CONSERVATION MANAGEMENT PLAN

(JULY 2023 - JUNE 2033)

ROYAL MANAS NATIONAL PARK

Department of Forests and Park Services

Ministry of Energy and Natural Resources

Royal Government of Bhutan

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Gelephu: Bhutan

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ROYAL GOVERNMENT'S ENDORSEMENT AND APPROVAL

Conservation Management Plan for Royal Manas National Park

(July 2023 - June 2033)

"In accordance with and as per the Forest and Nature Conservation Act of Bhutan, 2023"

Submitted for Approval

Chief Forestry Officer
Royal Manas National Park

Forwarded for Approval

Chief Forestry Officer
Nature Conservation Division

Recommended for Approval

DIRECTOR
Department of Forests and Park services

Approved by

SECRETARY
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Manas Park Range Office, RMNP beside the Mans river

A typical settlement inside RMNP

FOREWORD

Bhutan consists of 72% of its geographical area under forests cover, and 51.32 % is under the protected area network. Among other protected areas, Royal Manas National Park (RMNP), located in the south-central foothills of Bhutan is a symbol of dedication for the long-term conservation of wildlife and their habitat.

RMNP provides a safe refuge for charismatic species, which are endangered such as Royal Bengal tiger, golden langur, clouded leopard, Asian elephant, Asiatic water buffalo, Asiatic wild dog and Asiatic gaur. Having met the highest global standards for effective site-based management for wild tigers, the park has been accredited as Conservation Assured Tiger Standards (CA|TS) sites in 2019 and won the "TX2 Conservation Excellence Award" for 2020 from Global Tiger Forum along with Manas National Park, India. The crowning glory of RMNP is the incredible bird diversity, currently accounting to 63% of total bird species of Bhutan. The globally rare and endangered floral species such as *Dalbergia oleveri*, *Aquilaria malaccensis*, *Taxus baccata* and *Podocarpus neriifolia* are also found in the national park.

Recognizing the remarkable diversity and rich ecosystem, I am very pleased to learn about the revised Conservation Management Plan (2023-2033) prepared with a holistic mission to conserve and manage biodiversity in the park, ensure environmental, social and economic wellbeing of the park communities, adapt and mitigate climate change impacts. The plan is prepared incorporating all the lessons learnt from the past management plans, prevailing conservation threats, opportunities and through extensive community consultations.

The tremendous amount of hard work and sacrifices right from the tedious biodiversity inventories to exhaustive consultation meetings is very evident. For this, I would like to congratulate the entire team under Department of Forests and Park Services involved in the revision lead by RMNP and further urge all to strive for successful implementation of the planned objectives.

Tashi Delek!

(Karma Tshering

PREFACE

Bhutan's first national park, the Royal Manas National Park forms an indispensable corridor for the terai Arc Tiger conservation landscape. It also forms the core of Transboundary Manas Conservation Area (TraMCA) with Manas National Park of India. The park is increasingly recognized for the potential source of tiger population in the country. Spanning an area of 1057 km^2, with three distinct eco-floristic zones; sub-tropical, warm broadleaved & cool broadleaved forest and altitude ranging from 70 - 2714 m.a.s.l, the park forms habitat for diverse flora and fauna including many globally endangered species.

While the park management strive for scientific based conservation management of rich biodiversity, the park also faces many challenges that endangers the ecological integrity of the park. Thus, the fourth conservation management plan was developed based on the findings of surveys (biodiversity, socio-economic & threats) gathered through SMART patrol, community consultations and field data. The plan was developed holistically upon rigorous consultation with park staff, park communities and relevant stakeholders.

The fourth conservation management plan is prepared for the period of 10 years from 2023 to 2033. The plan as climate smart management plan is inclusive of programs for adapting and mitigating climate change based on the vulnerabilities of nature and communities. In addition, current management plan also has consolidated theme on environment & social safeguards (ESS) and gender mainstreaming.

Therefore, I would like to extend my appreciation to RMNP management for the successful finalization of the fourth conservation management plan. I am hopeful this plan will serve as a guiding tool in ensuring management decisions based on coherent understanding of the park, resources and associated values.

Tashi Delek.

(Lobzang Dorji)

Director

ACKNOWLEDGEMENT

With the successful enactment of this plan, Royal Manas National Park is pleased to present the fourth conservation management plan of the park. Unlike the past conservation management plan, this plan will be implemented for 10 years period, starting July, 2023 till June, 2033. Unlike past plans, the plan is more comprehensive with the inclusion of climate change, ESS and gender mainstreaming component. Therefore, the park management would like to convey our sincere acknowledgement to the involved parties for successful and timely formulation of this plan document. The plan would not have been possible without the consistent support of the Department and Nature Conservation Division (NCD) through technical guidance, review and due process of approval.

The management would like to congratulate and extend sincere gratitude to all the staff who were actively involved in various field surveys, data analysis, compilation and plan write up. The management highly values everyone's contribution and appreciate all for demonstrating unwavering commitment, dedication and support for this historic endeavor. This plan is entirely the output of the team work

The Dzongkhag administration, local government and the local communities had been providing us insightful ground information and they been engaged throughout our conservation management journey. Therefore, the park management would like to extend our heartiest gratitude to all the people of seven Gewogs; Phangkhar, Trong & Ngangla Gewogs (Zhemgang), Norbugang Gewogs (Pemagatshel) and Umling, Tareythang and Jigmecholing Gewogs (Sarpang) for their unwavering supports.

The conservation management plan revision necessitated multiple surveys which was the budget intensive process. Therefore, the park management is immensely grateful to Royal Government of Bhutan (RoGB), and Bhutan for Life (BFL) project for the financial support in the plan preparation.

(Royal Manas National Park)

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LIST OF ACRONYMS

BA	Basal Area
BFL	Bhutan for Life
BMG	Biodiversity Monitoring Grids
Cft	Cubic feet
CF	Community Forest
CFMG	Community Forest Management Group
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CP	Cluster Plot
DBH	Diameter at Breast Height
FNCRR	Forest and Nature Conservation Rules and Regulations
FNCA	Forest and Nature Conservation Act of Bhutan
GPS	Global Positioning System
G2C	Government to Citizen
H'	Shannon's diversity
HHs	Households
HWC	Human-Wildlife Conflict
IUCN	International Union for the Conservation of Nature
LULC	Land Use and Land Cover
METT+	Management Effectiveness Tracking Tool Plus
MoAF	Ministry of Agriculture and Forests
NCD	Nature Conservation Division
NFI	National Forest Inventory
NTS	National Tiger Survey
NWFP	Now-wood Forest Products
PA	Protected Area
PAST (software)	Paleontological statistics (software)
RBA	Relative Basal Area
RGoB	Royal Government of Bhutan
RMNP	Royal Manas National Park
SMART	Spatial Monitoring and Reporting Tool
SRFL	State Reserved Forest Land
TraMCA	Transboundary Manas Conservation Area
UNESCO	United Nations Educational Scientific and Cultural Organization
UWICER	Ugyen Wangchuk Institute for Conservation and Environmental Research

GLOSSARY OF BHUTANESE TERMS

Chiwog	Lowest administrative unit formed by group of villages
Chhu	River/stream
Chuzhing	Wetland
Dzongkhag	District
Gewog	Block
Gup	An elected head of the local government
Kamzhing	Dryland
Pipla	*Piper sp*.
Satshab	Land substitution
Thromde	Municipal body
Tshogpa	Elected representative of the Chewog
Tshesa	Kitchen garden
Tshedar	Animal live saving

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PART 1: BACKGROUND

1.1. History and Significance of Protected Areas in Bhutan

The Protected Area (PA) system in Bhutan was established in the 1960s in congruence with the country's first national development plan (Lham et al., 2019). The PAs were originally designated as wildlife sanctuaries, which were upgraded to national parks in the 1980s conferring greater levels of conservation. Currently, the PA of Bhutan consists of 51.44% of the country's geographical area.

Royal Manas National Park (RMNP) is the oldest park in Bhutan. It started as Game Sanctuary and was upgraded to Wildlife Sanctuary in 1966. Later in 1993, it was upgraded to National Park through an amalgamation of Namgyel Wangchuck Reserve and Manas Wildlife Sanctuary (RMNP, 2015). Initially, the Park was under the management of the Sarpang Forest Division and delinked for separate management under the current RMNP management in the late 1990s.

The Park owes its name and also much of its spectacular grandeur to the life-giving 'Manas River.' The river Manas forms the lifeline of the park providing a large tract of highly significant watershed area. Covering an area of 1057 km^2, the park forms a contiguous belt of abundant forest with Manas National Park in Assam, India. RMNP is not only a pride for its rich biodiversity but also for the spectacular landscape, eye-catching lush valleys and rivers, immense scenic beauty, unique culture, and lifestyle. It forms a part of Indo-Burman biodiversity hotspots constituting a remarkably diverse and rich ecosystem of international and national significance.

Crossing the mighty Manas

The Park further adjoins the World Heritage Site (Manas National Park) in India forming an integral part of the Transboundary Manas Conservation Area (TraMCA). The region forms an indispensable corridor for the Terai-Arc tiger Conservation Complex between the Terai regions of Nepal and India with landscapes in north-eastern India, Myanmar, and Southeast Asia. The significance of the entire Manas landscape as a single Transboundary entity and as a conservation complex is acknowledged globally by UNESCO World Heritage Centre, Paris (Borah et al. 2012). This conservation complex is also identified as one of the important Tiger Conservation Landscapes (TCL) for the long-term survival of tigers in the wild (Wibisono et al. 2010).

RMNP forms a major corridor for the movement of wildlife between India and Bhutan, with the conservational landscape of Manas National Park on the other side. The unique landscape forms an important natural conservatory of the country representing outstanding habitat diversity.

The Park is home to two endemic and globally threatened species, viz. golden langur and pygmy hog. It is one of the few places in the world to harbor the highest felid diversity of eight species of which five species are listed in the red list of IUCN. Renowned for its spectacular landscape suffused with one of the highest diversity of species in the country, it provides a safe refuge for charismatic and endangered species such as Royal Bengal tiger, golden langur, clouded leopard, Asian elephant, Asiatic water buffalo, Asiatic wild dog, and Gaur. The Park is now increasingly acknowledged as a potential source of the Royal Bengal tiger and has now been accredited as Conservation Assured Tiger Standards (CA|TS) site in 2019 for meeting the highest global standards for effective site-based management for wild tigers, and is the winner of the "TX2 Conservation Excellence Award" for 2020 by Global Tiger Forum along with Manas National Park, India.

The Park is also home to globally rare and endangered floral species such as *Dalbergia oleveri* (IUCN endangered species), *Aquilaria malaccensis* (IUCN vulnerable) species), *Taxus baccata* (Scheduled 1 species in FNCA 1995) and *Podocarpus neriifolius;* the only conifer broadleaved tree found distributed in small pockets of the park area. The Park is known for its incredible bird diversity, currently accounting for 63% of the total bird species of Bhutan. It is one of the few PAs in Bhutan, providing a safe refuge for all four hornbill species, viz. Rufus-necked hornbill, Great hornbill, Oriental-pied hornbill and Wreathed hornbill.

1.2. Vision, Mission and Goal

1.2.1. Vision

"A healthy and thriving natural landscape where its resources and values are managed sustainably for perpetuity."

1.2.2. Mission

"To conserve and manage the national parks through inclusive and integrated approaches for maximization of ecosystem services and sustainable utilization of natural resources."

1.2.3. Goals and objectives

Incorporating all the lessons learned from past management plans and prevailing conservation threats and opportunities, five goals have been identified to help achieve the mission and vision of the park. Under each strategic goal, a set of 13 objectives are stated to fulfill the goals (refer to Part 5: Management Prescription) for a detailed description of goals, objectives, strategies, and actions.

1.3. Salient features of the plan

The plan was prepared upon extensive identification of threats (focal problems) gathered from the field and community consultations. To ensure the alignment of goals, objectives, outputs, and activities, Logical Framework Analysis (LFA) and the development of a log frame matrix were adopted. The threats and activities were adopted through thorough consultations with all the communities and other stakeholders in the park (Appendix 11 & 12). This plan consists of seven broad parts or chapters and a summary of each part is presented hereunder:

Under the first chapter on background, the brief history and significance of protected areas in Bhutan with emphasis on RMNP's vision, mission, goals, and zones are presented. RMNP with an area of 1057 km^2 has identified four consecutive management zones: core zone, transition zone, buffer zone, and multiple-use zone.

The second chapter highlights the current status of RMNP in terms of its' Landscape characteristics, conservation significance, people and livelihood, other management regimes, administrative setup, service delivery, and infrastructure of the park are presented under this part.

The assessment of the previous management plan, lessons learned, and gaps and carry-over actions from the previous plan are presented in the third chapter.

Under the fourth chapter**,** threats had been identified through the socio-economic survey and public consultations covering all Gewogs under the park, and from Management Effectiveness Tracking Tools Plus (METT+) exercise and SMART database. Among many threats, Human-Wildlife Conflict (HWC) is rated as 'very high', while other threats such as swollen monsoon river, illegal activities, invasive pests, and diseases, etc. were categorized as 'high', Threats categorized under the 'low' category were forest fire and water source pollution.

The fifth chapter describes the park management's intention to achieve its visions and missions through five strategic goals and 13 objectives. These goals and objectives are geared towards protecting the keystone and other threatened species; mitigating conflicts between park residents and wild animals; scientific management of key natural resources in a participatory manner; conservation of watersheds for continued ecosystem services and strengthening the institutional capacity of the park management in conservation of natural resources. Gender mainstreaming in the conservation of natural resources, environment, and social safeguard components are discussed as separate topics under the Management prescription part.

The second last chapter presents the implementation plan and financial outlay to implement the management actions. All activities are included in the action plan with specific details of locations, key collaborators, and timeframe. A total of Nu. 194.28 million is proposed for implementing the activities during the 10 years.

The monitoring and evaluation plan for the planned activities is discussed in this chapter. The mid-term review will be conducted after five years which may entail a revision of activities or time frames.

1.4. Zones of the Park

Similar to other PAs in Bhutan, communities reside in the park with full access to traditional use-rights over natural resources. Therefore, the management regime demands an integrated approach to maintaining the ecological integrity of the PAs whilst considering the developmental activities in the park. Accordingly, the National Forest Policy of Bhutan 2011 mandates PAs to function, based on demarcated zones that accommodate integrated

conservation and development through appropriate management regimes. Therefore, the park area is classified into four zones (Figure 1) as per the Protected Area Zonation guidelines of Bhutan, 2019 which are as under.

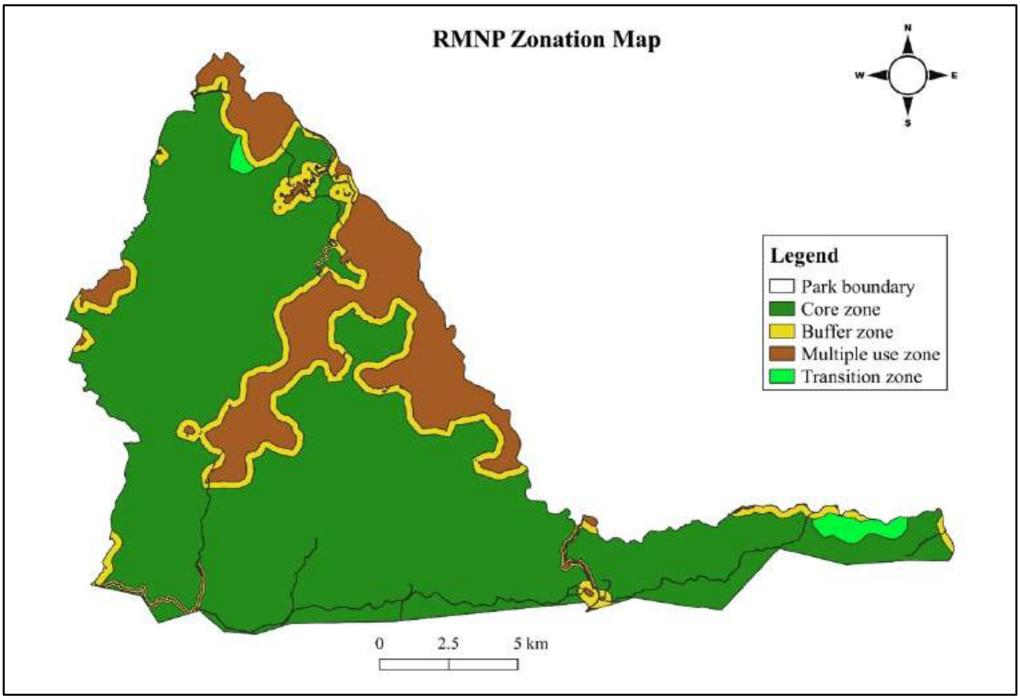


Figure 1: Zonation map of RMNP showing four different zones

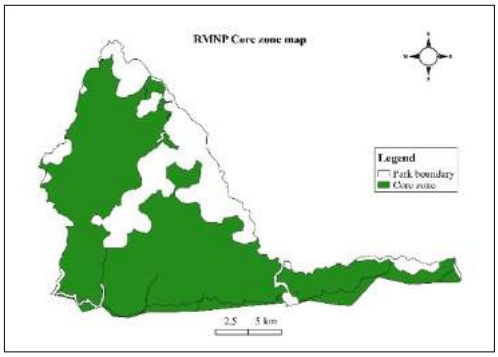
1.4.1. Core zone

The majority of the park area (789.39 Sq. Km) is classified under the core zone. The core zone is the park areas of high conservation values providing critical services for the persistence of important flora and fauna of various significance. The zone is extremely abundant in biodiversity providing habitats to numerous key species which are globally threatened and of conservation importance, such as the Royal Bengal tiger, Asiatic elephant, Guar, Leopards, Asiatic Black Bears, Asiatic water buffalos, etc. It is undisturbed by significant human activity; free of modern infrastructure and predominated by natural ecological processes. It is dominated by key wildlife habitats such as grasslands, salt licks, and waterholes.

1.4.2. Buffer zone

The 10 % (94.84 Sq. Km) of the park area is classified as a buffer zone. The buffer zone provides cushioning function to the core zone. Buffer zones are identified near the area of anthropogenic disturbances, inclusive within and outside of the PA. Therefore, the zone is

demarcated around the multiple-use zone on both sides of roads & trails, and along settlements adjacent to the park boundary. The buffer zone is an area with less intensive human interventions than a multiple-use zone, which may accommodate activities for environmental education, tourism, traditional resource use, and recreation facilities.



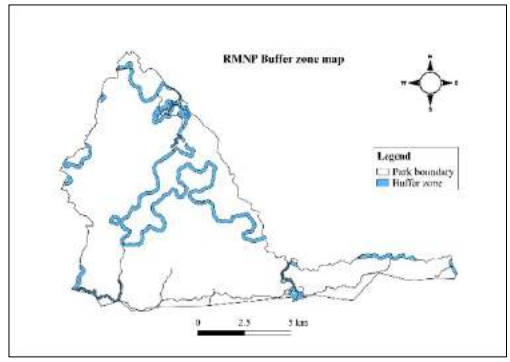
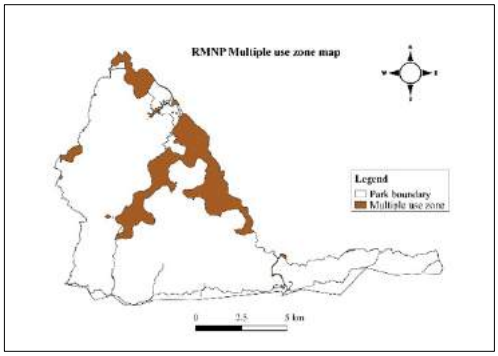
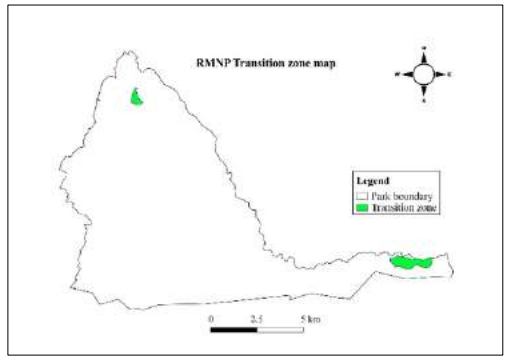


Figure 2: Different zones: A. Core zone map. B. RMNP Buffer zone map





C. RMNP Multiple use zone map D. RMNP Transition zone map

1.4.3. Multiple use zone

The 15% (161.06 Sq. Km) of the total park area is classified as a multiple-use zone. The multiple-use zone includes all the areas with human interference. The settlements or build-up areas; private & institution registered lands; resource allocation areas (such as community forests and NWFP areas), ecotourism & recreational areas, and agricultural farm lands are all considered in multiple use zone. Therefore, the multiple-use zone is being sustainably managed for natural resources for the benefit of people and wildlife.

1.4.4. Transitional zone

The transition zone is the area of interdependence between wildlife and communities. 12.11 Sq. Km, (constituting less than 2% of the park area) is classified as a Transitional zone. In a Transitional zone, the traditional and legal rights for sustainable use of natural resources are permitted for a certain period or seasons. The traditional grazing areas above the Zurphel community & vicinity of Tamala and traditional 'Pipla' collection areas vicinity of Norbugang communities fall under the Transition zone. The protection status of this zone is equivalent to the core zone with exceptions/relaxations during the traditional and legal use-right season. The transition zone is located within the core zone.

Twin waterfall enroute to Manas

PART 2: CURRENT STATUS OF RMNP

2.1. Landscape characteristics

RMNP is situated in the south-central foothills of Bhutan (90°35' E to 91°13' E and 26° 46' N to 27° 08' N). Spanning an area of 1057 km^2, the national park falls within the political jurisdiction of three Dzongkhags, viz. Zhemgang, Sarpang and Pemagatshel. The southern section of the park has an interspersion of irregular swathes of grasslands and wide riverbeds comprising one of the most picturesque national parks in Bhutan.

The lowest elevation recorded in the park is 70.06 masl (recorded during National Forest Inventory 2021, at Manas: 90.96239677N, 26.80108047E, earlier reported at 97 masl). The highest elevation is 2714 masl at Thongjaphu on the top of Kharila Ridge under Phangkhar, Zhemgang.

The Park consists of moist subtropical to cool temperate climates with four distinct seasons. Summer lasts from May to August with annual maximum temperature ranging from 20°C to 40°C. The rainfall ranges from 200mm to 4400mm annually. Autumn lasts between September and November experiencing changeable weather, which gradually shifts into a winter pattern. Characterized by cool weather and fog, winter is relatively drier with rare showers with average temperatures ranging from 5°C to 20°C. The Park experiences strong to moderately strong wind in the months of November-April. The geology consists mostly of the Buxa formation characterized by dolomites, quartzite, and variegated phyllite, overlain by the Manas formation and Shumar formation (Sherub and Wangchuk 2006).

The Park abounds with rivers and streams of perennial and seasonal nature. The largest river of the country, Manas drains about two-thirds of the water of the country. It springs from four major tributaries viz. Mangde Chhu, Chamkar Chhu, Kuri Chhu, and Drangme Chhu. The other perennial rivers such as Udigang, Kukulung, Kanamakura, Widang, and Tshendagang rivers form some of the important watersheds. Waterholes in the form of lakes and marshes are erratically distributed with higher density along the foothill belt of the park.

2.2. Floral description

2.2.1. Flora survey design and methodology

The Cluster plot ID number of the National Forest Inventory (NFI) was adopted for Biodiversity Monitoring Grid (BMG) as per the Biodiversity Monitoring and Social Surveying Protocol of Bhutan, 2020. This survey has enumerated whole cluster plots together with NFI data collection (Figure 2).

There are 67 NFI cluster plots/grids (201 sub-plots) distributed throughout the park area of 1057 sq. km. A total of 64 grids (178 sub-plots) were enumerated successfully, while the remaining grids and sub-plots could not be accessed due to difficult terrain. Each grid comprised three sub-plots of 12.62 m radius placed on "L" shaped transect at 50 m apart and referred to as the Elbow, North and East plots. All trees with a minimum diameter at breast height (DBH) of 10 cm were enumerated from the plots. For regeneration, the sub-plot of 3.57 m radius was laid within the Elbow plot and 0.57 m radius sub-plots for herbs within North & East plots. The fieldwork commenced in October 2021 and was completed in May 2022.

All statistical estimates presented in this report have been analyzed in Microsoft Excel, Pivot table functions, and PAST software. All estimates were generated at cluster plot level and are rounded to the nearest whole number or maximum of one decimal place.

Figure 3: NFI team (with porters) during enumeration of CPs at Gortey, Kanamakura

2.2.2. *Forest types*

The field manual for the National Forest Inventory of Bhutan, 2020, has made reference to the Flora of Bhutan for vegetation classification. The forest types of RMNP are broadly categorized into three as recorded during the field survey, detailed below. Relative Basal Area (RBA) was computed to deduce/analyze the species composition and dominance in each forest type.

i. Subtropical Forest: 200-1000m

The field inventory recorded the lowest elevation of 70.06 masl at Manas under Ngangla gewog, Zhemgang. The lone cluster plot enumerated at Gayhati under Norbugang gewog, Pemagatshel also falls in an elevation less than 200masl. However, considering the species composition, it is classified under Subtropical Forest. The southern belt of the park, viz. Manas, Sonamthang under Ngangla gewog, Changazam, Panabe, Mamung, part of Pongchula, Tradijong under Phangkhar gewog, part of Tshanglajong, Zurphel under Trong gewog, Zhemgang; Wongchilo under Taraythang, Tashithang under Umling gewog, Sarpang; Norbugang gewog under Pemagatshel fall under the forest type. The majority of the inventory plots (31 CPs) lie under the Subtropical Forest.

The dominant species in the forest type based on RBA consist of *Pterospermum acerifolium* (7.6%), *Duabanga grandiflora* (6.6%), *Mangifera sylvatica* (4.3%), *Ficus sp.* (3.4%), *Schima wallichii* (2.9%), *Stereospermum colais* (2.6%), *Michelia champaca* (2.6%), *Lagerstroemia parviflora* (2.6%), *Kydia calycina* (2.5%), *Celtis sp.* (2.3%), *Phoebe sp*. (2.3%), *Trewia nudiflora* (2.2%), *Terminalia chebula* (2.1%), *Sterculia villosa* (1.9%). The least dominant species (RBA value <1%) comprise *Acacia catechu, Premna bengalensis, Ulmus sp., Aphanamixis polystachya, Chukrasia sp., Choerospondias axillaris, Acrocarpus fraxinifolius, Sapium insigne. Aquilaria malaccensis*; the species of globally vulnerable can be found in this forest type.

ii. Warm broadleaved forest: 1000-2000m

The central part of the park, viz. Berti, Tama, Tshanglajong, Zurphel, Subdrang, Gongphu under Trong gewog; Mamung Trong, Pongchola, Tradijong, Panabe, Salapong, Shellingtoed, upper part of Changazam under Phangkhar gewog, Zhemgang; part of Norbugang under Pemagatshel and Wongchilo chewog under Taraythang, part of Jigmecholing, Umling gewog, Sarpang falls under the Warm broadleaved forest. A total of 23 cluster plots fall under this forest type.

The dominant tree species with highest RBA consist of *Castanopsis sp*. (11%), *Tetrameles nudiflora* (6.6%), *Syzygium sp.* (5.7%), *Ficus benghalensis* (4.7%), Duabanga grandiflora (3.4%), *Choerospondias axillaris* (3.1%), *Miliusa sp.* (3.1%), *Schima wallichii* (2.7%), *Litsea sp.* (2.2%), *Mangifera sylvatica* (2.2%), *Altingia excelsa* (2.1%), *Ficus sp*. (2.1%), *Dysoxylem sp.* (1.9%), *Macaranga denticulate* (1.8%). While the least dominant species (RBA value <1%) consist of *Pandanus furcatus, Bischofia javanica, Cordia sp., Callicarpa arborea, Engelhardia spicata, Quercus glauca, Wendlandia puberula*. The globally rare and endangered *Podocarpus neriifolius* was recorded and *Taxus baccata* were observed during the survey. A very small fragmented patch of coniferous forest dominated by *Pinus roxburghii* in the northern part of the park under Trong gewog is also found in the region. It has been further validated from the Land Use and Land Cover (LULC) map of the park (Figure 4.).

iii. Cool broadleaved forest: 2000-2900m

The northern part of the park, viz. Jigmecholing under Sarpang, part of Gongphu, Subdrang, Tshanglajong & Zurphel under Trong, Pongchola, Tradijong Zhemgang falls under the forest type. Only 7 CPs fall under the Coolbroadleaved forest. The dominant species of the forest type comprise of; *Quercus sp.* (16.2%), *Symplocos sp.* (7.1%), *Terminalia sp.* (4.6%), *Lithocarpus sp.* (4.3%), *Castanopsis sp.* (4.1%), *Syzygium sp*. (3.8%), *Quercus lamellosa* (3.3%), *Phoebe sp*. (2.7%), *Albizia sp.* (2.3%), *Persea sp.* (2.1%), *Betula alnoides* (1.3%). Also found interspersed in these forest types are *Rhododendron spps*. Of 64 cluster plots enumerated across all the forest types, 48.4% (31 CPs) fall under the Subtropical Forest indicating its dominance, followed by Warmbroadleaved forest with 40.6% (26 CPs) and Coolbroadleaved forest with 10.9% (7 CPs). The forest types map produced based on elevation is indicated in Figure 5.

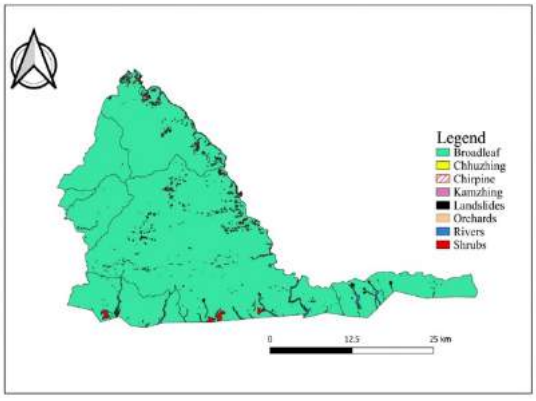


Figure 5: LULC of the park

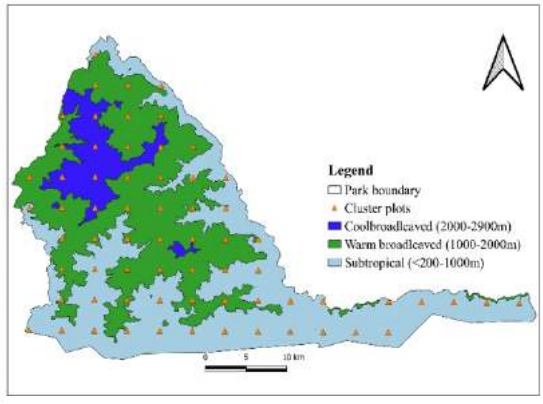


Figure 4: Forest types of the park by elevation

2.2.3. *Species diversity and composition*

The biodiversity checklist of the annual report of the park, 2020-2021 reported 272 tree species, 116 shrub species, 42 herb species, and other types illustrated in Table 1.

Table 1: Flora checklist of the park (Annual Park Report; 2020-2021)

Sl. No	Category	Identified	Unknown	Total
1	Tree	239	33	272
2	Shrub	94	22	116
3	Herb	42	6	48
4	Grass	6	23	29
5	Fern	8	22	30
6	Climber	21	20	41
7	Cane	7	0	7
8	Bamboo	8	1	9
9	Banana	3	0	3
10	Orchid	3	0	3
	Total	**431**	**127**	**558**

The recently conducted field enumeration recorded a total of 239 tree species belonging to 69 families. The number only includes those species which were observed and identified by the field crews and experts. About 68 tree observations from a total of 3214 observations were recorded as unknown species unidentified by the team. The family of 31 genera was recorded as unknown. Thus, the actual tree species and family is expected to be higher than reported.

From the total of 64 CPs, CP2218 at Tamala, Edi falls in private land without any trees to enumerate. Hence, the species diversity has been computed only for 63 CPs. The highest species diversity of 2.88 was recorded at CP2388 in Subtropical Forest and the least of 0.78 at CP2289 in the Coolbroadleaved forest (Figure 5). The species diversity & richness was further validated using PAST software.

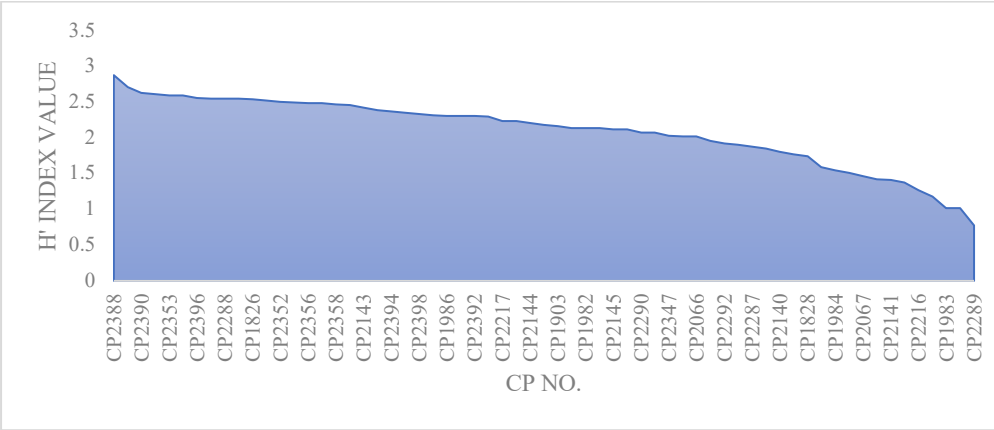


Figure 6: Species diversity by cluster plot wise

The family composition was largely dominated by Lauraceae (463 species) followed by Fagaceae (350 species) and Myrtaceae (258 species) and the least were Rhamnaceae, Rosaceae, and others with single species.

A total of 97 shrub species were recorded from 64 cluster plots during the inventory. Shannon's diversity (H) of shrub species was high in Subtropical Forest with 3.12 and an evenness value of 0.72, followed by the Warmbroadleaved forest with a diversity value of 2.62, evenness value of 0.69 and Coolbroadleaved forest, 1.68 and evenness value of 0.70.

Relative abundance of the overall shrubs recorded for the whole CPs revealed that *Elatostema integrifolium* (17.2%, n=2602) was found in high abundance, followed by *Chloranthus elatoir* (8.08%, n=1221), *Strobilanthes ascerens* (7.19%, n= 1087), *Boehmeria macrophylla* (6.9%, n=1052), *Psilanthus benglensis* (6.01%, n=909). The least abundant were *Mahonia napaulensis*, *Premna barbata*, *Vernonia extensa* with percentage <1 and single species recorded.

A total of 22 herb species were recorded from 29 Cluster plots out of 64 enumerated. Relative abundance (RA) of herbs revealed that *Ageratum conyzoides* (19.6%, n=73) was most abundant followed by *Ageratina adenophora* (14.2%, n=53), *Elatostema imbricans* (10.2%, n=38), *Achyranthes aspera* (7.5%, n=28), while the least abundant was *Sonchus asper, Achryospermum wallichianum* and *Urena lobata* with single record and <1 percentage. Shannon's diversity (H) of herb species was 2.59 and evenness was 0.84.

For regeneration, all tree species with DBH less than 5 cm was enumerated and categorized into established, unestablished, and recruits. In total, the regeneration of 90 major tree species was recorded in 51 cluster plots. Regeneration was maximum in the established category (42.6%, n=344) and the least was in recruits (22.8%, n=184) (Table 2).

Bauhinia sp. had the highest number of regeneration (11.8%, n=93), followed by *Syzygium sp*. (8.2%, n=66) and *Persea odorarissima sp*. (5.8%, n=47). Species with least regeneration recorded were *Stereospermum colais, Talauma hodgsonii, Sapium insigne* with single observation and <1 percentage. Shannon's diversity of regeneration was 2.8 and the evenness value of 0.8.

Table 2: Regeneration recorded during the inventory

Category	Established	Unestablished	Recruits
Count	344	280	184
Percent	42.6	34.7	22.8

**Established regeneration: Plants with DBH <5cm and height >2m.*

**Unestablished regeneration: Plants with DBH <5cm and height < 2 m.*

**Recruits: Small plants with 2-4 leaves but are current year's seedlings.*

2.2.4. Basal Area

In total, 273.4 m^2 basal area (BA) was recorded in 64 cluster plots (12.62 m) radius plots. The highest BA of 12.54 m^2 was recorded at CP2140 (1775 m) in a Cool broadleaved forest, while the lowest BA of 0.34 m^2 was recorded at CP2395 (258 m) in a subtropical forest. The CP-wise basal area is furnished in Figure 7.

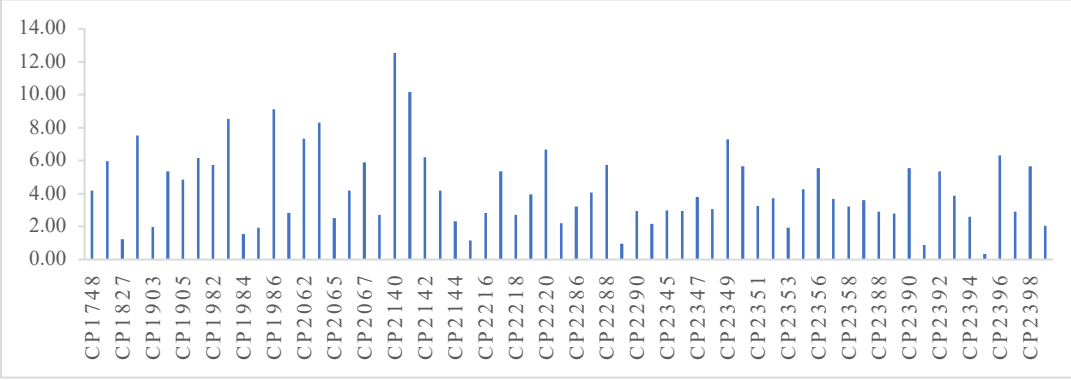


Figure 7: Basal area of each Cluster plot in m^2

2.3. Faunal diversity

2.3.1. Mammal Diversity

RMNP recorded 65 species of mammals (list shown in Appendix 1), of which about 44 percent falls under the International Union for Conservation of Nature's (IUCN) Red List of Threatened Species**.** The list of species as per the IUCN red list of threatened species is in Table 3.

Table 3: Mammal status of conservation concern as per IUCN and CITES

IUCN Threatened list	**No. of species**	**CITES**	**No. of species**
CR	1	Appendix I	20
EN	9	Appendix II	7
VU	12	Appendix III	6
NT	7	**FNCR 1995**	
LC	36	Schedule I	14

Figure 8: Tiger captured at Kukulung during NTS, 2021

The Park provides a safe refuge for charismatic species, which are endangered such as the Royal Bengal tiger (Figure 7), golden langur, Chinese pangolin, clouded leopard, Asian

elephant, Asiatic water buffalo, common leopard (Figure 8), Asiatic wild dog and Asiatic gaur. The Park recorded 8 species of felid diversity, of which 6 species are listed in the red list of IUCN. The nationwide tiger survey in 2015 and a recent survey in 2022 confirmed the park as one of the important tiger habitats harboring the highest densities of tigers in the country. Tigers undeniably form a symbol of the national park´s rich biodiversity and are a vital link in maintaining the health of the ecosystem. Realizing the importance, a long-term annual scientific monitoring of tigers in collaboration with Indian Manas National Park started in 2010. There has been a marked increase in the tiger population from 2015-2020 (Figure 9). The photographic evidence of three cubs, three juveniles, and five lactating female tigers recorded in 2015 and 2016 substantiates a healthy breeding tiger population in the park (RMNP, 2017). Therefore, RMNP harbors a potential source of tiger population critical for conservation at national and global levels. The open model analysis of tigers from 2011-2020 yielded an estimated mean rate of population change at 1.04 SE 0.05, representing an approximate 4% annual increase in the population between 2011-2020 (Figure 10).

Figure 9: Common leopard sighted during SMART patrolling at Manas

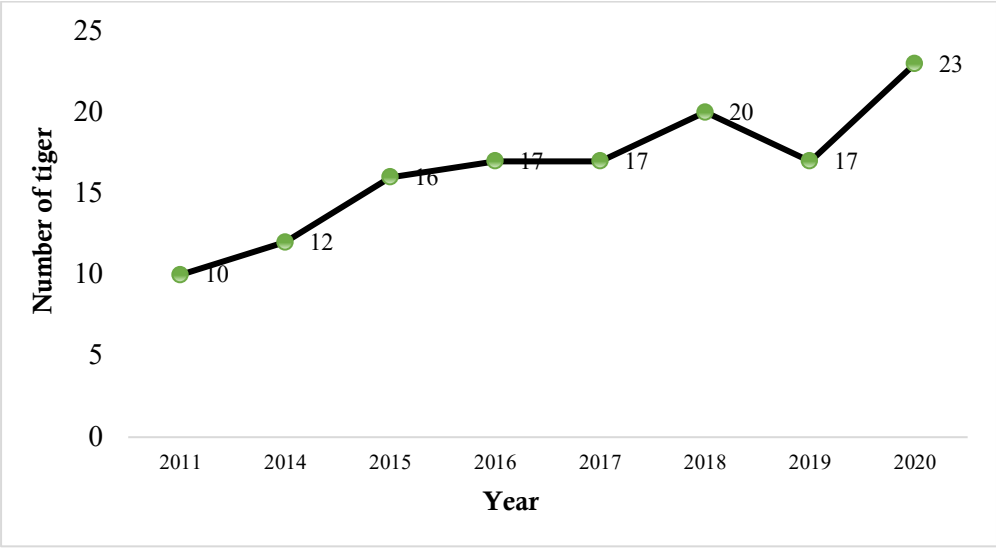


Figure 10: Estimate tiger population over the years

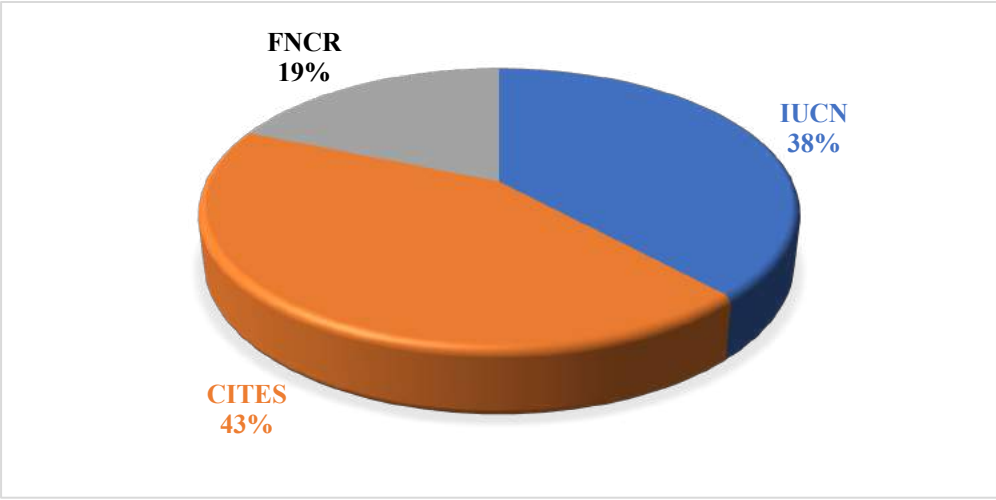


Figure 11: Threatened mammal species

2.3.2. Avifauna Diversity

RMNP is considered a paradise for birdlife due to the presence of an incredibly high number of bird species. The rich bird diversity is mainly attributed to the existence of vast areas of relatively undisturbed natural habitats and wide riverbeds to vast expanses of old-growth subtropical and warm broadleaf to cool broadleaf forests along wide altitudinal ranges (Dorji and Sherub, 2006). Thus, Park provides significant habitats for bird diversity with a record of 499 species (Appendix 2) belonging to 72 families, which accounts for 63 % of bird species found in Bhutan. Although the area constitutes

less than 3 % of the country's geographical area. There are several globally-threatened species among 499 recorded list (Figure 12).

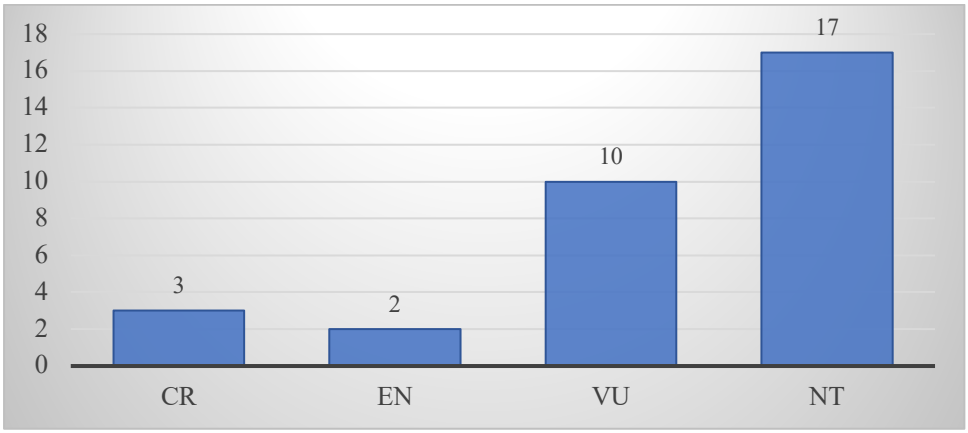


Figure 12: IUCN red list of bird species

A female Rufous-necked hornbill

2.3.3. Herpetofauna Diversity

Herpetofauna includes two vertebrate groups; amphibians and reptiles. The knowledge of herpetofauna in Bhutan is in a growing stage and so is in RMNP. The rapid biodiversity assessment survey (2014) recorded 32 species of herpetofauna, of which 12 species are

amphibians and 20 species are reptiles. The biodiversity survey (2022) and the compilation from secondary sources recorded 71 species of herpetofauna (Appendix 3) from 17 families (Figure 14) comprised of amphibians, reptiles, snakes, and testudines (Figure 13) in the park at present. However, additional species are expected to be explored in the future.

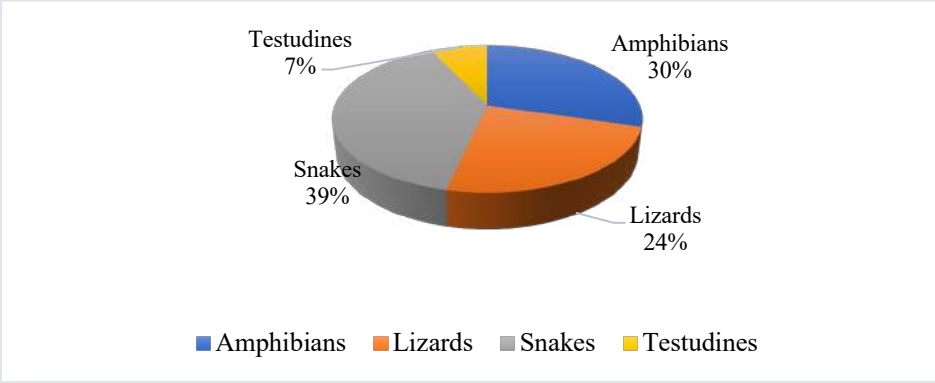


Figure 13: Percentage composition of herpetofauna

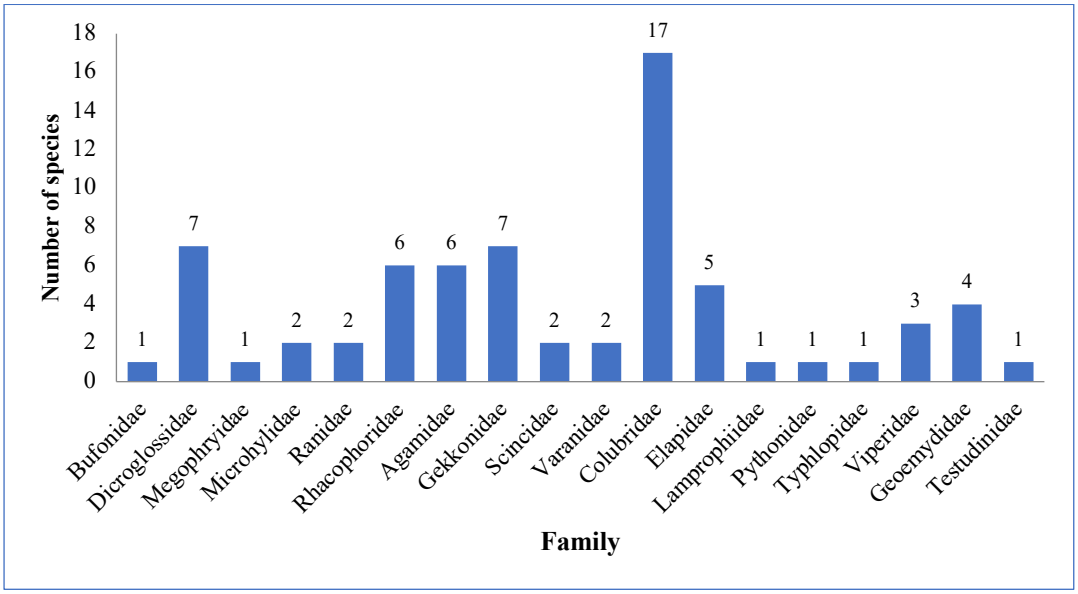


Figure 14: Herpetofauna family recorded in the park

2.3.4. Fish Diversity

RMNP recorded 60 fish species belonging to 42 Genera in 19 families (Figure 15). Two species; *Tor putitora* and *Pterocryptiscf. barakensis* are Endangered (EN), four species viz., Schizothorax cf. plagiostomus, *Bagarius bagarius, Cyprinion semiplotus* and *Schizothorax*

richardsonii are Vulnerable (VU) and five species namely *Anguilla bengalensis*, *Neolissochilus hexagonolepis, Aborichthys kempi, Ailia coila, and Glyptothorax striatus* are Near Threatened (NT) according to the IUCN Red list.

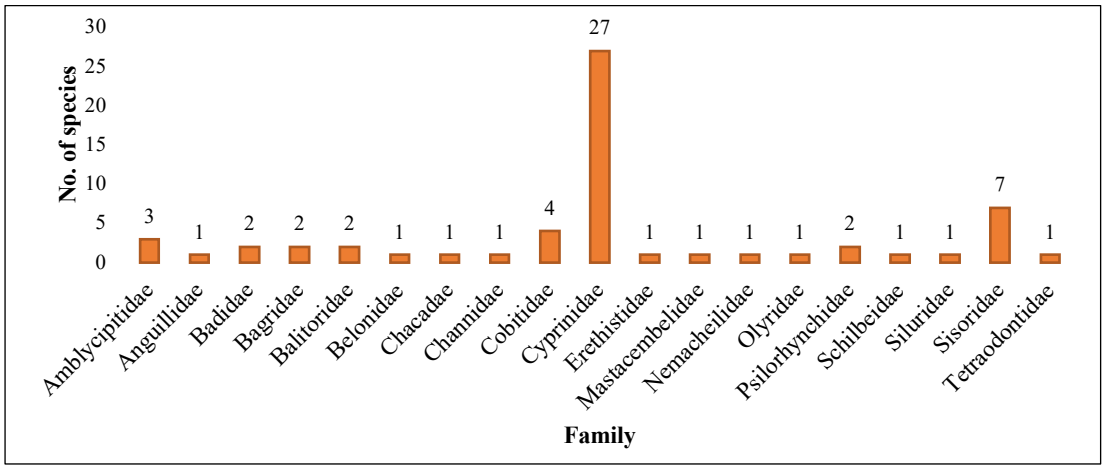


Figure 15: Fish families recorded in the park

2.3.5. *Butterfly Diversity*

Butterflies in the park inhabit five different micro-habitats types such as closed canopy, shrubland, river bed, crop field, and road. In terms of diversity, shrubland, and stream bed harbor the highest diversity of butterflies in RMNP. In total, 204 species (Appendix 4) are recorded in the park belonging to six families as of 2022 through the compilation of data from the field. The maximum number of species of butterfly recorded belong to the Nymphalidae family and the lowest was Satuniidae (Figure 16).

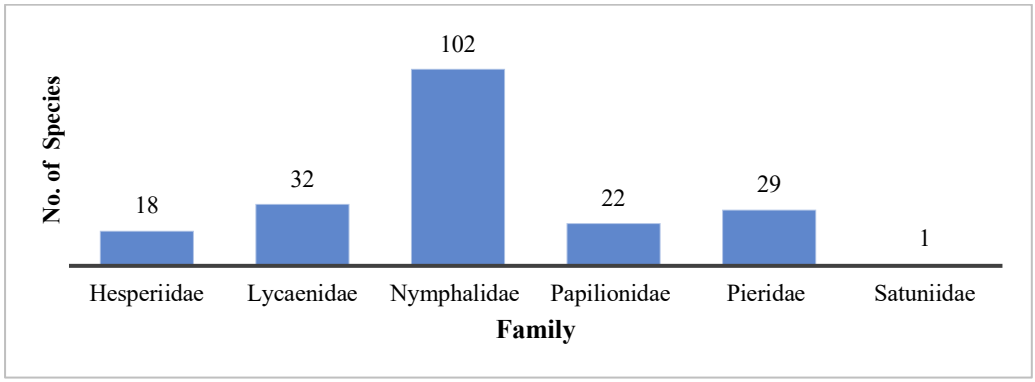


Figure 16: Butterfly families recorded in the park (as of 2022)

2.4. People and livelihood

2.4.1. General description

Similar to other PAs in the country, Royal Manas National Park also entails communities residing in and outside its boundary. These communities depend on forest resources from the park area and form an integral part of park management. Therefore, it is imperative to understand the demography, culture, and livelihoods and involve them in the conservation programs of the park. The socio-economic survey with a semi-structured questionnaire was conducted to understand the constraints and probable opportunities whilst balancing environment conservation with socioeconomic development programs.

2.4.2. Demography

The Park area falling under the jurisdiction of three *Dzongkhag* covers seven *Gewogs* with 1389 households (HHs) consisting estimated population of 11,755 (Table 4). Out of seven *Gewogs*, only Phangkhar and four *Chiwogs* from Trong *Gewog* falls inside the park, while the rest are adjacent gewogs administered by RMNP.

Table 4: Total estimated population within and adjacent to RMNP

Si. No.	Districts	Gewog	HHs. No. (Total/within or service catered by RMNP)	Est. population (Total/within or service catered by RMNP)	Area (Km^2)	Population density
1	Zhemgang	Phangkhar	201	2548	537	4.74
		Trong	376/180	3408/1697	359	9.49
		Ngangla	324/147	4085/1649	216	18.91
2	Sarpang	Tareythang	87	326	109	2.99
		Umling	472	2377	122	19.48
		Jigmecholing	698/31	5716/244	501	11.41
3	Pemagatshel	Norbugang	399/324	4263/2914	182	23.42
			2557/1389	22723/11755		

The socio-economic survey was carried out with a simple random sampling technique. Yamane's (1967) method was deployed to determine the household sample size for the survey. Sufficient sample size with a significant error of ±2.5% was considered to avoid biases. Households were sampled randomly from all the villages and the sampled households were ensured not too close and widely distributed to obtain diverse information on all social aspects.

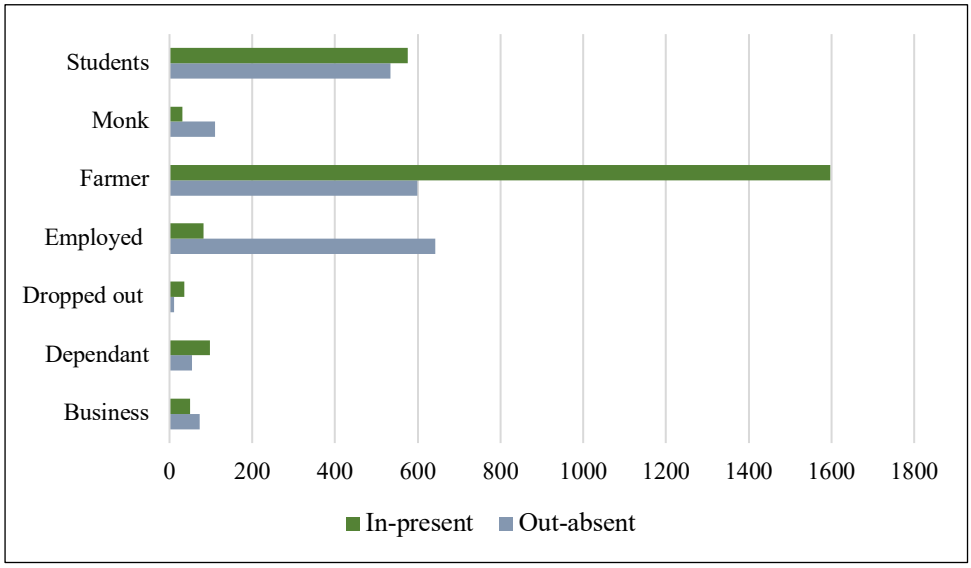


Figure 17: Population detail of the HHs

A total of 757 households from 56 villages were interviewed. An almost equal number of men and women respondents were considered for the interview (52.90% women) to avoid gender biases. The age class of respondents ranged from 16 - 96 years with an average age of 49 years old. The 39.1% of the total HHs interviewed consisted of communities residing inside the park, while the remaining respondents were communities residing adjacent to the park and depending on the resources. The survey found out the total population of 757 households was 4493, of which 45% (2023) of the population doesn't stay in their village (out-absent). Figure 17 shows the details of the in-present and out-absent populations from the surveyed HHs.

2.4.3. Livelihood

A. Landholding and agricultural practices

One of the primary livelihoods of communities residing in and around the park is subsistence agricultural practices. A major chunk of the population (64.69% of the in-present population)

are farmers and every HHs owns lands; *Chuzhing, Kamzhing, Khemsa*, Orchard, etc.) (Table 5).

Table 5: The details on the landholding of surveyed HHs in and around RMNP

Sl. No.	Land type	Area per HH (acre)			HHs No.	HHs %
		Max	Min	Avg		
1	*Chuzhing*	18	0.1	2.05	425	56.14
2	*Kamzhing*	24.9	0.1	4.09	727	96.04
3	*Tshesa /Khemsa*	0.5	0.07	0.33	757	100.00
4	Orchards	8	0.1	1.63	233	30.78
5	Others (lease, shared cropping, etc)	3	0.15	1.41	33	4.36

B. Livestock holding

The livestock rearing is another important component of rural livelihood. The survey found out the community rears livestock primarily as a source of income followed by a source of food which they ranked 1st and 2nd in importance respectively, although maximum HHs (404) were reported to have benefited from the manure of livestock (Table 6).

Table 6: Importance of livestock for different households

Sl. No.	Reasons	Importance (Rank 1 as most important to rank 5 as less important)					HHs No.
		Rank					
		1	2	3	4	5	
1	Source of income	210	98	25	1	0	334
2	Source of food	164	166	19	1	0	350
3	Manure	122	142	117	19	4	404
4	Means of transportation	8	9	5	9	7	38
5	Draught power	6	15	24	2	1	48
6	Others (biogas, clean house surrounding, live-saving *Tshedar*)	3	2	6	1	1	13

The farmers reported rearing 10 types of livestock including four types of cattle breeds. Figure 17 depicts the livestock population status of interviewed HHs. Three HHs also reported having fisheries (8 fishery ponds in total) as a part of farming for income generation.

2.4.4. *Sources of income (agriculture, livestock, and NWFP)*

Communities grow a wide range of crops for self-consumption as well as for income generation. Six primary food crops; maize, paddy, millet, buckwheat, wheat, and barley were grown by the communities out of which maize (grown by 440 HHs) followed by wetland paddy (238 HHs) is the most commonly grown crop. Besides food crops, communities also grow a total of 22 types of cash crops (Figure 18). Areca nut (grown by 334 HHs), followed by ginger and orange (grown by 230 & 220 HHs respectively) were the most commonly grown cash crops. Areca nut earns the maximum income for the communities followed by cardamom with an average annual income of Nu. 64,255.

Besides agriculture, livestock is another primary source of income for rural livelihood. Communities generate income by selling livestock products; butter, cheese, milk, eggs, selling live animals, meat, manure, draught power, and through transportation means (Table 7).

The communities residing along forest fringes also depend on livelihood on forest resources for consumption as well as income generation. A survey found out mushroom is the most common forest produce people sell & generate income followed by ferns, canes, and medicinal plants. However, the overall trend of people earning income from forest produce or NWFPs was found either static or decreasing.

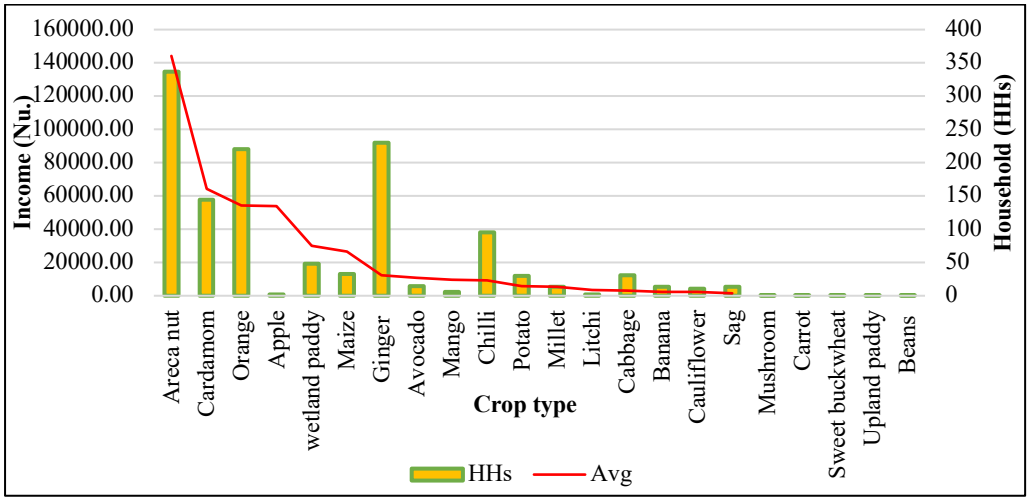


Figure 18: Income generation from different cash crops in the last 1 year

Table 7: Annual income generation from different types of livestock

Types of livestock	Products	Income (Nu.) generated in last 1 year by HHs			HHs No.	Self-consumption (HHs. No.)
		Max	Min	Avg (Nu.)		
Cattle	Butter	129150	250	14621.14	256	28
	Cheese	180000	150	15270.97	302	29
	Milk	252000	500	70927.25	41	2
	Sale of live animal	120000	20000	54333.33	3	
Donkey	Transportation	15000	3000	11000.00	3	
Fishery	Meat	70000			3	
Goat	Meat	55640			1	
	Sale of live animals	15000	5000	10000.00	3	
Horse/mule	Transportation	81000	300	21578.57	28	
Piggery	Meat	112000	7500	36400.00	6	1
	Sale of live animals	132000			1	
Poultry	Egg	1104000	120	46185.78	59	5
	Sale of live animals	80000	1300	17971.43	7	
	Meat	270000			1	
	Manure	10000			1	

2.4.5 Constraints; agriculture and livestock-rearing practices

The farmers reported various constraints while agriculture and livestock farming in rural living. Constraints for agriculture practices were broadly categorized under 11 types (Figure 19). The most common constraint for agriculture practices (reported by 83.88% HHs) was crop damage by wild animals. On the other hand, around nine types of constraints were reported for rearing livestock. Insufficient grazing is the most common constraint reported by 167 HHs, out of which 113 HHs ranked it as 1st (most severe) (Table 8).

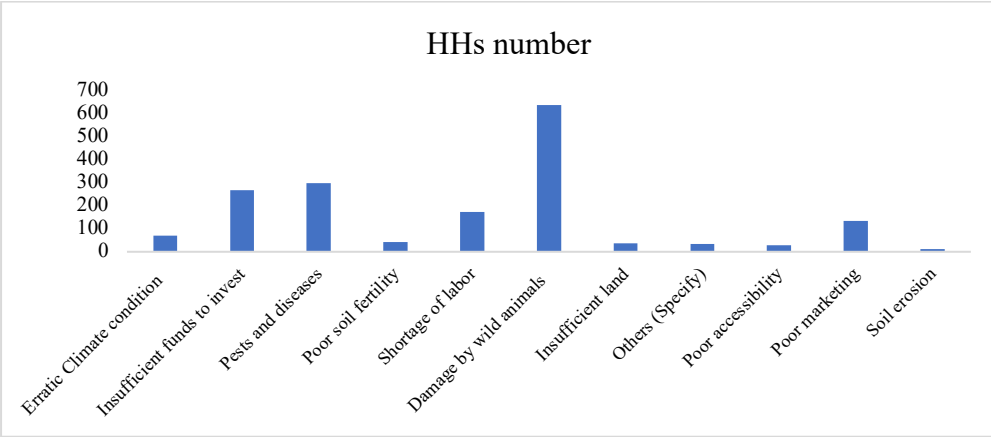


Figure 19: Farming constraints reported by the communities

Table 8: Various constraints reported by surveyed HHs while rearing livestock

Sl. No	Types of constraints	Severity of constraints (rank 1 as very severe to rank 5 as minor)					HHs No.
		Rank					
		1	2	3	4	5	
1	Insufficient grazing	113	45	8	1	0	167
2	Insufficient fodder	90	56	9	1	1	157
3	Losses due to predators	96	30	5	2	0	133
4	Diseases	40	47	17	5	2	111
5	Low milk yields	35	35	16	5	2	93
6	Poor quality local breeds	35	33	11	2	0	81
7	Poor quality grazing	10	20	10	2	2	44
8	Few extension visits	10	10	4	3	0	27
9	Parasites	5	8	3	2	0	18

2.4.6 Human-wildlife conflict

Human-wildlife conflict (HWC) is one of the major challenges the communities face while sustaining rural livelihood. The respondents (32%) reported HWC as a severe problem in their locality. The community reported that they face six different types of HWC (Table 9). Crop damages, livestock depredation, and property damages were the most common HWC reported.

Table 9: HWC types

Si. No.	Human-Wildlife Conflict (HWC)	Total HHs	Degree of HWC (No. of HHs)	
			Sever	Minor
1	Crop damages	604	179	425
2	Livestock predation	109	47	52
3	Property damages	24	8	16
4	Disease transmission	5	3	2
5	Social harassment	18	2	16
6	Others	19	6	13
	Total		245	524

Ten types of crops (Figure 20) were reported damaged by wild animals and 78.78% of the respondents reported crop depredation challenges, of which 179 HHs reported it as a severe issue. Maize, Areca nut, and paddy were reported to have been damaged more than other crops (Figure 20). The main predator of the crops are wild pigs, elephants, and monkeys. Livestock depredation by wild animals is the second major HWC issue. 109 HHs reported four types of livestock are being depredated by wild animals. The prevailing predator for cattle is the common leopard followed by wild dogs and tigers, while poultries are being reported to be predated by small felid species and martin (Table 10).

Table 10: Types of livestock being depredated by wild animals in the past three years

Sl. No.	Livestock	Breed	HHs. No.	Avg. dist (km)	Predators						
					Common Leopard	Tiger	Wild dog	Bear	Eagle	Jungle cat	Martin
1	Cattle	Jersey	22	5.18	11	5	6	0	0	0	0
		Local	51	1.53	31	6	12	2	0	0	0
		Mithun	12	1.08	6	3	2	1	0	0	0
2	Dog	Local	2	1	2	0	0	0	0	0	0
3	Horse	Mule	1	1	0	1	0	0	0	0	0
4	Poultry	Local	21	0.14	0	0	0	2	3	15	1
Total HHs.			109		50	15	20	5	3	15	1

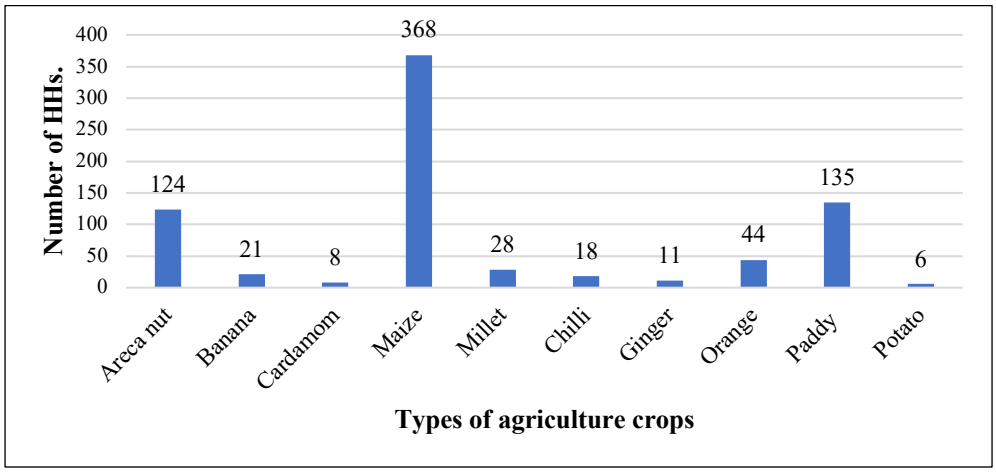


Figure 20: Types of crops depredated

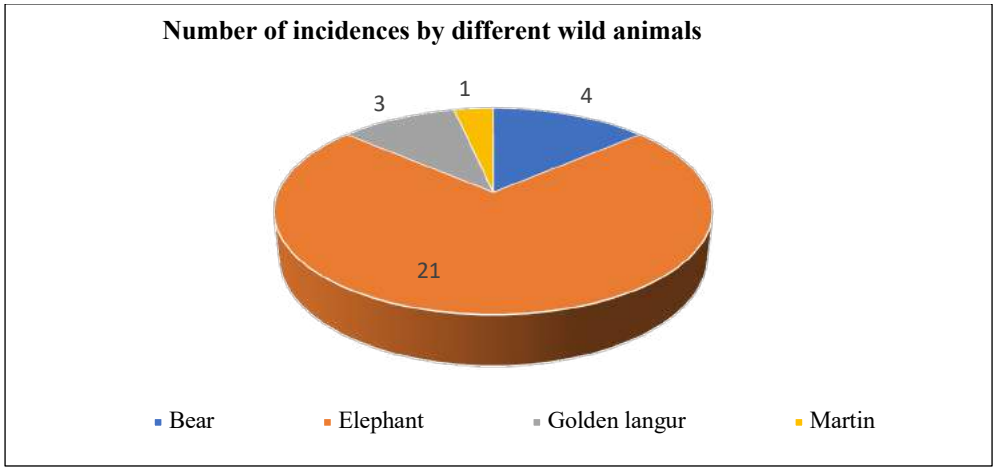


Figure 21: Property damage incidences by wild animals

Property damage by wild animals is another emerging HWC reported. Although, not rampant as other forms of HWC, it is reported as a frequent issue by some HHs. The properties reported to have been damaged by wild animals are houses, cattle sheds, grain stores, field guard houses, poultry farm houses, vehicle garages, huts, clothes, and utensils. Property damages are reported to have been done mostly by elephants than other animals (Figure 21).

2.4.7 Climate change and community perception

Climate change is an emerging issue affecting all sectors prompting redressal at different levels. 70.41% of the respondents have heard of and are aware of climate change. The 503 HHs of 757 stated that they have observed the impact of climate change occurring in their locality. The nature of climate change occurring in the community are broadly categorized into 12 types

(Table 11). The 95 HHs reported that the hailstorm/windy weather was causing the maximum impact on agriculture followed by pests and diseases (forests and agriculture crops and diseases for humans), scanty rain, and early onset of monsoon. The majority of the HHs ranked the impact of climate change as 1 (one) indicating it is an issue of concern in their locality.

The survey attempted to understand the severity of climate change's impact on the livelihood, income, properties, and lives of the people. Although the loss of human lives due to climate change is low (7 people during the last 10 years), the impact on livelihood and properties was found high (Table 12).

Table 11: Nature of climate change and ranking based on impacts (community's perception)

Sl. No.	Nature of climate change impacts	Rank (1 as with major impact and 4 with less impact)				HHs. No.
		1	2	3	4	
1	Delayed onset of monsoon	22	3	2	1	28
2	Drought	17	1			18
3	Early onset of monsoon	37	7			44
4	Floods	21	1	1		23
5	Forest fires	3	3			6
6	Hailstorms /wind	78	17			95
7	Landslides	3	1		1	5
8	Pest and diseases (forests and agriculture crops and diseases for human)	59	22	2		83
9	Prolonged rain	27	8	4		39
10	Scanty rain	41	5			46
11	Soil erosion	8	2			10
12	Others			2		2

Table 12: Degree of climate change impacts on people and their livelihoods (community perception)

Sl. No.	Impact of climate change on	Yes	No	Increase	Decrease
1	Livelihood	254	165		
2	Income			21	398
3	Properties	176	244		
4	Loss of lives	7	412		

The 52 HHs responded that their agriculture farming timing has changed mainly due to changes in rainy seasons. While few households reported that the change has occurred since 2015, many believe that the change is evident very recently (2 to 3 years back).

2.4.8 *Resource allocation (quantity of timber allotted)*

In six years as in Figure 22, RMNP allotted a total of 170955.8 cft of rural timber to the park communities. Maximum rural timber was allotted in the year 2018 (69361.1cft) followed by 2019 (28175.0 cft). Besides that, a total of 55196.83 cft of timber were allotted for commercial purposes from activities such as transmission lines within the same period (2016-2021). Maximum commercial timber was allotted in the year 2021 (29218.32 cft) followed by the year 2016 (13063.79 cft).

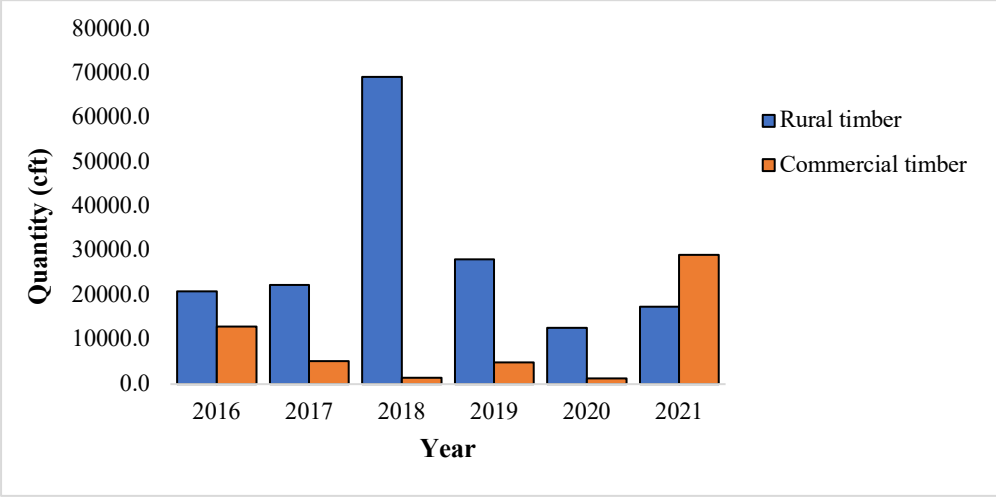


Figure 22: Timber supply for rural and commercial purposes (source: G2C)

2.5 Other forest management regimes

2.5.1. *Community forest management plan*

There are 19 CFs (Community Forests; Appendix 5) in the park consisting of 2277.46 hectares benefiting 486 households as of 2022. The establishment of community forests has benefited rural communities in many ways, such as easy access to local resources, conservation of nearby resources, income generation, and protection from illegal exploitation and rehabilitation of degraded forest lands. The Park monitors the CF activities and provides technical support and guidance in the proper functioning of the CFs.

2.5.2. Non-wood forest product management plans

Non-wood forest products (NWFPs) continue to be a vital natural resource to the rural communities for their livelihood and food security in many parts of the country. NWFPs provide food, medicine, raw materials, and income to rural communities. There are five NWFP management groups (Appendix 6) as of 2022. It covers an area of 160.85 hectares benefiting 86 households under Gomphu Range. The NWFP plans are prepared with technical support from forestry staff and are implemented accordingly.

2.5.3. Watershed management intervention plan

RMNP conducted an assessment and classification of watersheds for the entire area in 2020. Based on the outcome of the assessment, the Serchhu watershed under Umling has been identified as degraded and identified for intervention. Accordingly, with the support of the Watershed Management Division (WMD), a watershed intervention plan was developed and submitted to WMD in 2021. Relevant interventions are incorporated into the implementation framework of the plan (Appendix 7).

2.6. Administrative, service delivery and park infrastructure

2.6.1. Current administrative settings

The entire park area is spread over three Dzongkhags: Sarpang, Zhemgang, and Pemagatshel. The head office is located at Gelephu in Sarpang Dzongkhag and the park is currently manned by 91 staff (Technical: 56, non-technical: 5, GSP & ESP: 30). The services are further delivered from three Park Range Offices (Figure 23).

2.6.2. Park infrastructure

The head office, RMNP is located in Gelephu *Thromdhe*. The two-storied building houses the office of the Chief Forestry Officer, a technical and administrative section of the park along with a conference hall.

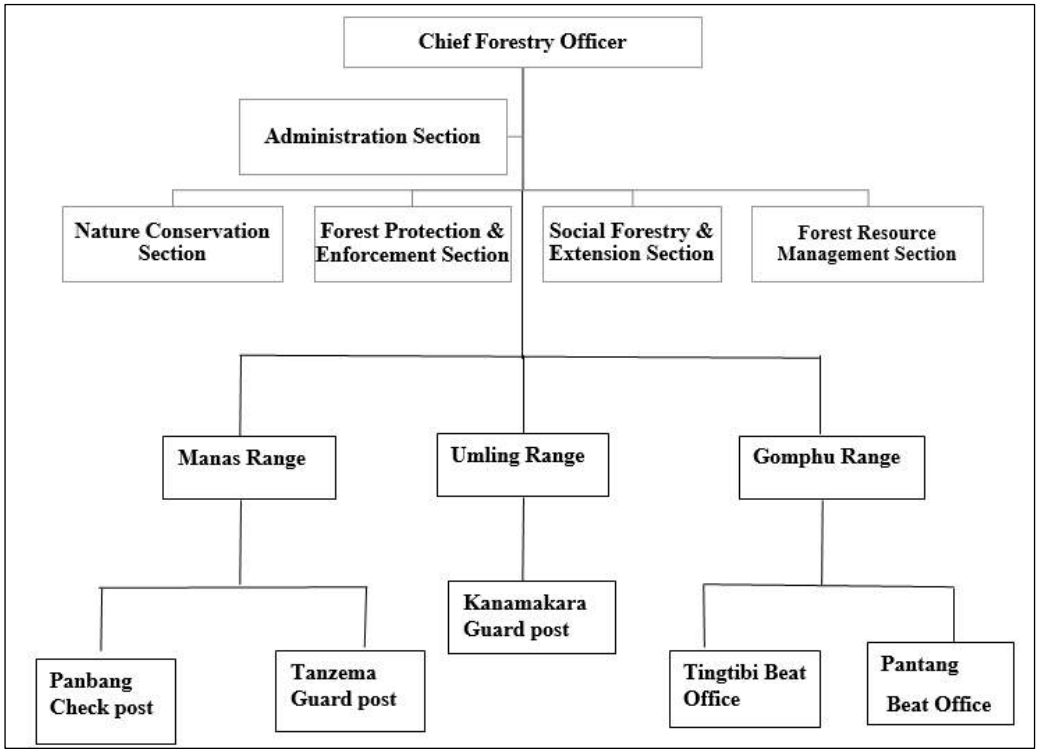


Figure 23: Administrative set up of RMNP

A. Umling range

Umling Range (located in Umling gewog, Sarpang Dzongkhag) caters services to the park areas under Sarpang Dzongkhag and is located 35 kilometers from Gelephu. The Range infrastructure consists of one unit office four nos. of 3 units staff quarters and one no. of 2 units staff quarters. Kanamakura guard post located 29 km from Umling is managed by staff of Umling range on a monthly rotation basis. A two-storied house and one number Observation Point (OP) at Kanamakura are occupied and utilized by forestry staff and RBA personnel. The guard post serves the purpose of protecting important flora and fauna of the park from illegal activities and also serves as a station to further patrol and survey thickly forested areas of the park.

B. Manas range

Manas Range is located on the fringe of the Indo-Bhutan International border. It has office and residential blocks for the staff who are placed in the Range. The only means of communication within the main base is through a wireless network and Motorola handset to communicate with

the staff. The Range compound has a magnificent Royal cottage & guest house and a wildlife observation tower (watch tower) at Specialthang (Figure 24). Manas Range also manages a check post at Panbang with one unit office structure and housing quarter. It also covers Tanzema Guardpost under Norbugang, Pemagatshel.

Figure 24: Wildlife observation tower (Watch tower) at Specialthang, Manas

C. Gomphu range

The one-unit building serves as the Range office and has two-unit staff quarters. Gomphu Range is supported by Beat Offices at Tingtibi and Pantang. The services are delivered from the old RNR building at Pantang. At Tingtibi, a single structure houses the offices of RMNP, Zhemgang Division, and Jigme Singye Wangchuck National Park. Three Eco-lodges (Gomphu, Pantang &Panbang), are built for management by the communities and towards enhancement of their livelihoods.

. The circuit

D. Road network

The proper Manas (Manas range) is accessible from four routes (Figure 25) as detailed below:

- Route 1: Gelephu to Manas via Tingtibi, Gomphu, Pantang, and Panbang (200 km)
- Route 2: Gelephu to Manas via Barpeta road, India (152 km)
- Route 3: Zhemgang to Manas via Tingtibi and Panbang (150 km)
- Route 4: Nganglam to Manas via Panbang (68 km)

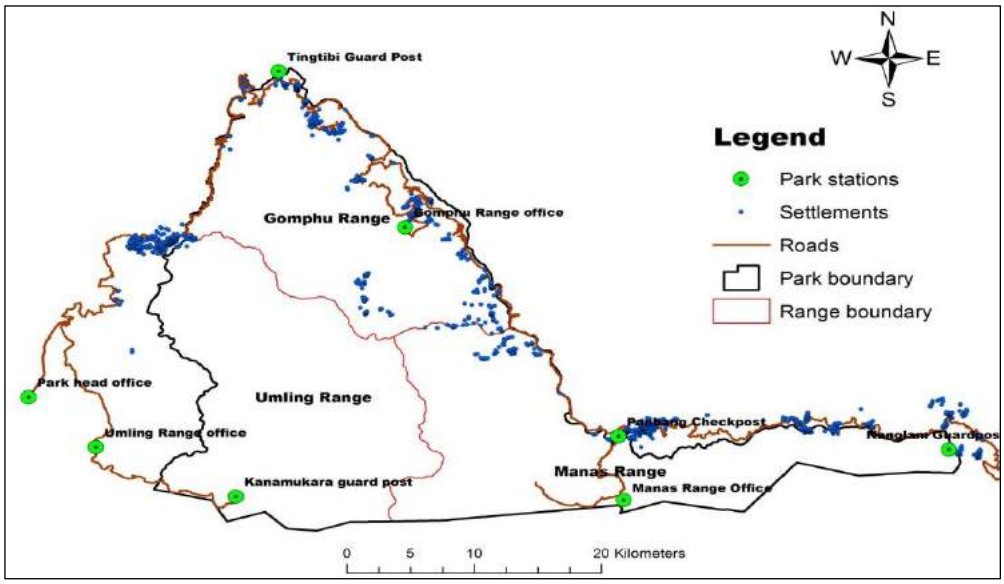


Figure 25: Map showing road connectivity in RMNP

PART 3: SUMMARY OF THE PAST PLAN

3.1. Assessment of previous management plan (major outputs)

Three consecutive Conservation Management Plans (1995-2020) were completed. The major outputs from the previous plan (2015-2020) are grouped into two management programs (Biodiversity and ecosystem Program, Communities, Recreation, and Development Program) with nine sub-programs as below:

3.1.1. Species conservation and protection

The various species were added and updated to the existing lists during the plan, which is separately discussed under the Flora and Fauna section of this plan. Further, studies were conducted to enhance the scientific knowledge which is documented in scientific papers, reports, and books (Refer: Appendix 8, 9 & 10).

The existing infrastructures (refer to 2.6) were constructed in the previous plan to enhance the protection and surveillance, and service delivery programs of the park. The demarcation of the park boundary and zonation was implemented. Towards the enhancement of communication networks in the park, the Motorola repeater base at Darachu connecting Park HQ, Umling Range, Kanamakura and Manas (Batashey top), and Panbang Check post was established. RMNP is considered a pioneer in the implementation of SMART patrol which enhanced efficient monitoring through data collection, identification of threats, and intelligence networks. Various illegal activities were curbed and monitored (Refer to part 4: Threats: Illegal activities). TraMCA was conceptualized for cross-border cooperation and curbing of illegal activities through information sharing and other programs.

3.1.2. Information and data management

It is vital to maintain all data and information gathered through surveys and other studies, for future reference and record. These are documented in the form of published scientific papers and technical reports. The SMART tool is also adopted to enhance data collection during patrols and other service delivery fieldwork. FIRMS (Forest Information and Resource

Management System) is timely updated with all relevant information. G2C also serves as a platform to store information on various service deliveries.

3.1.3. Habitat management

The habitat management consists of the creation and revival of grasslands (Figure 26), artificial waterholes and saltlicks, and the enrichment of natural mineral sites. It will maintain balanced prey-predator dynamics and reduce Human-Wildlife Conflicts while retaining the wildlife in its natural habitats. These activities were carried out on southern belts under Umling and Manas Range. The periodical clearing and burning of grasslands and enrichment with native grass species were conducted for habitat management.

Figure 26: Lowland grassland management activities at Kanamakura grassland

Grasslands, waterhole and wildlife

3.1.4. Research and monitoring

The Park conducted surveys and studies to understand the ecology of wildlife (Figure 27) and enhance the technical knowledge and data for proper interventions, conservation, and management. These studies are documented in scientific papers and technical reports (Refer to Appendix 9 & 10). The annual monitoring of tigers using camera traps jointly with Manas National Park, India was conducted.

Figure 27: Asiatic water buffalo and Guar at Gelongkhola, Manas

3.1.5. Environmental education and awareness

The awareness programs on forestry Rules and Regulations were conducted for all gewogs and education programs on the importance of conservations in nine schools. The Global Tiger Day was celebrated in 2 Schools (Norbugang in 2018 & Panbang in 2019), and World Wildlife Day was intended to create awareness among the communities.

3.1.6. Hunter to Hermit Program

Upon reporting a few cases of illegal transactions of tiger parts and other wildlife from Norbugang, Park and BTC in collaboration with Monastery organized an awareness program on tiger conservation for the people of Norbugang geog. The religious body plays an important role in changing the mindset of the community. Subsequently, International Tiger Day Celebration on 29th July 2018 was held at Norbugang wherein 36 poachers surrendered and

follow the path of conservationists and hermit life. As such "Hunter to hermit program" evolved as a success story in tiger conservation. To support the livelihood of surrendered poachers and to keep them monitored, Hunter to Hermit program was initiated with the following programs a) Conservation program, b) Livelihood support program c) Development of religious faith and compassion program. The communities are also involved in conservation works such as volunteering in wildlife habitat management activities (Figure 28).

Figure 28: Community-based conservation (wildlife habitat management), Tanzema, Nganglam

3.1.7. Livelihood program

It is vital to initiate livelihood programs to garner the support of the communities on conservation and minimize the pressure of their dependence on natural resources. The details of support programs are in Table 14.

Table 13: Livelihood programs initiated in Gewogs under RMNP

SN	Gewogs	Electric fencing	CGI sheets	Jersey cow/bulls	Mixed fodder spp.)	Bio-gas digestor
1	Tarithang	17.4.km	2 HHs	3	12 HHs	11 HHs

2	Umling	39.02 km	3 HHs	3		14 HHs
3	Trong	4.75 km	12 HHs	9		12 HHs
4	Phangkhar	5.5 km	35 HHs	12		17 HHs
5	Norbugang	4.5 km	6 HHs	5	28 HHs	22 HHs
6	Jigmecholing	2.0 km	1 HH	3		5 HHs
7	Ngangla		8 HHs	3	21 HHs	33 HHs

3.1.8. Recreational services

Eco-tourism products such as eco-lodges were developed at Pantang, Gomphu, Shilingtoe, Panbang, and Norbugang. However, Norbugang and Shilingtoe are no more functional owing to temporary structures and a lack of visitors. The communities were trained in food and beverage management and a few group members were trained in bird watching. River rafting was outsourced to River Guides of Panbang and Eco-trial from the Manas campus to Hatilora top was established.

3.1.9. Forest management and utilization

The 19 CFs and five NWFPS management groups were established. The details are attached in Appendix 5 & 6.

3.1.10. Institutional linkage and capacity building

The Park staff were trained on various short-term courses such as park management, arms training, basic GIS, and wildlife management at the Wildlife Institute of India (PGD and certificate Courses) The SMART training and refresher course were also conducted.

3.2. Lesson learned

The following are important lessons learned from the past management plans:

- A committed fund is necessary to achieve the planned activities.
- More research is required to understand species' behavior, biology, conservation status, ecology, and climate change impacts.
- TraMCA landscape conservation needs to continue.
- Require continued awareness and education programs to garner more support from the communities and other stakeholders.

- Explore and implement more ecotourism opportunities in the park for revenue generation and nature education.
- Understand animal behavior and ecology, design appropriate interventions, and educate the general public in mitigating Human-Wildlife Conflict.
- Adopt modern technologies such as drones for surveys, patrols, and studies in the park to enhance efficiency.
- Equip the field staff with proper security gadgets, communication devices, and safety gear to avoid risks from wild animals, poachers, and unforeseen natural disasters along the porous border.

3.3. Gaps and carry-over actions from the previous management plan

The gaps from the previous plan are identified and presented in Table 14. The unachieved activities are considered in the current plan.

Table 14: Status and carry-over actions for incorporation into the current plan

Sl. no.	Objectives and actions (2015-2020 plan period)	Status and carry-over actions
A	BIODIVERSITY AND ECOSYSTEM PROGRAM	
1	Identify research priorities and implement and monitor conservation programs to establish mechanisms and create opportunities for enhancing management capabilities and knowledge of wildlife science	
1.1	Habitat assessment of one-horned rhinoceros and pygmy hog.	Yes
1.2	Study on resident and altitudinal migrant bird species to better understand the migratory and nesting behavior as well as habitat use.	Partially achieved
1.3	Documentation of the traditional indigenous knowledge of NWFP	Yes
1.4	Pilot valuation of ecosystem services.	Yes
2	Maintain, create, or enhance habitat quality that supports a healthy and diverse wildlife population	
2.1	Artificial waterholes will be developed in areas of scanty water areas and in places where the distribution of waterholes is not uniform. Placing artificial waterholes strategically could increase wildlife species carrying capacity.	Partially achieved
3	Species conservation and adoption of SMART patrolling system to prevent, minimize or mitigate external and internal threats to the ecological integrity and biological	
3.1	Infrastructural development such as the construction of patrolling trails, guard posts, and patrolling outposts at strategic locations will be carried out to rein in illegal activities through constant monitoring and spread public awareness of the need to protect biodiversity through setting up of signage at every entry and exit point in the park.	Partially achieved
4	Maintain a proper database on all biodiversity and socio-economic aspects for easy access and effective national park management	

4.1	Update data on biodiversity on the Bhutan biodiversity portal for easy accessibility and information for the public	Yes
B	COMMUNITIES, RECREATION AND DEVELOPMENT PROGRAM	
5	Achieve biodiversity conservation by engaging local communities in safeguarding natural resources, promoting appropriate renewable energy and energy efficiency measures, and providing socio-economic benefits to the dependent communities	
5.1	Community-based crop and livestock insurance schemes will be further scaled up for prompt equitable compensation for loses to wildlife as a result of human-wildlife conflict.	Yes
6	Foster conservation and environmental consciousness among the local communities and other stakeholders through communication and education services.	
6.1	Develop informational resources on waste management for awareness and advocacy to different target groups	Partially achieved
7	Promote community-based ecotourism in augmenting the livelihood of local communities	
7.1	Establishment of eco-museums/interpretation centers at strategic locations to display local traditional products such as handcrafts and promotion of cane and bamboo products and cultural heritage to the visitors and help improve the livelihood of rural communities.	Yes
7.2	Development of eco-trails potential ecotourism sites.	Yes
8	Build an institutional linkage at all levels, which fosters and enhances sustainable public support for the park´s objectives and actions	
8.1	Adequate staff strength, knowledge, and skills are crucial to ensure efficient park management and to interpret and implement the prescribed management strategies. Capacity building will include training courses on wildlife and park management, GIS application, study tours, seminars, and workshops.	Partially achieved

PART 4: THREAT ANALYSIS

4.1. Analysis of conservation issues and threats

Threat analysis encompasses the assessment of threats in conservation planning and management.

Threats to the conservation of natural resources had been identified through the socioeconomic survey, public consultation covering all Gewogs under the park (Appendix 11), Management Effectiveness Tracking Tools Plus (METT+) exercise in all Range offices, and the data from the SMART database.

Upon identification of threats, a consultative meeting was held with the public of all gewogs to determine the rank (Appendix 12). The team considered the three criteria for threat ranking as per Miradi; 1) scope, 2) severity, and 3) irreversibility. The overall threats and their ranking are furnished in Table 15.

Table 15: Threat ranking & analysis

Threats	Scope	Severity	Irreversibility	Total	Over all Threat Rating
Human-Wildlife Conflict	4	4	1	17	Very high
Swollen monsoon river	3	3	3	15	High
Invasive plants	3	3	2	14	High
Illegal activities (logging, poaching, hunting, fishing)	3	3	1	13	High
Drying water sources	3	2	3	13	High
Increasing developmental activities	2	3	2	12	High
Wastes	2	2	1	9	Medium
Free grazing	2	2	1	9	Medium
Climate change	2	2	2	6	Medium
Water pollution	1	1	1	5	Low
Forest fire	1	1	1	5	Low

4.1.1. Human-wildlife conflict (Threat rank: Very High)

Human-Wildlife Conflict (HWC) is leading to the loss of livelihood of people, especially people dependent on livestock and agriculture. This often leads to a dwindling relationship between the conservation sector and local communities and has a high risk of retaliatory

killings of wildlife. The results from a socioeconomic survey on HWC are presented in Section 2.4, and this section elaborates on the issues from the public consultations on this plan.

During the public consultation, Human-wildlife conflict was a critical and common issue raised in all the blocks (Gewogs) of the park (Figure 29). The loss of crops to the wild herbivores was reported to have affected people's livelihood. Himalayan Black Bear ravaging orange orchards and debarking by ungulates such as samber and deer was reported at Trong gewog. The rural communities getting discouraged in agricultural farming due to the loss of crops to wildlife, rural folks getting blamed for harvesting NFWP from the forest and causing HWC, the current policy of stringent penalties for people for killing wildlife and lack of penalty for wildlife that harms people were the pressing issues raised from the public.

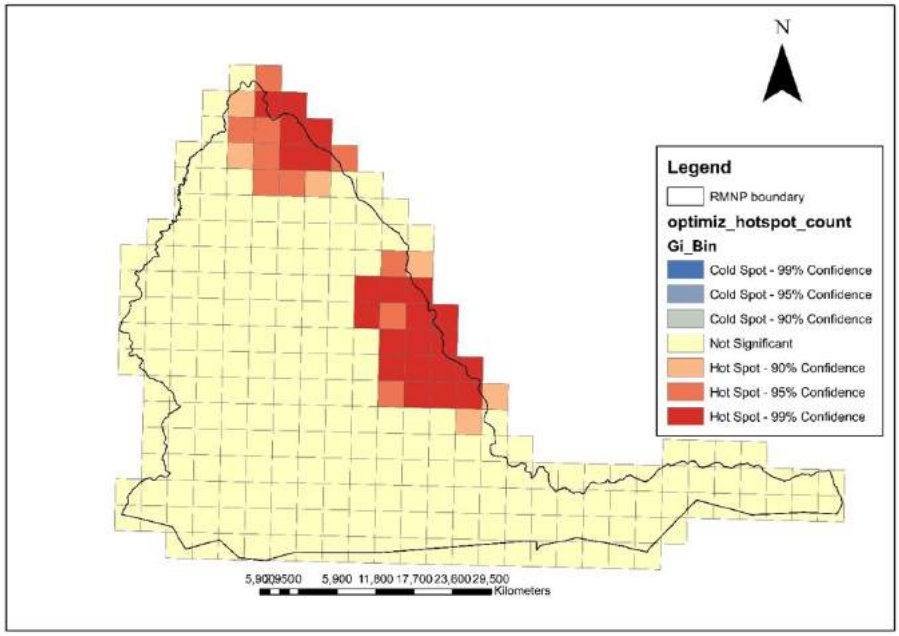


Figure 29: Hotspot map of HWC inside the park

Upscaling research on the root cause of the conflict, chain link fencing over electric fencing, high electric fencing power energizer to improve the efficacy of electric fencing, thinning of forest to enhance the habitat quality for wild animals, enrichment of wildlife habitat by planting fruiting trees were suggested from the public. Other measures such as the land substitution of those which fall within the park or in forest fringe areas where HWC incidences are high; legalization of hunting of abundant wildlife species such as wild boar; enhancing Rapid

Response Team in the community were also suggested during the public consultation. Instituting the insurance scheme was also raised to help conserve wildlife in addition to compensating for the loss of the local communities, and strengthening forest-people relationships.

4.1.2. Invasive plants (Threat rank: High)

According to the socioeconomic survey, after HWC, the respondents felt that pests and disease (n=298) is a major constraints in agricultural farming. During the public consultation, concerns were raised about the far-reaching impact it could have on the agriculture field and natural environment. *Mikania micrantha, Chromolaena odorata, Lantana camara, etc* was reported to be major invasive in the whole part of the park. People suggest manual removal as the only measure to confront it, allowing the use of controlled weedicides and research was also suggested by the public.

4.1.3. Illegal activities (Threat rank: High)

Illegal activities in the park mainly comprise logging, hunting, and other activities that pose key threats to conservation. The record from the SMART database of the past six years indicates that illegal logging was highest with 75 incidences, followed by fishing (72 incidences) and hunting (28 incidences). The trend analysis indicates that illegal fishing is on the increasing trend, while illegal logging and hunting are stable to some extent. Further substantial cases of illegal fishing are also reported every year (Figure 30). Poisoning in water bodies, stream diversion methods, and electrical devices are used for illegal fishing engendering the loss of aquatic diversity. However, with the current relaxation and new Fishing regulations in force, illegal fishing activities are expected to decline.

Hunting is also on the rise in the park. The SMART patrolling, National Tiger Survey (NTS), and National Forest Inventory (NFI) team reported dismantling a significant number of traps in the park. Hunters in the park are owing to the prevalence of porous border and swelling rivers in summer. For instance, the NFI team in October 2021 has come across indiscriminate felling of trees for *puthca* extraction at Geylongkhola region, Manas Range. The team also came across several makeshift machans used by poachers for hunting wild animals at Kukulung areas under Manas Range. The public consultation suggested proper awareness of forestry rules and regulations, education and outreach programs, and mechanisms to encourage people in reporting illegal activities.

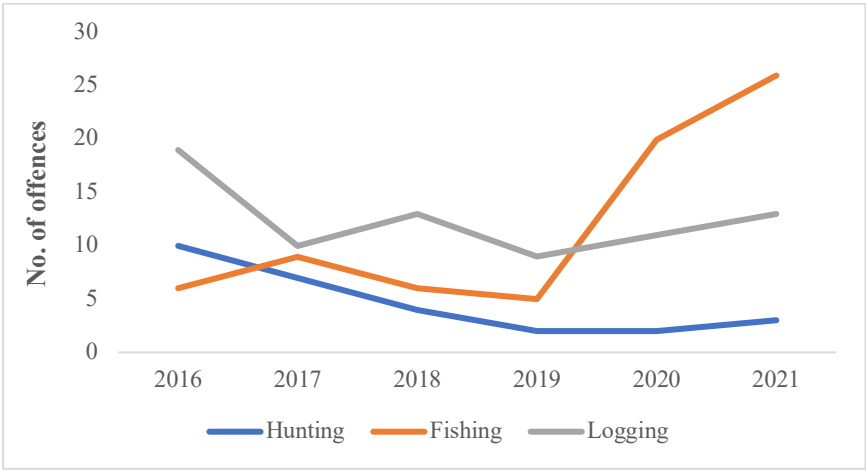


Figure 30: Forestry offense types and trend

4.1.4. Drinking water shortage (Threat rank: High)

The Watershed assessment and classification report, 2021 classified the majority of water sources under Umling and Taraythang under drying state (Figure 31). It has been recommended for intervention measures due to the increasing population, development activities, and service infrastructure. The possible reasons for drying water sources reported were; increased users, degradation of the catchment area, infrastructure development, disturbances from private land and road above the catchment area, landslides, and establishment of CF. The local community suggested activities such as protection and plantation at water sources/catchment areas, restricting tree felling around the catchment area, fencing of water sources, exploring and identifying new water sources, and traditional and cultural practices (appeasing local deity) to revive water sources.

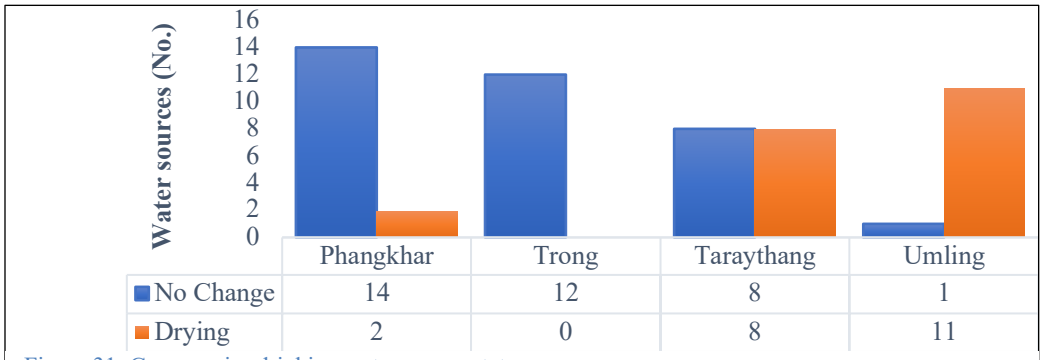


Figure 31: Gewog-wise drinking water source status

4.1.5. Increasing developmental activities (Threat rank: High)

The local community believes that forest degradation is a growing concern amid increasing developmental activities and a growing population. They suggested the initiatives such as afforestation, upscaling CF management, and minimizing disturbances in SRF land, bringing more areas under CF coverage to offset the forest loss through developmental activities and utilization. For the past two fiscal years, the Park has issued FCs for *Satshab* (land exchange/substitution), surface collection, government institutions, agriculture marketing products, water pipeline alignment, infrastructure, transmission line, livestock farm, farm road & approach road construction.

4.1.6. Waste disposal (Threat rank: Medium)

The increasing population and urbanization have not only become issues in urban areas but also in forest lands. The waste generation and pollution of forest lands by dumping waste carelessly have been one of the main factors causing the degradation of wildlife habitats. Solid wastes and littering are observed along motor roads, tracks, and inside deep forests accessible due to increasing farm road connectivity and waterbodies despite wide coverage of awareness programs. As mandated by the Waste Prevention and Management Regulation, 2012, the DoFPS initiates a cleaning campaign. The cleaning is carried out consistently involving local communities and three Range Offices; Gomphu, Manas, and Umling Range in their respective areas.

The public believes that littering in SRF land is a growing concern. As a measure, the local community suggests the establishment of garbage disposal at every *Chiwog*, initiating adequate awareness and outreach programs, tourists implement the Garbage in, Garbage out concept, mandatory use of waste bins in institutions and business community, prioritizing budget for waste management, designate proper waste dumping site, strict monitoring, and enforcement of Rules and Regulations, initiate monthly cleaning campaign by the local community, institute waste collection scheme.

4.1.7. Free grazing (Threat rank: Medium)

The socioeconomic survey found that insufficient grazing is the most common constraint reported by 167 HHs, out of which 113 HHs ranked it as first which indicates it is the most severe constraint followed by insufficient fodder. The free grazing in the forests could impact

conservation activities and also increase Human-Wildlife Conflicts. During the public consultation, the same constraint of area shortage for cattle to graze instead of institutional development was deliberated. The public suggested expansion of pasture land, grazing in SRF land, raising hybrid cattle and productive cattle, and supply of fodder seeds.

4.1.8. Climate change (Threat rank: Medium)

According to the socioeconomic survey (details in section 2.4.7), 69 HHs reported that climate change in the form of erratic rainfall patterns, increasing temperature, and dry weather conditions as constraints in agricultural farming. The community reported of negative impact on the livelihood of the people through loss of crops, landslides, and erratic rainfall causing land degradation. People suggested protection wall construction, tree plantation, bio-engineering works in the landslide-prone area, and avoiding forest & land degradation.

Similar impacts on biodiversity due to climate change such as dried water holes (likely causing dispersion of wild animals from their natural habitat), increasing landslide signs, flashfloods, etc were observed during the patrolling.

4.1.9. Water pollution (Threat rank: Low)

Community people shared their concern regarding drinking water sources getting polluted by wild animals such as elephants and guar. Water is being polluted even due to anthropogenic activities. Fencing of water sources, and setting efficient water filtering mechanisms/ at sources were some measures suggested to mitigate the threats.

4.1.10. Forest fire (Threat rank: Low)

Although the threat from a forest fire is low in the park, the northern part of the park especially Trong gewog, Zhemgang is susceptible to this threat, owing to small patches of Chirpine forests in the area. The residents at Umling and Taraythang also share the concern about the deliberate burning of debris from across the border and fire spreading inside the boundary.

4.2. Management challenges

4.2.1. Accessibility during monsoon

Seasonal challenges such as the inability to implement field works throughout the year due to inaccessibility from large monsoon rivers (both seasonal and perennial), and thick broadleaved forests possess risks and hamper effective conservation management. Manas Range and

Karnamakura Guard under Umling Range are connected by a forest road that requires annual maintenance. These station gets disconnected from the rest of the Range offices during summer due to road blocks caused by incessant rainfall and flash floods. Swelling of rivers frequently makes it difficult to cross in summer and ultimately hampers SMART patrolling and other field works.

4.2.2. Porous border with dense forests

The threats consist of hunting, poaching of wildlife, collection of NWFPs, setting of forest fires, cattle grazing, and illegal logging and transportation from within and across the border. The annual Park Reports 2019-2020 reported that in a decade, the park lost a few tigers, and seized a couple of elephant ivory, and dozens of bullock carts involved in illegal timber transactions. Due to the porous border, the security risk is a major impediment in streamlining patrolling efforts in the park. The staff on the ground faces uncertainty from security risks such as armed poachers or miscreants during patrolling and other field works throughout the southern border, aggravated by the dense forests and lack of reliable communication networks.

4.2.3. Communication bottlenecks

The rugged and mostly inaccessible landscape of the park, aggravated by poor basic infrastructure limit geographical mobility and creates communication bottlenecks. Such predicament constraints efficient patrolling and monitoring of the national park. While patrolling in extremely remote wilderness areas for a longer duration, the area without communication facilities is risky, in case of any unforeseen emergency to the team. It is difficult to communicate or evacuate any crew members in case of emergencies such as accidents or sickness. The main mode of communication at Manas and Karnamakura Guardpost is handsets. Hence, regular maintenance and procurement, and timely maintenance of proper repeater station is of paramount importance.

PART 5: MANAGEMENT PRESCRIPTION

5.1. Gender mainstreaming

The current management plan has actions that adequately address gender issues and encourage the participation of disadvantageous gender groups in the community in the conservation of natural resources. The actions planned are targeted to bring direct benefits to disadvantageous gender groups by giving them platforms, roles & responsibilities, and opportunities equal as advantageous gender groups. Some actions such as giving advocacy and training on nature guides, community forest management, and community-based HWC mitigation actions (rapid response team & safe system) are targeted towards women and less advantageous gender groups in the community to ensure their role and active participation in decision making in the society.

5.2. Environment and social safeguard

The actions planned are to be implemented as per the Environment and Social Safeguard Framework (ESSF). ESSF ensures the environment and society are not affected by the actions during or after implementation. The ESSF provides the mechanism where all the actions planned goes through a screening process called Environment and Social Safeguard (ESS) screening before implementation. The ESS screening addresses all the possible risks of action to the environment and society. During screening, some actions can be forbidden to implement based on the degree of possible risks whereas actions with permissible risks found out during ESS screening can be implemented but with Environment and Social Management Plan (ESMP). The ESMP will have all the possible risks outlined along with mitigation measures to ensure that the environment and society are not affected either during or after the implementation of the actions.

The strategies and actions (management prescriptions) are defined based on the overall conservation goal of the plan to protect and conserve species, maintain habitats, and enhance social livelihoods. These strategic actions will address the problems/issues, threats, challenges, and barriers that prevent them from achieving the conservation objectives, and subsequently ensure sustainable management of the park.

The management prescription has 5 goals, 13 objectives, 28 strategies, and 88 actions to address issues, threats, and challenges outlined in Part 4 of this plan.

5.3. Goals and Objectives

Goal 1: Conservation and protection of wildlife species and their habitat for sustained ecosystem function and its services

Objective: 1.1: Protect, conserve, and monitor the wildlife species

Strategy 1.1.1: Implement zero poaching strategy and strengthen law enforcement using enhanced SMART (Spatial Monitoring and Reporting Tool)

Action 1.1.1.1*: Provide training on the use and application of updated SMART versions*

Action 1.1.1.2*: Conduct planned and ad hoc patrol through SMART & drone technique*

Strategy 1.1.2: Strengthen wildlife law enforcement capacity, intelligence networking, transboundary coordination, information sharing network, and patrolling mechanism

Action 1.1.2.1: *Manage communication equipment (handsets/repeater stations/electronic visual display equipment)*

Action 1.1.2.2*: Coordination meetings/workshops for transboundary cooperation*

Action 1.1.2.3: *Identify and re-map patrol routes and surveillance sites*

Action 1.1.2.4*: Procure, install & monitor poachers' surveillance cameras at spatial target areas*

Action 1.1.2.5*: Conduct refresher training on arms handling, uniform code of conduct, first aid, and field safety for the staff*

Strategy 1.1.3: Equip field offices and field staff with patrol gear, gadgets, and materials

Action 1.1.3.1: *Procure patrolling equipment such as river rafting materials & motor boats*

Action 1.1.3.2: *Provide additional field equipment and gear such as tents, sleeping bags, mats, torch, field boots, first AID kits & GPS.*

Action 1.1.3.3: *Procure equipment such as laptops, camera traps and drones, and digital cameras*

Strategy 1.1.4: *Ensure species persistence/survival through research and monitoring of species*

Action 1.1.4.1: *Monitor camera trapping to determine tiger & clouded leopard populations in the park*

Action 1.1.4.2: *Carryout occupancy study and assess habitat for Pygmy hog.*

Action 1.1.4.3: *Study distribution and population estimate of Chinese pangolin*

Action 1.1.4.4: *Study population density, biomass, and habitat use of ungulates or primary prey species for Tiger*

Action 1.1.4.5: *Study ecology and human interaction of Asiatic Black Bear*

Action 1.1.4.6: *Monitoring and revalidation of golden masher spawning habitats.*

Strategy 1.1.5: Delineate different management zones in consultation with local communities

Action 1.1.5.1: *Fix boundary pillars along the park boundary*

Objective 1.2: *Manage wildlife habitat to support a healthy and diverse wildlife population*

Strategy 1.2.1: *Maintain existing grassland to improve forage quality and quantity for herbivores that serves as an important prey base*

Action 1.2.1.1: *Manage lowland grasslands*

Action 1.2.1.2: *Maintain natural waterholes, saltlicks, snags, and develop artificial waterholes*

Action 1.2.1.3: *Monitor and maintain existing waterholes and natural saltlicks.*

Goal 2: Adoption of mitigation and adaptation measures to address climate change impacts

Objective 2.1: Monitor risk and vulnerability of ecosystem health due to climate change

Strategy 2.1.1: Identify and control invasive plants, pests, and diseases

Action 2.1.1.1: *Carry out an inventory of general invasive species and design appropriate measures to prevent their spread.*

Objective 2.2: Provide sustained ecosystem services through effective management of watersheds

Strategy 2.2.1: Assess the state of the forest and carbon stock of the park

Action 2.2.1.1: *Carry out forest inventory in the NFI cluster plots of the park*

Strategy 2.2.2: Implement climate-smart restoration activities

Action 2.2.2.1: *Assess and map recharge areas, and carryout spring revival interventions*

Action 2.2.2.2: *Implement appropriate interventions for degraded watershed areas*

Strategy 2.2.3: Reduce Forest degradation

Action 2.2.3.1: *Carry out afforestation in SRF land*

Goal 3: Promotion of harmonious co-existence between people and wildlife through holistic approaches

Objective 3.1: Adopt measures to address the Human-Wildlife Conflict

Strategy 3.1.1: Enhance scientific data on the nature, extent, and causes of HWC

Action 3.1.1.1: *Update hotspot map*

Action 3.1.1.2: *Conduct ecological research on population, the nature, extent, seasonality, and the main causes of crop & livestock depredation by problematic wild animals*

Action 3.1.1.3: *Rescue and release a wild animal to the proper location*

Strategy 3.1.2: Apply different measures and community-driven approaches

Action 3.1.2.1: *Support HWC mitigation techniques such as electric fencing, high energizer, chain link fencing, alarm fencing, barbed wires, trenches construction*

Action 3.1.2.2: *Strengthen and continue the existing Rapid Response Team (RRT)*

Strategy 3.1.3: Institutionalize compensation scheme for livestock depredation and crop damages

Action 3.1.3.1: *Institutionalize compensation or insurance scheme for crops and livestock affected by wild animals*

Strategy 3.1.4*: Initiate innovative measures to address HWC*

Action 3.1.4.1: *Strengthen and promote the 'Hunter to Hermit' program*

Action 3.1.4.2: *Promote a safe system approach (elephant-friendly village, Rapid Response Team, etc.).*

Action 3.1.4.3: *Strengthen and upscale community-based wildlife habitat restoration works (Tanzema, Norbugang)*

Strategy 3.1.5: Resettle Park communities vulnerable to HWC

Action 3.1.5.1: *Verify in consultation with Gewogs and recommend land substitution to National Land Commission for private land in the core zone, fringe, and HWC hotspot areas*

Goal 4. Enhancement of community stewardship and participation in sustainable management of natural resources for socioeconomic benefits

Objective 4.1: Enhance community knowledge on sustainable management of natural resources

Strategy 4.1.1: Build community stewardship and empowerment through community forest and NWFP management groups towards sustainable use of natural resources

Action 4.1.1.1: *Establish new CF groups*

Action 4.1.1.2: *Carry out timely revision of CF & NWFP Management plans*

Strategy 4.1.2: Periodic monitoring of CF & subsidized timber, capacity building of CF and NWFP group members

Action 4.1.2.1: *Monitor CF and NWFP groups regularly*

Action 4.1.2.2: *Monitor RHBT*

Action 4.1.2.3: *Provide training on effective record keeping in the CFs and NWFP groups*

Objective 4.2: Enhance conservation awareness and education program

Strategy 4.2.1: Conduct educational outreach programs

Action 4.2.1.1: *Coordinate stakeholder coordination and collaboration workshops, meetings, and training.*

Action 4.2.1.2: *Conduct conservation education, advocacy, awareness of rules, regulations, forest fire, and training to promote local stewardship in conservation*

Objective 4.3: Promote community-based ecotourism ventures to improve the livelihood of the park communities

Strategy 4.3.1: Promote eco-tourism infrastructures

Action 4.3.1.1: *Establish community-managed camping grounds at Panbang, Pantang, etc.*

Action 4.3.1.2: *Promote ecotourism activities such as eco-trails, bird watching, and trekking at Hatilora, Gayhati*

Action 4.3.1.3*: Build capacity and train local youths and school drop outs in birding and nature guide*

Objective 4.4: Upscale advocacy and infrastructure on waste management

Strategy 4.4.1: Institute effective waste management mechanisms

Action 4.4.1.2*: Implement garbage-in-garbage-out waste management concept for visitors/tourists*

Action 4.4.1.3: *Conduct an education and awareness campaign on waste management for park's stakeholders*

Goal 5. Enhancement of management capacity and support facilities for improved service delivery and sustainable resource management

Objective 5.1: Enhance capacity building of park staff on conservation and allied sciences

Strategy 5.1.1: Enhance the knowledge base of the park staff as per the competency-based framework (CBF)

Action 5.1.1.1: *Organize short-term training for the staff on wildlife and park management, conservation, law enforcement, GIS application, drones, etc. as per the training needs of CBF*

Objective 5.2: Enhance basic infrastructure, appropriate technology, and communication facilities

Strategy 5.2.1: Establish and maintain adequate field offices, staff quarters, and other facilities

Action 5.2.1.1: *Maintain existing offices and staff quarters of Manas Range*

Action 5.2.1.2: *Maintain existing offices and staff quarters of Gomphu Range*

Action 5.2.1.3: *Maintain existing offices and staff quarters of Umling Range*

Action 5.2.1.4: *Install internet connection in the field offices*

Action 5.2.1.5: *Construct a watch tower for effective implementation of protection activities*

Action 5.2.1.6: *Maintenance of Park guest house.*

Action 5.2.1.7: *Compound lighting & fencing at Range Offices*

Action 5.2.1.8: *Construct retaining wall or River bank protection works*

Action 5.2.1.9: *Manage government properties (pool vehicles)*

Action 5.2.1.10: *Procure additional pool vehicles and motorbikes for range offices for effective public services delivery and conduct patrolling*

Action 5.2.1.11: *Construct visitor information center*

Action 5.2.1.12: *Procure computers for resource data management*

Action 5.2.1.13: *Annual maintenance of forest road from Sukuntaklai to Gortey*

Objective 5.3: Maintain the database of the park

Strategy 5.3.1: Document diversity and dynamics of flora and fauna species

Action 5.3.1.1: *Identify and carry out timely monitoring of the Biodiversity Monitoring Grids*

Strategy 5.3.2: *Establish and update a database on biodiversity and socio-economic status of the park*

Action 5.3.2.1: *Create a database to store all information related to the park.*

Objective 5.4: Assess the effectiveness of protected area management

Strategy 5.4.1: Evaluate protected area management effectiveness

Action 5.4.1.1: Assess Park management effectiveness using METT+ and CA/TS

Strategy 5.4.2: Mid-term review of the current conservation management plan

Action 5.4.2.1: Carry out a mid-term review of the management plan

Strategy 5.4.3: Revise the conservation management plan for the next period

Action 5.4.3.1: Conduct a socioeconomic survey

Action 5.4.3.2: Conduct a biodiversity survey

Action 5.4.3.3: Conduct public consultation

Action 5.4.3.4: Drafting, approval, and printing of the management plan

PART 6: IMPLEMENTATION PLAN AND FINANCIAL OUTLAY

The schedule and budget required for implementing plan prescriptions for the plan period of 10 years is outlined in the Table 16 below:

Table 16: Implementation Plan & Financial Outlay

Objectives	Year along with budget (in Nu. M)												Remarks
	Strategies	**Action**	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**	**Y7**	**Y8**	**Y9**	**Y10**	**Total**	
Protect, conserve, and monitor wildlife species.	Implement a Zero Poaching Strategy and strengthen law enforcement using enhanced SMART (Spatial Monitoring and Reporting Tool).	Provide training on the uses and application of updated SMART versions.	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2	All Range offices
		Conduct planned and ad hoc patrol through SMART & drone techniques.	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	8	
	Strengthen wildlife law enforcement capacity, intelligence networking, transboundary coordination, information sharing network, and patrolling mechanism.	Manage communication equipment (handsets/repeater stations/electronic visual display equipment).		0.7		0.4		0.3		0.3		0.3	2	Manas & Umling Range
		Coordinate meetings/workshops for transboundary cooperation.			0.3				0.3			0.3	0.9	Manas & Umling Range
		Identify and re-map patrol routes and surveillance sites.			0.3			0.3		0.2		0.1	0.9	All Range offices
		Procure, install & monitor poachers' surveillance cameras at spatial target areas.	0.05	0.05	0.05	1.5	0.05	0.05	0.05	1.5	0.05	0.05	3.4	All Range Offices. Procurement for year 4 & year 8

		Conduct refresher training on arms handling, uniform code of conduct, first aid, and field safety for the staff.			0.05		0.05		0.05		0.05		0.2	All Range Offices
	Equip field offices and field staff with patrol gear, gadgets, and materials.	Procure patrolling equipment such as river rafting materials & motor boats.		4.9			3		3		3		13.9	All Range Offices
		Procure additional field equipment and gear such as tents, sleeping bags, mats, torches, field boots, first AID kits & GPS.		2.5			2.5			2.5			7.5	All Range Offices
		Procure equipment such as laptops, camera traps and drones and digital cameras.		2.5			2.5			2.5			7.5	Approx. 4 laptops, 100 camera traps, 2 drones, 4 digital cameras
	Ensure species persistence/survival through research and monitoring of species.	Monitor camera trapping to determine tiger & clouded leopard populations in the park.	0.5	0.5	0.5	0.5	1.7	0.5	0.5	0.5	0.5	1.7	7.4	All Range Offices
		Carry out occupancy study and assess habitat for Pygmy hog.				2							2	Manas Range
		Study distribution and population estimate of Chinese pangolin.					0.7						0.7	Manas & Umling Range

		Study population density, biomass and habitat use of ungulates or primary prey species for Tiger.			0.5								0.5	All Range offices
		Study ecology and human interaction of Asiatic Black Bear.				0.7							0.7	All Range offices
		Monitoring and revalidation of golden masher spawning habitats.	0.6										0.6	All Range Offices
		Assess habitat and relative abundance of common Leopard and Human-leopard conflict in RMNP.				0.5							0.5	All Range Offices
	Delineate different management zones in consultation with local communities.	Fix boundary pillars along the park boundary.	0.25										0.25	All Range offices
Manage wildlife habitat to support a healthy and diverse wildlife population	Maintain existing grassland to improve forage quality and quantity (enrichment plantation) for herbivores that serve as an important prey base.	Manage lowland grasslands.	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	7.9	All Range Offices
	Maintain natural waterholes, saltlicks, snags and develop artificial waterholes.	Monitor and maintain existing waterholes and natural saltlicks.	0.2	0.15		0.15	0.15	0.15	0.15		0.15	0.15	1.25	All Range Offices

Monitor risk and vulnerability of ecosystem health due to climate change.	Identify and control invasive plants, pests & diseases.	Carry out an inventory of general invasive species and design appropriate measures to prevent their spread.					0.5						0.5	All Range Offices
Provide sustained ecosystem services through effective management of watersheds.	Assess the state of the forest and carbon stock of the park.	Carry out forest inventory in the NFI cluster plots of the park.					2.7					2.7	5.4	All Range offices
	Implement climate-smart restoration activities.	Assess and map recharge areas, and carry out spring revival interventions.	0.5	0.2	0.2								0.9	All Range Offices
		Implement appropriate interventions for degraded watershed areas.				1.5	1.5						3	Umling Range
	Reduce forest degradation.	Carry out afforestation in SRF land.				0.15			0.2				0.35	All Range offices
Adopt measures to reduce the Human-Wildlife Conflict.	Enhance scientific data on the nature, extent, and causes of HWC.	Update the HWC hotspot map.		0.1			0.1				0.1		0.3	Whole Gewogs
		Conduct ecological research on population, nature, extent, seasonality and the main causes of crop & livestock depredation by problematic wild animals.				0.1							0.1	Whole Gewogs
		Rescue and release a wild animal to the proper location.	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.5	Whole Gewogs

		Support HWC mitigation techniques such as electric fencing, high energizer, chain link fencing, alarm fencing, and barbed wires, trenches construction.			3		3		3		3		12	Whole Gewogs
		Strengthen and continue the existing Rapid Response Team (RRT).			0.3				0.3		0.3		0.9	Whole Gewogs
	Institutionalize compensation schemes for livestock depredation and crop damages.	Institutionalize compensation or insurance scheme for crops and live stocks affected by wild animals.			2								2	Whole Gewogs
		Strengthen and promote the "Hunters to Hermit' program.	0.15		0.15		0.2		0.2		0.3		1	Whole gewogs
		Promote a safe system approach (elephant-friendly village, Rapid Response Team, etc…).		0.2		0.2		0.2		0.2		0.2	1	Whole gewogs
		Strengthen and upscale community-based wildlife habitat restoration works (Tanzema, Norbugang).		0.1		0.1		0.1		0.1		0.1	0.5	
	Resettle Park communities vulnerable to Human-Wildlife Conflict.	Verify in consultation with Gewogs and recommend land substitution to National Land Commission for private land in the core			0.3								0.3	Whole Gewogs

		zone, fringe, and HWC hotspot areas.												
Enhance community knowledge on the management of natural resources.	Build community stewardship and empowerment through community forest or NWFP management groups towards sustainable use of natural resources. Reduce forest degradation.	Establish a new CF management group.					0.2						0.2	Subrang, Gomphu Range
		Carry out timely revision of CF & NWFP Management plans.									0.55	0.45	1	17 CFs due for revision
	Periodic monitoring of CF & subsidized timber, capacity building of CF and NWFP group members.	Monitor CF and NWFP groups regularly.	0.2	0.2		0.2	0.2	0.2	0.2		0.2	0.2	1.6	All Range offices
		Monitor RHBT.	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	1.5	All Range offices
		Provide training on governance and record keeping in the CFs and NWFP groups.		0.3				0.3				0.3	0.9	All Range offices
Enhance conservation awareness and sustainable	Educational outreach programs are enhanced through training, advocacy,	Coordinate stakeholder coordination and collaboration workshops, meetings and trainings.	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2	All Range offices

livelihood of park communities.	awareness, stakeholder coordination and regional cooperation.	Conduct conservation education, advocacy, awareness of rules, regulations, forest fire and training to promote local stewardship in conservation.	0.3		0.3		0.3		0.3		0.3		1.5	Whole Gewogs
Promote community-based eco-tourism ventures to improve the livelihood of the park communities.	Promote ecotourism infrastructures.	Establish community-managed camping grounds at Panbang, Pantang, etc.			1			1					2	Whole Gewogs
		Promote ecotourism activities such as eco-trails, bird watching and trekking at Hatilora, Gayhati.		2			1			1			4	Whole Gewogs
		Build capacity and train local youths and school dropouts in birding and nature guides.		0.4			0.5			0.7			1.6	Whole Gewogs
Upscale advocacy and infrastructure on waste management.	Institute effective waste management mechanisms.	Implement a garbage-in-garbage-out waste management concept for visitors or tourists.	0.5										0.5	Whole Gewogs
		Conduct education and awareness campaigns on waste management to park stakeholders.		0.05				0.1				0.1	0.25	Whole Gewogs

Enhance capacity building of park staff on conservation and allied sciences.	Enhance the knowledge base of the park staff as per CBF.	Organize short-term training for the staff on wildlife and park management, conservation, law enforcement, GIS application, drones, etc. as per the training needs of CBF.			1.5			1.5		1.5			4.5	All Range offices
Enhance basic infrastructure, appropriate technology and communication facilities.	Establish and maintain adequate field offices, staff quarters and other facilities.	Maintain existing offices and staff quarters of Manas Range.		4				3				3	10	Manas Range
		Maintain existing offices and staff quarters of Gomphu Range.	2		2					2			6	Gomphu Range
		Maintain existing offices and staff quarters of Umling Range.			4					4			8	Umling Range
		Install internet connection in the field offices.	1										1	Umling & Gomphu Range
		Construct watch towers for effective implementation of protection activities.		2									2	Manas (Zomrong/Gahati) & Umling Range (Kanamakura)
		Maintenance of Park guest house.	7			0.05	0.05	0.15	0.2	0.3	0.3	0.3	8.35	Manas Range.
		Compound lighting & fencing at Range Offices.	0.5	1.5									2	Manas & Umling Range

		Construct retaining wall or River bank protection works.	2			2				2			6	Manas Range.
		Manage government properties (pool vehicles).	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	8	Hilux: 3, DCM: 1, Two-wheelers: 3
		Procure additional pool vehicles and motorbikes for range offices for effective public services delivery and conduct patrolling.			3.6								3.6	All Range offices
		Construct visitor information centers.					3.5	3.5	3.5				10.5	Umling, Gomphu & Manas Range
		Procure computers for resource data management.	0.3			0.3			0.3			0.3	1.2	All Range offices
		Annual maintenance of seasonal road from Sukuntaklai to Gortey.	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	Umling range
Maintain a proper database on the biodiversity and socioeconomic status of the park.	Document diversity and dynamics of flora and fauna species.	Identify and carry out timely monitoring of the Biodiversity Monitoring Grids.	0.06	0.06	0.06	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.88	All Range offices
	Establish and update a database on the biodiversity and socio-economic status of the park.	Create a database to store all information related to the park.											0	All Range offices

Assess the effectiveness of protected area management.	Evaluate protected area management effectiveness.	Assess Park management effectiveness using METT+ and CA/TS.						0.1					0.1	All Range offices
	Mid-term review of the current conservation management plan.	Carry out a mid-term review of the current management plan.						0.3					0.3	
	Revise the conservation management plan for next period.	Conduct a socio-economic survey.									1.2		1.2	Whole gewogs
		Conduct a biodiversity survey.									0.8		0.8	Whole Park
		Conduct public consultation.									0.8		0.8	Whole *Gewogs*
		Drafting, approval and printing of the management plan.										0.15	0.15	
Grand total													**194.3**	

PART 7: MONITORING AND EVALUATION

The monitoring and evaluation plan includes the indicators against which the performance of the management plan will be measured. The details of the M&E plan prepared to ensure synergy with the management prescription and implementation framework are outlined in Table 17.

Table 17: Monitoring & Evaluation

Objectives	Action	Output indicator	Base line	Unit	Yearly Target										Remarks
					Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	
Protect, conserve and monitor wildlife species.	Provide training on the use and application of updated SMART versions.	Park staff trained	90	Percentage	30	30	30	30	30	30	30	30	30	30	
	Conduct planned and ad hoc patrol through SMART & drone techniques.	Distance covered	15	KM	180	180	180	180	180	180	180	180	180	180	
	Manage communication equipment (handsets/repeater stations/electronic visual display equipment).	Monitoring report/equipment purchased/maintained in three repeater stations	3	Number		3		2		2		2		1	
	Coordinate meetings/workshops for transboundary cooperation.	Number of coordination Meetings conducted	0	Number			1				1			1	

	Identify and re-map patrol routes and surveillance sites.	Number Patrol routs re-mapped	7	Number			3			3		2		1	
	Procure, install & monitor poachers' surveillance cameras at spatial target areas.	Number of Poachers' camera traps installed/monitored/procured	6	Number	2	2	2	40	2	2	2	40	2	2	Procurement for year 4 & year 8
	Conduct refresher training on arms handling, uniform code of conduct, first aid and field safety for the staff.	Staff trained	100	Percentage			30		30		30		30		
	Procure patrolling equipment such as river rafting materials & motor boats.	Number of river rafting materials purchased		Number	0	11			3		3		3		
	Procure additional field equipment and gear such as tents, sleeping bags, mats, torches, field boots, first AID kits and GPS.	GIMS report	30	Number		1			1			1			
	Procure equipment such as laptops, camera traps and drones and digital cameras.	Number of equipment procured	50	Number		50			50			50			4 laptops, 140 camera traps, 2 drones, 4

															digital cameras
	Monitor camera trapping to determine tiger & clouded leopard populations in the park.	Number of camera traps installed	1	Number	100	100	100	100	100	100	100	100	100	100	
	Carry out occupancy study and assess habitat for Pygmy hog.	Timeline by which habitat assessment for Pygmy Hog completed	0	Year				1							
	Study distribution and population estimate of Chinese pangolin.	Timeline by which distribution and population estimate of Chinese pangolin conducted	0	Year /Date					1						
	Study population density, biomass and habitat use of ungulates or primary prey species for Tiger.	Number of reports produced	0	Number			1								
	Study ecology and human interaction of Asiatic Black Bear.	Number of report produced	0	Number				1							
	Monitoring and revalidation of golden	Timeline by which mapping of	0	Year/date	1										

	masher spawning habitats.	Golden Mahseer spawning area mapped													
	Assess habitat and relative abundance of common Leopard and Human-wildlife conflict in RMNP.	Report	0	Number				1							
	Fix boundary pillars along the park boundary.	Report	0	Number	1										
Manage wildlife habitat to support a healthy and diverse wildlife population.	Manage lowland grasslands.	The area brought unde habitat management /Hacter of lowland grassland managed	220	Area (Ha)	220	220	220	220	220	220	220	220	220	220	Restoration of grassland
	Monitor and maintain existing waterholes and natural saltlicks.	Number of waterholes and natural saltlicks monitored	10	Number	15	15		15	15	15	15		15	15	
Monitor risk and vulnerability of ecosystem health due to climate change	Carry out an inventory of general invasive species and design appropriate measures to prevent their spread.	Report	0	Number					1						
Provide sustained ecosystem services through	Carry out forest inventory in the NFI cluster plots of the park.	Number of NFI cluster	67	Number					67					67	

effective management of watersheds		plots enumerated													
	Assess and map recharge areas, and carry out spring revival interventions.	Intervention report	1	Number	1	1	1								
	Implement appropriate interventions for degraded watershed areas.	Implementation report		Number				1	1						
	Carry out afforestation in SRF land.	Report	52.8	Ha				1			1				Baseline figure from SFES, Park HQ
Adopt measures to reduce the Human-Wildlife Conflict.	Update the HWC hotspot map.	HWC hotspot area mapped/report	0	Number	1				1				1		
	Conduct ecological research on population, nature, extent, seasonality and the main causes of crop & livestock depredation by problematic wild animals.	Report	2	Number				1							

	Rescue and release wild animals to the proper location.	Report	0	Number	1	1	1	1	1	1	1	1	1	1	
	Support HWC mitigation techniques such as electric fencing, high energizer, chain link fencing, alarm fencing, and barbed wires, trenches construction.	Number of mitigation measures	1	Number			1		1		1		1		
	Strengthen and continue the existing Rapid Response Team (RRT).	Report	2	Number			1				1		1		
	Institutionalize compensation or insurance scheme for crops and live stocks affected by wild animals.	Insurance scheme established	0	Number			2								
	Strengthen and promote the "Hunters to Hermit' program	Report	1	Number	1		1		1		1		1		
	Promote a safe system approach (elephant-friendly village, Rapid Response Team, etc…).	Report	1	Number		1		1		1		1		1	
	Strengthen and upscale community-based wildlife habitat restoration works (Tanzema, Norbugang).	Number of sites or areas brought under wildlife	1	Number/ha		1		1		1		1		1	

		restoration works													
	Verify in consultation with Gewogs and recommend land substitution to National Land Commission for Pvt. Land in the core zone, fringe and HWC hotspot areas.	Report	0	Number			1								
Enhance community knowledge on sustainable management of natural resources.	Establish a new CF management group.	Number of CF management groups formed	19	Number					1						New CF feasible at Subrang, Gomphu Range
	Carry out timely revision of CF & NWFP Management plans.	Number of CF and NWFP management plan revised	17	Number									9	8	17 CFs due for revision
	Monitor CF and NWFP groups regularly.	Number of CF and NWFP groups monitored	3	Number	10	10		10	10	10	10		10	10	
	Monitor RHBT.	Report	3	Number	1	1	1	1	1	1	1	1	1	1	
	Provide training on governance and record	CFMG/NWFPG members trained	5	Number		1				2				2	

	keeping in the CFs and NWFP groups.														
Enhance conservation awareness and sustainable livelihood of park communities.	Coordinate stakeholder coordination and collaboration workshops, meetings and trainings.	Number consultation meetings/training conducted	1	Number	1	1	1	1	1	1	1	1	1	1	
	Conduct conservation education, advocacy, awareness of rules, regulations, forest fire and training to promote local stewardship in conservation.	Number of awareness programs conducted	3	Number	1		1		1		1		1		
Promote community-based ecotourism ventures to improve the livelihood of the local communities.	Establish community-managed camping grounds at Pantang, Panbang.	Number of Campsite developed	1	Number			1			1					
	Promote ecotourism activities such as eco-trails, bird watching and trekking at Hatilora, Gayhati.	Number of ecotourism products developed	0	Number		2			1			1			
	Build capacity and train local youths and school dropouts in birding and nature guides.	Number of youth groups trained	1	Number		1			1			1			
	Implement a garbage-in-garbage-out waste management concept for visitors/tourists.	Timeline by which the garbage-in-garbage-out waste management	0	Number	1										

		concept introduced													
	Conduct education and awareness campaigns on waste management to park stakeholders.	Number of awareness campaigns conducted	2	Number		1				1				1	
Enhance capacity building of park staff on conservation and allied sciences.	Organize short-term training for the staff on wildlife and park management, conservation, law enforcement, GIS application, drone, etc. as per the training needs of CBF.	Number of staff trained		Number			50			50		50		50	
Enhance basic infrastructure, appropriate technology and communication facilities.	Maintain existing offices and staff quarters of Manas Range.	Number of Park infrastructure maintained	0	Number		15				15				15	
	Maintain existing offices and staff quarters of Gomphu Range.	Maintenance report	0	Number	1		1					1			
	Maintain existing offices and staff quarters of Umling Range.	Maintenance report	0	Number			1					1			
	Install internet connection in the field offices.	Field offices connected to the internet		Number	1										
	Construct watch towers for effective implementation of protection activities.	Watch towers constructed	2	Number		1									

	Maintenance of park guest house.	Guest house maintained	1	Number	1	1		1	1	1	1	1	1	1	
	Compound lighting & fencing at Range Offices.	Compound fenced/lighting system installed	0	Number	1	1									
	Construct retaining wall and River bank protection works.	River bank protection wall constructed	1	Number	1			1				1			
	Manage government properties (pool vehicles).	Report		Number	1	1	1	1	1	1	1	1	1	1	
	Procure additional pool vehicles and motorbikes for the range offices for effective public services delivery and conduct patrolling.	Report	3	Number			1								
	Construct visitor information centers.	Visitor information centers constructed	0	Number					1	1	1				
	Procure computers for resource data management.	Number of computers procured		Number	2			2			2			2	
	Annual maintenance of seasonal road from Sukuntaklai to Gortey.	length of road maintained	1	KM	22	22	22	22	22	22	22	22	22	22	Yearly maintenance
Maintain database of the park.	Identify and carry out timely monitoring works in the selected Biodiversity Monitoring Grids.	Number of BMG monitored	0	Number	6	6	6	6	6	6	6	6	6	6	

	Create a database to store all information related to the park.	Database created	0	Number		1									
Assess the effectiveness of protected area management.	Assess Park management effectiveness using METT+ and CA/TS.	Timeline by which METT+ conducted or RMNP METT+ score and set target	2	Number						1					
	Carry out a mid-term review of the management plan.	Timeline by which mid-term review of the management plan conducted	1	Date/Year						1			1		
	Conduct a socio-economic survey.	Report	1	Number									1		
	Conduct a biodiversity survey.	Report	1	Number									1		
	Conduct public consultation.	Report	1	Number									1		
	Drafting, approval and printing of the management plan.	Management plan	1	Number										1	

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APPENDICES

Appendix 1: List of mammal species of RMNP

Sl. No.	Common Name	Scientific name	Family
1	Asian Elephant	*Elephas maximus*	Elephantidae
2	Asiatic Brush-tailed Porcupine*	*Atherurusmacrourus*	Hystricidae
3	Asiatic Golden Cat	*Catopuma temmincki*	Felidae
4	Asiatic Water Buffalo	*Bubalus bubalis*	Bovidae
5	Assamese Macaque	*Macacaassamensis*	Cercopithecidae
6	Barking Deer	*Muntiacus muntjack*	Cervidae
7	Bengal Slow Loris^	*Nycticebus bengalensis*	Lorisidae
8	Binturong	*Arctictis binturong*	Viverridae
9	Black-napped Hare	*Lepusnigricollis*	Leporidae
10	Capped Langur	*Trachypithecus pileatus*	Cercopithecidae
11	Chinese Pangolin	*Manis pentadactyla*	Manidae
12	Clouded Leopard	*Neofelis nebulosa*	Felidae
13	Common Leopard	*Panthera pardus*	Felidae
14	Common Mongoose	*Herpetes edwardsii*	Herpestidae
15	Common Otter	*Lutra lutra*	Mustelidae
16	Common Palm Civet	*Paradoxurus hermaphroditus*	Viverridae
17	Crab-Eating Mongoose	*Herpestes urva*	Herpestidae
18	Fishing Cat	*Prionailurus viverrinus*	Felidae
19	Five-striped Palm Squirrel	*Funambulus pennantii*	Sciuridae
20	Gaur	*Bos gaurus*	Bovidae
21	Golden Langur	*Trachypithecus geei*	Cercopithecidae
22	Greater One-horned Rhinoceros	*Rhinoceros unicornis*	Rhinocerotidae
23	Grey Woodland Shrew	*Crocidura attenuata*	Soricidae
24	Himalayan Black Bear	*Ursus thibetanus laniger*	Ursidae
25	Himalayan Crestless Porcupine	*Hystrix brachyura*	Hystricidae
26	Himalayan Flying Squirrel	*Petauristamagnifus*	Sciuridae
27	Himalayan Goral	*Naemorhedus goral*	Bovidae
28	Himalayan Palm Civet	*Paguma larvata*	Viverridae
29	Himalayan Serow	*Capricornis thar*	Bovidae
30	Hispid Hare	*Caprolagus hispidus*	Leporidae
31	Hoary-bellied Squirrel	*Callosciurus pygerythrus*	Sciuridae
32	Hog Deer	*Axis porcinus*	Cervidae
33	Indian Crested Porcupine	*Hystrix indica*	Hystricidae
34	Indian Fox	*Vulpes bengalenis*	Canidae
35	Indian Fruit Bat	*Pteropus gigantenus*	Pteropodidae
36	Indian Long-tailed Shrew	*Soriculusleucops*	Soricidae

37	Jackal	*Canis aureus*	Canidae	
38	Jungle Cat	*Felis chaus*	Felidae	
39	Large Indian Civet	*Viverra zibetha*	Viverrida	
40	Large-toothed Ferret Badger	*Melogale personata*	Mustelidae	
41	Leopard Cat	*Felis bengalensis*	Felidae	
42	Lesser Bandicoot Rat	*Bandicota bengalensis*	Muridae	
43	Little Indian Field Mouse	*Mus booduga*	Muridae	
44	Long-tailed Tree Mouse	*Vandeleuria oleracea*	Muridae	
45	Malayan Giant Squirrel	*Ratufa bicolor*	Sciuridae	
46	Marbled Cat	*Felis marmorata*	Felidae	
47	Orange-bellied Himalayan Squirrel	*Dremomys lokriah*	Sciuridae	
48	Pygmy Hog	*Sus salvanius*	Suidae	
49	Red Fox	*Vulpesvulpes*	Canidae	
50	Rhesus Macaque	*Macacamulatta*	Cercopithecidae	
51	Sambar	*Cervus unicolor*	Cervidae	
52	Sikkim Rat**	*Rattus sikkimensis*	Muridae	
53	Sloth bear	*Melursus ursinus*	Ursidae	
54	Small Indian Civet	*Viverricula indica*	Viverridae	
55	Small-Clawed Otter	*Aonyx cinerea*	Mustelidae	
56	Small-toothed Ferret Badger	*Melogale moschata*	Mustelidae	
57	Spotted Linsang**	*Prionodon pardicolor*	Prionodontidae	
58	Spotted Deer	*Axis axis*	Cervidae	
59	Swamp Deer (Barasingha)	*Cervus duvaucelii*	Cervidae	
60	Three-striped Palm Squirrel	*Funambulus palmarum*	Sciuridae	
61	Tiger	*Panthera tigris*	Felidae	
62	White-tailed Wood Rat	*Madromys blanfordi*	Muridae	
63	Wild Dog	*Cuon alpinus permaevus*	Canidae	
64	Wild Pig	*Sus scrofa*	Suidae	
65	Yellow-throated Marten	*Martes flavigula*	Mustelidae	

Appendix 2: List of Bird Species of RMNP

Sl. No.	Common Name	*Scientific Name*	Family
1	Chestnut-breasted Partridge	*Arborophila mandellii*	PHASIANIDAE
2	Rufous-throated Partridge	*Arborophila rufogularis*	PHASIANIDAE
3	Hill Partridge	*Arborophila torqueola*	PHASIANIDAE
4	Black Francolin	*Francolinus francolinus*	PHASIANIDAE
5	Red Junglefowl	*Gallus gallus*	PHASIANIDAE
6	Kalij Pheasant	*Lophura leucomelanos*	PHASIANIDAE
7	Indian Peafowl	*Pavo Cristatus*	PHASIANIDAE
8	Grey Peacock Phaesant	*Polyplectron bicalcaratum*	PHASIANIDAE
9	Satyr Tragopan	*Tragopan satyra*	PHASIANIDAE
10	Fulvous Whistling Duck	*Dendrocygna bicolor*	ANATIDAE
11	Bar-headed Goose	*Anser indicus*	ANATIDAE
12	Ruddy Shelduck	*Tadorna ferruginea*	ANATIDAE
13	Gadwall	*Anas strepera*	ANATIDAE
14	Eurasian Wigeon	*Anas penelope*	ANATIDAE
15	Mallard	*Anas platyrhynachos*	ANATIDAE
16	Spot-billed Duck	*Anas poecilorhyncha*	ANATIDAE
17	Northern Shoveler	*Anas clypeata*	ANATIDAE
18	Northern Pintail	*Anas acuta*	ANATIDAE
19	Common Teal	*Anus crecca*	ANATIDAE
20	Red-crested Pochard	*Rhodonessa rufina*	ANATIDAE
21	Common Pochard	*Aythya ferina*	ANATIDAE
22	Goosander	*Mergus merganser*	ANATIDAE
23	Barred Buttonquail	*Turnix suscitator*	TURNICIDAE
24	Yellow-legged Buttonquail	*Turnix tanki*	TURNICIDAE
25	Yellow-rumped Honeyguide	*Indicator xanthonotus*	PICIDAE
26	Bay Woodpecker	*Blythipicus pyrrhotis*	PICIDAE
27	Rufous Woodpecker	*Celeus brachyurus*	PICIDAE
28	Greater Flameback	*Chrysocolaptes lucidus*	PICIDAE
29	Stripe-breasted Woodpecker	*Dendrocopos atratus*	PICIDAE
30	Grey-capped Pygmy Woodpecker	*Dendrocopos canicapillus*	PICIDAE
31	Crimson-breasted Woodpecker	*Dendrocopos cathpharius*	PICIDAE

32	Darjeeling Woodpecker	*Dendrocopos darjellensis*	PICIDAE
33	Fulvous-breasted Woodpecker	*Dendrocopos macei*	PICIDAE
34	Rufous-bellied Woodpecker	*Dendrocopos hyperythrus*	PICIDAE
35	Himalayan Flameback	*Dinopium shorii*	PICIDAE
36	Pale-headed Woodpecker	*Gecinulus grantia*	PICIDAE
37	Eurasion Wryneck	*Jynx torquilla*	PICIDAE
38	Speckled Piculet	*Picumnus innominatus*	PICIDAE
39	Grey-headed Woodpecker	*Picus canus*	PICIDAE
40	Lesser Yellownape	*Picus chlorolophus*	PICIDAE
41	Greater Yellownape	*Picus flavinucha*	PICIDAE
42	White-browed Piculet	*Sasia ochracea*	PICIDAE
43	Blue-throated Barbet	*Megalaima asiatica*	RAMPHASTIDAE
44	Blue-eared Barbet	*Megalaima australis*	RAMPHASTIDAE
45	Golden-throated Barbet	*Megalaima franklinii*	RAMPHASTIDAE
46	Coppersmith Barbet	*Megalaima haemacephala*	RAMPHASTIDAE
47	Lineated Barbet	*Megalaima lineata*	RAMPHASTIDAE
48	Great Barbet	*Megalaima virens*	RAMPHASTIDAE
49	Rufous-necked Hornbill	*Aceros nipalensis*	BUCEROTIDAE
50	Wreathed Hornbill	*Aceros undulatus*	BUCEROTIDAE
51	Oriental Pied Hornbill	*Anthracoceros albirosttis*	BUCEROTIDAE
52	Great Hornbill	*Buceros bicornis*	BUCEROTIDAE
53	Common Hoopoe	*Upupa epops*	UPUPIDAE
54	Red -headed Trogon	*Harpactes erythrocephalus*	TROGONIDAE
55	Indian Roller	*Coracias benghalensis*	CORACIIDAE
56	Dollardbird	*Eurystomus orientalis*	CORACIIDAE
57	Blyth's Kingfisher	*Alcedo hercules*	ALCEDINIDAE
58	Common Kingfisher	*Alcedo atthis*	ALCEDINIDAE
59	Oriental Dwarf Kingfisher	*Ceyx erithacus*	ALCEDINIDAE
60	Ruddy Kingfisher	*Halcyon coromanda*	ALCEDINIDAE
61	White-throated Kingfisher	*Halcyon smyrnensis*	ALCEDINIDAE
62	Crested Kingfisher	*Megaceryle lugubris*	ALCEDINIDAE
63	Pied Kingfisher	*Ceryle rudis*	ALCEDINIDAE
64	Blue-bearded Bee-eater	*Nyctyornis athertoni*	MEROPIDAE
65	Chestnut-headed Bee-eater	*Merops leschenaulti*	MEROPIDAE

66	Green Bee-eater	*Merops orientalis*	MEROPIDAE
67	Blue-tailed Bee-eater	*Merops philippinus*	MEROPIDAE
68	Plaintive Cuckoo	*Cacomantis merulinus*	CUCULIDAE
69	Grey-bellied Cuckoo	*Cacomantis Passerinus*	CUCULIDAE
70	Banded bay Cuckoo	*Cacomantis sonneratti*	CUCULIDAE
71	Asian Emerald Cuckoo	*Chrysococcyx maculatus*	CUCULIDAE
72	Violet Cuckoo	*Chrysococcyx xanthorhynchus*	CUCULIDAE
73	Chestnut-winged Cuckoo	*Clamator coromandus*	CUCULIDAE
74	Eurasian Cuckoo	*Cuculus canorus*	CUCULIDAE
75	Indian Cuckoo	*Cuculus micropterus*	CUCULIDAE
76	Lesser Cuckoo	*Cuculus poliocephalus*	CUCULIDAE
77	Oriental Cuckoo	*Cuculus saturatus*	CUCULIDAE
78	Hodgson's Hawk Cuckoo	*Hierococcyx fugax*	CUCULIDAE
79	Large Hawk Cuckoo	*Hierococcyx sparverioides*	CUCULIDAE
80	Common Hawk Cuckoo	*Hierococcyx varius*	CUCULIDAE
81	Green-billed Malkoha	*Phaenicophaeus tristis*	CUCULIDAE
82	Drongo Cuckoo	*Surniculus lugubris*	CUCULIDAE
83	Asial Koel	*Eudynamys scolopacea*	CUCULIDAE
84	Lesser Coucal	*Centropus bengalensis*	CUCULIDAE
85	Greater Coucal	*Centropus sinensis*	CUCULIDAE
86	Red-breasted Parakeet	*Psittacula alexandri*	PSITTACIDAE
87	Slaty-headed Parakeet	*Psittacula himalayana*	PSITTACIDAE
88	Rose-ringed Parakeet	*Psittacula krameri*	PSITTACIDAE
89	Alexandrine Parakeet	*Psittacula eupatria*	PSITTACIDAE
90	Dark-rumped Swift	*Apus acuticauda*	APODIDAE
91	Fork-tailed Swift	*Apus pacificus*	APODIDAE
92	Himalayan Swiftlet	*Collocalia brevirostris*	APODIDAE
93	Asian Palm Swift	*Cypsiurus balasiensis*	APODIDAE
94	White-throated Needletail	*Hirundapus Caudacutus*	APODIDAE
95	Alpine Swift	*Tachymarptis melba*	APODIDAE
96	Crested Treeswift	*Hemiprocne coronata*	HEMIPROCNIDAE
97	Spotted Owlet	*Athene brama*	STRIGIDAE
98	Spot-bellied Eagle Owl	*Bubo nipalenses*	STRIGIDAE
99	Collered Owlet	*Glaucidium brodiei*	STRIGIDAE
100	Asian Barred Owlet	*Glaucidium cuculoides*	STRIGIDAE
101	Jungle Owlet	*Glaucidium radiatum*	STRIGIDAE

102	Tawny Fish Owl	*Ketupa flavipes*	STRIGIDAE
103	Brown Hawk Owl	*Ninox scutulata*	STRIGIDAE
104	Collared Scops Owl	*Otus bakkaamoena*	STRIGIDAE
105	Mountain Scops Owl	*Otus spilocephalus*	STRIGIDAE
106	Oriental Scops Owl	*Otus sunia*	STRIGIDAE
107	Tawny owl	*Strix aluco*	STRIGIDAE
108	Brown Wood Owl	*Strix leptogrammica*	STRIGIDAE
109	Savanna Nightjar	*Carpimulgus affinis*	CAPRIMULGIDAE
110	Grey Nightjar	*Carpimulgus indicus*	CAPRIMULGIDAE
111	Long-tailed Nightjar	*Carpimulgus macrurus*	CAPRIMULGIDAE
112	Hodgson's Frogmouth	*Batrachostomus moniliger*	PODARGIDAE
113	Emerald Dove	*Chalcophaps indica*	COLUMBIDAE
114	Speckled Wood pigeon	*Columba hodgsonii*	COLUMBIDAE
115	Rock Pegion	*Columba livia*	COLUMBIDAE
116	Green Imperial Pigeon	*Ducula aenea*	COLUMBIDAE
117	Mountain Imperial Pigeon	*Ducula badia*	COLUMBIDAE
118	Barred Cuckoo Dove	*Macropygia unchall*	COLUMBIDAE
119	Spotted Dove	*Streptopelia chinensis*	COLUMBIDAE
120	Eurasian Collared Dove	*Streptopelia decaocto*	COLUMBIDAE
121	Oriental Turtile Dove	*Streptopelia orientalis*	COLUMBIDAE
122	Laughing Dove	*Streptopelia senegalensis*	COLUMBIDAE
123	Red Collared Dove	*Streptopelia tranquebarica*	COLUMBIDAE
124	Pin-tailed green Pigeon	*Treron apicauda*	COLUMBIDAE
125	Orange-breasted Green Pigeon	*Treron bicincta*	COLUMBIDAE
126	Thick-billed Green Pigeon	*Treron curvirostra*	COLUMBIDAE
127	Yellow-footed Green Pigeon	*Treron phoenicoptera*	COLUMBIDAE
128	Pompadour Green Pigeon	*Treron pompadora*	COLUMBIDAE
129	Wedge-tailed Green Pigeon	*Treron sphenura*	COLUMBIDAE
130	Ashy Wood Pigeon	*Columba pulchricollis*	COLUMBIDAE
131	White-breasted Waterhen	*Amaurornis phoenicurus*	RALLIDAE
132	Slaty-breasted Rail	*Lewinia striata.*	RALLIDAE
133	Eurasian Woodcock	*Scolopax rusticola*	SCOLOPACIDAE
134	Pintail Snipe	*Gallinago stenura*	SCOLOPACIDAE
135	Common Snipe	*Gallinago galinago*	SCOLOPACIDAE

136	Common Sandpiper	*Actitis hypoleucos*	SCOLOPACIDAE
137	Temminck's Stint	*Calidris temminckii*	SCOLOPACIDAE
138	Eurasian Curlew	*Numenius arquata*	SCOLOPACIDAE
139	Common Greenshank	*Tringa nebularia*	SCOLOPACIDAE
140	Green Sandpiper	*Tringa ochropus*	SCOLOPACIDAE
141	Common Redshank	*Tringa totanus*	SCOLOPACIDAE
142	Greater Painted Snipe	*Rostratula benghalensis*	SCOLOPACIDAE
143	Great Thick-knee	*Esacus recurvirostris*	BURHINIDAE
144	Eurasian Thick-knee	*Burhinus oedicnemus*	BURHINIDAE
145	Ibisbill	*Ibidorhyncha struthersii*	IBIDORHYNCHIDAE
146	Pied Avocet	*Recurvirostra avosetta*	RECURVIROSTRIDAE
147	Lesser Sand Plover	*Charadius mongolus*	CHARADRIIDAE
148	Kentish Plover	*Charadrius alexandrius*	CHARADRIIDAE
149	Little Ringed Plover	*Charadrius dubius*	CHARADRIIDAE
150	Long-billed Plover	*Charadrius placidus*	CHARADRIIDAE
151	River Lapwing	*Vanellus duvaucelii*	CHARADRIIDAE
152	Red-wattled Lapwing	*Vanellus indicus*	CHARADRIIDAE
153	Small Pratincole	*Glareola lactea*	GLAREOLIDAE
154	Brown-headed Gull	*Larus brunnicephalus*	LARIDAE
155	Pallas's Gull	*Larus ichthyaetus*	LARIDAE
156	Black-headed Gull	*Larus ridibundus*	LARIDAE
157	River Tern	*Sterna aurantia*	LARIDAE
158	Common Tern	*Sterna hirundo*	LARIDAE
159	Osprey	*Pandion haliaetus*	ACCIPITRIDAE
160	Jerdon's Baza	*Aviceda jerdonni*	ACCIPITRIDAE
161	Black Baza	*Aviceda leuphotes*	ACCIPITRIDAE
162	Eurasian Marsh Harrier	*Circus aeruginosus*	ACCIPITRIDAE
163	Pied Harrier	*Circus melancleucos*	ACCIPITRIDAE
164	Hen Harrier	*Circus cyaneus*	ACCIPITRIDAE
165	Oriental Honey-buzzard	*Pernis ptilorhyncus*	ACCIPITRIDAE
166	Common Buzzard	*Buteo buteo*	ACCIPITRIDAE
167	Black Eagle	*Ictinaetus malayensis*	ACCIPITRIDAE
168	Crested Serpent Eagle	*Spilornis cheela*	ACCIPITRIDAE
169	Lesser Fish Eagle	*Icthyophaga humilis*	ACCIPITRIDAE
170	Palla's Fish Eagle	*Haliaeetus leucoryphus*	ACCIPITRIDAE
171	Greater Spotted Eagle	*Aquila clanga*	ACCIPITRIDAE
172	Steppe Eagle	*Aquila nipalensis*	ACCIPITRIDAE

173	Booted Eagle	*Hieraaetus pennatus*	ACCIPITRIDAE
174	Rufous-bellied Eagle	*Hieraaetus kienerii*	ACCIPITRIDAE
175	Mountain Hawk Eagle	*Spizaetus nipalensis*	ACCIPITRIDAE
176	Black-shouldered Kite	*Elanus caeruleus*	ACCIPITRIDAE
177	Brahminy Kite	*Haliastur indus*	ACCIPITRIDAE
178	Black Kite	*Milvus migrans*	ACCIPITRIDAE
179	Eurasian Sparrowhawk	*Accipiter nisus*	ACCIPITRIDAE
180	Crested Goshawk	*Accipiter trivirgatus*	ACCIPITRIDAE
181	Besra	*Accipiter virgatus*	ACCIPITRIDAE
182	Shikra	*Accipiter badius*	ACCIPITRIDAE
183	Himalayan Griffon	*Gyps himalayensis*	ACCIPITRIDAE
184	White-rumped Vulture	*Gyps bengalensis*	ACCIPITRIDAE
185	Red-headed Vulture	*Sarcogyps calvus*	ACCIPITRIDAE
186	Bonelli's Eagle	*Hieraaetus fasciatus*	ACCIPITRIDAE
187	Peregrine Falcon	*Falco peregrinus*	FALCONIDAE
188	Oriental Hobby	*Falco severus*	FALCONIDAE
189	Eurasian Hobby	*Falco subbuteo*	FALCONIDAE
190	Pied Falconet	*Microhierax melanoleucos*	FALCONIDAE
191	Collared Falconet	*Microhierax caerulescens*	FALCONIDAE
192	Common Kestrel	*Falco tinnunculus*	FALCONIDAE
193	Little Grebe	*Tachybaptus ruficollis*	PODICIPEDIDAE
194	Great Cormorant	*Phalacrocorax carbo*	PHALACROCORACIDAE
195	Little Cormorant	*Phalacrocorax niger*	PHALACROCORACIDAE
196	Little Egret	*Egretta garzetta*	ARDEDAE
197	Great Egret	*Casmerodius albus*	ARDEDAE
198	Intermediate Egret	*Mesophoyx intermedia*	ARDEDAE
199	Cattle Egret	*Bubulcus ibis*	ARDEDAE
200	Indian Pond Heron	*Ardeola grayii*	ARDEDAE
201	Little Heron	*Butorides striatus*	ARDEDAE
202	Grey Heron	*Ardea cinerea*	ARDEDAE
203	White-bellied Heron	*Ardea insignis*	ARDEDAE
204	Purple Heron	*Ardea purpurea*	ARDEDAE
205	Malayan Night Heron	*Gorsachius melanolophus*	ARDEDAE
206	Cinnamon Bittern	*Lxobrychus cinnamomeus*	ARDEDAE
207	Black-crowned Night Heron	*Nycticorax nycticorax*	ARDEDAE

208	Black Stork	*Ciconia nigra*	CICINIIDAE
209	Woolly-necked Strok	*Ciconia episcopus*	CICINIIDAE
210	Lesser Adjutant	*Leptoptilos javanicus*	CICINIIDAE
211	Blue Pitta	*Pitta Cyanea*	PITTIDAE
212	Blue-naped Pitta	*Pitta nepalenses*	PITTIDAE
213	Hooded Pitta	*Pitta sordida*	PITTIDAE
214	Long-tailed Broadbill	*Psarisomus dalhousiae*	EURYLAIMIDAE
215	Silver-breasted Broadbill	*Serilophus lunatus*	EURYLAIMIDAE
216	Golden-fronted Leafbird	*Chloropsis aurifrons*	CHLOROPSEIDAE
217	Orange-bellied Leafbird	*Chloropsis hardwickii*	CHLOROPSEIDAE
218	Asian Fairy Bluebird	*Irena puella*	IRENIDAE
219	Brown Shrike	*Lanius cristatus*	LANIIDAE
220	Long-tailed Shrike	*Lanius schach*	LANIIDAE
221	Grey-backed Shrike	*Lanius tephronotus*	LANIIDAE
222	Burmese Shrike	*Lanius collurioides*	LANIIDAE
223	Yellow-billed Blue Magpie	*Urocissa flavirostris*	CORVIDAE
224	Common Green Magpie	*Cissa chinensis*	CORVIDAE
225	Grey Treepie	*Dendrocitta formasae*	CORVIDAE
226	Collared Treepie	*Dendrocitta frontalis*	CORVIDAE
227	Rofous Treepie	*Dendrocitta vagabunda*	CORVIDAE
228	House Crow	*Corvus splendens*	CORVIDAE
229	Large-billed Crow	*Corvus macrorhynchos*	CORVIDAE
230	Ashy Woodswallow	*Artamus fuscus*	ARTAMIDAE
231	Eurasian Golden Oriole	*Oriolus oriolus*	ORIOLIDAE
232	Slender-billed Oriole	*Oriolus tenuirostris*	ORIOLIDAE
233	Maroon Oriole	*Oriolus traillii*	ORIOLIDAE
234	Black-hooded Oriole	*Oriolus xanthornus*	ORIOLIDAE
235	Black-winged Cuckooshrike	*Coracina melaschistos*	CHAMPEPHAGIDAE
236	Large Cuckooshrike	*Coracina macei*	CHAMPEPHAGIDAE
237	Bar-winged Flycatchershrike	*Hemipus picatus*	CHAMPEPHAGIDAE
238	Short-billed Minivet	*Pericrocotus brevirostri*	CHAMPEPHAGIDAE
239	Small Minivet	*Pericrocotus cinnamomeus*	CHAMPEPHAGIDAE
240	Long-tailed Minivet	*Pericrocotus ethologus*	CHAMPEPHAGIDAE
241	Scarlet Minivet	*Pericrocotus flammeus*	CHAMPEPHAGIDAE
242	Rosy Minivet	*Pericrocotus roseus*	CHAMPEPHAGIDAE
243	Grey-chinned Minivet	*Pericrocotus solaris*	CHAMPEPHAGIDAE

244	Yellow-bellied Fantail	*Rhipidura hypoxantha*	RHIPIDURIDAE
245	White-throated Fantail	*Rhipidura albicollis*	RHIPIDURIDAE
246	Black Drongo	*Dicrurus macrocercus*	DICRURIDAE
247	Bronzed Drongo	*Dicrurus aeneus*	DICRURIDAE
248	Crow-billed Drongo	*Dicrurus annectans*	DICRURIDAE
249	Spangled Drongo	*Dicrurus hottentottus*	DICRURIDAE
250	Ashy Drongo	*Dicrurus leucophaeus*	DICRURIDAE
251	Greater Racket-tailed Drongo	*Dicrurus paradiseus*	DICRURIDAE
252	Lesser Racket-tailed Drongo	*Dicrurus remifer*	DICRURIDAE
253	Black-naped Monarch	*Hypothymis azurea*	MONARCHIDAE
254	Asian Paradise-flycatcher	*Terpsiphone paradisi*	MONARCHIDAE
255	Common Iora	*Aegithina tiphia*	AEGITHINIDAE
256	Large Woodshrike	*Tephrodornis gularis*	TEPHRODORNITHIDAE
257	Brown Dipper	*Cinclus pallasii*	CINCLIDAE
258	Blue Rock Thrush	*Monticola solitarius*	TURDIDAE
259	Blue-capped Rock thrush	*Monticola cinclorhynchus*	TURDIDAE
260	Chestnut-bellied Rock Thrush	*Monticola rufiventris*	TURDIDAE
261	Black-breasted Thrush	*Turdus dissimilis*	TURDIDAE
262	Dark-throated Thrush	*Turdus ruficollis*	TURDIDAE
263	Orange-headed Thrush	*Zoothera citrina*	TURDIDAE
264	Scaly Thrush	*Zoothera dauma*	TURDIDAE
265	Long-billed Thrush	*Zoothera monticola*	TURDIDAE
266	Plain-backed Thrush	*Zoothera mollissima*	TURDIDAE
267	Chestnut Thrush	*Turdus rubrocanus*	TURDIDAE
268	Lesser Shortwing	*Brachypteryx leucophrys*	TURDIDAE
269	Blue Whistling Thrush	*Myophonus caeruleus*	TURDIDAE
270	White-collared Blackbird	*Turdus albocinctus*	TURDIDAE
271	Grey-winged Blackbird	*Turdus boulboul*	TURDIDAE
272	Tickle's Thrush	*Turdus unicolor*	TURDIDAE
273	Dark-sided Flycatcher	*Muscicapa sibirica*	MUSCICAPIDAE
274	Pale-chinned Flycatcher	*Cyornis poliogenys*	MUSCICAPIDAE
275	Blue-throated Flycatcher	*Cyornis rubeculoides*	MUSCICAPIDAE
276	Pale Blue Flycatcher	*Cyornis unicolor*	MUSCICAPIDAE
277	Verditer Flycatcher	*Eumyias thalassina*	MUSCICAPIDAE
278	Slaty-backed Flycatcher	*Ficedula hodgsonii*	MUSCICAPIDAE

279	White-gorgeted Flycatcher	*Ficedula monileger*	MUSCICAPIDAE
280	Red-throated Flycatcher	*Ficedula parva*	MUSCICAPIDAE
281	Sapphire Flycatcher	*Ficedula sapphira*	MUSCICAPIDAE
282	Rofour-gorgeted Flycatcher	*Ficedula strophiata*	MUSCICAPIDAE
283	Ultramarine Flycatcher	*Ficedula superciliaris*	MUSCICAPIDAE
284	Slaty-blue Flycatcher	*Ficedula tricolor*	MUSCICAPIDAE
285	Little Pied Flycatcher	*Ficedula westermanni*	MUSCICAPIDAE
286	Asian Brown Flycatcher	*Muscicapa dauurica*	MUSCICAPIDAE
287	Ferruginous Flycatcher	*Muscicapa ferruginea*	MUSCICAPIDAE
288	Pygme Blue Flycatcher	*Muscicapella hodgsoni*	MUSCICAPIDAE
289	Large Niltava	*Niltava grandis*	MUSCICAPIDAE
290	Small Niltava	*Niltava macgrigoriae*	MUSCICAPIDAE
291	Rufous-bellied Niltava	*Niltava sundara*	MUSCICAPIDAE
292	Grey-headed Canary Flycatcher	*Serilophus lunatus*	MUSCICAPIDAE
293	Snowy-browed Flycatcher	*Ficedula hyperythra*	MUSCICAPIDAE
294	White-capped Water Redstart	*Chaimarrornis leucocephalus*	MUSCICAPIDAE
295	Green Cochoa	*Cochoa viridis*	TURDIDAE
296	Siberian Rubythroat	*calliope calliope*	MUSCICAPIDAE
297	White-tailed Rubythroat	*Luscinia pectoralis*	MUSCICAPIDAE
298	White-rumped Shama	*Copsychus malabaricus*	MUSCICAPIDAE
299	Oriental Magpie Robin	*Copsychus saularis*	MUSCICAPIDAE
300	Black-backed Forktail	*Enicurus immaculatus*	MUSCICAPIDAE
301	Spotted Forktail	*Enicurus maculatus*	MUSCICAPIDAE
302	Slaty-backed Forktail	*Enicurus schistaceus*	MUSCICAPIDAE
303	Little Forktail	*Enicurus scouleri*	MUSCICAPIDAE
304	White-tailed Robin	*Myiomela leucura*	MUSCICAPIDAE
305	Daurian Redstart	*Phoenicurus auroreus*	MUSCICAPIDAE
306	Blue-fronted Redstart	*Phoenicurus frontalis*	MUSCICAPIDAE
307	Hodgson's Redstart	*Phoenicurus hodgsoni*	MUSCICAPIDAE
308	Black Redstart	*Phoenicurus ochruros*	MUSCICAPIDAE
309	Plumbeous Water Redstart	*Rhyacornis fuliginosus*	MUSCICAPIDAE
310	Pied Bushchat	*Saxicola caprata*	MUSCICAPIDAE
311	Grey Bushchat	*Saxicola ferrea*	MUSCICAPIDAE
312	Common Stonechat	*Saxicola torquata*	MUSCICAPIDAE
313	Golden Bush Robin	*Tarsiger chrysaeus*	MUSCICAPIDAE
314	Oranged-flanked Bush Robin	*Tarsiger cyanurus*	MUSCICAPIDAE

315	Asian Pied Starling	*Sturnus contra*	STURNIDAE
316	Jungle Myna	*Acridotheres fuscus*	STURNIDAE
317	Bank Myna	*Acridotheres ginginianus*	STURNIDAE
318	Common Myna	*Acridotheres tristis*	STURNIDAE
319	Hill Myna	*Gracula religiosa*	STURNIDAE
320	Common Starling	*Strunus vulgaris*	STURNIDAE
321	Chestnut-tailed Starling	*Sturnus malabaricus*	STURNIDAE
322	Spot-winged Starling	*Saroglossa spiloptera*	STURNIDAE
323	Chestnut-bellied Nutchatch	*Sitta castanea*	SITTIDAE
324	Beautiful Nuthatch	*Sitta formosa*	SITTIDAE
325	Velvet-fronted Nuthatch	*Sitta frontalis*	SITTIDAE
326	White-tailed Nuthatch	*Sitta himalayensis*	SITTIDAE
327	Wallcreeper	*Tichodroma muraria*	SITTIDAE
328	Brown -throated Treecreeper	*Certhia discolor*	CERTHIIDAE
329	Rusty-flanked Treecreeper	*Certhia nipalenses*	CERTHIIDAE
330	Winter Wren	*Troglodytes troglodytes*	TROGLODYTIDAE
331	Sultan Tit	*Melanochlora sultanea*	PARIDAE
332	Coal Tit	*Parus ater*	PARIDAE
333	Great Tit	*Parus major*	PARIDAE
334	Green-backed Tit	*Parus monticolus*	PARIDAE
335	Yellow-cheecked Tit	*Parus spilonotus*	PARIDAE
336	Black-throated Tit	*Aegithalos concinnus*	PARIDAE
337	Rufous-vented Tit	*Aegithalos iouschistos*	PARIDAE
338	Asian House Martin	*Delichon dasypus*	HIRUNDINIDAE
339	Nepal House Martin	*Delichon nipalenses*	HIRUNDINIDAE
340	Red-rumped Sallow	*Hirundo daurica*	HIRUNDINIDAE
341	Eurasian Crag Martin	*Hirundo rupestris*	HIRUNDINIDAE
342	Barn Sallow	*Hirundo rustica*	HIRUNDINIDAE
343	Plain Martin	*Riparia paludicola*	HIRUNDINIDAE
344	Sand Martin	*Riparia riparia*	HIRUNDINIDAE
345	Goldcrest	*Regulus regulus*	REGULIDAE
346	White-throated Bulbul	*Alophoixus flaveolus*	PYCNONOTIDAE
347	Ashy Bulbul	*Hemixos flavala*	PYCNONOTIDAE
348	Black Bulbul	*Hypsipetes leucocephalus*	PYCNONOTIDAE
349	Mountain Bulbul	*Hypsipetes mcclellandii*	PYCNONOTIDAE
350	Red-vented Bulbul	*Pycnonotus cafer*	PYCNONOTIDAE

351	Red-whiskered Bulbul	*Pycnonotus jocosus*	PYCNONOTIDAE
352	Black-crested Bulbul	*Pycnonotus melanicterus*	PYCNONOTIDAE
353	Straited Bulbul	*Pycnonotus striatus*	PYCNONOTIDAE
354	Himalayan Bulbul	*Pycnonotus leucogenys*	PYCNONOTIDAE
355	Hill Prinia	*Prinia atrogularis*	CISTICOLIDAE
356	Grey-crowned Prinia	*Prinia cinereocapilla*	CISTICOLIDAE
357	Striated Prinia	*Prinia criniger*	CISTICOLIDAE
358	Grey-breasted Prinia	*Prinia hodgsonii*	CISTICOLIDAE
359	Ashy Prinia	*Prinia socialis*	CISTICOLIDAE
360	Jungle Prinia	*Prinia sylvatica*	CISTICOLIDAE
361	Rufescent Prinia	*Prinia rufescens*	CISTICOLIDAE
362	Black-throated Prinia	*Prinia atrogularis*	CISTICOLIDAE
363	Orintal White-eye	*Zosterops palpebrosus*	ZOSTEROPIDAE
364	Chestnut-headed Tesia	*Tesia castaneocoronata*	ALAUDIDAE
365	Slaty-bellied Tesia	*Tesia olivea*	ALAUDIDAE
366	Grey-bellied Tesia	*Tesia cyaniventer*	ALAUDIDAE
367	Rufous-faced Warbler	*Abroscopus albogularis*	SYLVIIDAE
368	Black-faced warbler	*Abroscopus schisticeps*	SYLVIIDAE
369	Yellow-bellied Warbler	*Abroscopus superciliaris*	SYLVIIDAE
370	Bylth's Reed Warbler	*Acrocephalus dumetorum*	SYLVIIDAE
371	Yellowish-bellied Bush Warbler	*Cettia acanthizoides*	SYLVIIDAE
372	Grey-sided Bush Warbler	*Cettia brunnifrons*	SYLVIIDAE
373	Aberrant Bush Warbler	*Cettia flavolivacea*	SYLVIIDAE
374	Brownish-flanked Bush Warbler	*Cettia fortipes*	SYLVIIDAE
375	Chestnut-crowned Bush Warbler	*Cettia major*	SYLVIIDAE
376	Pale-footed Bush Warbler	*Cettia pallidipes*	SYLVIIDAE
377	Yellow-vented Warbler	*Ohylloscopus cantator*	SYLVIIDAE
378	Mountain Tailorbird	*Orthotomus cuculatus*	SYLVIIDAE
379	Common Tailorbird	*Orthotomus sutorius*	SYLVIIDAE
380	Tickle's Leaf Warbler	*Phylloscopus affinis*	SYLVIIDAE
381	Lemon-rumped Warbler	*Phylloscopus chloronotus*	SYLVIIDAE
382	Yellow-browed Warbler	*Phylloscopus inornatus*	SYLVIIDAE
383	Ashy-throated Warbler	*Phylloscopus maculipennis*	SYLVIIDAE

384	Large-bellied Leaf Warbler	*Phylloscopus magnirostris*	SYLVIIDAE
385	Buff-barred Warbler	*Phylloscopus pulcher*	SYLVIIDAE
386	Blyth's Leaf Warbler	*Phylloscopus reguloides*	SYLVIIDAE
387	Greenish Warbler	*Phylloscopus trochiloides*	SYLVIIDAE
388	Dusty Warbler	*Phylloscopus fuscatus*	SYLVIIDAE
389	Whistler's Warbler	*Seicecus whistleri*	SYLVIIDAE
390	White-spectacled Warbler	*Seicercus affinis*	SYLVIIDAE
391	Golden-spectacled Warbler	*Seicercus burkii*	SYLVIIDAE
392	Chentnut-crowned Warbler	*Seicercus castaniceps*	SYLVIIDAE
393	Grey-cheecked Warbler	*Seicercus poliogenys*	SYLVIIDAE
394	Grey-hooded Warbler	*Seicercus xanthoschistos*	SYLVIIDAE
395	Broad-billed Warbler	*Tickellia hodgsoni*	SYLVIIDAE
396	White-throated Laughingthrush	*Garrulax albogularis*	TIMALIDAE
397	Grey-sided Laughingthrush	*Garrulax caerulatus*	TIMALIDAE
398	Chestnut-crowned Laughingthrush	*Garrulax erythrocephalus*	TIMALIDAE
399	Rufous-vented Laughingthrush	*Garrulax gularis*	TIMALIDAE
400	White-crested Laughingthrush	*Garrulax leucoplophus*	TIMALIDAE
401	Bhutan Laughingthrush(streaked)	*Garrulax lineatus*	TIMALIDAE
402	Lesser Necklaced Laughingthrush	*Garrulax monileger*	TIMALIDAE
403	Greater Necklaced Laughingthrush	*Garrulax pectoralis*	TIMALIDAE
404	Rufous-necked Laughingthrush	*Garrulax ruficollis*	TIMALIDAE
405	Rufous-chinned Laughingthrush	*Garrulax rufogularis*	TIMALIDAE
406	Blue-winged Laughingthrush	*Garrulax squamatus*	TIMALIDAE
407	Striated Laughingthrush	*Garrulax striatus*	TIMALIDAE
408	Red-faced Liocichla	*Liocichla phoenicea*	TIMALIDAE
409	Puff-throated Babbler	*Pellorneum ruficeps*	TIMALIDAE
410	Buff-breasted Babbler	*Pellorneum tickelli*	TIMALIDAE
411	Jungle Babbler	*Turdoides striatus*	TIMALIDAE
412	Pin-striped Tit Babbler	*Macronous gularis*	TIMALIDAE
413	Chestnut-capped Babbler	*Timalia pileata*	TIMALIDAE
414	Abbott's Babbler	*Malacocincla abbotti*	TIMALIDAE

415	Rusty-cheecked Scimitar Babbler	*Pomatorhinus erythrogenys*	TIMALIDAE
416	Coral-billed Scimitar Babbler	*Pomatorhinus ferruginosus*	TIMALIDAE
417	Streaked-breasted Scimitar Babbler	*Pomatorhinus ruficollis*	TIMALIDAE
418	White-browed Scimitar Babbler	*Pomatorhinus schisticeps*	TIMALIDAE
419	Grey-throated Babbler	*Stachyris nigriceps*	TIMALIDAE
420	Rufous-fronted Babbler	*Stachyris rufifrons*	TIMALIDAE
421	Rufous-capped Babbler	*Stachyris ruficeps*	TIMALIDAE
422	Golden Babbler	*Stachyris chrysaea*	TIMALIDAE
423	Spotted Wren Babbler	*Spelaeornis formosus*	TIMALIDAE
424	Eyebrowed Wren-Babbler	*Napothera epilepidota*	TIMALIDAE
425	Rufous-throated Wren Babbler	*Spelaeornis caudatus*	TIMALIDAE
426	White-hooded Babbler	*Gampsorhynchus rufulus*	TIMALIDAE
427	White-browed Shrike Babbler	*Pteruthius flaviscapis*	TIMALIDAE
428	Black-eared Shrike Babbler	*Pteruthius melanotis*	TIMALIDAE
429	Black-headed Shrike Babbler	*Pteruthius rufiventer*	TIMALIDAE
430	Yellow-eyed Babbler	*Chrysomma sinense.*	TIMALIDAE
431	Cutia	*Cutia nipalensis*	TIMALIDAE
432	Red-billed Leiothrix	*Leiothrix lutea*	TIMALIDAE
433	Silver-eared Mesia	*Leiothrix argentauris*	TIMALIDAE
434	Scaly-breasted Wren Babbler	*Pnoepyga albiventer*	TIMALIDAE
435	Pygmy Wren Babbler	*Pnoepyga pusilla*	TIMALIDAE
436	Blue-winged Minla	*Minla cyanouroptera*	TIMALIDAE
437	Red-tailed Minla	*Minla ignotincta*	TIMALIDAE
438	Chestnut-tailed Minla	*Minla strigula*	TIMALIDAE
439	Rusty-fronted Barwing	*Actinodura egertoni*	TIMALIDAE
440	Hoary-throated Barwing	*Actinodura nipalensis*	TIMALIDAE
441	Rufous-winged Fulvetta	*Alcippe castaneceps*	TIMALIDAE
442	Yellow-throated Fulvetta	*Alcippe cinerea*	TIMALIDAE
443	Nepal Fulvetta	*Alcippe nipalensis*	TIMALIDAE
444	White-browed Fulvetta	*Alcippe vinipectus*	TIMALIDAE
445	Beautiful Sibia	*Heterophasia pulchella*	TIMALIDAE
446	Rufous Sibia	*Heterophasia capistrata*	TIMALIDAE
447	Long-tailed Sibia	*Heterophasia picaoides*	TIMALIDAE

448	White-naped Yuhina	*Yuhina bakeri*	TIMALIDAE
449	Whiskered Yuhina	*Yuhina flavicollis*	TIMALIDAE
450	Black-chinned Yuhina	*Yuhina nigrimenta*	TIMALIDAE
451	White-bellied Yuhina	*Yuhina zantholeuca*	TIMALIDAE
452	Striated Yuhina	*Yuhina castaniceps*	TIMALIDAE
453	Rufous-vented Yuhina	*Yuhina occipitalis*	TIMALIDAE
454	Stripe-throated Yuhina	*yuhina gularis*	TIMALIDAE
455	Lesser Rufous-headed Parrotbill	*Paradoxornis atrosuperciliaris*	TIMALIDAE
456	Grey-headed Parrotbill	*Paradoxornis gularis*	TIMALIDAE
457	Black-throated Parrotbill	*Paradoxornis nipalensis*	TIMALIDAE
458	Greater Rufous-headed Parrotbill	*Paradoxornis ruficeps*	TIMALIDAE
459	Yellow-vented Flowerpecker	*Dicaeum chrysorrheum*	DICAEIDAE
460	Plain Flowerpecker	*Dicaeum concolor*	DICAEIDAE
461	Scarlet-backed Flowerpecker	*Dicaeum cruentatum*	DICAEIDAE
462	Pale-billed Flowerpecker	*Dicaeum erythrorynchos*	DICAEIDAE
463	Fire-breasted Flowerpecker	*Dicaeum ignipectus*	DICAEIDAE
464	Green-tailed Sunbird	*Aethopyga nipalenses*	NECTARINIIDAE
465	Black-throated Sunbird	*Aethopyga saturata*	NECTARINIIDAE
466	Crimson Sunbird	*Aethopyga siparaja*	NECTARINIIDAE
467	Fire-tailed Sunbird	*Aethopyga ignicauda*	NECTARINIIDAE
468	Ruby-cheecked Sunbird	*Anthreptes singalensis*	NECTARINIIDAE
469	Streaked Spiderhunter	*Arachnothera magna*	NECTARINIIDAE
470	Little Spiderhunter	*Arachnothera longirostra*	NECTARINIIDAE
471	Purple Sunbird	*Nectarinia asiatica*	NECTARINIIDAE
472	House Sparrow	*Passer domesticus*	PASSERIDAE
473	Eurasian Tree Sparrow	*Passer montanus*	PASSERIDAE
474	Russet Sparrow	*Passer rutilans*	PASSERIDAE
475	Olive-backed Pipit	*Anthus hodgsonii*	MOTACILLIDAE
476	Richard's Pipit	*Anthus richardi*	MOTACILLIDAE
477	Rosy Pipit	*Anthus roseatus*	MOTACILLIDAE
478	Paddyfield Pipit	*Anthus rufulus*	MOTACILLIDAE
479	Rechard's Pipit	*Anthus richardi*	MOTACILLIDAE
480	White Wagtail	*Montacilla alba*	MOTACILLIDAE
481	Grey Wagtail	*Montacilla cinerea*	MOTACILLIDAE

482	Citrine Wagtail	*Montacilla citreola*	MOTACILLIDAE
483	White-browed Wagtail	*Montacilla maderaspatensis*	MOTACILLIDAE
484	Yellow Wagtail	*Motacilla flava*	MOTACILLIDAE
485	Rufous-breasted Accentor	*Prunelia strophiata*	PRUNELLIDAE
486	Maroon-backed Accentor	*Prunelia immaculata*	PRUNELLIDAE
487	Black-breasted Weaver	*Ploceus benghalensis*	PLOCEIDAE
488	Baya Weaver	*Ploceus philippinus*	PLOCEIDAE
489	White-rumped Munia	*Lonchura striata*	ESTRILDIDAE
490	Scaly-breasted Munia	*Lonchura punctulata*	ESTRILDIDAE
491	Brown Bullfinch	*Pyrrhula nipalensis*	FRINGILLIDAE
492	Spot-winged Grosbeak	*Mycerobas melanozanthos*	FRINGILLIDAE
493	Common Rosefinch	*Carpodacus erythrinus*	FRINGILLIDAE
494	Dark-breasted Rosefinch	*Carpodacus nipalensis*	FRINGILLIDAE
495	Yellow-breasted Greenfinch	*Carduelis spinoides*	FRINGILLIDAE
496	Little Bunting	*Emberiza pusilla*	EMBERIZIDAE
497	Black-faced Bunting	*Emberiza spodocephala*	EMBERIZIDAE
498	Crested Bunting	*Melophus lathami*	EMBERIZIDAE
499	Spot-billed Pelican	*Pelecanus philippensis*	PELECANIDAE

Appendix 3: List of herpetofauna of RMNP

Sl. No.	Common Name	*Scientific name*	Family
	Amphibians		
1	Marbled Sucker Frog	*Amolops marmoRatus*	Ranidae
2	Hill stream frog	*Amolops spp.*	Ranidae
3	Common Asian Toad	*Duttaphrynus melanostictus*	Bufonidae
4	Indian Skittering Frog	*Euphlyctis cyanophlyctis*	Dicroglossidae
5	Asian Rice Frog	*Fejervarya limnocharis*	Dicroglossidae
6	Nepal Wart Frog	*Fejervarya nepalensis*	Dicroglossidae
7	Indian Bull Frog	*Hoplobatrachus tigerinus*	Dicroglossidae
8	Assam Forest Frog	*Hylarana leptoglossa*	Ranidae
9	Trickle Frog	*Ingerana borealis*	Dicroglossidae
10	Eastern Spadefoot Toad	*Leptobrachium bopu*	Megophryidae
11	Concave-crowned Horned Frog	*Megophyrs parva*	Megophryidae
12	Ornate Narrow Mouth Frog	*Microhyla ornata*	Microhylidae
13	Bush Frog	*Philautus sp*	Rhacophoridae
14	Himalayan Tree Frog	*Polypedates himalayensis*	Rhacophoridae
15	Common Tree Frog	*Polypedates leuconystax*	Rhacophoridae

16	Terai Tree Frog	*Polypedates teraiensis*	Rhacophoridae
17	Twin Spotted Tree Frog	*Rhacophorus bipunctatus*	Rhacophoridae
18	Nepal Flying Frog	*Rhacophorus maximus*	Rhacophoridae
19	Indian Balloon Frog	*Uperodon globulosus*	Microhylidae
20	Terai Cricket Frog	*Zakerana teraiensis*	Dicroglossidae
21	Cricket Frog	*Zakerana pierrei*	Dicroglossidae
	Lizards		
22	Jerdon's Forest Lizard	*Calotes jerdoni*	Agamidae
23	Gray's Forest Lizard	*Calotes maria*	Agamidae
24	Common Garden Lizard	*Calotes versicolor*	Agamidae
25	Assamese Day Gecko	*Cnemaspis assamensis*	Gekkonidae
26	Khasi Hill Bent-toad Gecko	*Cyrtodactylus khasiensis*	Gekkonidae
27	Tokay Gecko	*Gekko Gecko*	Gekkonidae
28	Brook's House Gecko	*Hemidactylus brookii*	Gekkonidae
29	Common House Gecko	*Hemidactylus frenatus*	Gekkonidae
30	Bark Gecko	*Hemidactylus leschenaultii*	Gekkonidae
31	Flat tailed Gecko	*Hemidactylus platyurus*	Gekkonidae
32	Smooth Scaled Mountain Lizard	*Japalura planidorsata*	Agamidae
33	Variegated Mountain Lizard	*Japalura variegata*	Agamidae
34	Blue Fan-throat Lizard	*Ptyctolaemus gularis*	Agamidae
35	Indian Forest Skink	*Sphenomorphous indicus*	Scincidae
36	Spotted Litter Skink	*Sphenomorphus maculatus*	Scincidae
37	Bengal Monitor Lizard	*Varanus bengalensis*	Varanidae
38	Water Monitor	*Varanus salvator*	Varanidae
	Snakes		
39	Short Nose Vine Snake	*Ahaetulla prasina*	Colubridae
40	Buff Striped keelback	*Amphiesma stolatum*	Colubridae
41	Eastern Cat Snake	*Boiga gokool* +	Colubridae
42	Tawny Cat Snake	*Boiga ochracea*	Colubridae
43	Siamese Cat Snake	*Boiga siamensis* +	Colubridae
44	Common Krait	*Bungarus caeruleus*	Elapidae
45	Banded Krait	*Bungarus fasciatus*	Elapidae
46	Ornate Flying Snake	*Crysopelea ornata*	Colubridae
47	Brahminy Blind Snake	*Indotyphlops braminus*	Typhlopidae
48	Zaw's Wolf Snake	*Lycodon zawi*	Colubridae
49	Monocled Cobra	*Naja kaouthia*	Elapidae
50	King Cobra	*Ophiophagus hannah*	Elapidae
51	Black-banded Trinket	*Oreocryptophis porphyraceus*	Colubridae
52	Eastern Trinket Snake	*Orthriophis cantoris*	Colubridae
53	Striped Trinket Snake	*Orthriophis taeniurus yunnanensis*	Colubridae
54	Mountain Pit Viper	*Ovophis monticola*	Viperidae
55	Mock Viper	*Psammodynastes pulverulentus*	Lamprophiidae

56	False Cobra	*Pseudoxenodon macrops*	Colubridae
57	Indo Chinese Rat Snake	*Ptyas korros*	Colubridae
58	Indian Rat Snake	*Ptyas mucosa*	Colubridae
59	Green Rat Snake	*Ptyas nigromarginata*	Colubridae
60	Burmese Python	*Python bivittatus*	Pythonidae
61	Himalayan Keelback	*Rhabdophis himalayanus*	Colubridae
62	Red Necked Keelback	*Rhabdophis subminiatus*	Colubridae
63	MacClenlland's Coral Snake	*Sinomicrurus macclellandi*	Elapidae
64	White-lipped Pit Viper	*Trimeresurus albolabris*	Viperidae
65	Pope's Pit Viper	*Trimeresurus popeiorum*	Viperidae
66	Checkered Keelback	*Xenochrophis pisCator*	Colubridae
	Testudines		
67	Malayan Box Turtle	*Cuora amboinensis*	Geoemydidae
68	Keeled Box Turtle	*Cuora mouhotii*	Geoemydidae
69	Elongated Tortoise	*Indotestudo elongata*	Testudinidae
70	Tricarinate Hill Turtle	*Melanochelys tricarinata*	Geoemydidae
71	Indian Black Turtle	*Melanochelys trijuga*	Geoemydidae

Appendix 4: List of butterfly species of RMNP

Sl. No.	Common Name	Scientific Name	Family
1	Chestnut Angle	*Odontoptilium angulata angulata* (Felder-1862)	HESPERIIDAE
2	Common Awl	*Hasora badra badra* (Fruhstorfer-1911)	HESPERIIDAE
3	Common Spotted Flat	*Celaenorrhinus leucocera* (Koller)	HESPERIIDAE
4	*Coon**	*Sancus folio* (Mabille)	HESPERIIDAE
5	Dranded orange owlet	*Burara oedipodea*	HESPERIIDAE
6	Dusky Yellow Breasted Flat	*Gerosis phisara phisara* (Mabille-1903)	HESPERIIDAE
7	Fulvous Pied Flat	*Coladenia dan festa* (Evans-1949)	HESPERIIDAE
8	Great Swift	*Pelopidas assamensis (*Wood-Mason & De Niceville-1882)	HESPERIIDAE
9	Himalayan Dart	*Potanthus dara* (Kollar)	HESPERIIDAE
10	Indian awlking, common yeoman, Common mormon, Oriental red helen & Staff sergent	*Choaspes benjaminii*	HESPERIIDAE
11	Indian Skipper	*Spialia galba* (Fabricius-1793)	HESPERIIDAE
12	Orange Awlet	*Bibasis jaina* (Moore)	HESPERIIDAE

13	Orange Tail Awl	*Bibasis sena* (Moore)	HESPERIIDAE
14	Pale Palm Dart	*Telicota colon* (Fabricius-1775)	HESPERIIDAE
15	Restricted Demon	*Notocrypta curvifas*(Felder)	HESPERIIDAE
16	Small Branded Swift	*Pelopidas thrax masta* (Evans-1949)	HESPERIIDAE
17	Tiger Hopper	*Ochus subvittatus subradiatus* (Moore-1778)	HESPERIIDAE
18	Water Snow Flat	*Tagiades litigiosa litigiosa* (Hubner-1819)	HESPERIIDAE
19	Angled Sun Beam	*Curetis acuta (Moore)*	LYCAENIDAE
20	Banded Line Blue	*Prosotas aluta coelestis* (De Niceville)	LYCAENIDAE
21	Bright Sun Beam	*Zeltus amasa* (Fabricius)	LYCAENIDAE
22	Chocolate Royal	*Remelana jangala ravata* (Moore-1884)	LYCAENIDAE
23	Club Beak	*Libythia myrrha* (Godart)	LYCAENIDAE
24	Common Acacia Blue	*Surendra quercetorum* (Moore-1857)	LYCAENIDAE
25	Common Beak	*Libythea lepita lepita* (Moore-1857)	LYCAENIDAE
26	Common Gem	*Poritia hewitsoni hewitsoni* (Moore-1865)	LYCAENIDAE
27	Common Imperial	*Cheritra freja freja*(Fabricius-1793)	LYCAENIDAE
28	Common Pierrot	*Castalius rosimon rosimon*(Fruhstorfer)	LYCAENIDAE
29	Common Quaker	*Neopithecops zalmora zalmora* (Distance-1884)	LYCAENIDAE
30	Common Tinsel	*Catapaecilma elegans*(Druce)	LYCAENIDAE
31	Common Tit	*Hypolycaena erylus himavantus*(Fruhstorfer)	LYCAENIDAE
32	Elbowed Pierrot	*Celeta elna noliteia* (Fruhstorfer-1922)	LYCAENIDAE
33	Fluffy Tit	*Zeltus amasa* (Fabricius)	LYCAENIDAE
34	Forget Me Not	*Catochrysops panormus* (Fabricius-1793)	LYCAENIDAE
35	Fulvous pied flat	*Pseudocoladenia dan*	LYCAENIDAE
36	Large Hedge Blue	*Celastrina huegelii oreana* (Moore-1883)	LYCAENIDAE
37	Large Oak Blue	*Arhopala amantes amantes*(Hewitson-1862)	LYCAENIDAE
38	Lemon Pansy	*Junonia lemonias*	LYCAENIDAE
39	Malayan	*Megisba malayan sikkima*(Moore-1879)	LYCAENIDAE
40	Metallic Cerulean	*Jamides alecto eurysaces*(Fruhstorfer)	LYCAENIDAE

41	Orchid Tit	*Chliaria othona* (Hewitson-1865)	LYCAENIDAE
42	Pale Grass Blue	*Pseudozizeeria maha* (Kollar-1848)	LYCAENIDAE
43	Pea Blue	*Lampides boeticus* (Linnaeus-1767)	LYCAENIDAE
44	Plum Judy	*Abisara echerius suffusa* (Moore-1878)	LYCAENIDAE
45	Purple Sapphire	*Heliophorus epicles indicus* (Fruhstorfer)	LYCAENIDAE
46	Slate Flash	*Rapala manea schistacea*(Moore-1879)	LYCAENIDAE
47	Western Centaur Oakblue	*Arhopala pseudocentaurus* (Doubleday)	LYCAENIDAE
48	White Bordered Copper	*Lycaena pavana* (Kollar)	LYCAENIDAE
49	Yamfly	*Loxura atymnus continentalis*(Fruhstorfer)	LYCAENIDAE
50	yellow pansy	*Junonia hierta*	LYCAENIDAE
51	Angled Castor	*Ariadne ariadne pallidior* (Fruhstorfer)	NYMPHALIDAE
52	Autumn Leaf	*Doleschallia bisaltide indica* (Moore-1881)	NYMPHALIDAE
53	Banded Treebrown	*Lethe verma*	NYMPHALIDAE
54	Black Forester	*Lethe vindhya* (C. & R. Felder)	NYMPHALIDAE
55	Black Prince	*Rohana parisatis parisatis* (Moore-1857)	NYMPHALIDAE
56	Black Raja	*Charaxes solon* (Fabricius-1781)	NYMPHALIDAE
57	Blackvein Sergeant	*Parathyma ranga ranga* (Moore-1857)	NYMPHALIDAE
58	Blue duke	*Euthalia dura*	NYMPHALIDAE
59	Blue Glassy Tiger	*Tirumala limniace leopardus* (Moore-1880)	NYMPHALIDAE
60	Blue Pansy	*Precis orithya ocyale* (Hubener-1816)	NYMPHALIDAE
61	Blue Tiger	*Tirumala limniace exoticus*	NYMPHALIDAE
62	Bright Eye Bushbrown	*Mycalesis nicotia* (Westwood-1850)	NYMPHALIDAE
63	Brown King Crow	*Euploea klugii klugii* (Moore-1858)	NYMPHALIDAE
64	Chocolate Pansy	*Precis iphita iphita* (Cramer-1779)	NYMPHALIDAE
65	Chocolate Tiger	*Parantica melaneus platiniston* (Fruhstorfer-1910)	NYMPHALIDAE
66	Circe	Hestina nama (Doubleday-1845)	NYMPHALIDAE
67	Colour Sergeant	*Parathyma nefte inara* (Doubleday & Hewitson-1850)	NYMPHALIDAE
68	Commander	*Moduza procris procris* (Cammer-1877)	NYMPHALIDAE

69	Commodore	*Limenitis danava* (Moore-1857)	NYMPHALIDAE
70	Common Bushbrown	*Mycalesis perseus blasius* (Fabricius-1798)	NYMPHALIDAE
71	Common Castor	*Ariadne meriono assama* (Evans)	NYMPHALIDAE
72	Common Crow	*Euploea core core* (Cramer-1790)	NYMPHALIDAE
73	Common Earl	*Tanaecia julii appiades* (Menetries-1857)	NYMPHALIDAE
74	Common Evening Brown	*Melanitis leda* (Linnaenus)	NYMPHALIDAE
75	Common Fivering	*Ypthima baldus baldus*(Fabricius-1775)	NYMPHALIDAE
76	Common Jester	*Symbrenthai lilaea khasiana* (Moore-1874)	NYMPHALIDAE
77	Common Lascar	*Pantoporia hordinia hordinia* (Stoll-1791)	NYMPHALIDAE
78	Common Leopard	*Phalanta phalantha* (Drury-1770)	NYMPHALIDAE
79	Common Map	*Cyrestis thyodamas thyodamas* (Boisduval-1836)	NYMPHALIDAE
80	Common Maplet	*Chersonesia risa risa* (Doubleday & Hewitson-1850)	NYMPHALIDAE
81	Common Pamfly	*Elymnias hypermnestra undularis* (Drury-1773)	NYMPHALIDAE
82	Common Sailer	*Neptis hylas varmona* (Moore-1872)	NYMPHALIDAE
83	Common Tiger	*Danaus (Salathura) genutia* (Cramer-1779)	NYMPHALIDAE
84	common yeoman	*Cirrochroa tyche*	NYMPHALIDAE
85	Constable	Dichorragia nesimachus	NYMPHALIDAE
86	Courtesan	*Euripus halitheres* (Doubleday and Hewitson-1848)	NYMPHALIDAE
87	Cruiser	*Vindula erota erota* (Fabricius-1793)	NYMPHALIDAE
88	Dark Archduke	*Lexias dirtea khasiana*(Swinhoe-1893)	NYMPHALIDAE
89	Dark Blue Tiger	*Tirumala septentrioni* (Butler-1874)	NYMPHALIDAE
90	Dark Brand Bushbrown	*Mycalesis mineus mineus* (Linnaeus-1765)	NYMPHALIDAE
91	Dark Evening Browning	*Melanitis phedimebele bela*(Moore-1875)	NYMPHALIDAE
92	Dot-Dash Sergeant	*Parathyma kanwa* (Moore)	NYMPHALIDAE
93	Double Branded Blue Crow	*Euploea sylvester hopei* (Fabricius-1793)	NYMPHALIDAE
94	Glassy Tiger	*Parantica aglea melanoides* (Moore-1883)	NYMPHALIDAE

95	Great Eggfly	*Hypolimnas bonila* (Linnaeus-1758)	NYMPHALIDAE
96	Great Nawab	*Polyura eudamippus eudamippus*(Doubleday-1843)	NYMPHALIDAE
97	Green commodore	*Sumalia daraxa*	NYMPHALIDAE
98	Grey Count	*Taneaecia lepidea lepidea* (Butler-1868)	NYMPHALIDAE
99	Grey Pansy	*Precis atlites atlites* (Johanssen-1764)	NYMPHALIDAE
100	Himalayan Fivering	*Ypthima sakra sakre* (Moore-1857)	NYMPHALIDAE
101	Indian Fritillary	*Agyreus hyperbius hyperbius* (Johanssen-1764)	NYMPHALIDAE
102	Indian Purple Emperor	*Apatura ambica ambica* (Kollar)	NYMPHALIDAE
103	Indian Red Admiral	*Vanessa indica indica* (Herbst-1794)	NYMPHALIDAE
104	Indian Tortoiseshell	*Aglais cashmiriensis aesis* (Kollar-1844)	NYMPHALIDAE
105	Jezebel Palmfly	*Elymnias vasudeva vasudeva*(Moore-1857)	NYMPHALIDAE
106	Jungle Glory	*Thaumantis diores* (Doubleday)	NYMPHALIDAE
107	Knight	*Lebadea martha marrtha* (Fabricius-1787)	NYMPHALIDAE
108	Large Yeoman	*Cirrochroa aoris aoris* (Doubleday-1847-48)	NYMPHALIDAE
109	Lemon Pansy	*Precis lemonias lemonias*(Linnaeus-1758)	NYMPHALIDAE
110	Leopard Lacewing	*Cethosia cyane* (Drury-1770)	NYMPHALIDAE
111	Long Brand Bushbrown	*Myacalesis visala visala* (Moore-1857)	NYMPHALIDAE
112	Magpie Crow	*Euploea radmanthus* (Fabricius-1973)	NYMPHALIDAE
113	Nigger	*Orsotrioena medus medus*(Fabricius-1775)	NYMPHALIDAE
114	Orange Oakleaf	*Kallima inachus inachus* (Boisduval-1836)	NYMPHALIDAE
115	Orange Staff Sengeant	*Athyma cama* (Moore)	NYMPHALIDAE
116	Painted Courtesan	*Euripus consimilis consimilis* (Westwood-1850)	NYMPHALIDAE
117	Pale Green Sailer	*Neptis zaida bhutanica* (Doubleday)	NYMPHALIDAE
118	Pallid Nawab	*Polyura arja* (Felder and Felder-1867)	NYMPHALIDAE
119	Panther	*Neurosigma doubledayi doubledayi* (westwood-1848)	NYMPHALIDAE
120	Pasha	*Herona marathus marathus*(Doubleday-1848)	NYMPHALIDAE

121	Peacock Pansy	*Precis almana almanac*(Linnaeus-1758)	NYMPHALIDAE
122	Plain Earl	*Tanaecia jahnu* (Moore-1857)	NYMPHALIDAE
123	Plain Tiger	*Danaus (Anosia) schrysippus* (Linnaeus-1758)	NYMPHALIDAE
124	Popinjay	*Stibochiona nicea nicea* (Gray-1833-1846)	NYMPHALIDAE
125	Powdered baron	*Euthalia monina*	NYMPHALIDAE
126	Punchinello	*Zemoros flegyas indicus*(Fabricius-1897)	NYMPHALIDAE
127	Red Lacewing	*Cethosia biblis tisamena* (Fabricius-1770)	NYMPHALIDAE
128	Small Staff Sergen	*Parathyma zeroca* (Moore-1872)	NYMPHALIDAE
129	Small Yellow Sailer	*Neptis miah* (Moore- 1857)	NYMPHALIDAE
130	Sordid emperor	*Chitoria sordida*	NYMPHALIDAE
131	Spotted palmfly	*Elymnias malelas malelas*	NYMPHALIDAE
132	Spotted Sailer	*Neptis magadha* (C. & R. Felder)	NYMPHALIDAE
133	Staff sergeant	*Athyma selenophora*	NYMPHALIDAE
134	Staff sergeant	*Athyma zeroca moore*	NYMPHALIDAE
135	Staff Sergeant	*Parathyma selenophora selenophora* (Kollar-1844)	NYMPHALIDAE
136	Straight Banded Treebrown	*Neope verma sintica*(Fruhstorfer-1911)	NYMPHALIDAE
137	Streaked Baron	*Euthalia jama jamida* (Felder-1866)	NYMPHALIDAE
138	Striped Blue Crow	*Euploea mulciber mulciber* (Cramer-1777)	NYMPHALIDAE
139	Sullid Sailer	*Neptis soma* (Moore-1858)	NYMPHALIDAE
140	Tabby	*Pseudergolis wedah* (Kollar-1844)	NYMPHALIDAE
141	Tawny Rajah	*Charaxes polyxena hierax* (Felder--1867)	NYMPHALIDAE
142	Vagrant	*Vagrans egista* (Hemming-1934)	NYMPHALIDAE
143	Variegated Rajah	*Charaxes kahruba* (Moore)	NYMPHALIDAE
144	Wavy maplet	*Chersonesia intermedia*	NYMPHALIDAE
145	White Edged Blue Baron	*Euthalia phemius* (Doubleday and Hewitson-1848)	NYMPHALIDAE
146	Whitebar Bushbrown	*Mycalesis anaxias oemate* (Frushtorfer-1911)	NYMPHALIDAE
147	Yellow Coster	*Pareba vesta* (Fabricius-1787)	NYMPHALIDAE
148	Yellow Jack Sailer	*Lassipa viraja viraja* (Moore-1872)	NYMPHALIDAE
149	Yellow Pansy	*Precis hierta magna* (Evans-1923)	NYMPHALIDAE

150	Yellow Rajah	*Charaxea marmax* (Ochsenheimer-1816)	NYMPHALIDAE
151	Yellow Sailer	*Neptis ananta* (Moore)	NYMPHALIDAE
152	Common Red Forester	*Lethe mekara*	NYMPHALIDAE
153	Blue Striped Mime	*Chalasa slateri slateri* (Hewison 1859)	PAPILIONIDAE
154	Common Batwing	*Atrophaneura varuna astorion*(Westwood-1842)	PAPILIONIDAE
155	Common Blue Bottle	*Graphium sarpedom sarpedom* (Linnaeus-1758)	PAPILIONIDAE
156	Common Jay	*Graphium doson axion* (Felder, C., and R.-1864)	PAPILIONIDAE
157	Common Lime	*Chilasa clytia clytai* (Linnaeus-1758)	PAPILIONIDAE
158	Common mormon	*Papilio polytes*	PAPILIONIDAE
159	Common Raven	*Papilio castor* (Westwood)	PAPILIONIDAE
160	Common Rose	*Pachilopta aristolochiae aristolochiae* (Fabricius-1775)	PAPILIONIDAE
161	Common Windmill	*Atrophaneura polyeuctes* (Doubleday-1842)	PAPILIONIDAE
162	Fivebar Swordtail	*Pathysa antiphates pompilius*(Fabricius-1787)	PAPILIONIDAE
163	Fourbar Swordtail	*Graphium agetes* (Westwood)	PAPILIONIDAE
164	Golden Birdwing	*Triodes aeacus aeacus* (C. & R. Felder-1865)	PAPILIONIDAE
165	Great Mormom	*Papilio memnon agenor* (Linnaeus)	PAPILIONIDAE
166	Lesser Batwing	*Atrophaneura aidoneus*(Doubleday-1845)	PAPILIONIDAE
167	Lesser Zebra	*Graphium macareus* (Godart)	PAPILIONIDAE
168	Lime Butterfly	*Princeps demoleus* (Linnaeus-1758)	PAPILIONIDAE
169	Paris Peacock	*Papilo paris*(Linnaeus)	PAPILIONIDAE
170	Red Breast	*Papilio alcmenor* (C. & R. Felder-1864)	PAPILIONIDAE
171	Red Helen	*Papilo helenus* (Linnaeus)	PAPILIONIDAE
172	Spot Sword tail	*Pathysa nomius nomius*(Esper-1785-98)	PAPILIONIDAE
173	Tailed Jay	*Graphium agammemnon agammemnon* (Linnaeus-1758)	PAPILIONIDAE
174	Yellow Helen	*Papilio (menelaides) nephelus* (Westwood-1845)	PAPILIONIDAE
175	Cabbage white	*Pieris rapae*	PIERIDAE
176	Checkered white(cf)	*Pontia protodice*	PIERIDAE
177	Chocolate Albatross	*Appias lyncida elenora*(Boisduval-1836)	PIERIDAE

178	Common Emigrant	*Catopsilia pomona*(Fabricius-1775)	PIERIDAE
179	Common Grass Yellow	*Terias hecabe contubernalis*(Moore-1886)	PIERIDAE
180	Common Gull	*Cepora nerissa nerissa*(Fabricius-1775)	PIERIDAE
181	Common Wanderer	*Pareronia valeria (Cramer)*	PIERIDAE
182	Dark Clouded Yellow	*Colias fieldii* (Menetries-1855)	PIERIDAE
183	Great Orange tip	*Hebomoia glaucippe glaucipe*(Linnaeus-1758)	PIERIDAE
184	Indian Cabbage White	*Pieris canidia indica* (Evans-1926)	PIERIDAE
185	Large Cabbage White	*Pieris brassicae nepalensis* (Grey-1846)	PIERIDAE
186	Lesser Gull	*Cepora nadina nadina* (Lucas-1852)	PIERIDAE
187	Mottled Emigrant	*Catopsilis pyranthe*(Linnaeus-1758)	PIERIDAE
188	One Spot Grass Yellow	*Eurema andersoni andersoni*(Moore-1886)	PIERIDAE
189	Pale Jezebel	*Delias sanaca oreas* (Talbot-1928)	PIERIDAE
190	Pale Wanderer	*Pareronia avatar avatar* (Moore-1857)	PIERIDAE
191	Plain Puffin	*Appias indra* (Moore-1857)	PIERIDAE
192	Psyche	*Leptosia nina nina* (Fabricius-1793)	PIERIDAE
193	Red Base Jezebel	*Delias aglaia* (Linnaeus-1758)	PIERIDAE
194	Red Spot Jezebel	*Delias descombesi leucacantha* (Boisduval-1836)	PIERIDAE
195	Redspot sawtooth	*Prioneris clemanthe*	PIERIDAE
196	Spot Puffin	*Appias lalage* (Doubleday)	PIERIDAE
197	Spotted Sawtooth	*Leptosia thestylis thestylis* (Doubleday-1842)	PIERIDAE
198	Striped Albastross	*Appias libythea olferna* (Fabricius)	PIERIDAE
199	Tailed Sulphur	*Dercas verhuelli doubledayi*(Moore-1905)	PIERIDAE
200	Three Spot Grass Yellow	*Eurema blanda silhetana*(Wallace-1867)	PIERIDAE
201	Tree Yellow	*Gandaca harina asssamica*(Moore-1906)	PIERIDAE
202	Yellow Jezebel	*Delias agostina* (Hewitson-1852)	PIERIDAE
203	Yellow Orange tip	*Ixias pyrene familiaris* (Butler-1896)	PIERIDAE
204	Giant peacock	*Saturnia pyri*	SATUNIIDAE

Appendix 5: CF lists of RMNP

Name of the CF	Dzongkhag	Gewog	Area (Ha.)	Member (No.)	Plan due for revision
Salapong	Zhemgang	Phangkhar	130.2	19	2029
Gomphu Nyamroop Drongdey Nagtshel	Zhemgang	Trong	264	61	2029
Sangtsheri	Zhemagang	Phangkhar	113.9	24	2030
Zurphel Chithuen	Zhemgang	Trong	145	27	2029
Changarzam	Zhemgang	Phangkhar	74	13	2029
Tashibe	Zhemgang	Phangkhar	168.51	22	2031
Rigsum Gongphel Dongdhey Naktshel	Zhemgang	Trong	217.03	23	2031
Shelingtoe	Zhemgang	Phangkhar	147.59	27	2031
Samdrup Choling	Sarpang	Umling	85.49	20	2029
Dangling	Sarpang	Umling	170.4	34	2029
Tashithang	Sarpang	Umling	75.3	9	2029
Gojung	Zhemgang	Phangkhar	87	15	2029
Juenphel	Sarpang	Umling	96.72	20	2031
Thrungthug	Sarpang	Umling	86.8	26	2031
Linger	Sarpang	Umling	93.36	30	2031
Gaden	Sarpang	Umling	102.31	32	2031
Dungmin	Sarpang	Umling	121.57	49	2022
Rejuk	Sarpang	Umling	16.39	16	2022
Geyser Tashicholing	Sarpang	Umling	81.89	19	2029

Appendix 6: NWFP Groups of RMNP

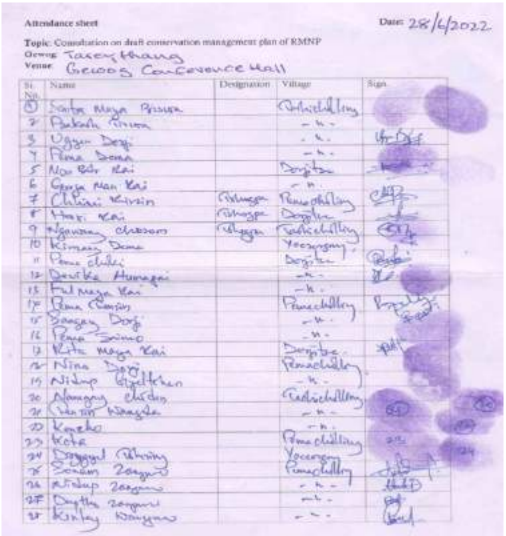
Name of the NWFP	Dzongkhag	Gewog	Area (Ha.)	Member (HHs.)	Plan due for revision
Pongchula Tsharzaw Tshogpa	Zhemgang	Phangkhar	39.5	25	2022
Mamung Bamboo Mgt. group	Zhemgang	Phangkhar	20.68	16	2022
Panabe NWFP group	Zhemgang	Phangkhar	22.6	17	2022
Zangbe ShingmenDhulen Dhetshen	Zhemgang	Phangkhar	26.2.	11	2022
Salapong NWFP Group	Zhemgang	Phangkhar	51.87	17	2022

Appendix 7: Logical Framework Analysis (LFA) for Serchhu Watershed Management Plan

Output	Activities	Verifiable indicators	Collaborating Agency	Lead Agency	Budget (M Nu.)
Objective 1: To minimize the movement of soil and surface runoff from road and other constructions					
1.1. All road constructions conforming to EFRC rules	1.1.1. Plantation of trees and bamboos to stabilize in the excavated/ landslide areas	Number of seedlings	RMNP/GT/Water users (WU)	RMNP	0.040
	1.1.2. Construction of check dams	Number of check dams constructe d	RMNP/GT/WU	RMNP	0.030
	1.1.3. Monitoring of excavation and dumping of the excavated soil	Monitorin g protocol put in place	RMNP/DoR/WU	RMNP	0.015
1.2. Maintaining waterways free of debris through regular monitoring	1.2.1. Conduct awareness programme on dumping of debris in the watershed area	Awarenes s report	RMNP/GT/Com munities	RMNP	0.05
	1.2.2. Monitoring of debris along the waterways to avoid formation of pools	Monitorin g report	RMNP/WU	RMNP	0.010
Objective 2: To mitigate degraded influences and improve watershed conditions					
2.1. Restore degraded forest and utilization of forest resources within sustainable limits	2.1.1. Enrichment plantation in the degraded area	Number of seedlings planted	GT/RMNP/WU	RMNP	0.020
	2.1.2. Monitoring the extraction of resources from the watershed area	Monitorin g report	RMNP/WU	RMNP	0.010
	2.1.3. Mapping of the potential recharge area using hydrological concept	Number of recharge area mapped	GT/RMNP/WM D	RMNP	0.050
2.2. Waste management practice enhanced	2.2.1. Install waste bins along the road junctions and strategic locations	Number of waste bills installed	GT/RMNP/comm unities	RMNP	0.025
	2.2.2. Construct waste disposal pits at strategic locations and install sign boards	Number of disposal pits and signboard s installed	GT/RMNP/comm unities	RMNP	0.025
	2.2.3. Co-ordinate and monitor waste cleaning monthly	Monitorin g report	GT/RMNP/comm unities	RMNP	0.050

Appendix 8: Public consultation attendance sheets

i) Taraythang Gewog



Attendance sheet

Date: 28/6/2022

Topic: Consultation on draft conservation management plan of RMNP

Gewog: Taraythang

Venue: Gewog Conference Hall

Sl. No.	Name	Designation	Village	Sign
1	Santa Maya Biswa		Tsholingkhar	
2	Prakash Chhetri		-"-	
3	Ugyen Dorji		-"-	
4	Pema Dema		-"-	
5	Nar Bdr Rai		Dorjitse	
6	Ganga Man Rai		-"-	
7	Chhimi Rinzin	Tshogpa	Pemachhiling	
8	Hari Rai	Tshogpa	Dorjitse	
9	Ngawang Choezom	Tshogpa	Tashichhiling	
10	Kinzang Dema		Yoezergang	
11	Pema Choki		Dorjitse	
12	Devika Humagai		-"-	
13	Phul Maya Rai		-"-	
14	Pema Choezom		Pemachhiling	
15	Sangay Dorji		-"-	
16	Pema Samdrup		-"-	
17	Rita Maya Rai		Dorjitse	
18	Nima Dorji		Pemachhiling	
19	Nidup Gyeltshen		-"-	
20	Namgay Choden		Tashichhiling	
21	Chencho Wangdi		-"-	
22	Kencho		-"-	
23	Kota		Pemachhiling	
24	Dorjee Tshering		Yoezergang	
25	Sonam Zangmo		Pemachhiling	
26	Nidup Zangmo		-"-	
27	Dawa Zangmo		-"-	
28	Kinley Wangmo		-"-	

Sl. No.	Name	Designation	Village	Sign
29	Karma Choden		Pemachhiling	
30	Dekizang Choezom		-"-	
31	Yeshey Zangmo		-"-	
32	Karma Dhendup		Yoezergang	
33	Rinchen Dema		Tashichhiling	
34	Lhari Zangmo		-"-	
35	Choden Thinley		-"-	
36	Sigma Wangdi		Pemachhiling	
37	Sangay Yeser		-"-	
38	Rubina Biswa		Yoezergang	
39	Karma Wangdi	CSC		
40	Sangay		Yoezergang	
41	Melam Dorji		-"-	
42	Sigma Dorji		-"-	
43	Sri Narayan		-"-	
44	Pema Khandu		-"-	
45	Chabilal		Tsholingkhar	
46	Dechen Wangmo		Yoezergang	
47	Ngawang Choden		-"-	
48	Phuntsho Wangmo		-"-	
49	Deki Choden		Tashichhiling	
50	Sangay Penjor		Yoezergang	
51	Dawa			
52	Ganga Man Rai		Wangchilu	
53	Khar Ka Bdr Rai		Dorjitse	
54	Ganeshan Adhikari		-"-	
55	Dema Tshering		Tashichhiling	
56	Purna Bdr. Rai		Dorjitse	
57	Dubra		Tashichhiling	
58	Sangay Tshewang		Yoezergang	
59	Dupchu Zangmo		-"-	
60	Dhan Bdr Rai		Dorjitse	
61	Man Kr. Darjee		Wangchilu	

Sl. No.	Name	Designation	Village	Sign
62	Grata Ram Rai		Dorjitse	
63	Santa Bir Rai		-"-	
64	Tshering Dorzom	Tshogpa	Yoezergang	
65	Sonam Dhendup		-"-	
66	Pushpa Dungana	Tshogpa	Wangchilu	
67	Dhan Man Gurung	Gup	T/thang	
68	Ugyen Tshewang	Mangmi	T/thang	
69	Jigme Dorji	GAO	-"-	

ii) Umling Gewog

Attendance sheet

Date: 29/06/2022

Topic: Consultation on draft conservation management plan of RMNP

Gewog: Umling

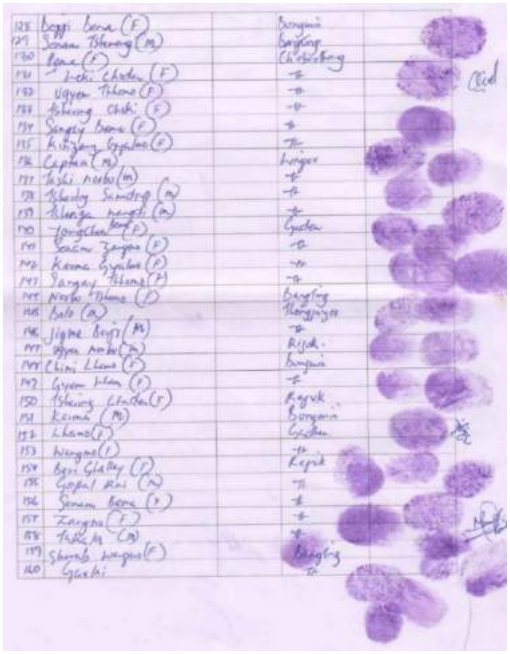
Venue: RNR Conference Hall

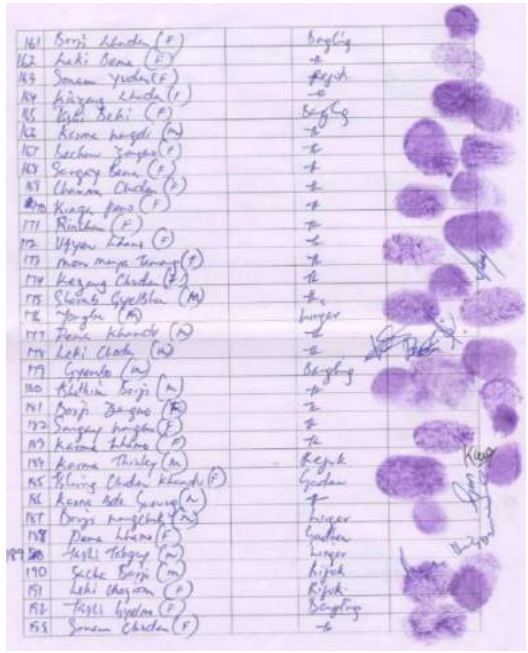
Sl. No.	Name	Designation	Village	Sign
1	Sangay (M)		Dungsam	
2	Kinchen Wangmo (F)		- " -	
3	Sonam (M)		Thongsaler	
4	Pema Wangchuk (M)		- " -	
5	Nidup Zangmo (F)		Tashithang	
6	Kinchen Wangmo (F)		- " -	
7	Chuda Zangmo (F)		- " -	
8	Wangmo Tshering (F)		Dungsam	
9	Yeshi Choden (F)		Tashithang	
10	Kinley Choden (F)		- " -	
11	Tshering Zangmo (F)		- " -	
12	Unavailable		- " -	
13	Tshering Choki (F)		- " -	
14	Bawa Dema (M)		- " -	
15	Thinley (M)		Lingar	
16	Sangay Thinley (M)		- " -	
17	Kinzang (F)		Dagling	
18	Lekir Yonten (M)		Dungsam	
19	Chimi Dorji (M)		Lingar	
20	Kinley (M)		Tashithang	
21	Lekir Dema (M)		Thongsaler	
22	Bawa Dema (M)		Lingar	
23	Pema Yangzom (F)		Thongsaler	
24	Pema Gyaltsho (M)		Lingar	
25	Unavailable		- " -	
26	Nedup (M)		Tashithang	
27	Tshering Lhamo (F)		Lingar	
28	Kinley (M)		Tashithang	

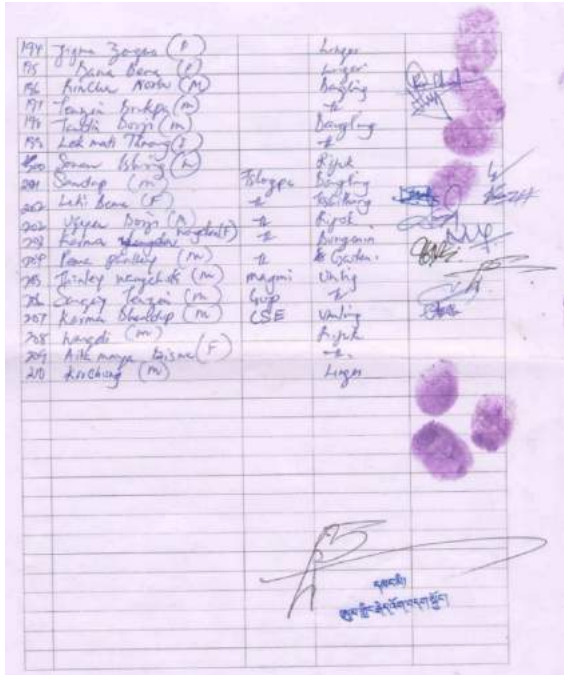
33	Kobi (M)		
34	Sangay Thinley (M)		
35	Yonten Wangchuk (M)		Dungsam
36	Nedup (F)		Tashithang
37	Dem Maya Sangday (F)		Chukarthang
38	Kinchen Choden (F)		- " -
39	San Maya Tamang (F)		Dungsam
40	Phuntso (M)		Thongsaler
41	Chimi Wangmo (F)		- " -
42	Tshering Pelden (F)		- " -
43	Dorji Dema (F)		Chukarthang
44	Kezang (F)		- " -
45	Yeshi Dema (F)		- " -
46	Unavailable (F)		- " -
47	Dorji Dema (F)		- " -
48	Sonam Choki (F)		- " -
49	Tshulthrim Zangmo (F)		- " -
50	Dorji Dema (F)		- " -
51	Kunzi (F)		- " -
52	Kinchen Wangmo (F)		- " -
53	Yeshi Dolma (F)		- " -
54	Leki Choden (F)		- " -
55	Pema Choki (F)		Lingar
56	Kinley Zangmo (F)		Dungsam
57	Dorji Dem (F)		- " -
58	Kezang Choden (F)		Gaden
59	Sonam Zangmo (F)		- " -
60	Chimi Wangmo (F)		Dungsam
61	Yeshi Choden (F)		- " -

62	Jamtsho (M)		Dungsam
63	Kunga Dema (F)		- " -
64	Dorji Wangmo (F)		Choden
65	Unavailable (F)		- " -
66	Tshi Choki (F)		- " -
67	Sangay Choephel (M)		Dungsam
68	Pema Thinley (M)		- " -
69	Sangay Penjor (M)		Tashithang
70	Sangay Wangdi (M)		Thongsaler
71	Chukipe (M)		Dungsam
72	Unavailable (M)		Lingar
73	Subandhay Tamang (M)		Dungsam
74	Nguway Dema (F)		- " -
75	Tshi Dorji (M)		- " -
76	Thinley (M)		Thongsaler
77	Ugyen Pem (M)		Kuglay
78	Yeshi Pelden (F)		Choden
79	Sonam Tshomo (F)		- " -
80	Sangay Thinley (M)		Dungsam
81	Pema Dema (F)		- " -
82	Tshomo Lhamo (F)		- " -
83	Thinley Wangmo (F)		Nagula
84	Kinley Tgyaltsho (M)		Gaden
85	Unavailable (M)		- " -
86	Wangmo (F)		Kuglay
87	Sonam Tshomo (F)		- " -
88	Pema Gyaltsho (M)		Lingar
89	Dawa Dema (F)		- " -
90	Dawa Dema (F)		Dungsam
91	Pema Choden (F)		Lingar
92	Kunzang Choki (F)		- " -
93	Unavailable (F)		Dagling
94	Unavailable (M)		- " -

	Name	Designation	Village	Sign
95	Dil maya (F)		Tashithang	
96	Tshering Choden (F)		Gaden	
97	Dechen Lhaden (F)		Dungsam	
98	Chogyal Tshering (M)		- " -	
99	Phat maya (F)		- " -	
100	Karma Tshithem (M)		Dungsam	
101	Rapt Tamang (M)		Thongsaler	
102	Sonam Dorjey (M)		Rejek	
103	Nidup Tgyaltsho (M)		- " -	
104	Tashi Gem (F)		Lingar	
105	Leki Wangchuk (M)		Rejek	
106	Tshering Dema (F)		Gaden	
107	Pema Bakpa (M)		Gaden	
108	Jangchen (M)		Dungsam	
109	Sangay Chogem (F)		- " -	
110	Nidup Dem (F)		Rejek	
111	Tshering Penjo (M)		Gaden	
112	Kinley Maya Tamang (F)		Dungsam	
113	Kiran Lhamo (F)		Rejek	
114	Sangay Wangyal (M)		Gaden	
115	Dorji Tgyaltsho (M)		Rejek	
116	Norbu Bhomo (F)		Rejek	
117	Dechen Dem (F)		- " -	
118	Ashang Lhamo (F)		Lingar	
119	Ringzin Dorji Tamang (M)		Dungsam	
120	Ashang Lhamo (F)		Lingar	
121	Pema (F)		Dungsam	
122	Tshering Choden (F)		Dagling	
123	Karma (M)		Dagling	
124	Gyemen Singye Tamang (M)		Rejek	
125	Mom Singye Gurung (M)		- " -	
126	Ratna Bdr. Mungar (M)		Sangay	
127	Dorji Yudon (F)		Dagling	







iii) Trong Gewog

Attendance sheet

Date: 30/6/2022

Topic: Consultation on draft conservation management plan of RMNP

Gewog: Trong

Venue: Gewoog Conference Hall

Sl. No.	Name	Gender (M/FM)	Designation	Village	Sign
1.	Kinsangmo	F	Farmer	Subrang	
2.	Dechen Wangmo	F	-11-	-11-	
3	Dechen Peldon	F		Gomphu	
4.	Kinley Tshomo	F		Zurphel	
5.	Pema Lhamo	F		"	
6.	Sonam Wangchuk	M		"	
7.	Dechen Wangmo	F		"	
8	Tshokey	F		"	
9.	Ugyen Dema	F		"	
10	Kinley Yangzom	F		"	
11	Sonam	F		Tshanglajong	
12	Damchoms	F		"	
13	Tshering Yangzom	F		"	
14	Tshering Dorji	M		Zurphel	
15	Tshering Deker	F		"	
16	Choda Dorji	M		Zurphel	
17	Ugyen Tshomo	F		Zurphel.	
18	Tshendu Wangmo	F		-11-	
19	Pema Dorji	M.		Berti	
20	Tshering Deki	F		Zurphel.	
21	Kinga Zangmo	F		-11-	
22	Choki Mo	F		Tshanglajong	
23	Sherab Dema	F		Thajtibi	
24	Namtayla	M		Berti	
25	Pema Tashi	M		-11-	
26	Dawa Tshering	M		Tshanglajong	
27	Dawa Dema	F		-11-	

SL	Name	Gender	Designation	Village	Sign
28	Dechen Lhaden	F	-	Tshanglajong	
29	Leki Choden	F		-11-	
30	Yeega Wangmo	F	-	Zurphel.	
31	Nangay	M		Tshanglajong	
32	Yeshi Lhamo	F	-	Zurphel.	
33	Phuntsho Choden	F		-11-	
34	Rinchen Wangmo	F		Tshanglajong	
35	Phuntso	M	-	Tshanglajong	
36	Jamyang	M	-	Tshanglajong.	
37	Nakhro Mo	F	-	Tshanglajong	
38	Pema Choden	F	-	Tshanglajong	
39	Tashi Wangdi	M	-	Gomphu.	
40	Tashi Wangmo	F	-	Gomphu	
41	Shacha	M	-	Gomphu	
42	Dorji Wangchuk	M	-	Tshanglajong	
43	Norbu	M	-	Tshanglajong	
44	Sonam Tashi	M		Gomphu	
45	Nangay Wangdi	M	-	Gomphu	
46	Rinzin Wangchuk	M		Gomphu	
47	Leki Tshewang	M		Gomphu	
48	Dorolo Rinchen	M		-11-	
49	Karma Yangzom	F		Tshanglajong	
50	Tshering Yangdon	F		Tshanglajong	
51	Kinzang Choden	F		-11-	
52	Jampel Lhamo	F		-11-	
53	Tashi Phuntsho	M		Zurphel.	
54	Ugyen Lhamo	F		Tshanglajong	
55	Tandin Tshering Wangdi	M		-11-	
56	Tashi Dorji	M		-11-	
57	Sonam Youden	F		-11-	
58	Jampel Lhamo	F		Subrang	

59	Jamboy Dorji	M	-	Subrang.	
60	Rinchen Wangmo	F		-11-	
61	Sangay Zangmo	F		-11-	
62	Kinzang Wangmo	F		-11-	
63	Sonam Dema	F		-11-	
64	Sonam Zangmo	F		-11-	
65	Jamboy Nidup	M		-11-	
66	Tshewang Dorji	M		-11-	
67	Ugyen Choden	F		-11-	
68	Dechen Wangmo	F		-11-	
69	Tandin Wangchuk	M		-11-	
70	Tshewang Norbu	M	-11	-11-	
71	Kinzang Dorji	M		Gomphu.	
72	Ugyen Wangdup	M		-11-	
73	Tenzin Wangchuk	M		Gomphu.	
74	Sangay Dorji	M	Tshogpa.	Subrang	
75	Tashi	M	Tshogpa	Tshanglajong	
76	Yeshi Wangdi	M	-	Subrang.	
77	Sangmo	F	-11-	Tshanglajong	
78	Dorji Wangchuk	M	Mangmi	Thajtibi.	
79	Pema Chophel	M	Tsanglajong		
80	Nidup	M	"		
81	Kinzang Rinzin	M	"		
82	Tenzin Dorji	M	"		
83.	Thinley Dorji	M	"		
84.					

iv) Phangkhang Gewog

Attendance sheet

Date: 07/07/2022

Topic: Consultation on draft conservation management plan of RMNP

Gewog: Phangkhar

Venue: Gewog hall

Sl. No.	Name	Gender (M/F/M)	Designation	Village	Sign.
1	Sonam Dendup	Male	Tshogpa	Pantang	
2	Cheney Zangmo	F		Panabe	
3	Metho Lhamo	F		Pantang	
4	Pema Dechen	F		Pantang	
5	Dechen Zangmo	F		Pantang	
6	Peldon	F		Mamung	
7	Rinchen Lhamo	F		Chengazam	
8	Jamyang Tshering	M		—"—	
9	Leki Thogyal Tshogyal	M		—"—	
10	Pema Dubar	M		—"—	
11	Kezang Lhamo	F		—"—	
12	Rinchen Choten	M		—"—	
13	Sangay Chedup	M		—"—	
14	Ugyen Tshering	M		—"—	
15	Ugyen Tshering	M		—"—	
16	Dendup Tshering	M		—"—	
17	Dorji Jurmi	M		—"—	
18	Pema Tshewang	M		—"—	
19	Namgay Wangchuck	M		—"—	
20	Dorji Dawa Jukchan	M	Tshogpa	—"—	
21	Karma Wangchuck	M		Mamung	
22	Tshering Choten	M		—"—	
23	Shecha Choki Gyeltshen	M		—"—	
24	Choden Tshultrim	M		—"—	
25	Yonten Tobgay	M		—"—	
26	Tshering Dendup	M		—"—	
27	Tshering Samdrup	M		Pantang	
28	Shelal Dorji	M	-	Tashibi	
29	Thinley Dorji	—"—	—	—"—	
30	Guru Dorji	—"—	-	—"—	
31	Tashi Dorji	—"—	-	—"—	
32	Nacho Namgay	—"—	-	—"—	
33	Tashi	—"—	-	—"—	
34	Sangay Jamyang	—"—	Tshogpa	—"—	
35	Lhendup	—"—	-	[illegible]	
36	Rinchen Ngedup	—"—	-	Chengazam	
37	Sangay Khandu	—"—	-	Mamung	
38	Rinchen Wangmo	F	-	—"—	
39	Dechen Lhamo	—"—	-	—"—	
40	Namzom	—"—	-	—"—	
41	Jamtsey Yeshi	F		Mamung	
42	Tshering Norbu	M	-	—"—	
43	Dorji Rinchen	M	—	Pantang	
44	Dorji Yangdon	F	—	—"—	
45	Choki Wangmo	F	—	—"—	
46	Choki Wangmo	F	-	—"—	
47	Leki Doma	F	-	Panabe	
48	Sangay Drukpa	M	—	—"—	
49	Pema Zangmo	F	—	Pantang	
50	Sangay Singden	F	—	—"—	
51	Tshendula	M	-	Pantang	
52	Pema Rinzom	F	—	Panabe	
53	Drakpa	M	-	Pantang	
54	Sangay Mengdon				
55	Kinley Wangmo				
56	Sangay Choden	F	CSE		
57	Dawa Tshering	M	—	Pantang	
58	Rinchen Lhamo	F	—	—"—	
59	Thinley	M		Pantang	
60	Sangay	M		Panabe	
61	Sangay Dorji	M		—"—	
62	Rinchen Dubla	M		Pantang	
63	Jambay Wangchuck	M			
64	Dorji Khandu	M			
65	Sangay Tshe chodup	M		—"—	
66	Leki Tsheden	F		Panabe	
67	Sangay Choki	M		Pantang	
68	Tashi	M	Gup	Phangkhar	
69	Tshering Yeshi	M	Tshogpa	Pongchola	
70	Sangay Dorji	"	Mangmi	Tashibi	
71	Sangay Rinchen	M		Pongchola	
72	Pema Zomkela	M	Tshogpa	Larebi	
73	Choki Wangmo	F	—	Pantang	
74	Leki Yangzom	F	—	—"—	
75	Sangay Dorji	M	—	"	
76	Dongchen	M	—	—"—	
77	Tshering Norbu	M	—	"	
78	Cheten Lhamo	F	—	"	
79	Rinchen	M	—	"	
80	Sonam Choden	F	—	"	

Appendix 9: Photographs taken during public consultation at four Gewogs

Umling Gewog

Trong Gewog

Taraythang Gewog

Phangkhar Gewog

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