurasian Otter (*Lutra lutra*)



Grey Mongoose (*Herpestes edwardsii*)



Tracks of a Fishing Cat (*Prionailurus viverrinus*)



Common House Rat (*Rattus rattus*)



Bicoloured leaf-nose Bat (*Hipposideros ater*)

Figure 39:

Common Mammals recorded from the study site

5.2.3 Terrestrial Invertebrates

5.2.3.1 Dragonflies and Damselflies

Freshwater wetlands are often occupied by a number of dragonflies and damselflies. Similarly, Thumbikulama Tank, and the surrounding marshlands and canals are teeming with multiple species of these freshwater insects commonly referred to as odonates.



Pruinosed Bloodtail (*Lathrecista asiatica*)



Keyhole Glider (*Tramea basilaris*)

Figure 40:
Common
Dragonflies
and
Damselies
recorded
from the
study site



Indigo Dropwing (*Trithemis festiva*)



Crimson Dropwing (*Trithemis aurora*)



Striped-headed Threadtail (*Prodasineura sita*)
- Endemic



Adam's Gem (*Libellago adami*) - Endemic

Altogether, 29 species of dragonflies and damselfies were observed in the Thumbikulama area. Majority of these were observed in the marshlands scattered around in the low lying areas. Even though the species richness of dragonflies was less in the tank habitat than that of the marshlands, it had the highest abundance of dragonflies. It is likely that the diversity of dragonflies and damselfies in the tank habitat will increase with time once the aquatic vegetation is properly established.

The observed species of dragonflies and damselfies included two endemic species, namely Adam's Gem (*Libellago adami*) and Stripe-headed Thread tail (*Prodasineura sita*), and two Vulnerable species according to the last updated National Red Listing assessment (2012). However, both these threatened species, i.e.; Indigo Drop wing (*Trithemis festiva*) and Keyhole Glider (*Tramea basilaris*) are relatively widespread and common species within their ranges.

5.2.3.2 Butterflies

The butterfly fauna of Thumbikulama represents a typical dry lowland species composition with 66 recorded species. These are mostly observed in open habitats such as scrublands, tank beds, forest edges, home gardens and agricultural areas.

Two species of endemic butterflies namely Sri Lanka Lesser Albatross (*Appias galene*) and Sri Lanka Tamil Bushbrown (*Mycalesis subdita*), were observed in the area. The threatened butterfly species reported in Thumbikulama are the Endangered Blue Pansy (*Junonia orithya*) and Vulnerable Large Guava Blue (*Virachola perse*) and Banded Peacock (*Papilio crino*). Four other near threatened species were also observed during the present study and these are Double-banded Crow (*Euploea sylvester*), Common Small Flat (*Sarangesa dasahara*), Smallest Swift (*Parnara bada*) and Small branded Swift (*Pelopidas mathias*).

Among the habitats present in the area, the Scrub Lands had the highest abundance as well as the highest species richness of butterflies. The tank area and home gardens and agricultural lands had the second and third highest species richness of butterflies. This agrees well with the general pattern of diversity in butterflies since most common and generalist species of butterflies are associated with open habitats with abundant flowering plants which are important as nectar sources.



Peacock Pansy (*Junonia almana*)



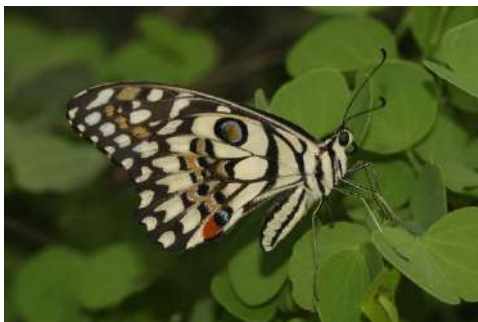
Blue Pansy (*Junonia orithya*)



Common Small Flat (*Sarangesa dasahara*)



Tailed Jay (*Graphium agamemnon*)



Lime Butterfly (*Papilio demoleus*)



Crimson Rose (*Pachliopta hector*)

Figure 41:
Common
Butterflies
recorded
from the
study site

5.2.3.3 Land Snails

Only five species of land snails were observed during the present study. Out of these two were identified to species level. No species of conservation importance or endemic species were recorded. The introduced African Giant Snail (*Lissachatina fulica*) is an established invasive alien species which was observed in association of home gardens and agricultural lands in the landscape.

5.2.3.4 Spiders

The spiders are one of the most diverse arthropods in Sri Lankan ecosystems. Forty-six species of spiders were reported from the present work. Out of these 36 were identified to the species level while the rest were only identified to the genus level. They occupied all terrestrial habitats of the Thumbikulama landscape. Three of the species identified are endemic to the country and these are Lemon-leg Tiger Spider (*Poecilotheria fasciata*), Sri Lanka Elongated Green Crab Spider (*Oxytate subvirens*) and *Tissahamia ethagala*.

Of the identified species, two are nationally Critically Endangered species as per the last updated National Red List of Sri Lanka. However, it should be noted that these both species are relatively commonly encountered species in the dry lowlands as per the updated knowledge.

Most of the spider diversity was observed to be associated with the forest and the forest edge habitat in the Thumbikulama landscape.



Tissahamia ethagala - Endemic



Sri Lanka Elongated Green Crab Spider (*Oxytate subvirens*) - Endemic

Figure 42:
Common
Land Snails
and spiders
recorded
from the
study site



Signature Spider (*Argiope anasuja*)



Asemonea tenuipes



Lemon-leg Tiger Spider (*Poecilotheria fasciata*) - Endemic



Common Translucent Snail (*Cryptozona bistralis*)

5.2.4 Aquatic Fauna

5.2.4.1 Freshwater Fish

The tanks, marshes and waterways connecting those are important habitats for the freshwater fish fauna of dry zone ecosystems. The tanks are also utilized for fisheries purpose resulting in introduced fish species dominating that habitat. A total of 19 native freshwater fish species and one introduced fish species were observed from Thumbikulama Tank and surrounding freshwater habitats.



Large Silver Carplet (*Amblypharyngodon grandisquamis*) - Endemic



Long-snouted Barb (*Puntius dorsalis*) - Endemic

Figure 43:
Endemic
freshwater fish
recorded from
the study site



Striped Dwarf Catfish (*Mystus nanus*) - Endemic



Sri Lankan Mystus Catfish (*Mystus zeylanicus*) - Endemic



Tic Tac-toe Barb (*Pethia melanomaculata*) - Endemic



Red Fin Labeo (*Labeo lankae*) - Endemic

Six of the native species are endemic to the country including Striped Dwarf Catfish (*Mystus nanus*), Sri Lanka Mystus catfish (*Mystus zeylanica*), Tic tac-toe barb (*Pethia melanomaculata*), Swamp barb (*Puntius thermalis*), Large silver carplet (*Amblypharyngodon grandisquamis*) and Dry zone butter catfish (*Ompok ceylonensis*). No threatened species of fish were observed from the area but one near threatened species namely, Brown Snakehead (*Channa kelaartii*) was observed in the tank habitat.

5.2.4.2 Freshwater Crabs

The crab genus *Oziothelphusa* sp was found burrowing in the inside of the tank bund. This genus is likely to inhabit in paddy fields and slow flowing irrigation canals, and thus is likely to inhabit the marshy areas around Thumbikulama.

5.2.5 Summary of the Faunal Diversity in Thumbikulama

Thumbikulama Tank and the surrounding landscape supports a typical dry zone faunal assemblage. During the rapid survey conducted 374 species of fauna were reported with 31 confirmed endemics. However, it should be noted that this does not represent the entire faunal diversity of the area, even for the taxa that were sampled, since this was a rapid survey. Detailed studies over a period of time would provide a better understanding and a more complete picture of the fauna of Thumbikulama Tank system. Table 3 provides a summary of the fauna reported during the present study.

Table 3: Summary of the findings of faunal diversity survey

Taxonomic Group	Species Richness	Endemics	Conservation Status				
			CR	EN	VU	NT	LC
Land Snails	5						1
Spiders	46	3	2	1		3	23
Dragonflies	29	2			2	2	25
Butterflies	66	2		1	2	4	59
Freshwater Crab	1						
Freshwater Fish	20	6				1	18
Amphibians	14	2			2		12
Reptiles	29	4				4	25
Birds	117	9				6	99
Mammals	47	3	1	5	7	6	28
Total	374	32	3	7	13	26	290

5.2.5.1 Endemic Fauna

The 31 species of endemic fauna identified from Thumbikulama area (Annex 05) were from various taxonomic groups. Among the taxa that were surveyed, the highest number of endemics were reported among the birds with nine species. All other taxa also included several endemics each.

No endemic species were confirmed among the land snails observed during the present work. However, it should be noted that, considering the pattern of endemism among Sri Lankan land snails, all the three species of snails that were not identified to the species level are likely to be endemic species.

5.2.5.2 Threatened species

The present survey reports 23 species (Annex 6) of national threatened fauna species based on most updated conservation assessment including each taxonomic group. These includes three Critically Endangered species, seven Endangered species and 13 Vulnerable species. However, it should be noted that some of the national conservation assessments of selected faunal taxa are somewhat outdated and they are being revised currently. Accordingly, some of the species presented under this category in the current study are likely to have different statuses in the upcoming assessments.

Some of the identified threatened species such as Asian Elephant, Fishing Cat and Otter might be of higher conservation importance since all these are flagship species that occupies the mosaic of freshwater and terrestrial habitats present in the landscape. They are also of high importance as keystone species in the ecosystem and species with high economic potential as attractions in ecotourism activities.

Among threatened terrestrial invertebrates reported, the Lemon Leg Tiger Spider is of high importance due to the illegal pet trade surrounding them. It is important to ensure their conservation and take necessary actions to prevent illegal collections and exploitation, especially if the areas are to be developed as an ecotourism zone.

Chapter 6 - Ethnobotanical Data

Ethnobotany means studying how people of a particular culture and region use native plant species for their daily needs. The utilization patterns of plant species vary among different regions and cultures mainly because of their own traditions and customs. Traditional knowledge is directly associated with ethnobotany and it has a long history. Mainly, ethnobotany applications are common in the sectors of traditional medicine, food and nutrition, traditional arts and crafts, domestic industries and rituals. The local customs, beliefs, and astronomy are linked with ethnobotany and it shows various diversification from region to region of a particular country. Meanwhile, some ethnobotany knowledge and practices are seen limited to individual groups or persons of a given community. Ethnobotany supports to better understanding of natural resources in sorrowing areas that can be used for human needs. This practice helps to improve the living conditions of the community with nature-based solutions.

Due to the present economic and social situation of the world, the ethnobotany and application of traditional knowledge are shown to have lesser attention. Usually, ethnobotany practices need some time, per-processing methods and fulfillment of some non-tangible requirements. Therefore, utilization of all ethnobotany practices is not completely easy and simple. Also, lack of knowledge holders on ethnobotany and gaps in the knowledge transfer process are common issues in this particular subject.

In the international arena, there is a trend to conserve and re-introduction of traditional knowledge including ethnobotany. The International Convention on Biological Diversity (CBD) plays a major role in this matter. In the local context, the National Policy and Strategy on Biodiversity-Related Traditional Knowledge of Sri Lanka provides provisions for this subject.

6.1 Study Area

The Thumbikulama Tank is a newly rehabilitated tank in the Palugaswewa Divisional Secretariat Division of the Anuradhapura district. As per the available information, the area is rich in ethnobotany values and previously the community of the area has been utilizing these resources for their anthropogenic requirements. After the tank Rehabilitation, the Healthy Landscapes Project (HLP) intends to carry out an ethnobotany survey in the area as a part of the proposed biodiversity survey.

6.2 Objectives of the ethnobotany Study

The objectives of the study were to;

1. Identify the ethnobotanical plant species.
2. List the plant species and to record their ethnobotanical usages.
3. Determine the ethnobotanical value for the study area.
4. Identify the traditional usage of plant species in the area.
5. Identify the future potential of ethnobotany in the area.

6.3 Results of ethnobotany study

From the field survey and discussions with knowledge holders, 120 ethnobotanical plant species were identified. According to the importance of ethnobotanical value, 80 plant species were selected for the review (Annex 7). The review was mainly focused to the following ethnobotanical values of those identified plant species;

1. Preparation of medicinal decoctions.
2. Preparation of fermentations or support for steam therapy.
3. Extracting medicinal oils.
4. Prepare medicinal drinks or Kola-Kanda.
5. Orthopedic treatments.
6. Eye treatments.
7. Skin treatments.
8. Neuro-system treatments.
9. Leafy vegetables.
10. Lesser-known fruits.
11. Occult practices.
12. Supplementary for food preparation.
13. Treating skin burnings.
14. Snake bite treatments.
15. Cultural practices.

According to the above importance, identified plant species were tabled and the Table 4 below shows the results.

Table 4: Number of plant species recorded under the 15 selected ethnobotanical values

No.	Ethnobotanical value	No. of Plant Species reported	Percentage from total reviewed plant species
1	Preparation of medicinal decoctions.	24	30%
2	Preparation of fermentations or support for steam therapy.	49	61%
3	Extracting medicinal oils.	18	22%
4	Prepare medicinal drinks or Kola-Kanda.	05	6%
5	Orthopedic treatments.	31	38%
6	Eye treatments.	07	8%
7	Skin treatments.	12	15%
8	Neuro-system treatments.	05	6%
9	Leafy vegetables.	15	18%
10	Lesser-known fruits.	09	11%
11	Occult practices.	05	6%
12	Supplementary for food preparation.	06	7%
13	Treating skin burnings.	06	7%
14	Snake bite treatments.	29	36%
15	Cultural practices.	05	6%

The highest number of plant species (49 plant species representing 61%) was recorded under the category of fermentations or support to steam therapy. The second highest number was recorded under the orthopedic treatments where 31 plant species indicated this importance accounting 38% of the total reviewed plant species.

It was reviewed that, 29 plant species had value on snake bite treatments with a percentage of 36%. Preparation of medicinal decoctions is one of the major parts of traditional medicine and under this survey, 24 plant species displayed this importance accounting 30% of the total reviewed plant species.

The plant species utilized to extract medicinal oils represented the next highest ethnobotanical value section (22%) including 18 plant species.

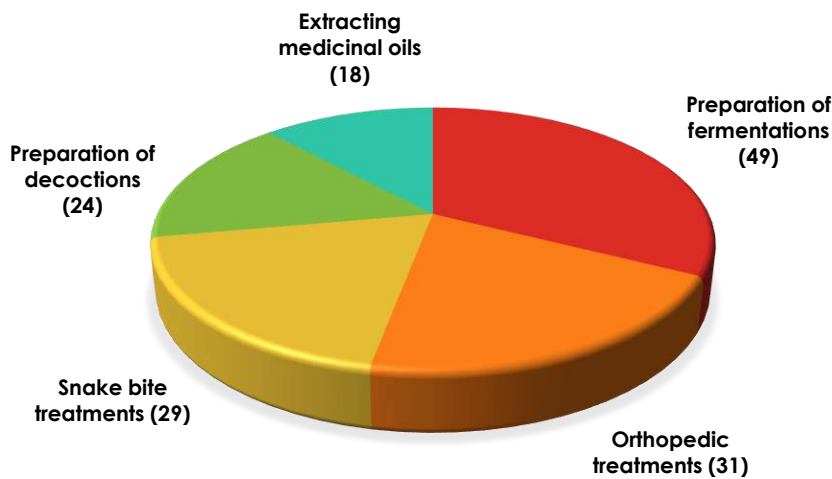


Figure 44:

Number of plant species discovered from the study area having major medicinal values.

The importance as leafy vegetables were recorded as the 6th highest ethnobotanical value of the study and 15 plant species showed this value with 18 percent of the total reviewed plant species. As per the plant species used for medical treatments, 12 plant species had medicinal value for skin treatments with 15% of total plant species. Lesser-known fruits included 09 species accounting 11% percentage of total studied species.

All other plant species indicated comparatively low applications but the importance is high.

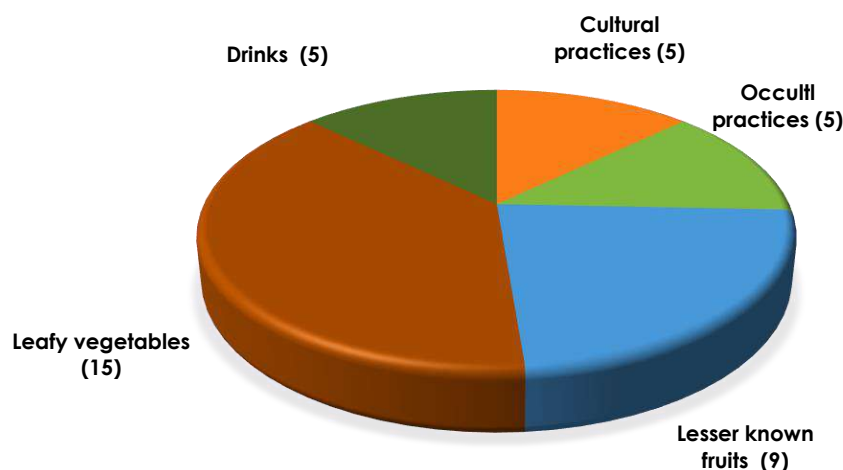


Figure 45:

Number of plant species used for common ethnobotany practices

Specially, for the preparation of medicinal oil, some plant species play a critical role. Under this survey and data review, 18 plant species were identified as important plants for medicinal oil preparation and most of these plants were used to prepare the special oil named “Kalukumara Thylaya”.

Occult practices are common rituals in rural village areas and lack of supporting ingredients is one of the limiting factors for these rituals. The study area provided habitats for a large number of medicinal plants and out of these plant species 05 species were important for the occult practices. In particular, Kesara babila (*Sida alnifoli*) is used to prepare the film (Anduna) for “Anjanam”. Also, the Goda Rathmal plant (*Ixora jucunda*) is used as a special firewood for many ritual practices.

Mora (*Dimocarpus longan*) and Koon (*Schleichera oleosa*) were the main tree types of lesser-known fruit species found in the survey. Mora is a sweet-taste fruit and the Koon fruit is a sweet and sour taste fruit. Therefore, earlier, Koon fruit has used to prepare a special type of chutney named “Koon Annuga”.

Chapter 7 - Conclusions and Recommendations.

7.1 Threats to flora and habitats.

Despite the importance of flora and habitats of the study area, numerous threats are risking their survival. Some of the significant threats are as follows.

Habitat Loss: The destruction and fragmentation of habitats due to activities like deforestation, expansion of settlements, and agriculture pose a significant threat to sensitive species. Loss of habitat directly affects plant survival and their ability to reproduce.

Invasive Species: Invasive species can compete or prey upon rare or sensitive species, leading to their decline or extinction. These non-native species often lack natural predators or have advantages over native species, causing imbalances in ecosystems. Much of the disturbed areas surrounding the tank is affected by IAS plants, mainly *Panicum maximum* and *Chromolena odorata*. This growth of IAS is severely affecting habitat regeneration and native biodiversity.



Figure 46: Invasive Alien Species- *Chromolena odorata* growing at the tank bund

Nature incompatible plantation forestry: Establishment of Teak, *Acacia auriculiformis* and *Eucalyptus* sp plantations is serving an inferior or damaging ecosystem services by way of accelerating soil erosion, reducing biodiversity, stressing animal life and suppressing forest regeneration. Exposed soil encountered in most plantation areas is risking soil erosion under heavy rain.



Figure 47:
Eucalyptus citriodora (Left),
Acacia auriculiformis (Middle) and
Tectona grandis growing at the site

Over exploitation: Unsustainable harvesting of sensitive species can push them towards further rarity. Demand for plant parts for medicinal use (e.g. *Salacia oblonga* - Himbutu) or timber harvesting (e.g. *Manilkara hexandra* -Palu) can deplete populations rapidly.

Soil erosion and sedimentation: Removal of vegetation cover, movement of heavy vehicles and civil constructions activities are accelerating soil erosion in certain locations, especially around the tank. Eroded soil often badly affect capacity of the tank through sedimentation. Removal of tank sediment is an expensive affair. Ecologically superior healthy water body of a tank is supporting numerous wetland species as well as many other nearby wildlife.



Figure 48:
 Soil erosion near the sluice gate of the tank

Climate Change: Rising temperatures, altered rainfall patterns, and other effects of climate change can disrupt ecosystems and negatively impact rare species and habitats. Plant species may struggle to adapt to new conditions or face increased vulnerability to diseases and predators.

7.1.1 Recommendations for sustaining flora and their habitats.

There remains an urgent need for the conservation and sustainable use of biological diversity associated with Thumbikulama Tank and the surrounding area influencing the tank. The threat to biodiversity stems mainly from habitat destruction, over-harvesting, IAS and the inappropriate introduction of forest plantations. As the secondary forest patches in the area play a major role in sustaining the endemic and threatened flora, urgent conservation measures are necessary for them to prevent ongoing anthropogenic disturbances. Such conservation measures should follow the given zoning map (Figure 33) that has mapped both the secondary forest patches and special hotspot areas (shown in red color) that showed forest-pockets having aggregated sensitive species. Tank renovation related soil disturbance activities has aggravated the soil erosion. Several interventions can be proposed for long term sustenance of the tank and its associated landscape.



Figure 49:

The catchment forest has scattered large trees

Planning is essential, and it should have a long term and integrated approach. Surrounding forests, which are catchment areas, have to be protected from degradation on the spot. Causative factors behind habitat destruction and over-harvesting have to be identified and through engagement of stakeholders. Analysis of cause and effect relations for identification of issues will be most useful.

This would show the problem area for integrated management approach. Securing of local political commitment as well as support of local governing agencies is an absolute prerequisite for appropriate integrated management of tank environment. Involvement of all stakeholders (surrounding village communities, CBOs and state officials) from the very beginning will ensure their support in managing tank associated environment. Such engagements can establish a common knowledge and information platform as a major management tool for participatory actions, and facilitate knowledge and awareness raising at all levels. Systematic participatory approaches create an enabling environment for the management of tank environment and achieve sustainable solutions.

Meanwhile, it is necessary to encourage irrigation management institutions (Department of Agrarian Development and Irrigation Department) to make arrangements for an integrated management of tank catchment referring to recently gazette environmental provisions of tank environment.

Awareness among the village community on the usefulness of complying with the various rules and regulations, acts, etc., which are meant for conserving, managing and developing the tank environment which providing them food and livelihood security, is very low. Information, education and capacity building should be a priority action area for improving the knowledge base at the grass-root level and also for taking burning issues to the governing agencies.

The most serious invasive plant affecting large areas is *Panicum maximum*. This plant has a good economic potential as an animal feed. In many countries *Panicum maximum* is used as a cattle feed and also prepared into feeds for chicken, goat or pigs. Initially, *Panicum* grass can be popularized as a cut-and-carry cattle feed and later can be used for making silage and hay which are useful for dry season feeds in this dry zone. Simply by chopping into 2cm-3cm using simple machinery, the palatability can be increased and support both cattle and goat farming. Since the country is undergoing serious issues with milk production, this plant can be a big part of finding a solution. Dry zone cattle farmers are often complaining about shortage of fodder in dry months. In addition, make periodic observations for presence of nuisance species such as *Lantana camara*, *Chromolena odorata* and *Xanthium indicum* or such weeds. Active removal of these should be prioritized.



Figure 50: Buffalos and cattle grazing in the study area

Improvement of vegetation cover in larger catchment area, including home gardens, is the best solution for controlling soil erosion and sedimentation. This can be in the form of improving the canopy density of home gardens, degraded forests and other poorly vegetated areas. Site-specific land restoration strategies have to be followed using sound science. Tank sedimentation is largely affecting water capacity and removal will be a costly affair in future.

Restoration of degraded areas is a prime need to improve the ecosystem services. Various types of ecosystems are important with regard to the role they play in sustaining economy and biodiversity.

Application of vegetative methods can be ideally used for restoring village tank environment, scrub lands, grasslands, secondary forests and riverine areas. Degraded lands, forest plantations and scrub lands need to be restored using ecological restoration approaches enhance native flora in catchments. Following positive characters are to be looked into in selecting native plants for catchment forest restoration;

1. Drought resistance and climatic fitness.
2. Source of feeding material to wildlife.
3. Attracts seed dispersal agents (birds and bats) bringing seeds from nearby natural areas.
4. Fixes Nitrogen and improves soil fertility.
5. Serves as a key stone species providing opportunities for many animal species to rest, breed, feed and hide.
6. Ability to survive under the prevailing situation based on performance in on-site trials or in natural regeneration.
7. Disease resistance.
8. Dense canopy in case of forest restoration.
9. Already thriving in nearby habitats.
10. Requires little maintenance
11. High level of natural regeneration.
12. Life span of over 20 years.
13. Resistance to strong, dry winds.
14. Fast rate of growth.
15. Value as non-timber products (medicinal, food, bee honey production etc.)

Following is a selection of suitable trees (indigenous) for the area for such restorations. However, local traditional knowledge can decide more tree species.

Bauhinia racemosa (Maila)
Pongamia pinnata (Karanda)
Ficus benghalensis (Mahanuga)
Limonia acidissima (Divul)
Syzygium cumini (Madan)
Trema orientale (Gedumba)
Mitragyna tubulosa (Helamba)
Pleiospermium alatum (Tumpath kurudu)
Pterospermum suberifolium (Welan)
Schleichera oleosa (Kon)
Ficus racemosa (Attikka)
Madhuca longifolis (Mee)

7.2 Conclusion and Recommendations for Fauna

This section highlights the threats observed during the study for fauna and their habitats along with recommendations for such threats.

7.2.1 Threats to fauna and their habitats.

The Human wildlife conflict, hunting, illegal and over exploitation of wildlife, presence of Invasive species, habitat destruction and degradation were identified as major threats for fauna and or their habitats.

7.2.1 Human Wildlife Conflict

Conflict between the elephant population and the local community is an ongoing issue in this region. Electric fencing in most areas control the elephant movements in to human inhabited and cultivated areas. Additional recommendations such as bio-fences using various plant species that elephants do not favor have been discussed.

During the present survey, signs of elephants were observed in all different habitat types surveyed. Local community also informed that the movement path of elephants often lies across the Teak plantation area located between the tank catchment area and the village.



Figure 51:

Elephant footprints near Thumbikulama Tank (Top), Damages to the Electric fence at a certain place by elephants (Middle), fallen Teak trees by elephants in the Teak cultivation (Bottom).



In any planned development work, care must be taken to maintain the regular movement path of elephants uninterrupted and manage habitat corridors to facilitate their movement across the landscape. Areas with economical interest can be fenced using electric or bio-fences to increase the protection of people and properties.

7.2.2 Hunting, illegal and over exploitation of wildlife

Informal interviews with the local community revealed that hunting activities are taking place in the landscape using local firearms while the extent of the issue is not clear at this stage. However, the field survey team noted a general lack of encounters with common wildlife during the survey period which raised the question whether hunting pressure might have had any impact on that.

If the area to be developed as an ecotourism area, measures must be taken to reduce the hunting pressure on wildlife as such hunting reduces the wildlife viewing opportunities and related economic benefits. It is also important to enhance a healthy population of wildlife in the landscape to maintain its ecological balance.

Overfishing or use of destructive fishing practices may also cause harmful effects on the population of local freshwater fish assemblage in the tank, water bodies and wetlands. Therefore, the fishing activities in the tank and any surrounding habitat have to be regulated to ensure no species are overfished and or threatened.



Figure 52:

Some fish samples caught by the fishers from Thumbikulama Tank



Figure 53:

Two juvenile Star Tortoise (*Geochelone elegans*) found from the site

It is also of importance to prevent illegal exploitation of wildlife in the area. If proposed ecotourism activities are focused on foreign tourists, illegal wildlife collections and trading would also be possible. Especially, with the presence of species having interest in pet trade for example, Tiger Spiders of genus *Poecilotheria* and Star tortoises, and other species used in the international illegal wildlife trade such as Pangolin, measures should be taken to prevent any illegal collection and smuggling of such species.

7.2.3 Invasive fauna species

The present study reported only two invasive fauna species. One of these is the Giant African Snail (*Lissachatina fulica*) which is a known agricultural pest often encountered in home gardens and agricultural fields. It was not encountered in forest habitats and wherever it was observed, it was not observed in large numbers.

The other invasive fauna species is the introduced food fish Tilapia (*Oreochromis* sp.) which can become invasive if released into natural freshwater bodies. They have been introduced to Thumbikulama Tank and are found in good numbers. Fishing operations are in place where Tilapia are fished regularly as an income generation activity. In natural waterways Tilapia may pose a serious threat to the local freshwater fish community by outcompeting them for resources (Goonatilake et al. 2020).



Figure 54:

Large Tilapia (*Oreochromis* sp.) caught from Thumbikulama Tank

7.2.4 Habitat destruction and degradation

Multiple observations of tree felling in the forest area was observed during the surveys. Though it is understandable that local community utilizing some amount of forest resources for their needs, care must be taken to prevent damage to the health of the ecosystem.



Figure 55:

Cut tree observed in the study area

Agricultural development in the proposed command area should be done with measures to conserve the standing forest patches within that land. These patches represent well established forests that has been inexistence for a reasonable period of time and provide habitat corridors and connectivity in the landscape.

7.2.2 Recommendations for fauna

Three decades ago, when Thumbikulama Tanka was functioning, villagers cultivated around 600 acres of paddy lands across eight villages from Thumbikulama Tank. However, the collapse of the bund led to the abandonment of these lands, allowing the forest to reclaim. Thus, the tank basing and some cultivated area became a thriving habitat for elephants, featuring a footpath and a forest cover. Recently, the Forest Department designated the region as Thumbikulama Forest Reserve, recognizing its significance.

The fauna of the study area includes 8.3% endemic species and 6.2% nationally threatened species. Notably, 23 threatened species, including 13 mammals, inhabit the area, providing habitats for vulnerable species like otters and Stripe-necked mongooses. Furthermore, this region served as a crucial habitat for elephants, and with the restoration of the bund, their migration is now confined to the forest reserve. Situated between Palugaswewa, Habarana, Digampathana, and Galkagawala, the tank area is frequented by herds of elephants. Since the tank's restoration, elephants have ceased entering nearby villages, finding abundant food and water around the tank.

Thumbikulama Tank, classified as an Olagam Wewa, is a sizable tank away from human habitats, primarily supplying water for agriculture. Being a top tank in the cascade system, its restoration significantly benefits other tanks and canals downstream. Given this, allocating lands for paddy cultivation in the vicinity is challenging. A proposed solution is to designate land areas near villages for cultivation, protected by elephant fences. Moreover, encouraging villagers to cultivate using Thumbikulama water can enhance climate change resilience by leveraging the sustainable water supply.

In Sri Lanka, farmers traditionally rely on past climate experiences to predict monsoonal weather, providing expectations for the upcoming cultivation season. These mature farmers should actively engage in the cultivation meeting process by sharing their experience of past seasonal weather events. Before the onset of the northeast monsoon, they organize an unofficial pre-cultivation meeting and discuss expectations about rainfall (Kekulandala, 2023). Therefore, in the Thumbikulama area, this network should be implemented within the farmers' organization, and this should be organized by the governance mechanism for Small Tank Cascade Systems (STCS), recognizing the role played by these key actors and incorporating their local knowledge into decision processes.

Though the Healthy Landscapes Project's primary goal is to enhance climate change resilience and adaptation, the dry zone cascade systems, interlinked tanks connected by canals, act as semi-natural rainwater management systems, conserving precious rainfall in the arid region. Furthermore, considering the rich biodiversity observed in the area, there is immense potential to transform it into a thriving ecotourism center. Local farmers, creating a symbiotic relationship between conservation efforts and community engagement, can strategically govern this endeavor.



Figure 56:

Birds in Thumbikulama Tank as important components for ecotourism





Figure 57: Some natural beauties around Thumbikulama tank for ecotourism attraction (II)

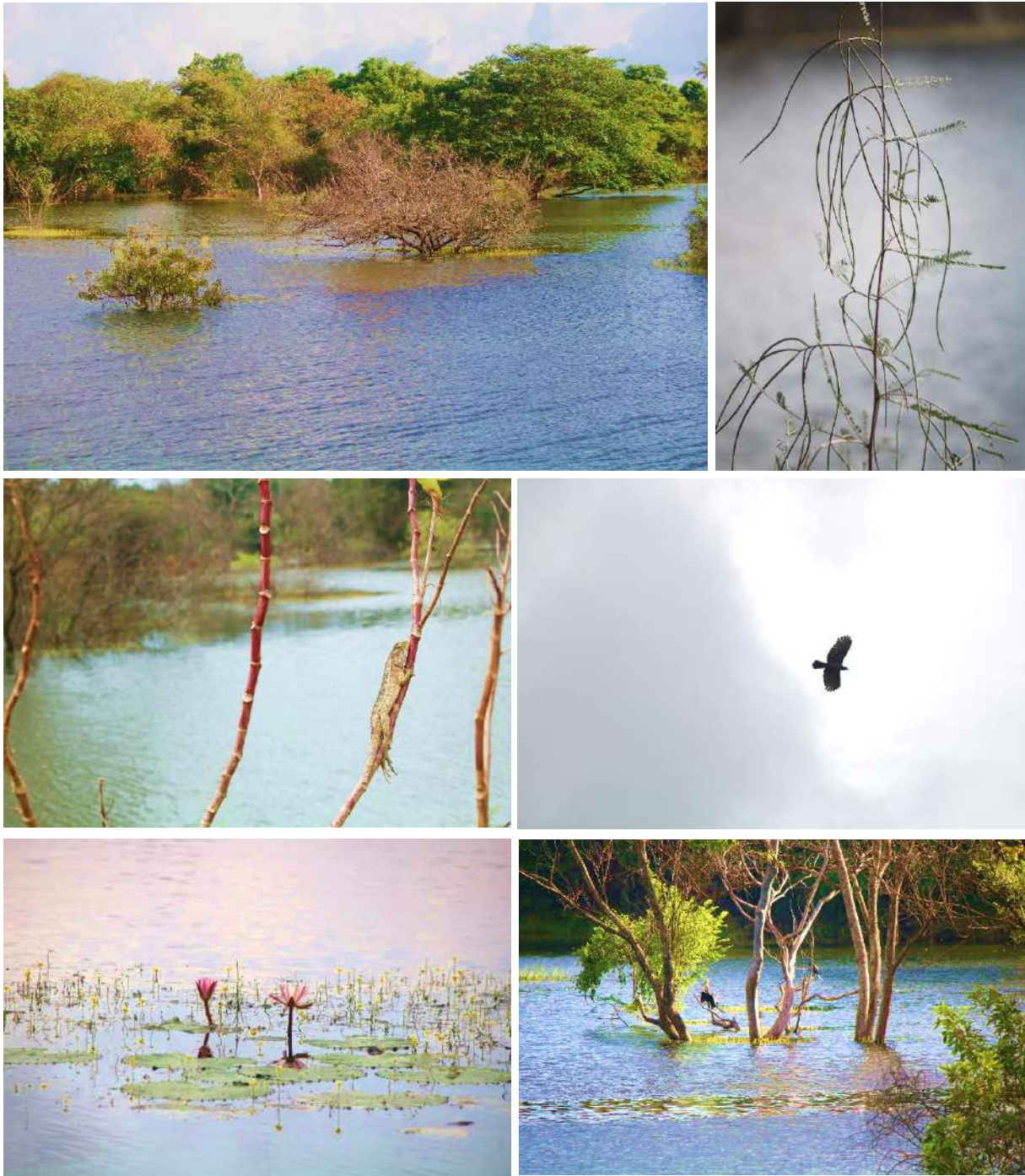


Figure 58: Some natural beauties around Thumbikulama Tank for ecotourism attraction (II)

By allowing farmers to take charge, the ecotourism center can become a platform to showcase and promote their locally-produced goods within the tank ecosystem, fostering sustainable practices. Additionally, this approach can provide economic opportunities for unemployed young individuals who can be employed as facilitators, contributing to both community development and conservation efforts.

In addition to promoting ecotourism, the Thumbikulama Tank can also serve as a focal point for fisheries activities. The recent discovery of the endemic fish- Red Fin Labeo (*Labeo lankae*) in some areas of Malwathu Oya presents a unique opportunity.



Figure 59:
Red Fin Labeo (*Labeo lankae*) -Endemic fish in Sri Lanka



Figure 60:
Display board at Thumbikulama Tank about introduction of *Labeo lankae* to the tank

By introducing this species into the Thumbikulama Tank as a restoration site, a deliberate effort has been made to enhance the local ecosystem (Figures 59 and 60).

To enhance the visitor experience and promote responsible tourism, we recommend the establishment of an observation center or watchtower at the tank's corner. This facility would serve as an educational hub, providing insights into the local ecosystem, biodiversity, and the cultural history of the area. By promoting sustainable tourism practices, such as minimal environmental impact and respect for local traditions, the observation center can contribute to the long-term conservation goals of the Thumbikulama Tank and its surrounding ecosystem.

It is important to note that the current biodiversity survey is the first one conducted in this area. This inaugural survey provides a baseline understanding of the diverse fauna present, setting the stage for future monitoring and conservation initiatives.

In addition to the region's diverse fauna, the presence of many endemic and medicinal plants underscores the ecological significance of the Thumbikulama Tank ecosystem. Recognizing the ethnobotanical value of these plants is crucial for conservation efforts. Therefore, efforts should be directed towards the preservation of these plant species and the documentation of their traditional uses. Understanding the cultural, ecological, and socio aspects of the cascade system specific to the Thumbikulama Tank ecosystem is essential. This knowledge will guide and inform further conservation practices, ensuring that interventions are culturally sensitive, ecologically sustainable, and socially inclusive. By integrating these aspects into conservation strategies, we can enhance the overall effectiveness of efforts to safeguard the unique biodiversity and cultural heritage of the Thumbikulama Tank ecosystem.

7.3 Conclusion and Recommendations for Ethnobotanical aspects

The rich levels of ethnobotanical species and presence of traditional practices create large potentials to incorporate the ethnobotany of the area with eco-tourism, sustainable use and livelihood development.

7.3.1 Potentials in Eco-tourism

Thumbikulama Tank is located in a tourist area and considerable number of local and foreign tourists visit this area annually. Tourism is one of the major income generation modes of this area and there is an emerging demand for the tourist cottage industry. As there is a growing trend on herbal products, healthy foods, organic foods, the ethnobotanical value of the area can be applied to the eco-tourism industry aiming new income for the local community.

7.3.2 Potentials in sustainable use practices.

Introducing activities to utilize traditional ethnobotanical values would support conservation and re-introduction of traditional knowledge. According to the characteristics of traditional knowledge, some ethnobotanical practices appeared to be limited to the Thumbikulama area. Re-introduction of traditional ethnobotanical uses would support conservation and sustainable of ethnobotanical species along with the use of traditional knowledge as stated on the International Convention on Biological Diversity (CBD) and Article 8 (J) of the CBD.

7.3.3 Potentials in livelihood development

Identified ethnobotanical practices have potentials to improve the livelihood of the community after proper market channel analysis. For example, preparation of traditional food and beverages, arts, crafts and medicinal products can be linked with income generation activities.

7.3.4 Conclusion and Recommendations

The ethnobotanical value of the Thumbikulama Tank area is very high having higher potential to use this resource for the sustainable development of the area and the country. Owing to the presence of valuable plant species, there is a significant traditional medicinal value in the area. Most of the bi-annual and annual medicinal plants (herbs) are located in tank bund area (Figure 61) and due to the maintenance practices of the tank bund, these species could possibly.



Figure 61: Some ethnobotanical species
(Top: *Ricinus communis*, Bottom:
Mussaenda frondosa)



Therefore, a detailed study on ethnobotany is very important for the site in order to formulate suitable actions to conserve the existing important plant species. There are very limited Persons who have traditional knowledge (knowledge holders) in the area and that is a main issue faced in identifying ethnobotanical ethnobotanical plant types.

The lack of knowledge transferring mechanism is also identified at the survey period and this could be critical for the sustainability of ethnobotanical practices. Therefore, immediate actions need to be implemented to record (printed and electronic) the existing traditional knowledge among the community people.

According to the ethnobotanical potential of the area, and the nature of the land use patterns, the study highlights the following recommendations;

1. To Produce of a pictorial guide on medicinal plants of Thumbikulama area including color photographs of the medicinal plant and their main morphological characters which can be used to identify the ethnobotanical species precisely.
2. Initiating of a traditional knowledge register related to the ethnobotanical practices of the area.
3. Introducing the ethnobotanical value of Thumbikulama Tank area to the local tourism industrialist as new eco-tourism avenues
4. Take action to translocate or propagate annual or bi-annual medicinal plant species in newly established medicinal gardens as ex-situ conservation strategies.
5. Verification of identified medicinal plant species with the technical support of the Department of Ayurveda and to introduce conservation and sustainable use practices for those species.
6. Facilitate to conduct “traditional food festival” to introduce the ethnobotanical value of the area for local and foreign tourists.
7. Facilitating research studies aiming ethnobotanical species, their uses and conservation strategies for those species in the area.
8. Launching programs to transfer the traditional knowledge and ethnobotanical practices to from the elders to the younger generation.

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Annex 1



Annex 1

list of plants encountered in Thumbikulama tank and its 1.6km surrounding area

SF: Secondary forests | PL: Forest plantations - Monoculture (Teak) | TS: Dry deciduous thorn scrublands | GR: Dry (Damana) grasslands | HG: Home gardens | TN: Tank | RF: Riverine evergreen forests | MR: Marshes

	Family (Old)	Family APG III	Species	Sinhala Names	RED LIST		Alien Invasive Plants (IAS)	SF	PL	TS	GR	HG	TN	RF	MR
					2020 Status	ENDEMIC									
1	Malvaceae	Malvaceae	<i>Abelmoschus esculentus</i>	Bandakka	NOT EVALUATED							x			
2	Malvaceae	Malvaceae	<i>Abutilon hirtum</i>		LC			x		x	x	x			
3	Malvaceae	Malvaceae	<i>Abutilon indicum</i>	Bethanoda	LC			x	x	x		x			
4	Malvaceae	Malvaceae	<i>Abutilon pannosum</i>		LC			x		x					
5	Fabaceae (Leguminosae) - Mimosaseae	Fabaceae	<i>Acacia auriculiformis</i>		NOT EVALUATED			x	x			x			
6	Euphorbiaceae	Euphorbiaceae	<i>Acalypha indica</i>	Kuppamenia	LC							x			
7	Amaranthaceae	Amaranthaceae	<i>Achyranthes aspera</i>	Karal haba, gas-karalheba	LC						x	x			
8	Rutaceae	Rutaceae	<i>Acronychia pedunculata</i>	Ankenda	LC			x	x						
9	Rutaceae	Rutaceae	<i>Aegle marmelos</i>	Beli	NOT EVALUATED							x			
10	Fabaceae (Leguminosae)	Fabaceae	<i>Aeschynomene indica</i>	Diya-siyambala	LC								x	x	x
11	Asteraceae (Compositae)	Asteraceae	<i>Ageratum conyzoides</i>	Hulan tala, hulantala	NOT EVALUATED		IAS	x	x	x	x	x		x	x
12	Meliaceae	Meliaceae	<i>Aglaia elaeagnoidea</i>		LC			x							
13	Apocynaceae	Apocynaceae	<i>Allamanda cathartica</i>	Wal-ruk-attana	NOT EVALUATED							x			

14	Amaranthaceae	Amaranthaceae	<i>Allmania nodiflora</i>	Kumatiya, wenni wella	LC								x				
15	Sapindaceae	Sapindaceae	<i>Allophylus cobbe</i>	Bu-kobbe	LC			x	x	x						x	
16	Poaceae (Gramineae)	Poaceae	<i>Alloteropsis cimicina</i>	Bundeni-tana	LC			x				x				x	x
17	Aloaceae (Early under Liliaceae)	Xanthorrhoeaceae	<i>Aloe vera</i>	Komarica	NOT EVALUATED								x				
18	Lauraceae	Lauraceae	<i>Alseodaphne semecarpifolia</i>	Wewarana	VU			x	x								
19	Apocynaceae	Apocynaceae	<i>Alstonia scholaris</i>	Ruk-attana, eth-mada	LC			x	x								
20	Amaranthaceae	Amaranthaceae	<i>Alternanthera sessilis</i>	Mukunuwenna	LC							x	x	x			x
21	Fabaceae (Leguminosae)	Fabaceae	<i>Alysicarpus vaginalis</i>	Aswenna, Ratu aswenna	LC			x	x	x		x	x				
22	Amaranthaceae	Amaranthaceae	<i>Amaranthus spinosus</i>	Katu kera, katu thampala	LC								x				
23	Amaranthaceae	Amaranthaceae	<i>Amaranthus viridis</i>	Kura thampala, sulukura	LC								x				
24	Lythraceae	Lythraceae	<i>Ammannia baccifera</i>		LC										x		x
25	Anacardiaceae	Anacardiaceae	<i>Anacardium occidentale</i>	Kaju	NOT EVALUATED								x				
26	Annonaceae	Annonaceae	<i>Annona muricata</i>	Katu anoda, rata atta	NOT EVALUATED								x				
27	Annonaceae	Annonaceae	<i>Annona reticulata</i>	Anoda, weli atha,	NOT EVALUATED								x				
28	Araceae	Araceae	<i>Anthurium andraeanum</i>	Anthurium	NOT EVALUATED								x				
29	Poaceae (Gramineae)	Poaceae	<i>Apocopis mangalorensis</i>		LC							x	x				
30	Fabaceae (Leguminosae)	Fabaceae	<i>Arachis hypogaea</i>	Rata-kaju, ratakaju	NOT EVALUATED								x				
31	Arecaceae (Palmae)	Arecaceae	<i>Areca catechu</i>	Puwak	NOT EVALUATED								x				
32	Convolvulaceae	Convolvulaceae	<i>Argyrea osyrensis</i>	Dumbada	LC			x	x								
33	Convolvulaceae	Convolvulaceae	<i>Argyrea populifolia</i>	Girithilla	LC			x	x	x			x			x	
34	Poaceae (Gramineae)	Poaceae	<i>Aristida setacea</i>	Et-tuttiri	LC			x	x	x		x	x				

57	Poaceae (Gramineae)	Poaceae	<i>Brachiaria reptans</i>		LC			x	x	x	x				x	x
58	Euphorbiaceae	Phyllanthaceae	<i>Breynia vitis-idaea</i>	Gas-kayila	LC			x	x	x						
59	Euphorbiaceae - Phyllanthaceae	Phyllanthaceae	<i>Bridelia retusa</i>	Keta-kela	LC			x	x							
60	Cyperaceae	Cyperaceae	<i>Bulbostylis barbata</i>	Uru hiri	LC						x					
61	Fabaceae (Leguminosae)	Fabaceae	<i>Cajanus rugosus</i>	Wal-kollu	LC							x				
62	Asclepiadaceae	Apocynaceae	<i>Calotropis gigantea</i>	Wara	LC							x				
63	Capparaceae (Capparidaceae)	Capparaceae	<i>Capparis zeylanica</i>	Sudu-wellangiriya, wellangiriya	LC			x		x						
64	Solanaceae	Solanaceae	<i>Capsicum annum</i>	Miris	NOT EVALUATED								x			
65	Solanaceae	Solanaceae	<i>Capsicum frutescens</i>	Kochchi, nay-miris	NOT EVALUATED								x			
66	Sapindaceae	Sapindaceae	<i>Cardiospermum halicacabum</i>	Penela-wel, wel penela	LC			x		x		x				
67	Caricaceae	Caricaceae	<i>Carica papaya</i>	Gas-labu, papol	NOT EVALUATED								x			
68	Apocynaceae	Apocynaceae	<i>Carissa spinarum</i>	Heen-karamba, karamba	LC			x	x	x						
69	Fabaceae (Leguminosae) - Caesalpiniaceae	Fabaceae	<i>Cassia fistula</i>	Ehela	NOT EVALUATED			x	x							
70	Fabaceae (Leguminosae) - Caesalpiniaceae	Fabaceae	<i>Cassia roxburghii</i>	Ratu-wa	LC			x	x	x						
71	Rubiaceae	Rubiaceae	<i>Catunaregam spinosa</i>	Kukuruman, kukurummuwan	LC			x		x						
72	Amaranthaceae	Amaranthaceae	<i>Celosia argentea</i>	Kiri henda	LC						x	x				
73	Apiaceae (Umbelliferae)	Apiaceae	<i>Centella asiatica</i>	Gotukola, hin-gotukola	LC						x	x			x	x
74	Fabaceae (Leguminosae) - Caesalpiniaceae	Fabaceae	<i>Chamaecrista kleinii</i>	Bin-siyambala	LC							x			x	x
75	Oleaceae	Oleaceae	<i>Chionanthus zeylanicus</i>	Geratiya	LC			x								
76	Poaceae (Gramineae)	Poaceae	<i>Chloris barbata</i>	Mayuru-tana	NOT EVALUATED				x	x	x					

77	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	VU			x										
78	Asteraceae (Compositae)	Asteraceae	<i>Chromolaena odorata</i>	Podi singno maran, lakkannattan	NOT EVALUATED	IAS		x	x	x	x	x					x	
79	Meliaceae	Meliaceae	<i>Chukrasia tabularis</i>	Hulanhik, hiri-kita	NT			x	x			x	x					
80	Lauraceae	Lauraceae	<i>Cinnamomum cassia</i>	Dawul-kurundu	LC			x	x								x	
81	Poaceae (Gramineae)	Poaceae	<i>Cirtococcum trigonum</i>		NOT EVALUATED			x	x	x			x				x	
82	Menispermaceae	Menispermaceae	<i>Cissampelos pareira</i>	Diya mitta	LC			x	x	x			x					
83	Vitaceae	Vitaceae	<i>Cissus latifolia</i>	Wal diya labu / heen thuvalla	LC			x									x	
84	Rutaceae	Rutaceae	<i>Citrus aurantifolia</i>	Dehi	NOT EVALUATED												x	
85	Rutaceae	Rutaceae	<i>Citrus aurantium</i>	Ambul-dodan	NOT EVALUATED												x	
86	Rutaceae	Rutaceae	<i>Clausena indica</i>	Migon-karapincha	LC			x										
87	Capparaceae (Capparidaceae)	Cleomaceae	<i>Cleome gynandra</i>	Wela	LC			x			x			x				
88	Capparaceae (Capparidaceae)	Cleomaceae	<i>Cleome monophylla</i>		LC			x	x								x	
89	Fabaceae (Leguminosae)	Fabaceae	<i>Clitoria ternatea</i>	Katarodu, nil-katarolu	LC			x	x					x				
90	Cucurbitaceae	Cucurbitaceae	<i>Coccinia grandis</i>	Kowakka	LC												x	
91	Arecaceae (Palmae)	Arecaceae	<i>Cocos nucifera</i>	Pol	NOT EVALUATED												x	
92	Euphorbiaceae	Euphorbiaceae	<i>Codiaeum variegatum</i>		NOT EVALUATED												x	
93	Araceae	Araceae	<i>Colocasia esculenta</i>	Gahala	LC												x	
94	Combretaceae	Combretaceae	<i>Combretum albidum / ovalifolium ?</i>	Kaduru-ketiya wel	NT			x										
95	Commelinaceae	Commelinaceae	<i>Commelina benghalensis</i>	Diya-meneriya	LC				x	x		x	x				x	x
96	Commelinaceae	Commelinaceae	<i>Commelina diffusa</i>	Gira-pala, tanapala	LC			x	x			x					x	x
97	Commelinaceae	Commelinaceae	<i>Commelina kurzii</i>		LC							x	x				x	x

121	Cyperaceae	Cyperaceae	<i>Cyperus rotundus</i>	Kaladuru	LC					x	x	x				x		
122	Poaceae (Gramineae)	Poaceae	<i>Dactyloctenium aegyptium</i>	Putu-tana	LC				x	x	x	x						
123	Fabaceae (Leguminosae)	Fabaceae	<i>Dalbergia pseudo-sissoo</i>	Bambara-wel	LC			x	x									
124	Fabaceae (Leguminosae)	Fabaceae	<i>Derris parviflora</i>	Kala-wel, sudu-kala-wel	LC	ENDEMIC		x	x	x						x		
125	Fabaceae (Leguminosae)	Fabaceae	<i>Desmodium pryonii</i>		LC			x	x									
126	Fabaceae (Leguminosae)	Fabaceae	<i>Desmodium triflorum</i>	Heen-undupiyaliya	LC			x		x	x	x				x		
127	Poaceae (Gramineae)	Poaceae	<i>Dichaetaria wightii</i>		VU			x										
128	Poaceae (Gramineae)	Poaceae	<i>Digitaria ciliaris</i>	Guru-tana	LC			x				x				x		
129	Poaceae (Gramineae)	Poaceae	<i>Digitaria longiflora</i>		LC			x	x	x	x	x				x		
130	Sapindaceae	Sapindaceae	<i>Dimocarpus longan</i>	Mora, rasa-mora, peni mora	LC			x										
131	Euphorbiaceae	Euphorbiaceae	<i>Dimorphocalyx glabellus</i>	Weliwenna, ten-kuttiya	LC			x	x	x								
132	Dioscoreaceae	Dioscoreaceae	<i>Dioscorea pentaphylla</i>	Katu-ala, katuwala-ala	LC			x		x								
133	Dioscoreaceae	Dioscoreaceae	<i>Dioscorea spicata</i>	Gonala	VU			x	x									
134	Ebenaceae	Ebenaceae	<i>Diospyros malabarica</i>	Thimbiri	LC			x								x		
135	Ebenaceae	Ebenaceae	<i>Diospyros ovalifolia</i>	Habara, kunumella	LC			x		x								
136	Rubiaceae	Rubiaceae	<i>Discospermum sphaerocarpum</i>		LC			x		x								
137	Asclepiadaceae	Apocynaceae	<i>Dregea volubilis</i>	Anguna	LC					x						x		
138	Euphorbiaceae - Putranjivaceae	Putranjivaceae	<i>Drypetes gardneri</i>	Gal-wira, eta-wira, yakilda	NT			x										
139	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepriaria</i>	Weera	LC			x										
140	Verbenaceae	Verbanaceae	<i>Duranta repens</i>			NOT EVALUATED										x		
141	Poaceae (Gramineae)	Poaceae	<i>Echinochloa crusgalli</i>	Maratu, wel-marukk, bajiri	LC											x	x	x
142	Boraginaceae	Boraginaceae	<i>Ehretia microphylla</i>	Hin-thambala	LC			x		x								

143	Poaceae (Gramineae)	Poaceae	<i>Eleusine indica</i>	Belathana	LC						x	x			
144	Myrsinaceae	Primulaceae	<i>Embelia tsjeriam-cottam</i>		NT			x							
145	Asteraceae (Compositae)	Asteraceae	<i>Emilia sonchifolia</i>	Kadupahara	LC						x	x			
146	Poaceae (Gramineae)	Poaceae	<i>Eragrostis atrovirens</i>		LC						x				
147	Poaceae (Gramineae)	Poaceae	<i>Eragrostis ciliaris</i>		LC				x	x	x				
148	Poaceae (Gramineae)	Poaceae	<i>Eragrostis japonica</i>		LC			x		x	x	x			
149	Poaceae (Gramineae)	Poaceae	<i>Eragrostis uniolooides</i>		LC							x		x	
150	Eriocaulaceae	Eriocaulaceae	<i>Eriocaulon quinquangulare</i>	Heen kokmota	LC								x	x	x
151	Myrtaceae	Myrtaceae	<i>Eucalyptus citriodora</i>	Karupantine	NOT EVALUATED			x		x					
152	Myrtaceae	Myrtaceae	<i>Eugenia bracteata</i>	Tembiliya	NOT EVALUATED			x							
153	Euphorbiaceae	Euphorbiaceae	<i>Euphorbia hirta</i>	Bu dada kiriya	LC				x	x	x	x			
154	Connvolvulaceae	Connvolvulaceae	<i>Evolvulus alsinoides</i>	Visnu-kranthi, nil vishnukranthi	LC				x	x	x	x			
155	Moraceae	Moraceae	<i>Ficus amplissima</i>	Ela-nuga	LC			x							
156	Moraceae	Moraceae	<i>Ficus benghalensis</i>	Maha-nuga	LC			x							
157	Moraceae	Moraceae	<i>Ficus hispida</i>	Kota-dimbula, kota-simbula	LC			x	x	x		x			
158	Moraceae	Moraceae	<i>Ficus racemosa</i>	Attikka	LC								x		
159	Moraceae	Moraceae	<i>Ficus religiosa</i>	Bo	NOT EVALUATED			x							
160	Cyperaceae	Cyperaceae	<i>Fimbristylis cinnamometorum</i>		LC						x		x	x	x
161	Cyperaceae	Cyperaceae	<i>Fimbristylis cymosa</i>		LC									x	x
162	Cyperaceae	Cyperaceae	<i>Fimbristylis dichotoma</i>		LC									x	x
163	Cyperaceae	Cyperaceae	<i>Fimbristylis miliacea</i>	Mudu-hal-pan	LC								x	x	x
164	Flacourtiaceae	Salicaceae	<i>Flacourtia indica</i>	Katukutundu, uguressa	LC			x							
165	Euphorbiaceae - Phyllanthaceae	Phyllanthaceae	<i>Flueggea leucopyrus</i>	Heen katu pila	LC			x	x	x	x				
166	Cyperaceae	Cyperaceae	<i>Fuirena capitata</i>		LC						x		x	x	x

167	Clusiaceae (Guttiferae)	Clusiaceae	<i>Garcinia spicata</i>	Gokatu	NT			x								
168	Molluginaceae (Early under Aizoaceae)	Molluginaceae	<i>Glinus oppositifolius</i>	Heen-ala	LC					x	x					
169	Fabaceae (Leguminosae)	Fabaceae	<i>Gliricidia sepium</i>	Wetahira	NOT EVALUATED				x				x			
170	Rutaceae	Rutaceae	<i>Glycosmis mauritiana</i>	Dodampana	LC			x							x	
171	Rutaceae	Rutaceae	<i>Glycosmis pentaphylla</i>	Dodan-pana	LC			x								
172	Verbenaceae	Lamiaceae	<i>Gmelina arborea</i>	At-demata	NT			x								
173	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya, damunu	LC			x	x	x	x					
174	Tiliaceae	Malvaceae	<i>Grewia orientalis</i>	Wel-keliya, wel-mediya	LC			x	x	x	x				x	
175	Celastraceae	Celastraceae	<i>Gymnosporia emarginata</i>	Katu pila	LC			x		x						
176	Rubiaceae	Rubiaceae	<i>Haldina cordifolia</i>	Kolon	LC			x					x			
177	Periplocaceae (early under Asclepiadaceae)	Apocynaceae	<i>Hemidesmus indicus</i>	Heen-iramusu, iramusu	LC			x	x	x	x	x				
178	Malvaceae	Malvaceae	<i>Hibiscus micranthus</i>	Bebila, siriwedi babila	LC			x		x						
179	Malvaceae	Malvaceae	<i>Hibiscus rosa-sinensis</i>	Sapaththu-mal, wada	NOT EVALUATED								x			
180	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda-Kirilla, Dada Kirala, Goda Kirala	NT			x	x			x	x			
181	Linaceae	Linaceae	<i>Hugonia mystax</i>	Bu-Getiya, Maha-Getiya, Gini-ketiya-wel, Watti Weti	LC						x					
182	Violaceae	Violaceae	<i>Hybanthus enneaspermus</i>	Maha yotu wenna, maha yotuwenna	LC			x								
183	Flacourtiaceae	Achariaceae	<i>Hydnocarpus venenata</i>	Makulu, makula, makulla	LC	ENDEMIC		x								x
184	Lamiaceae (Labiatae)	Lamiaceae	<i>Hyptis capitata</i>		NOT EVALUATED				x	x	x	x				
185	Lamiaceae (Labiatae)	Lamiaceae	<i>Hyptis suaveolens</i>	Ali thala	NOT EVALUATED							x	x			

186	Apocynaceae	Apocynaceae	<i>Ichnocarpus frutescens</i>	Kiri-wel	LC			x	x	x						
187	Fabaceae (Leguminosae)	Fabaceae	<i>Indigofera hirsuta</i>	Averiya / bu averi	LC					x	x	x				
188	Fabaceae (Leguminosae)	Fabaceae	<i>Indigofera tinctoria</i>	Nil-awariya	LC					x	x	x				
189	Convolvulaceae	Convolvulaceae	<i>Ipomoea obscura</i>	Maha madhu / tel kola	LC			x		x		x				
190	Poaceae (Gramineae)	Poaceae	<i>Isachne globosa</i>	Bata-della	LC			x								x
191	Poaceae (Gramineae)	Poaceae	<i>Isachne kunthiana</i>		LC							x	x			x
192	Poaceae (Gramineae)	Poaceae	<i>Ischaemum barbatum</i>		LC							x	x		x	x
193	Poaceae (Gramineae)	Poaceae	<i>Ischaemum ciliare</i>	Rat-tana	LC				x				x			x
194	Poaceae (Gramineae)	Poaceae	<i>Ischaemum rugosum</i>	Kudu-kedu	LC					x						
195	Rubiaceae	Rubiaceae	<i>Ixora pavetta</i>	Maha-rathambala	LC			x	x			x				
196	Oleaceae	Oleaceae	<i>Jasminum angustifolium</i>	Wal pichcha/ wekonda	LC			x	x	x						
197	Verbenaceae	Verbenaceae	<i>Lantana camera</i>	Ganda-pana	NOT EVALUATED	IAS		x	x	x			x			
198	Sapindaceae	Sapindaceae	<i>Lepisanthes tetraphylla</i>	Dambu	LC			x								
199	Fabaceae (Leguminosae) - Mimosaseae	Fabaceae	<i>Leucaena leucocephala</i>	Ipil-ipil	NOT EVALUATED			x	x				x			
200	Lamiaceae (Labiatae)	Lamiaceae	<i>Leucas biflora</i>	Geta-thumbu	LC								x			
201	Lamiaceae (Labiatae)	Lamiaceae	<i>Leucas zeylanica</i>	Geta-thumbu	LC				x	x	x				x	x
202	Rutaceae	Rutaceae	<i>Limonia acidissima</i>	Divul	LC								x			
203	Scrophulariaceae	Linderniaceae	<i>Lindernia antipoda</i>	Wila, kanakokwila	LC											x
204	Lauraceae	Lauraceae	<i>Litsea glutinosa</i>	Bombi, bomi	LC			x	x							
205	Onagraceae	Onagraceae	<i>Ludwigia adscendens</i>	Beru-diyaniilla	LC									x	x	x
206	Onagraceae	Onagraceae	<i>Ludwigia hyssopifolia</i>		LC											x
207	Fabaceae (Leguminosae)	Fabaceae	<i>Macroptilium lathyroides</i>		NOT EVALUATED					x						

272	Hippocrateaceae (Early under Celastraceae)	Celastraceae	<i>Salacia oblonga</i>	Himbutu, gal himbutu	EN			x	x	x							
273	Sapindaceae	Sapindaceae	<i>Sapindus emarginatus</i>	Penela, kaha penela	LC			x									
274	Euphorbiaceae - Phyllanthaceae	Phyllanthaceae	<i>Sauropus rigidus</i>	Ginihiriya	NT	ENDEMIC		x									
275	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Kon	LC			x					x				
276	Cyperaceae	Cyperaceae	<i>Scleria lithosperma</i>		LC			x	x								
277	Scrophulariaceae	Plantaginaceae	<i>Scoparia dulcis</i>	Wal koththamalli	NOT EVALUATED			x		x	x	x					
278	Loranthaceae	Loranthaceae	<i>Scurrula parasitica</i>		LC			x	x								
279	Rhamnaceae	Rhamnaceae	<i>Scutia myrtina</i>	Bath gedi, kattamberiya	LC			x		x							
280	Euphorbiaceae	Euphorbiaceae	<i>Sebastiania chamaelea</i>	Rat-pitawakka	LC								x				
281	Fabaceae (Leguminosae) - Caesalpiaceae	Fabaceae	<i>Senna tora</i>	Peti-tora	LC							x	x			x	
282	Fabaceae (Leguminosae)	Fabaceae	<i>Sesbania grandiflora</i>	Katuru-murunga	NOT EVALUATED								x				
283	Malvaceae	Malvaceae	<i>Sida acuta</i>	Gas-bevila, gas bebila	LC			x	x			x	x				
284	Malvaceae	Malvaceae	<i>Sida cordata</i>	Bevila, wel bebila	LC			x	x	x		x	x				
285	Malvaceae	Malvaceae	<i>Sida cordifolia</i>	Hin-anoda, wal- bavila	LC			x									
286	Malvaceae	Malvaceae	<i>Sida rhombifolia</i>	Kotican-bevila	LC							x					
287	Solanaceae	Solanaceae	<i>Solanum macrocarpon</i>	Wam-batu	NOT EVALUATED									x			
288	Solanaceae	Solanaceae	<i>Solanum melongena</i>	Ela-batu	NOT EVALUATED									x			
289	Solanaceae	Solanaceae	<i>Solanum violaceum</i>	Tibbotu, fitta batu	LC									x			
290	Rubiaceae	Rubiaceae	<i>Spermacoce articularis</i>		LC						x	x	x				x
291	Rubiaceae	Rubiaceae	<i>Spermacoce hispida</i>	Hin-geta-kola	LC			x		x	x	x					
292	Anacardiaceae	Anacardiaceae	<i>Spondias dulcis</i>	Amberella	NOT EVALUATED									x			



Annex 2



Annex 2: Some endemic flora species represented in study sites.



Vernonia zeylanica (Pupula)



Sauropus rigidus (Ginihiriya)



Hydnocarpus venenata (Makulu)



Derris parviflora (Kala-wel)



Rhinacanthus polonnaruwensis (Heen anitta)

Annex 3

Annex 3: Some threatened flora encountered in the study area.



Salacia oblonga (Himbutu)



Chloroxylon swietenia (Burutha)



Naringi crenulata (Wal-beli)



Dioscorea spicata (Gonala)



Dichaetaria wightii

Annex 4

Annex 4

List of fauna encountered in Thumbikulama tank and it`s 1.6 km surrounding study area

Dragonflies					
	Family	Species	English Name	Distribution Status	Conservation Status
1	Chlorocyphidae	<i>Libellago adami</i> Fraser, 1939	Adam's Gem	Endemic	LC
2	Coenagrionidae	<i>Agriocnemis pygmaea</i> (Rambur, 1842)	Wandering Wisp	Native	LC
3	Coenagrionidae	<i>Ischnura senegalensis</i> (Rambur, 1842)	Common Bluetail	Native	LC
4	Coenagrionidae	<i>Ceriagrion coromandelianum</i> (Fabricius, 1798)	Yellow Waxtail	Native	LC
5	Coenagrionidae	<i>Pseudagrion microcephalum</i> (Rambur, 1842)	Blue Sprite	Native	LC
6	Coenagrionidae	<i>Pseudagrion rubricepsceylonicum</i> Kirby, 1891	Orange-faced Sprite	Native	LC
7	Platycnemididae	<i>Copera marginipes</i> (Rambur, 1842)	Yellow Featherleg	Native	LC
8	Platycnemididae	<i>Prodasineura sita</i> (Kirby, 1893)	Stripe-headed Threadtail	Endemic	LC
9	Gomphidae	<i>Ictinogomphus rapax</i> (Rambur, 1842)	Rapacious Flangetail	Native	LC
10	Aeshnidae	<i>Anax indicus</i> Lieftinck, 1942	Elephant Emperor	Native	LC
11	Macromiidae	<i>Epophthalmia vittata cyanocephala</i> Hagen, 1867	Blue-eyed Pondcruiser	Native	NT
12	Libellulidae	<i>Brachydiplax sobrina</i> (Rambur, 1842)	Sombre Lieutenant	Native	LC
13	Libellulidae	<i>Lathrecista asiatica asiatica</i> (Fabricius, 1798)	Pruinosed Bloodtail	Native	NT
14	Libellulidae	<i>Orthetrum sabina</i> (Drury, 1770)	Green Skimmer	Native	LC
15	Libellulidae	<i>Potamarcha congener</i> (Rambur, 1842)	Blue Pursuer	Native	LC
16	Libellulidae	<i>Acisoma panorpoides</i> Rambur, 1842	Asian Pintail	Native	LC
17	Libellulidae	<i>Brachythemis contaminata</i> (Fabricius, 1793)	Asian Groundling	Native	LC
18	Libellulidae	<i>Crocothemis servilia servilia</i> (Drury, 1770)	Oriental Scarlet	Native	LC
19	Libellulidae	<i>Diplacodes trivialis</i> (Rambur, 1842)	Blue Percher	Native	LC
20	Libellulidae	<i>Neurothemis tullia tullia</i> (Drury, 1773)	Pied Parasol	Native	LC
21	Libellulidae	<i>Trithemis aurora</i> (Burmeister, 1839)	Crimson Dropwing	Native	LC
22	Libellulidae	<i>Trithemis festiva</i> (Rambur, 1842)	Indigo Dropwing	Native	VU

23	Libellulidae	<i>Trithemis pallidinervis</i> (Kirby, 1889)	Dancing Dropwing	Native	NT
24	Libellulidae	<i>Rhyothemis variegata variegata</i> (Linnaeus, 1763)	Variegated Flutterer	Native	LC
25	Libellulidae	<i>Pantala flavescens</i> (Fabricius, 1798)	Wandering Glider	Native	LC
26	Libellulidae	<i>Tramea basilaris burmeisteri</i> Kirby, 1899	Burmeister's Glider	Native	VU
27	Libellulidae	<i>Tramea limbata</i> (Desjardins, 1832)	Sociable Glider	Native	LC
28	Libellulidae	<i>Tholymis tillarga</i> (Fabricius, 1798)	Foggy-winged Twister	Native	LC
29	Libellulidae	<i>Urothemis signata</i> (Rambur, 1842)	Scarlet Basker	Native	LC

Butterflies

	Family	Species	English Name	Distribution Status	Conservation Status
1	Papilionidae	<i>Pachliopta hector</i> (Linnaeus, 1758)	Crimson Rose	Native	LC
2	Papilionidae	<i>Pachliopta aristolochiae</i> (Fabricius, 1775)	Common Rose	Native	LC
3	Papilionidae	<i>Papilio crino</i> Fabricius, 1793	Banded Peacock	Native	VU
4	Papilionidae	<i>Papilio demoleus</i> Linnaeus, 1758	Lime Butterfly	Native	LC
5	Papilionidae	<i>Papilio polytes</i> Linnaeus, 1758	Common Mormon	Native	LC
6	Papilionidae	<i>Papilio polymnestor</i> Cramer, [1775]	Blue Mormon	Native	LC
7	Papilionidae	<i>Graphium agamemnon</i> (Linnaeus, 1758)	Tailed Jay	Native	LC
8	Pieridae	<i>Leptosia nina</i> Fabricius, 1793	Psyche	Native	LC
9	Pieridae	<i>Delias eucharis</i> Drury, 1773	Jezebel	Native	LC
10	Pieridae	<i>Belenois aurota</i> (Fabricius, 1793)	Pioneer	Native	LC
11	Pieridae	<i>Cepora nerissa</i> (Fabricius, 1775)	Common Gull	Native	LC
12	Pieridae	<i>Appias galene</i> (C. & R. Felder, 1865)	Sri Lankan Lesser Albatross	Endemic	LC
13	Pieridae	<i>Pareronia ceylanica</i> C. & R. Felder, 1865	Dark Wanderer	Native	LC
14	Pieridae	<i>Catopsilia pyranthe</i> (Linnaeus, 1758)	Mottled Emigrant	Native	LC
15	Pieridae	<i>Catopsilia pomona</i> (Fabricius, 1775)	Lemon Emigrant	Native	LC

16	Pieridae	<i>Eurema hecabe</i> (Linnaeus, 1758)	Common Grass Yellow	Native	LC
17	Pieridae	<i>Eurema blanda</i> (Boisduval, 1836)	Three-Spot Grass Yellow	Native	LC
18	Nymphalidae	<i>Parantica aglea</i> (Stoll, 1782)	Glassy Tiger	Native	LC
19	Nymphalidae	<i>Danaus chrysippus</i> (Linnaeus, 1758)	Plain Tiger	Native	LC
20	Nymphalidae	<i>Danaus genutia</i> (Cramer, [1779])	Common Tiger	Native	LC
21	Nymphalidae	<i>Euploea core</i> (Cramer, 1780)	Common Crow	Native	LC
22	Nymphalidae	<i>Euploea sylvester</i> (Fabricius, 1793)	Double Branded Crow	Native	NT
23	Nymphalidae	<i>Ariadne ariadne</i> (Linnaeus, 1763)	Angled Castor	Native	LC
24	Nymphalidae	<i>Cirrochroa thais</i> (Fabricius, 1787)	Tamil Yeoman	Native	LC
25	Nymphalidae	<i>Acraea terpsicore</i> (Linnaeus, 1758)	Tawny Coster	Native	LC
26	Nymphalidae	<i>Junonia lemonias</i> (Linnaeus, 1758)	Lemon Pansy	Native	LC
27	Nymphalidae	<i>Junonia orithya</i> (Linnaeus, 1758)	Blue Pansy	Native	EN
28	Nymphalidae	<i>Junonia atlites</i> (Linnaeus, 1763)	Grey Pansy	Native	LC
29	Nymphalidae	<i>Junonia iphita</i> (Cramer, 1779)	Chocolate Soldier	Native	LC
30	Nymphalidae	<i>Junonia almana</i> (Linnaeus, 1758)	Peacock Pansy	Native	LC
31	Nymphalidae	<i>Hypolimnas bolina</i> (Linnaeus, 1758)	Great Eggfly	Native	LC
32	Nymphalidae	<i>Neptis hylas</i> (Linnaeus, 1758)	Common Sailor	Native	LC
33	Nymphalidae	<i>Euthalia aconthea</i> (Cramer, 1777)	Baron	Native	LC
34	Nymphalidae	<i>Melanitis leda</i> (Linnaeus, 1758)	Common Evening Brown	Native	LC
35	Nymphalidae	<i>Orsotriaena medus</i> (Fabricius, 1775)	Medus Brown	Native	LC
36	Nymphalidae	<i>Mycalesis subdita</i> (Moore, 1892)	Sri Lankan Tamil Bushbrown	Endemic	LC
37	Nymphalidae	<i>Mycalesis mineus</i> (Linnaeus, 1758)	Dark-Brand Bushbrown	Native	LC
38	Nymphalidae	<i>Mycalesis perseus</i> (Fabricius, 1775)	Common Bushbrown	Native	LC

39	Nymphalidae	<i>Mycalesis patnia</i> (Moore, 1857)	Sri Lanka Gladeye Bushbrown	native	LC
40	Nymphalidae	<i>Ypthima ceylonica</i> Hewitson, 1864	White Four-ring	Native	LC
41	Lycaenidae	<i>Spalgis epeus</i> (Westwood, 1851)	Apefly	Native	LC
42	Lycaenidae	<i>Arhopala amantes</i> (Hewitson, 1862)	Large Oakblue	Native	LC
43	Lycaenidae	<i>Zesius chrysomallus</i> Hübner, 1821	Redspot	Native	LC
44	Lycaenidae	<i>Loxura atymnus</i> (Stoll, 1780)	Yamfly	Native	LC
45	Lycaenidae	<i>Spindasis vulcanus</i> (Fabricius, 1775)	Common Silverline	Native	LC
46	Lycaenidae	<i>Virachola perse</i> (Hewitson, 1863)	Large Guava Blue	Native	VU
47	Lycaenidae	<i>Prosotas nora</i> (C. Felder, 1860)	Common Lineblue	Native	LC
48	Lycaenidae	<i>Jamides celeno</i> (Cramer, [1775])	Common Cerulean	Native	LC
49	Lycaenidae	<i>Castalius rosimon</i> (Fabricius, 1775)	Common Pierrot	Native	LC
50	Lycaenidae	<i>Discolampa ethion</i> (Westwood, 1851)	Banded Blue Pierrot	Native	LC
51	Lycaenidae	<i>Freyeria putli</i> (Kollar, [1844])	Grass Jewel	Native	LC
52	Lycaenidae	<i>Zizeeria karsandra</i> (Moore, 1865)	Dark Grass Blue	Native	LC
53	Lycaenidae	<i>Zizina otis</i> (Fabricius, 1787)	Lesser Grass Blue	Native	LC
54	Lycaenidae	<i>Zizula hylax</i> (Fabricius, 1775)	Tiny Grass Blue	Native	LC
55	Lycaenidae	<i>Talicerca nyseus</i> (Guérin-Méneville, 1843)	Red Pierrot	Native	LC
56	Lycaenidae	<i>Azanus jesous</i> Guérin-Méneville, 1849	African Babul Blue	Native	LC
57	Lycaenidae	<i>Acytolepis puspa</i> (Horsfield, 1828)	Common Hedge Blue	Native	LC
58	Lycaenidae	<i>Neopithecops zalmora</i> (Butler, [1870])	Quaker	Native	LC
59	Lycaenidae	<i>Chilades lajus</i> (Stoll, 1780)	Lime Blue	Native	LC
60	Hesperiidae	<i>Sarangesa dasahara</i> Moore, 1886	Common Small Flat	Native	NT
61	Hesperiidae	<i>Caprona ransonnettii</i> (R. Felder, 1868)	Golden Angle	Native	LC
62	Hesperiidae	<i>Spialia galba</i> (Fabricius, 1793)	Grizzled Skipper	Native	LC
63	Hesperiidae	<i>Ampittia dioscorides</i> Fabricius, 1793	Bush Hopper	Native	LC
64	Hesperiidae	<i>Taractrocera maevius</i> (Fabricius, 1793)	Common Grass Dart	Native	LC
65	Hesperiidae	<i>Parnara bada</i> (Moore, 1878)	Smallest Swift	Native	NT

66	Hesperiidae	<i>Pelopidas mathias</i> (Fabricius, 1798)	Small Branded Swift	Native	NT
Spiders					
	Family	Species	English Name	Distribution Status	Conservation Status
1	Araneidae	<i>Argiope aemula</i> (Walckenaer, 1841)	Andrew's Cross Spider	Native	LC
2	Araneidae	<i>Argiope anasuja</i> Thorell, 1887	Signature Spider	Native	LC
3	Araneidae	<i>Cyclosa bifida</i> (Doleschall, 1859)	Long-bellied Cyclosa Spider	Native	LC
4	Araneidae	<i>Cyclosa insulana</i> (Costa, 1834)	Brown Lobed Spider	Native	LC
5	Araneidae	<i>Cyrtophora cicatrosa</i>	Garden Tent-web Spider	Native	NE
6	Araneidae	<i>Eriovixia laglaizei</i> (Simon, 1877)		Native	LC
7	Araneidae	<i>Gea spinipes</i> C. L. Koch, 1843		Native	CR
8	Araneidae	<i>Neoscona nautica</i> (L. Koch, 1875)	Brown Sailor Spider	Native	LC
9	Araneidae	<i>Gasteracantha geminata</i> (Fabricius, 1798)	Common Spiny Orbweaver, Common Kite Spider	Native	LC
10	Clubionidae	<i>Matidia</i> sp.			
11	Hersiliidae	<i>Hersilia savignyi</i> Lucas, 1836	Common Two-tailed Spider	Native	LC
12	Lycosidae	<i>Bowie ceylonensis</i>			
13	Nephilidae	<i>Herennia multipuncta</i> (Doleschall, 1859)	Ornate Tree trunk Spider	Native	LC
14	Nephilidae	<i>Nephilengys malabarensis</i> (Walckenaer, 1841)	Hermit Spider	Native	LC
15	Oxyopidae	<i>Oxyopes macilentus</i> L. Koch, 1878	Yellow-striped Lynx Spider	Native	LC
16	Pholcidae	<i>Crossopriza lyoni</i> (Blackwall, 1867)		Native	DD
17	Pholcidae	<i>Tissahamia ethagala</i>		Endemic	NE
18	Pholcidae	<i>Pholcus</i> sp.			
19	Pisauridae	<i>Dolomedes</i> sp.			

20	Pisauridae	<i>Hygropoda</i> sp.			
21	Psechridae	<i>Psechrus</i> sp.			
22	Salticidae	<i>Asemonea tenuipes</i> (O. P.-Cambridge, 1869)		Native	CR
23	Salticidae	<i>Carrhotus viduus</i> (C. L. Koch, 1846)		Native	DD
24	Salticidae	<i>Hasarius adansoni</i> (Audouin, 1826)	Adanson's House Jumper	Native	LC
25	Salticidae	<i>Hyllus semicupreus</i> (Simon, 1885)		Native	NT
26	Salticidae	<i>Menemerus bivittatus</i> (Dufour, 1831)	Common House Jumper	Native	LC
27	Salticidae	<i>Myrmarachne plataleoides</i> (O. P.-Cambridge, 1869)	Kerengga/ Red ant-like Jumper	Native	LC
28	Salticidae	<i>Myrmarachne melanocephala</i> MacLeay, 1839		Native	LC
29	Salticidae	<i>Phintella vittata</i> (C. L. Koch, 1846)	Banded Phintella	Native	LC
30	Salticidae	<i>Chrysilla volupe</i> (Karsch, 1879)		Native	DD
31	Salticidae	<i>Plexippus paykulli</i> (Audouin, 1826)	Large Housefly catcher	Native	NT
32	Salticidae	<i>Plexippus petersi</i> (Karsch, 1878)	Common Housefly catcher	Native	LC
33	Salticidae	<i>Portia</i> sp.			
34	Salticidae	<i>Rhene flavicomans</i> Simon, 1902		Native	DD
35	Salticidae	<i>Siler semiglaucus</i> (Simon, 1901)	Red & Blue Tiny Jumper	Native	LC
36	Salticidae	<i>Telamonia dimidiata</i> (Simon, 1899)	Two-striped Telamonia	Native	LC
37	Sparassidae	<i>Heteropoda venatoria</i> (Linnaeus, 1767)	Domestic Huntsman Spider	Native	LC
38	Sparassidae	<i>Olios lamarcki</i> (Latreille, 1806)		Native	DD
39	Sparassidae	<i>Olios milleti</i> (Pocock, 1901)	Common Green Huntsman Spider	Native	LC
40	Sparassidae	<i>Pandercetes</i> sp.			

41	Tetragnathidae	<i>Tetragnatha viridorufa</i> Gravely, 1921	Common Long-jawed Orb weaver	Native	LC
42	Theraphosidae	<i>Poecilotheria fasciata</i> (Latreille, 1804)	Lemon Leg Tiger Spider	Endemic	EN
43	Thomisidae	<i>Oxytate subvirens</i> (Strand, 1907)	Sri Lanka Elongated Green Crab Spider	Endemic	NT
44	Thomisidae	<i>Thomisus sp.</i>			
45	Uloboridae	<i>Zosis geniculata</i> (Olivier, 1789)	Grey House Spider, Common House cribellate orb weaver	Native	LC
46	Sicariidae	<i>Loxosceles sp.</i>			
Land Snails					
	Family	Species	English Name	Distribution Status	Conservation Status
1	Ariophantidae	<i>Cryptozona bistrialis</i> (Beck 1837)	Common Translucent Snail	Native	LC
2	Ariophantidae	<i>Euplecta sp.</i>			
3	Achatinidae	<i>Lissachatina fulica</i> (Bowdich 1822)	Giant African Snail	Introduced	NE
4	Cyclophoroidea	<i>Cyclophorus sp.</i>			
5	Cyclophoroidea	<i>Aulopoma sp.</i>			
Freshwater Crabs					
	Family	Species	English Name	Distribution Status	Conservation Status
	Gecarcinucidae	<i>Oziothelphusa sp</i>		Native	LC

Freshwater Fish

	Family	Species	English Name	Distribution Status	Conservation Status
1	Anabantidae	<i>Anabas testudineus</i> (Bloch, 1792)	Climbing perch	Native	LC
2	Bagridae	<i>Mystus nanus</i> Sudasinghe et al., 2016	Striped dwarf catfish	Endemic	LC
3	Bagridae	<i>Mystus zeylanicus</i> Ng & Pethiyagoda, 2013	Sri Lanka mystus	Endemic	LC
4	Channidae	<i>Channa kelaartii</i> (Günther, 1861)	Brown snakehead	Native	NT
5	Channidae	<i>Channa punctata</i> (Bloch, 1793)	Spotted snakehead	Native	LC
6	Channidae	<i>Channa striata</i> (Bloch, 1793)	Murrel	Native	LC
7	Cobitidae	<i>Lepidocephalichthys thermalis</i> (Valenciennes, 1846)	Common spiny loach	Native	LC
8	Cyprinidae	<i>Pethia melanomaculata</i> (Deraniyagala, 1956)	Tic tac-toe barb	Endemic	LC
9	Cyprinidae	<i>Plesiopuntius bimaculatus</i> (Bleeker, 1863)	Redside barb	Native	LC
10	Cyprinidae	<i>Puntius dorsalis</i> (Jerdon, 1849)	Long-snouted barb	Native	LC
11	Cyprinidae	<i>Puntius thermalis</i> (Valenciennes, 1844)	Swamp barb	Endemic	LC
12	Cyprinidae	<i>Puntius vittatus</i> Day, 1865	Silver barb	Native	LC
13	Cyprinidae	<i>Systemus sarana</i> (Hamilton, 1822)	Olive barb	Native	
14	Danionidae	<i>Amblypharyngodon grandisquamis</i> Jordan & Starks, 1917	Large Silver carplet	Endemic	LC
15	Danionidae	<i>Esomus thermoicos</i> (Valenciennes, 1842)	Flying barb	Native	LC
16	Danionidae	<i>Rasbora microcephalus</i> (Jerdon, 1849)	Carverii rasbora	Native	LC
17	Gobiidae	<i>Glossogobius giurus</i> (Hamilton, 1822)	Bar eyed goby	Native	LC
18	Heteropneustidae	<i>Heteropneustes fossilis</i> (Bloch, 1794)	Stinging catfish	Native	LC
19	Siluridae	<i>Ompok ceylonensis</i> (Günther, 1864)	Dry zone butter catfish	Endemic	LC
20	Cichlidae	<i>Oreochromis sp.</i>	Tilapia	Introduced	NE

Amphibians					
	Family	Species	English Name	Distribution Status	Conservation Status
1	Bufonidae	<i>Duttaphrynus scaber</i> Schneider,1799	Schneider's toad	Native	VU
2	Bufonidae	<i>Duttaphrynus melanostictus</i> Schneider,1799	Common toad	Native	LC
3	Microhylidae	<i>Microhyla ornata</i> (Dumeril & Bibron, 1841)	Ornate narrow mouth frog	Native	LC
4	Microhylidae	<i>Microhyla mihintalei</i> Wijayathilaka, Garg, Senevirathne, Karunarathna, Biju and Meegaskumbura	Red narrow mouth frog	Native	LC
5	Microhylidae	<i>Uperodon rohani</i> Garg et al. 2018	Variegated ramanella	Endemic	LC
6	Microhylidae	<i>Uperodon taprobanicus</i> (Parker,1934)	Sri Lankan bullfrog	Native	LC
7	Microhylidae	<i>Uperodon systoma</i> (Schneider, 1799)	Marbled balloon frog	Native	LC
8	Dicroglossidae	<i>Euphlyctis cyanophlyctis</i> (Schneider, 1799)	Indian skipper frog	Native	LC
9	Dicroglossidae	<i>Euphlyctis hexadactylus</i> (Lesson,1834)	Indian green frog	Native	LC
10	Dicroglossidae	<i>Minervarya agricola</i> (Jerdon, 1853)	Common paddy field frog	Native	LC
11	Dicroglossidae	<i>Hoplobatrachus crassus</i> (Jerdon, 1853)	Jurdon's bullfrog	Native	LC
12	Dicroglossidae	<i>Sphaerotheca breviceps</i> (Schneider, 1799)	Short headed burrowing frog	Native	LC
13	Rhacophoridae	<i>Pseudophilautus regius</i> Manamendra-Arachchi & Pethiyagoda, 2005	Polonnaruwa shrub frog	Endemic	VU
14	Rhacophoridae	<i>Polypedates maculatus</i> (Gray, 1834)	Spotted tree frog	Native	LC
Reptiles					
	Family	Species	English Name	Distribution Status	Conservation Status
1	Agamidae	<i>Calotes calotes</i> (Linnaeus, 1758)	Green forest Lizard	Native	LC
2	Agamidae	<i>Calotes versicolor</i> (Doudin, 1802)	Garden Lizard	Native	LC
3	Gekkonidae	<i>Gehyra mutilata</i> (Wiegmann, 1834)	Four-clawed Gecko	Native	LC

4	Gekkonidae	<i>Hemidactylus parvimaclatus</i> Deraniyagala, 1953	Sri Lankan House Gecko	Native	LC
5	Gekkonidae	<i>Hemidactylus frenatus</i> Schlegel, 1836	Asian House Gecko	Native	LC
6	Scincidae	<i>Riopa punctata</i> (Linnaeus, 1758)	Spotted Supple Skink	Native	LC
7	Scincidae	<i>Eutropis carinata</i> (Schneider, 1801)	Common Skink	Native	LC
8	Scincidae	<i>Eutropis thammanna</i> Das, de Silva & Austin, 2008	Tammenna Skink	Endemic	LC
9	Varanidae	<i>Varanus bengalensis</i> (Daudin, 1802)	Land Monitor	Native	LC
10	Colubridae	<i>Ahaetulla nasuta</i> (Lacepede, 1789)	Green Vine Snake	Endemic	LC
11	Colubridae	<i>Ahaetulla pulverulenta</i> (Dumeril, Bibron & Dumeril, 1854)	Brown Vine Snake	Endemic	LC
12	Colubridae	<i>Boiga ceylonensis</i> (Gunther, 1858)	Sri Lanka cat Snake	Native	LC
13	Colubridae	<i>Boiga forsteni</i> (Dumeril, Bibron & Dumeril, 1854)	Forsten's Cat Snake	Native	NT
14	Colubridae	<i>Dendrelaphis bifrenalis</i> (Boulenger, 1890)	Boulenger's Bronze-back	Native	NT
15	Colubridae	<i>Dendrelaphis tristis</i> (Daudin, 1803)	Common Bronze-back	Native	LC
16	Colubridae	<i>Lycodon aulicus</i> (Linnaeus, 1758)	Common Wolf Snake	Native	LC
17	Colubridae	<i>Oligodon taeniolatus</i> (Jerdon, 1853)	Russell's Kukri Snake	Native	LC
18	Colubridae	<i>Ptyas mucosa</i> (Linnaeus, 1758)	Sri Lankan Rat Snake	Native	LC
19	Natricidae	<i>Amphiesma stolatum</i> (Linnaeus, 1758)	Buff Striped Keelback	Native	LC
20	Natricidae	<i>Atretium schistosum</i> (Daudin, 1803)	Olive Keelback	Native	LC
21	Elapidae	<i>Bungarus caeruleus</i> (Schneider, 1801)	Common Indian Krait	Native	LC
22	Elapidae	<i>Naja naja</i> (Linnaeus, 1758)	Indian Cobra/ Spectacled Cobra	Native	LC
23	Pythonidae	<i>Python molurus</i> (Linnaeus, 1758)	Rock Python	Native	LC
24	Viperidae	<i>Daboia russelii</i> (Shaw & Nodder, 1797)	Indian Russell's Viper	Native	LC
25	Viperidae	<i>Hypnale hypnale</i> (Merrem, 1820)	Merrem's Hump-nosed Pit Viper	Native	LC

26	Bataguridae	<i>Melanochelys trijuga</i> (Schweigger, 1812)	Parker's Black Turtle	Native	LC
27	Testudinidae	<i>Geochelone elegans</i> (Schoepff, 1795)	Indian Star Tortoise	Native	NT
28	Trionychidae	<i>Lissemys ceylonensis</i> (Gray, 1856)	Flapshell Turtle	Endemic	LC
29	Crocodylidae	<i>Crocodylus palustris</i> Lesson, 1831	Mugger Crocodile	Native	NT
Birds					
	Family	Species	English Name	Distribution Status	Conservation Status
1	Phasianidae	<i>Pavo cristatus</i> Linnaeus, 1758	Indian Peafowl	Native	LC
2	Phasianidae	<i>Gallus lafayetii</i> Lesson, 1831	Sri Lanka Junglefowl	Endemic	LC
3	Anatidae	<i>Dendrocygna javanica</i> (Horsfield, 1821)	Lesser Whistling-duck	Native	LC
4	Podicipedidae	<i>Tachybaptus ruficollis</i> (Pallas, 1764)	Little Grebe	Native	LC
5	Rallidae	<i>Amaurornis phoenicurus</i> (Pennant, 1769)	White-breasted Waterhen	Native	LC
6	Rallidae	<i>Porphyrio porphyrio</i> (Linnaeus, 1758)	Purple Swamphen	Native	LC
7	Turnicidae	<i>Turnix suscitator</i> (Gmelin, 1789)	Barred Buttonquail	Native	LC
8	Ciconiidae	<i>Mycteria leucocephala</i> (Pennant, 1769)	Painted Stork	Native	LC
9	Ciconiidae	<i>Ciconia episcopus</i> (Boddaert, 1783)	Woolly-necked Stork	Native	LC
10	Ciconiidae	<i>Anastomus oscitans</i> (Boddaert, 1783)	Asian Openbill	Native	LC
11	Threskiornithidae	<i>Threskiornis melanocephalus</i> (Latham, 1790)	Black-headed Ibis	Native	LC
12	Threskiornithidae	<i>Platalea leucorodia</i> Linnaeus, 1758	Eurasian Spoonbill	Native	LC
13	Ardeidae	<i>Ardeola grayii</i> (Sykes, 1832)	Indian Pond-heron	Native	LC
14	Ardeidae	<i>Bubulcus ibis</i> (Linnaeus, 1758)	Cattle Egret	Native	LC
15	Ardeidae	<i>Ardea cinerea</i> Linnaeus, 1758	Grey Heron	Native	LC
16	Ardeidae	<i>Ardea purpurea</i> Linnaeus, 1766	Purple Heron	Native	LC
17	Ardeidae	<i>Ardea alba</i> Linnaeus, 1758	Great White Egret	Native	LC
18	Ardeidae	<i>Ardea intermedia</i> Wagler, 1829	Intermediate Egret	Native	LC
19	Ardeidae	<i>Egretta garzetta</i> (Linnaeus, 1766)	Little Egret	Native	LC

20	Ardeidae	Nycticorax nycticorax (Linnaeus, 1758)	Black-crowned Night-heron	Native	LC
21	Pelecanidae	<i>Pelecanus philippensis</i> Gmelin, 1789	Spot-billed Pelican	Native	LC
22	Phalacrocoracidae	Microcarbo niger (Vieillot, 1817)	Little Cormorant	Native	LC
23	Phalacrocoracidae	Phalacrocorax fuscicollis Stephens, 1826	Indian Cormorant	Native	LC
24	Anhingidae	Anhinga melanogaster Pennant, 1769	Oriental Darter	Native	LC
25	Charadriidae	Vanellus indicus (Boddaert, 1783)	Red-wattled Lapwing	Native	LC
26	Scolopacidae	Actitis hypoleucos Linnaeus, 1758	Common Sandpiper	Migrant	NE
27	Turnicidae	Turnix suscitator (Gmelin, 1789)	Barred Buttonquail	Native	LC
28	Laridae	Chlidonias hybrida (Pallas, 1811)	Whiskered Tern	Migrant	NE
29	Accipitridae	Spilornis cheela (Latham, 1790)	Crested Serpent-eagle	Native	LC
30	Accipitridae	Accipiter badius (Gmelin, 1788)	Shikra	Native	LC
31	Accipitridae	Haliaeetus ichthyaetus (Horsfield, 1821)	Grey-headed Fish-eagle	Native	NT
32	Accipitridae	Haliastur indus (Boddaert, 1783)	Brahminy Kite	Native	LC
33	Accipitridae	Pernis ptilorhyncus (Temminck, 1821)	Oriental Honey-buzzard	Native	NE
34	Accipitridae	Haliaeetus leucogaster (Gmelin, 1788)	White-bellied Sea-eagle	Native	LC
35	Accipitridae	Nisaetus cirrhatus (Gmelin, 1788)	Changeable Hawk-eagle	Native	LC
36	Columbidae	Chalcophaps indica (Linnaeus, 1758)	Grey-capped Emerald Dove	Native	LC
37	Columbidae	Treron bicinctus (Jerdon, 1840)	Orange-breasted Green-pigeon	Native	LC
38	Columbidae	Treron pompadora (Gmelin, 1789)	Sri Lanka Green-pigeon	Endemic	LC
39	Columbidae	Ducula aenea (Linnaeus, 1766)	Green Imperial-pigeon	Native	LC
40	Columbidae	Spilopelia suratensis (Gmelin, 1789)	Spotted Dove	Native	LC

41	Psittacidae	<i>Psittacula krameri</i> (Scopoli, 1769)	Rose-ringed Parakeet	Native	LC
42	Psittacidae	<i>Psittacula eupatria</i> (Linnaeus, 1766)	Alexandrine Parakeet	Native	LC
43	Cuculidae	<i>Centropus sinensis</i> (Stephens, 1815)	Greater Coucal	Native	LC
44	Cuculidae	<i>Phaenicophaeus viridirostris</i> (Jerdon, 1840)	Blue-faced Malkoha	Native	LC
45	Cuculidae	<i>Eudynamys scolopaceus</i> (Linnaeus, 1758)	Western Koel	Native	LC
46	Cuculidae	<i>Cacomantis passerinus</i> (Vahl, 1797)	Grey-bellied Cuckoo	Migrant	NE
47	Cuculidae	<i>Hierococcyx varius</i> (Vahl, 1797)	Common Hawk-cuckoo	Migrant	NE
48	Cuculidae	<i>Surniculus dicruroides</i> (Hodgson, 1839)	Drongo Cuckoo	Native	LC
49	Cuculidae	<i>Clamator jacobinus</i> (Boddaert, 1783)	Pied Cuckoo	Native	LC
50	Strigidae	<i>Otus bakkamoena</i> Pennant, 1769	Collared Scops-owl	Native	LC
51	Strigidae	<i>Ketupa zeylonensis</i> (Gmelin, 1788)	Brown Fish-owl	Native	LC
52	Strigidae	<i>Strix leptogrammica</i> Temminck, 1831	Brown Wood-owl	Native	NT
53	Strigidae	<i>Glaucidium radiatum</i> (Tickell, 1833)	Jungle Owlet	Native	NT
54	Caprimulgidae	<i>Caprimulgus asiaticus</i> Latham, 1790	Indian Nightjar	Native	LC
55	Caprimulgidae	<i>Caprimulgus atripennis</i> Jerdon, 1845	Jerdon's Nightjar	Native	LC
56	Apodidae	<i>Aerodramus unicolor</i> (Jerdon, 1840)	Indian Swiftlet	Native	LC
57	Apodidae	<i>Cypsiurus balasiensis</i> (Gray, 1829)	Asian Palm-swift	Native	LC
58	Hemiprocnidae	<i>Hemiprocne coronata</i> (Tickell, 1833)	Crested Treeswift	Native	LC
59	Coraciidae	<i>Coracias benghalensis</i> (Linnaeus, 1758)	Indian Roller	Native	LC
60	Meropidae	<i>Merops orientalis</i> Latham, 1802	Asian Green Bee-eater	Native	LC
61	Meropidae	<i>Merops philippinus</i> Linnaeus, 1766	Blue-tailed Bee-eater	Migrant	NE
62	Alcedinidae	<i>Alcedo atthis</i> (Linnaeus, 1758)	Common Kingfisher	Native	LC
63	Alcedinidae	<i>Pelargopsis capensis</i> (Linnaeus, 1766)	Stork-billed Kingfisher	Native	LC
64	Alcedinidae	<i>Halcyon smyrnensis</i> (Linnaeus, 1758)	White-breasted Kingfisher	Native	LC
65	Bucerotidae	<i>Ocyrceros gingalensis</i> (Shaw, 1811)	Sri Lanka Grey Hornbill	Endemic	LC

66	Megalaimidae	Psilopogon haemacephalus (Statius Müller, 1776)	Coppersmith Barbet	Native	LC
67	Megalaimidae	Psilopogon rubricapillus (Gmelin, 1788)	Sri Lanka Barbet	Endemic	LC
68	Megalaimidae	Psilopogon zeylanicus (Gmelin, 1788)	Brown-headed Barbet	Native	LC
69	Picidae	Dinopium psarodes (Linnaeus, 1758)	Sri Lanka Lesser Flameback	Endemic	LC
70	Pittidae	Pitta brachyura (Linnaeus, 1766)	Indian Pitta	Migrant	NE
71	Artamidae	Artamus fuscus Vieillot, 1817	Ashy Woodswallow	Native	NT
72	Aegithinidae	Aegithina tiphia (Linnaeus, 1758)	Common Iora	Native	LC
73	Oriolidae	Oriolus xanthornus (Linnaeus, 1758)	Black-hooded Oriole	Native	LC
74	Vangidae	Tephrodornis affinis Blyth, 1847	Sri Lanka Wood-shrike	Endemic	LC
75	Campephagidae	Coracina macei (Lesson, 1831)	Large Cuckooshrike	Native	NT
76	Campephagidae	Pericrocotus cinnamomeus (Linnaeus, 1766)	Small Minivet	Native	LC
77	Laniidae	Lanius cristatus Linnaeus, 1758	Brown Shrike	Migrant	NE
78	Dicruridae	Dicrurus caerulescens (Linnaeus, 1758)	White-bellied Drongo	Native	LC
79	Rhipiduridae	Rhipidura aureola Lesson, 1830	White-browed Fantail	Native	LC
80	Monarchidae	Hypothymis azurea (Boddaert, 1783)	Black-naped Monarch	Native	LC
81	Monarchidae	Terpsiphone paradisi (Linnaeus, 1758)	Indian Paradise Flycatcher	Native	LC
82	Corvidae	Corvus splendens Vieillot, 1817	House Crow	Native	LC
83	Corvidae	Corvus macrorhynchos Wagler, 1827	Large-billed Crow	Native	LC
84	Hirundinidae	Hirundo rustica Linnaeus, 1758	Barn Swallow	Migrant	NE
85	Hirundinidae	Cecropis hyperythra (Blyth, 1849)	Sri Lanka Swallow	Endemic	LC
86	Alaudidae	Mirafraga affinis Blyth, 1845	Rufous-winged Bushlark	Native	LC
87	Alaudidae	Alauda gulgula Franklin, 1831	Oriental Skylark	Native	LC
88	Cisticolidae	Cisticola juncidis (Rafinesque, 1810)	Zitting Cisticola	Native	LC
89	Cisticolidae	Prinia sylvatica Jerdon, 1840	Jungle Prinia	Native	LC

90	Cisticolidae	<i>Prinia socialis</i> Sykes, 1832	Ashy Prinia	Native	LC
91	Cisticolidae	<i>Prinia inornata</i> Sykes, 1832	Plain Prinia	Native	LC
92	Cisticolidae	<i>Prinia hodgsonii</i> Blyth, 1844	Grey-breasted Prinia	Native	LC
93	Cisticolidae	<i>Orthotomus sutorius</i> (Pennant, 1769)	Common Tailorbird	Native	LC
94	Pycnonotidae	<i>Pycnonotus melanicterus</i> (Gmelin, 1789)	Sri Lanka Black-capped Bulbul	Endemic	LC
95	Pycnonotidae	<i>Pycnonotus cafer</i> (Linnaeus, 1766)	Red-vented Bulbul	Native	LC
96	Pycnonotidae	<i>Pycnonotus luteolus</i> (Lesson, 1841)	White-browed Bulbul	Native	LC
97	Phylloscopidae	<i>Phylloscopus magnirostris</i> Blyth, 1843	Large-billed Leaf-warbler	Migrant	NE
98	Timaliidae	<i>Rhopocichla atriceps</i> (Jerdon, 1839)	Dark-fronted Babbler	Native	LC
99	Pellorneidae	<i>Pellorneum fuscicapillus</i> (Blyth, 1849)	Sri Lanka Brown-capped Babbler	Endemic	LC
100	Leiotrichidae	<i>Turdoides affinis</i> (Jerdon, 1845)	Yellow-billed Babbler	Native	LC
101	Zosteropidae	<i>Zosterops palpebrosus</i> (Temminck, 1824)	Oriental White-eye	Native	LC
102	Sturnidae	<i>Acridotheres tristis</i> (Linnaeus, 1766)	Common Myna	Native	LC
103	Muscicapidae	<i>Copsychus saularis</i> (Linnaeus, 1758)	Oriental Magpie-robin	Native	LC
104	Muscicapidae	<i>Saxicoloides fulicatus</i> (Linnaeus, 1766)	Indian Robin	Native	LC
105	Muscicapidae	<i>Kittacincla malabarica</i> (Scopoli, 1788)	White-rumped Shama	Native	LC
106	Muscicapidae	<i>Muscicapa dauurica</i> Pallas, 1811	Asian Brown Flycatcher	Migrant	NE
107	Muscicapidae	<i>Cyornis tickelliae</i> Blyth, 1843	Tickell's Blue Flycatcher	Native	LC
108	Chloropseidae	<i>Chloropsis jerdoni</i> (Blyth, 1844)	Jerdon's Leafbird	Native	LC
109	Dicaeidae	<i>Dicaeum erythrorhynchos</i> (Latham, 1790)	Pale-billed Flowerpecker	Native	LC
110	Dicaeidae	<i>Dicaeum agile</i> (Tickell, 1833)	Thick-billed Flowerpecker	Native	NT
111	Nectariniidae	<i>Nectarinia zeylonica</i> (Linnaeus, 1766)	Purple-rumped Sunbird	Native	LC

112	Nectariniidae	Cinnyris lotenius (Linnaeus, 1766)	Loten's Sunbird	Native	LC
113	Ploceidae	Ploceus philippinus (Linnaeus, 1766)	Baya Weaver	Native	LC
114	Estrildidae	Lonchura punctulata (Linnaeus, 1758)	Scaly-breasted Munia	Native	LC
115	Estrildidae	Lonchura malacca (Linnaeus, 1766)	Tricoloured Munia	Native	LC
116	Estrildidae	Lonchura striata (Linnaeus, 1766)	White-rumped Munia	Native	LC
117	Motacillidae	Anthus rufulus Vieillot, 1818	Paddyfield Pipit	Native	LC
Mammals					
	Family	Species	English Name	Distribution Status	Conservation Status
1	Manidae	<i>Manis crassicaudata</i> (Gray, 1827)	Pangolin	Native	NT
2	Soricidae	<i>Suncus murinus</i> (Linnaeus, 1766)	Common Musk Shrew	Native	LC
3	Pteropodidae	<i>Cynopterus sphinx</i> (Vahl, 1979)	Short-nosed fruit Bat	Native	LC
4	Pteropodidae	<i>Pteropus medius</i> (Temminck, 1825)	Flying fox	Native	LC
5	Pteropodidae	<i>Rousettus leschenaulti</i> (Desmarest, 1820)	Fulvous fruit Bat	Native	LC
6	Emballonuridae	<i>Taphozous melanopogon</i> Temminck, 1841	Black-bearded sheath-tailed Bat	Native	VU
7	Hipposideridae	<i>Hipposideros ater</i> Temleton, 1848	Bicoloured leaf-nose Bat	Native	LC
8	Hipposideridae	<i>Hipposideros speoris</i> (Schneider, 1800)	Schneider's leaf-nose Bat	Native	LC
9	Megadermatidae	<i>Megaderma lyra</i> Geoffroy, 1810	False vampire Bat	Native	VU
10	Rhinolophidae	<i>Rhinolophus beddomei</i> Anderson, 1905	Great horse-shoe Bat	Native	VU
11	Rhinolophidae	<i>Rhinolophus rouxii</i> Temminck, 1835	Rufous horse-shoe Bat	Native	LC
12	Vespertilionidae	<i>Kirivoula pictus</i> (Pallas, 1767)	Painted Bat	Native	NT
13	Vespertilionidae	<i>Pipistrellus coromandra</i> (Gray, 1838)	Indian Pipistrel	Native	VU
14	Cercopithecidae	<i>Macaca sinica</i> (Linnaeus, 1771)	Sri Lanka Toque Monkey	Endemic	LC

15	Cercopithecidae	<i>Semnopithecus priam</i> Blyth, 1844	Grey Langur	Native	LC
16	Lorisidae	<i>Loris lyderkkerianus</i> Cabrera, 1908	Grey Slender Loris	Native	NT
17	Canidae	<i>Canis aureus</i> Linnaeus, 1758	Jackal	Native	LC
18	Felidae	<i>Felis chaus</i> Gueldenstaedt, 1776	Jungle Cat	Native	NT
19	Felidae	<i>Panthera pardus</i> (Linnaeus, 1758)	Leopard	Native	EN
20	Felidae	<i>Prionailurus viverrinus</i> (Bennett, 1833)	Fishing Cat	Native	EN
21	Herpestidae	<i>Herpestes brachyurus</i> Gray, 1837	Brown Mongoose	Native	LC
22	Herpestidae	<i>Herpestes edwardsii</i> (Geoffroy, 1818)	Grey Mongoose	Native	LC
23	Herpestidae	<i>Herpestes smithii</i> Gray, 1837	Ruddy Mongoose	Native	LC
24	Herpestidae	<i>Herpestes vitticollis</i> Bennett, 1835	Stripe-necked Mongoose	Native	VU
25	Mustelidae	<i>Lutra lutra</i> (Linnaeus, 1758)	Otter	Native	VU
26	Viverridae	<i>Paradoxurus hermaphoditus</i> (Pallas, 1777)	Palm Cat	Native	LC
27	Viverridae	<i>Paradoxurus stenocephalus</i> Groves, Rajapaksha & Manamendra-Archchi, 2009	Sri Lanka Golden Dryzone Palm Civet	Endemic	CR
28	Viverridae	<i>Viverricula indica</i> (Desmarest, 1817)	Ring-tailed Civet	Native	LC
29	Elephantidae	<i>Elephas maximus</i> Linnaeus, 1758	Asian Elephant	Native	EN
30	Suidae	<i>Sus scrofa</i> Linnaeus, 1758	Wild Boar	Native	LC
31	Cervidae	<i>Axis axis</i> (Erxleben, 1777)	Spotted Deer	Native	LC
32	Cervidae	<i>Rusa unicolor</i> Kerr, 1792	Sambur	Native	NT
33	Cervidae	<i>Muntiacus muntjak</i> (Zimmermann, 1780)	Barking Deer	Native	NT
34	Tragulidae	<i>Moschiola meminna</i> Erxleben, 1777	Sri Lanka Mouse Deer	Endemic	LC
35	Hystricidae	<i>Hystrix indica</i> (Kerr, 1792)	Porcupine	Native	LC
36	Muridae	<i>Tetera indica</i> (Hardwicke, 1807)	Gerbil/ Antelope Rat	Native	LC
37	Muridae	<i>Bandicota bengalensis</i> (Gray, 1835)	Mole Rat	Native	LC
38	Muridae	<i>Bandicota indica</i> (Bechstein, 1800)	Malabar Bandicoot	Native	LC
39	Muridae	<i>Golunda ellioti</i> Gray, 1837	Bush Rat	Native	EN
40	Muridae	<i>Millardia meltada</i> (Gray, 1837)	Soft-furred field Rat	Native	EN
41	Muridae	<i>Mus booduga</i> (Gray, 1837)	Indian Field Mouse	Native	LC

42	Muridae	<i>Mus musculus</i> Linnaeus, 1758	Indian House Mouse	Native	LC
43	Muridae	<i>Rattus rattus</i> (Linnaeus, 1758)	Common House Rat	Native	LC
44	Muridae	<i>Vandeleuria oleracea</i> (Bennett, 1832)	Long-tailed Tree Mouse	Native	VU
45	Scuridae	<i>Funambulus palmarum</i> (Linnaeus, 1766)	Palm Squirrel	Native	LC
46	Scuridae	<i>Ratufa macroura</i> (Pennant, 1769)	Giant Squirrel	Native	LC
47	Leporidae	<i>Lepus nigricollis</i> Cuvier, 1823	Black-naped Hare	Native	LC



Annex 5



Annex 05: Endemic fauna observed in Thumbikulama study area

	Taxonomic Group	Family	Species	English Name
1	Dragonflies	Chlorocyphidae	<i>Libellago adami</i> Fraser, 1939	Adam's Gem
2	Dragonflies	Platycnemididae	<i>Prodasineura sita</i> (Kirby, 1893)	Stripe-headed Threadtail
3	Butterflies	Pieridae	<i>Appias galene</i> (C. and R. Felder, 1865)	Sri Lankan Lesser Albatross
4	Butterflies	Nymphalidae	<i>Mycalesis subdita</i> (Moore, 1892)	Sri Lankan Tamil Bushbrown
5	Spiders	Pholcidae	<i>Tissahamia ethagala</i>	
6	Spiders	Theraphosidae	<i>Poecilotheria fasciata</i> (Latreille, 1804)	Lemon Leg Tiger Spider
7	Spiders	Thomisidae	<i>Oxytate subvirens</i> (Strand, 1907)	Sri Lanka Elongated Green Crab Spider
8	Fish	Bagridae	<i>Mystus nanus</i> Sudasinghe et al., 2016	Striped dwarf catfish
9	Fish	Bagridae	<i>Mystus zeylanicus</i> Ng and Pethiyagoda, 2013	Sri Lanka mystus
10	Fish	Cyprinidae	<i>Pethia melanomaculata</i> (Deraniyagala, 1956)	Tic tac-toe barb
11	Fish	Cyprinidae	<i>Puntius thermalis</i> (Valenciennes, 1844)	Swamp barb
12	Fish	Danionidae	<i>Amblypharyngodon grandisquamis</i> Jordan and Starks, 1917	Large Silver carplet
13	Fish	Siluridae	<i>Ompok ceylonensis</i> (Günther, 1864)	Dry zone butter catfish
14	Amphibians	Microhylidae	<i>Uperodon rohani</i> Garg et al. 2018	Variegated ramanella
15	Amphibians	Rhacophoridae	<i>Pseudophilautus regius</i> Manamendra-Arachchi and Pethiyagoda, 2005	Polonnaruwa shrub frog
16	Reptiles	Scincidae	<i>Eutropis thammanna</i> Das, de Silva and Austin, 2008	Tammenna Skink
17	Reptiles	Colubridae	<i>Ahaetulla nasuta</i> (Lacepede, 1789)	Green Vine Snake
18	Reptiles	Colubridae	<i>Ahaetulla pulverulenta</i> (Dumeril, Bibron and Dumeril, 1854)	Brown Vine Snake
19	Reptiles	Trionychidae	<i>Lissemys ceylonensis</i> (Gray, 1856)	Flapshell Turtle
20	Birds	Phasianidae	<i>Gallus lafayetii</i> Lesson, 1831	Sri Lanka Junglefowl
21	Birds	Columbidae	<i>Treron pompadora</i> (Gmelin, 1789)	Sri Lanka Green-pigeon
22	Birds	Bucerotidae	<i>Ocyrceros gingalensis</i> (Shaw, 1811)	Sri Lanka Grey Hornbill

23	Birds	Megalaimidae	<i>Psilopogon zeylanicus</i> (Gmelin, 1788)	Sri Lanka Barbet
24	Birds	Picidae	<i>Dinopium psarodes</i> (Linnaeus, 1758)	Sri Lanka Lesser Flameback
25	Birds	Vangidae	<i>Tephrodornis affinis</i> Blyth, 1847	Sri Lanka Wood-shrike
26	Birds	Pycnonotidae	<i>Pycnonotus melanicterus</i> (Gmelin, 1789)	Sri Lanka Black-capped Bulbul
27	Birds	Pellorneidae	<i>Pellorneum fuscocapillus</i> (Blyth, 1849)	Sri Lanka Brown-capped Babbler
28	Birds	Hirundinidae	<i>Cecropis hyperythra</i> (Blyth, 1849)	Sri Lanka Swallow
29	Mammals	Cercopithecidae	<i>Macaca sinica</i> (Linnaeus, 1771)	Sri Lanka Toque Monkey
30	Mammals	Viverridae	<i>Paradoxurus stenocephalus</i> Groves, Rajapaksha and Manamendra-Archchi, 2009	Sri Lanka Golden Dryzone Palm Civet
31	Mammals	Tragulidae	<i>Moschiola meminna</i> Erxleben, 1777	Sri Lanka Mouse Deer

Annex 6

Annex 6: Nationally threatened species of fauna reported from the study site

	Taxonomic Group	Family	Species	English Name	Threat Status
1	Dragonflies	Libellulidae	<i>Trithemis festiva</i> (Rambur, 1842)	Indigo Dropwing	VU
2	Dragonflies	Libellulidae	<i>Tramea basilaris burmeisteri</i> Kirby, 1899	Burmeister's Glider	VU
3	Butterflies	Nymphalidae	<i>Junonia orithya</i> (Linnaeus, 1758)	Blue Pansy	EN
4	Butterflies	Papilionidae	<i>Papilio crino</i> Fabricius, 1793	Banded Peacock	VU
5	Butterflies	Lycaenidae	<i>Virachola perse</i> (Hewitson, 1863)	Large Guava Blue	VU
6	Spiders	Araneidae	<i>Gea spinipes</i> C. L. Koch, 1843		CR
7	Spiders	Salticidae	<i>Asemonea tenuipes</i> (O. P.-Cambridge, 1869)		CR
8	Spiders	Theraphosidae	<i>Poecilotheria fasciata</i> (Latreille, 1804)	Lemon Leg Tiger Spider	EN
9	Amphibians	Bufo	<i>Duttaphrynus scaber</i> Schneider, 1799	Schneider's toad	VU
10	Amphibians	Rhacophoridae	<i>Pseudophilautus regius</i> Manamendra-Arachchi and Pethiyagoda, 2005	Polonnaruwa shrub frog	VU
11	Mammals	Viverridae	<i>Paradoxurus stenocephalus</i> Groves, Rajapaksha and Manamendra-Archchi, 2009	Sri Lanka Golden Dryzone Palm Civet	CR
12	Mammals	Felidae	<i>Panthera pardus</i> (Linnaeus, 1758)	Leopard	EN
13	Mammals	Felidae	<i>Prionailurus viverrinus</i> (Bennett, 1833)	Fishing Cat	EN
14	Mammals	Elephantidae	<i>Elephas maximus</i> Linnaeus, 1758	Asian Elephant	EN
15	Mammals	Muridae	<i>Golunda ellioti</i> Gray, 1837	Bush Rat	EN
16	Mammals	Muridae	<i>Millardia meltada</i> (Gray, 1837)	Soft-furred field Rat	EN
17	Mammals	Emballonuridae	<i>Taphozous melanopogon</i> Temminck, 1841	Black-bearded sheath-tailed Bat	VU
18	Mammals	Megadermatidae	<i>Megaderma lyra</i> Geoffroy, 1810	False vampire Bat	VU
19	Mammals	Rhinolophidae	<i>Rhinolophus beddomei</i> Anderson, 1905	Great horse-shoe Bat	VU
20	Mammals	Vespertilionidae	<i>Pipistrellus coromandra</i> (Gray, 1838)	Indian Pipistrel	VU
21	Mammals	Herpestidae	<i>Herpestes vitticollis</i> Bennett, 1835	Stripe-necked Mongoose	VU
22	Mammals	Mustelidae	<i>Lutra lutra</i> (Linnaeus, 1758)	Otter	VU
23	Mammals	Muridae	<i>Vandeleuria oleracea</i> (Bennett, 1832)	Long-tailed Tree Mouse	VU

Annex 7

Amaranthaceae	Amaranthaceae	<i>Amaranthus viridis</i>	Kura thampala, Sulukura	LC		√							√					
Connvolvulaceae	Connvolvulaceae	Argyreia populifolia	Girithilla	LC									√					
Rutaceae	Rutaceae	<i>Atalantia ceylanica</i>	Yakinaran, Waldehi, Yati-naran, Yak dehi	LC	√	√	√		√		√			√			√	
Meliaceae	Meliaceae	<i>Azadirachta indica</i>	Kohomba	NOT EVALUATED	√	√	√		√	√	√	√		√		√	√	√
Scrophulariaceae	Plantaginaceae	<i>Bacopa monnieri</i>	Lunuwila	LC	√	√	√				√							
Fabaceae (Leguminosae) - Caesalpiniaceae	Fabaceae	<i>Bauhinia racemosa</i>	Maila	LC		√			√				√					
Euphorbiaceae	Phyllanthaceae	<i>Breynia vitis-idaea</i>	Gas-kayila	LC		√			√								√	
Euphorbiaceae - Phyllanthaceae	Phyllanthaceae	<i>Bridelia retusa</i>	Keta-Kela	LC									√					
Asclepiadaceae	Apocynaceae	<i>Calotropis gigantea</i>	Ela Wara, Hela Wara, Wara, Mudu Wara	LC		√			√								√	
Rubiaceae	Rubiaceae	<i>Canthium coromandelicum</i>	Kara	LC		√			√				√					
Capparaceae (Capparidaceae)	Capparaceae	<i>Capparis zeylanica</i>	Sudu-wellangiriya, Wellangiriya, Kalu welangiriya	LC	√	√	√		√		√						√	
Sapindaceae	Sapindaceae	<i>Cardiospermum halicacabum</i>	Penela-wel, Wel penela	LC	√	√		√	√		√	√					√	
Apocynaceae	Apocynaceae	<i>Carissa spinarum</i>	Heen-Karamba, Karamba	LC									√					

Fabaceae (Leguminosae)	Fabaceae	<i>Crotalaria retusa</i>	Kaha- Andanahiriya	LC	√	√													
Euphorbiaceae	Euphorbiaceae	<i>Croton aromaticus</i>	Wel-Keppetiya	LC		√													√
Euphorbiaceae	Euphorbiaceae	<i>Croton laccifer</i>	Gas-Keppetiya, Keppetiya	LC		√													
Hypoxidaceae (Early under Amarallidaceae)	Hypoxidaceae	<i>Curculigo orchioides</i>	Bim thal, Heen bin tal, Sudu kela	LC	√	√			√	√									√
Menispermaceae	Menispermaceae	<i>Cyclea peltata</i>	Kehipiththan, Kaha-Pittan, Kehi-pittan, Kessi-pissan	LC														√	√
Fabaceae (Leguminosae)	Fabaceae	<i>Desmodium triflorum</i>	Heen- undupiyaliya	LC	√	√			√	√	√								√
Sapindaceae	Sapindaceae	<i>Dimocarpus longan</i>	Mora, Rasa- mora, Peni Mora	LC										√				√	
Ebenaceae	Ebenaceae	<i>Diospyros malabarica</i>	Thimbiri	LC															
Asclepiadaceae	Apocynaceae	<i>Dregea volubilis</i>	Anguna, Anukkola, Kiri- Anguna, Titta- Anguna	√						√		√							
Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Wira	LC										√					√
Poaceae (Gramineae)	Poaceae	<i>Eleusine indica</i>	Bela-tana, Wal- Kurakkan, Wal- mal-kurakkan, Bela thana	LC		√			√										
Asteraceae (Compositae)	Asteraceae	<i>Emilia sonchifolia</i>	Kadupahara	LC		√													√
Connvolvulaceae	Connvolvulaceae	<i>Evolvulus alsinoides</i>	Visnu-kranthi, Nil Vishnukranthi	LC	√							√							

Phyllanthaceae	Phyllanthaceae	<i>Margaritaria indica</i>	Rathkarau	LC												√			√
Rhamnaceae	Rhamnaceae	<i>Scutia myrtina</i>	Kattamberiya	LC					√										√
Rubiaceae	Rubiaceae	<i>Ixora jucunda</i>	Godarathmal	NT												√			