RED PANDA
CONSERVATION ACTION PLAN FOR NEPAL 2019-2023

Government of Nepal
Ministry of Forests and Environment

Department of Forests and Soil Conservation

Department of National Parks and Wildlife Conservation

Kathmandu, Nepal
2018

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Technical Team

Mr. Gopal Prakash Bhattarai, Deputy Director General, DNPWC
Mr. Laxman Prasad Poudyal, Ecologist, DNPWC
Mrs. Madhuri Karki (Thapa), Planning Officer, DFSC
Mr. Damber Bista, Conservation Manager, RPN
Dr. Naresh Subedi, Manager (Conservation Program), NTNC
Dr. Kanchan Thapa, Technical Advisor, Hariyo Ban Programme-II, WWF Nepal
Dr. Bhagawan Raj Dahal, Transboundary Tiger Manager, ZSL Nepal
Mr. Rishi Ranabhat, Assistant Ecologist, DNPWC
Mr. Bhupendra Prasad Yadav, Assistant Ecologist, DNPWC
Dr. Arjun Thapa, Species Expert, SMCRF

Review Team

Mr. Man Bahadur Khadka, Director General, DNPWC
Mr. Krishna Prasad Acharya, Joint Secretary (Technical), MFSC
Dr. Sindhu Prasad Dhungana, Joint Secretary (Technical), MFSC
Dr. Maheshwar Dhakal, Joint Secretary (Technical), MFSC
Dr. Rajendra K.C., Deputy Director General, DFSC
Mr. Yajna Nath Dahal, Joint Secretary (Technical), MFSC
Mr. Ram Chandra Kandel, Deputy Director General, DNPWC
Dr. Hem Sagar Baral, Country Representative, ZSL Nepal
Dr. Shant Raj Jnawali, Chief of Party, Hariyo Ban Programme-II, WWF Nepal
Prof. Karan Bahadur Shah, Wildlife Expert, Nepal
Mr. Ang Phuri Sherpa, Country Director, RPN
Dr Angela Glatston, Species Expert, RPN

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Foreword

The diverse topography, altitudinal and climatic variation provides suitable habitat for an extraordinary diversity of wildlife in Nepal. Red Panda is such a wildlife species which is adapted primarily in temperate forests with abundant bamboo in the understorey. The Government of Nepal has prioritized the conservation of threatened species including Red Panda through the endorsement of species specific conservation action plans.

Red Panda, one of the elusive mammal, is listed as Endangered in IUCN Red List of Threatened Species and included in Appendix I of CITES. National Parks and Wildlife Conservation Act 2029 B.S. (1973) has categorized Red Panda as protected species of Nepal. Despite being a protected species, intensified anthropogenic activities, such as livestock grazing, illegal trade, poaching and habitat loss and degradation are inducing threats for their long term survival.

Red Panda Conservation Action Plan for Nepal (2019-2023) has been prepared with an aim to protect and manage red panda populations in Nepal which will be achieved by holistic approach of conservation including research, monitoring, awareness building, habitat improvement and threat management. Involvements of local communities have been well prioritized in this action plan which I believe will be critical in achieving the targeted objectives of this five year action plan.

I would like to express my sincere thanks to all the working group members and reviewers for their tireless effort and contribution to bring this document in such a perfect shape. I also thank Red Panda Network for their technical and financial support to produce this action plan.

For effective and successful implementation of this plan, I kindly appeal all concerned government agencies, development and conservation partners and local communities. I am hopeful that implementation of this plan will be a milestone in red panda conservation in Nepal.

21/Sept/2018

Man Bahadur Khadka
Director General

Government of Nepal
Ministry of Forests and Environment
Department of Forests and Soil Conservation
Babarmahal, Kathmanmdu

Tel.: 01-4227574
Email: info@dof.gov.np

Ref. No.
Date:

Foreword

The Red Panda is considered as one of the earth's living fossils and is listed in endangered category of the IUCN Red List of Threatened Species. This cryptic and elusive mammal is included in the Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and also included in schedule I of the National Parks and Wildlife Conservation Act, 1973 as protected wildlife of the country.

Almost 70% of the total habitat of Red Panda lies outside the protected areas in Nepal. Most of these habitats have been managed as the Community forest and Government managed forest. The Department of Forests and Soil Conservation facilitates community forests to act towards the conservation of this valuable species. In recent decades, survival of this species is facing severe threats from poaching, illegal trade, habitat loss and degradation and fragmentation of forests. In order to address these issues, Government of Nepal has put consistent efforts for combating the illegal trade and focuses on practicing integrated conservation approach for long term survival of this species.

The Red Panda Conservation Action Plan (2019-2023) aims to improve the national status of Red Panda and secure their habitat against emerging threats. This action plan focuses on conducting extensive research using rigorous scientific tools and techniques to understand their ecological and habitat dynamics. Furthermore, it also emphasizes on curbing poaching, controlling illegal trade and strengthening local stewardship for red panda conservation. I hope, it will also synergize the combined efforts of Department of Forests and Soil Conservation, provincial and local governments, conservation partners and local communities to achieve this goal.

Finally, I would like to appreciate the efforts made by the technical team members and reviewers to prepare this action plan. The Department of Forests and Soil Conservation will provide continuous support and is committed for the effective implementation of the plan. I believe that this action plan will be a guiding document to all the concerned stakeholders for conservation of Red Panda.

Ram Prasad Lamsal, Ph.D
Director General

Contents

Abbreviations and Acronyms

ACA	Annapurna Conservation Area
ANCA	Api Nampa Conservation Area
BZUC/UG	Buffer Zone Users Committee/ User Group
CBAPU	Community Based Anti-Poaching Unit
CFUG	Community Forest User Group
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DFO	Division Forest Office/ Divisional Forest Officer
DNA	Deoxy-ribose Nucleic Acid
DNPWC	Department of National Parks and Wildlife Conservation
DFSC	Department of Forests and Soil Conservation
DHR	Dhorpatan Hunting Reserve
GCA	Gaurishankar Conservation Area
GoN	Government of Nepal
IUCN	International Union for Conservation of Nature
KCA	Kanchenjunga Conservation Area
KL	Kanchenjunga Landscape
KNP	Khaptad National Park
KSL	Kailash Sacred Landscape
LNP	Langtang National Park
MBNP	Makalu Barun National Park
MCA	Manaslu Conservation Area
MoFE	Ministry of Forests and Environment
NBSAP	Nepal Biodiversity Strategy and Action Plan
NPR	Nepalese Rupee
NPWC	National Parks and Wildlife Conservation
NTFP	Non-Timber Forest Products
NTNC	National Trust for Nature Conservation
NWCCCC	National Wildlife Crime Control Coordination Committee
PA	Protected Area
RNP	Rara National Park
RPN	Red Panda Network
SAWEN	South-Asia Wildlife Enforcement Network
SHL	Sacred Himalayan Landscape
SMCRF	Small Mammals Conservation and Research Foundation
SNP	Sagarmatha National Park
SPNP	Shey Phoksundo National Park
WCCB	Wildlife Crime Control Bureau
WWF	World Wildlife Fund
ZSL	Zoological Society of London

Executive Summary

The red panda is considered as one of the earth's living fossils, its ancestry can be traced back to Miocene and Pliocene age in northern hemisphere. Now, distribution of this species is limited in temperate bamboo forests in south-western China, Nepal, India, Bhutan and Myanmar. Tila Karnali River in Kalikot district of Nepal is westernmost distribution limit of red panda while its easternmost distribution limit is the Minshan Mountain and Upper Min valley in Sichuan province, at central China. In Nepal, red panda's presence has been documented from 24 districts and seven protected areas with potential habitat of 23,977 km^2.

This species is listed as Endangered in IUCN Red List of Threatened Species and included in the Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora. The species is also listed as protected priority species by Nepal Government's National Parks and Wildlife Conservation Act, 1973. Habitat loss, degradation and fragmentation along with poaching and illegal trade are the most pressing anthropogenic threats to red panda conservation. Besides, lack of awareness, unsustainable developmental activities, dog's predation, bamboo die-off, climate change and transfer of diseases from livestock and dogs are some other threats to red panda survival. Proper mitigation of these threats is prioritized in the conservation action plan. Prevalence of most of the threats could be sites specific. Understanding of threats to red panda in different areas of the country is paramount for planning and developing this plan. Therefore, successful conservation of Red panda in Nepal will largely depend upon how the threats are addressed at the particular sites.

Since 1980s, red panda focused researches and conservation interventions have been taking place in Nepal. One of the first radio collaring study on red panda was carried out in late 1980s in Nepal following a number of cursorily studies on this species. The first national survey of this species was carried out in 2016. In addition, community based red panda focused conservation initiatives are being carried out in the country. Remoteness and inaccessibility to red panda habitats, inadequate law enforcement and insufficient incentives and livelihood opportunities for local communities are main conservation challenges for this species. However, the success of red panda based eco-tourism in eastern Nepal has indicated an ample opportunity to foster the conservation impact by considering red panda as a flagship species. It is hoped that the involvement of local communities and use of cutting-edge technology in research and monitoring would take the conservation work to higher level.

This conservation action plan has been envisioned with the goal to protect and manage red panda populations in Nepal. Following five objectives have been set to achieve this goal.

Enhance understanding and knowledge on conservation status, ecology and habitat dynamics of red panda.

Curb poaching and illicit trade of red panda.

Protect and manage the red panda habitat.

Strengthen and extend community based red panda conservation initiative.

Strengthen cooperation and coordination on red panda conservation at national and international level.

A log-frame has been developed to guide proper implementation and monitoring of this action plan. The Department of National Parks and Wildlife Conservation, and Department of Forests and Soil Conservation will take an overall lead in implementing this action plan. They will coordinate with Ministry of Industry, Tourism, Forest and Environment at state level and their field offices along with other government and international agencies to secure the fund and strengthening cooperation. Based on this action plan, annual plans will be developed with specified roles of each conservation partners and monitoring and evaluation of the progress of this action plan will be carried out regularly. A mid-term and final review of the action plan implementation progress will also be conducted by involving a team of independent consultants. Total budget for this five-year action plan has been estimated to be NPR 303,050,000.

Red Panda in Action (Photo: Laura Joyce Gadziala)

Introduction

1

1.1 Relevance of the Action Plan

The red panda *Ailurus fulgens* is the only species of Family Ailuridae distributed in five Himalayan range countries, namely, Nepal, India, Bhutan, China and Myanmar. Despite of its critical status due to habitat loss, degradation, fragmentation, poaching and illegal trade, this species is still facing several conservation threats in Nepal. The Government of Nepal had previously prepared a site-specific Red Panda Conservation Action Plan for Langtang National Park and Buffer Zone (2010-2014) though its effectiveness is yet to be reviewed. Nonetheless, that initiation revealed the need of red panda focused conservation action plan at national level. Some efforts initiated red panda at local level in some key areas of Nepal are insufficient to ensure the conservation as the long-term survival of endangered species demand intervention at landscape level. Therefore, this conservation action plan has been envisioned to ensure the conservation of red panda at the national level.

1.2 Action Plan Development Process

A working group representing officials from Department of National Parks and Wildlife Conservation (DNPWC); Department of Forests and Soil Conservation (DFSC) and conservation partners including National Trust for Nature Conservation (NTNC); Red Panda Network (RPN); WWF Nepal, Zoological Society of London (ZSL), and experts was formed. Arrays of consultation meetings were held at local level with the members of Community Forest User Groups (CFUGs) and Buffer Zone User Groups and Committees (BZUGs/UCs). It was followed by consultation with relevant government authorities including the officials of Protected Areas (PAs) and concerned Divisional Forest Offices (DFOs). Based on these consultations, a draft report was prepared which was shared amongst the working group members and experts for review. The final plan was prepared by incorporating the feedback and comments received from national and international experts before publication.

1.3 Scope of the Action Plan

This action plan is primarily guided by the National Biodiversity Strategy and Action Plan (NBSAP) 2014-2020. Information reported in this document is based on the available literature and findings of recent studies on red panda in Nepal. Therefore, it is deemed appropriate to direct the enforcement agencies including the DNPWC and DFSC, conservation partners and local communities for red panda conservation. Since the red panda is considered as an indicator species of the health of Eastern Himalayan Broadleaf and Conifer forest (Wikramanayake et al. 2001), its conservation could ensure the well-being of associated biodiversity and ecosystem.

This action plan is comprised of seven chapters. The first chapter includes introduction with highlight on the relevance of this action plan along with its scope whereas the second chapter describes on red panda status with focus on distribution at global and national level and its ecology. Similarly, the third chapter summarizes the major conservation efforts and achievements made so far at the national level. The fourth chapter provides a list of major conservation threats while fifth chapter highlights the challenges and opportunities. Likewise, the sixth chapter deals with the Red Panda Conservation Action Plan (2019-2023). The Plan incorporates the goal, objectives, outputs and actions to be carried out during the implementation of this plan. The last chapter provides insight on implementation mechanism and monitoring plan. The log-frame along with tentative budget and timeline is presented in the Annexes.

2 Background

2.1 Global Status and Distribution

Red panda, lesser panda, shinning cat, fire fox, and fox bear are some of the common names used for red panda in English. The word panda is derived from a Nepali dialect word *nigalya ponya*: *nigalya* is thought to come from nigalo meaning bamboo, but the source of *ponya* is less certain, although it may come from *ponja* meaning the ball of the foot or claws - making the complete meaning 'bamboo foot' (Glatston 2011).

Red panda is considered to be one of the earth's living fossils, its ancestry can be traced back in Europe during the late Oligocence – early Miocene (Peigne et al. 2005). Its ancestors were widely distributed in Eurasia and North America; but now, its distribution is confined in the eastern Himalayas in temperate bamboo forests in south-western China, Nepal, India, Bhutan and Myanmar (Map 1) (Glatston 1989). The species is now limited to temperate, conifer and adjacent broadleaf forest (Choudhary 2001) where it specializes on a diet of bamboo (Reid et al. 1991, Wei et al. 1999).

Red panda *Ailurus fulgens* is native to Bhutan, China, India, Myanmar and Nepal (Glatston et al. 2015). Despite of some reports on red panda's presence from Khaptad National Park (KNP) and Api-Nampa Conservation Area (ANCA) in far-west Nepal (Jnawali et al. 2012), recent study has marked Tila Karnali river in Kalikot district (81.66^{0}E) in Nepal as the westernmost distribution limit of red panda (Bista et al. 2016) and easternmost limit in the Minshan Mountain and Upper Min valley (104^{0}E) in Sichuan province, China (Ellerman & Morrison-Scott 1966). However, further exploration is necessary to confirm the occupancy status beyond these limits.

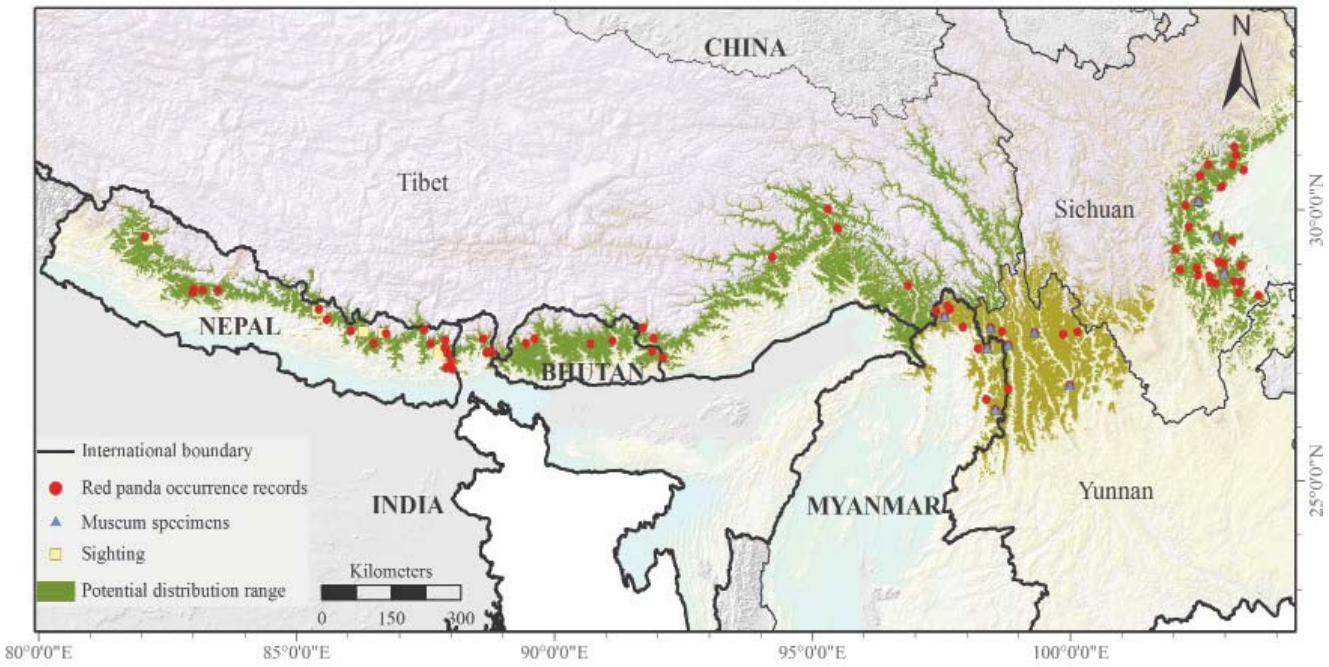
Taxonomy
Kingdom: Animalia
Phylum: Chordata
Class: Mammalia
Order: Carnivora
Family: Ailuridae
Scientific Name: *Ailurus fulgens* (Cuvier 1825)
Sub-species: *A. f. fulgens* & *A. f. styani*

The sub-species, *Ailurus fulgens fulgens* is primarily found in Nepal, India, Bhutan, Tibet and the north-eastern Yunnan Province of China. The sub-species *A. f. styani* is distributed in Sichuan and northeastern Yunnan of eastern China and Myanmar (Wei & Hu 1993, Wei et al. 1999). The Nujang River seems to act as a natural barrier separating the two subspecies (Wei et al. 2000) though it is still debatable (Hu et al. 2011). Groves (2011) proposed that these two sub-species should be viewed as two separate distinct species.

The estimated potential red panda habitat available in its entire distribution range varies greatly between different studies. Choudhury (2001) estimated the potential habitat of about 142,400 km^2, while two other studies have suggested different area available across the entire range, eg. 47,000 km^2 (Kandel et al. 2015) and 134,975 km^2 (Thapa et al. 2018). The total range-wide red panda population is estimated to be less than 10,000 mature individuals (Glatston et al. 2015) along with captive population of 959 red panda including 610 *A. f. fulgens* and 349 *A. f. styani* outside China (pers comm. Angela Glatston, 2018).

The red panda is listed as Endangered in IUCN Red List of Threatened Species and included in the Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Map 1: Global red panda distribution range *(Source: Thapa et al. 2018)*



Red Panda mother with cubs (Photo: Axel Gebauer)

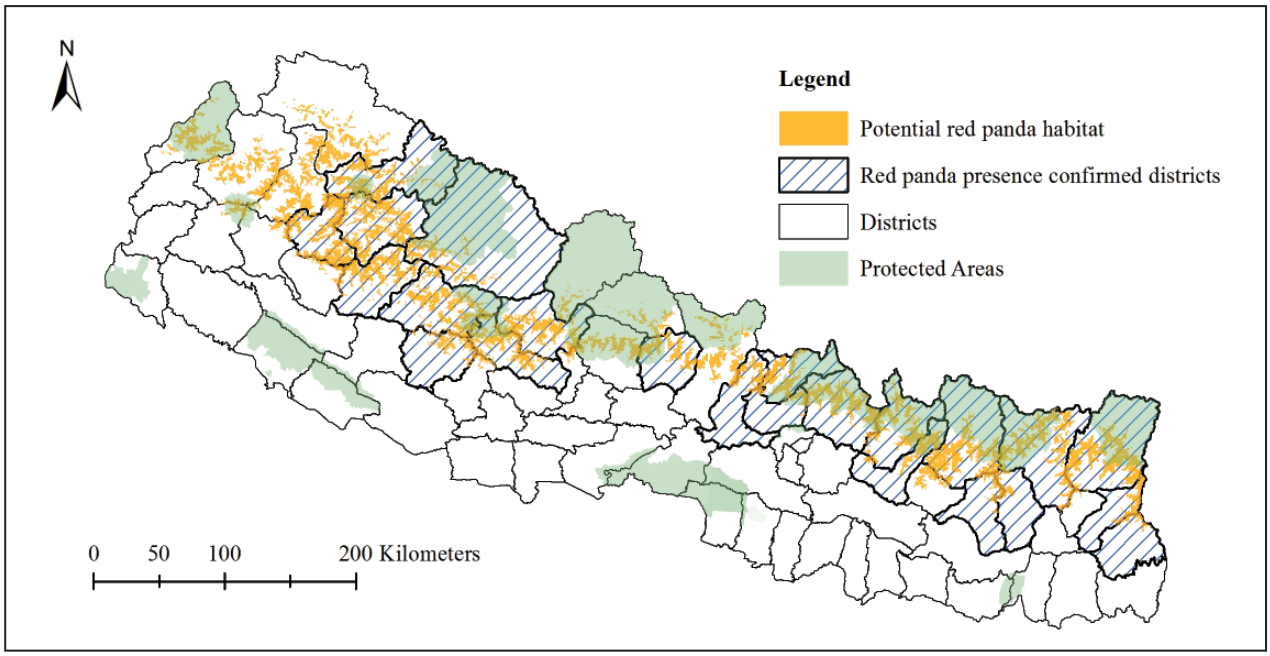
2.2 National Status and Distribution

The national red panda survey 2016 documented the potential red panda habitat available across 23,977 km^2, out of which, almost 70% of the total habitat lies outside the PAs network (Map 2) (Bista et al. 2016). This estimation is close to the finding of other studies: 22,400 km^2 (Kandel et al. 2015) and 20,150 km^2 (Thapa et al. 2018). The red panda has sparse distribution in temperate and sub-alpine forest zones of the Himalayan ecosystem between 2000 m and 4800 m in Nepal (Baral & Shah 2008). It's distribution primarily depends on the availability of the bamboo forests.

Red panda has been reported from Rara National Park (RNP), Shey Phoksundo National Park (SPNP), Langtang National Park (LNP), Sagarmatha National Park (SNP) and Makalu Barun National Park (MBNP), Dhorpatan Hunting Reserve (DHR), Annapurna Conservation Area (ACA), Manaslu Conservation Area (MCA), Gaurishankar Conservation Area (GCA) and Kanchenjunga Conservation Area (KCA). The districts inside and outside the protected areas include Ilam, Panchthar, Taplejung, Sankhuwasabha, Bojpur, Khotang and Solukhumbu(State One); Ramechap, Dolakha, Sindhupalchowk, Rasuwa, Nuwakot and Dhading (State Three); Gorkha, Lamjung, Kaski, Manang, Myagdi and Baglung (State Gandaki); Rolpa and East Rukum (State Five); and West Rukum, Dolpa, Jajarkot, Jumla, Mugu and Kalikot (State Karnali) (Suwal and Verheugt 1995, Steffens 2004, William 2006, Paudel 2009, RPN 2010, Joshi and Sangam 2011, Jnawali et al. 2012, Panthi et al. 2012, Thapa et al. 2014, Bhatta et al. 2014, Dangol 2014, Panthi et al. 2015, Bista et al. 2016, Rai et al. 2018, Bista et al. 2018). However national survey 2016 did not record the presence from Gorkha, Kaski and Manang Districts; and ACA, MCA and ANCA (Bista et al. 2016). Probability of red panda occupancy in these range districts and protected areas is equally possible which needs further exploration.

The national population size of red panda has been estimated to be 317-582 individuals (Jnawali et al. 2011). However, Population and Habitat Viability Assessment on red panda (Jnawali et al. 2012) suggested total population ranging from 237 to 1061 individuals segregated into 11 sub-populations (1. Kanchenjunga 2. Sankhuwasabha East 3. Sankhuwasabha West 4. Sagarmatha 5. Gaurishankar 6. Langtang 7. Manaslu-Annapurna 8. Dhorpatan 9. Rara 10. Khaptad and 11. Darchula) distributed in Nepal.

Map 2: Potential red panda habitat and presence confirmed districts in Nepal *(Source: Bista et al. 2016)*



Despite of potential habitat available in Khaptad and Darchula, red panda presence is yet to be confirmed which needs further corroboration (Bista et al. 2016). These estimates are merely based on rough habitat estimation and known density estimates that needs further assessment using cutting-edge technologies. The central zoo of Nepal has only two individuals of red panda to date. Ex-situ population comprising from all the zoos distributed in different countries can contribute to the conservation of the species by providing a genetically and demographically sustainable backup population for the wild population (Jha 2011).

Different common names based on the dialects of local ethnic communities are used in different places of Nepal (Table 1).

Red Panda (Photo: Kuniko Kai)

Table 1: Vernacular names of red panda in difference places of Nepal *(Source: Bista et al. 2016)*

Districts	Local Names
Panchthar, Ilam & Taplejung	*Niga´lapo´nya* (Limbu), pundekundo
Khotang	*Kundo* (Rai)
Solukhumbu	*Pungur* (Rai)
Ramechap	*Phulnayan* (Sherpa)
Sindhupalchok	*Syaudo* & *Taarebhaalu*, *Phop* (Tamang), *Hoprpa*, (Sherpa)
Nuwakot	*Machyang* (Tamang)
Rasuwa	*Hope*
Dhading	*Khop* & *Phonichha*
Gorkha	*Punksim* (in Gurung)
Lamjung	*Lita-Sayala* (Gurung) *Cherrha* (Tamang)
Kaski	*Nyakarau*
Manang	*Wah*, *Lheete* & *Meta-Sayal* (Gurung)
Myagdi	*Okra*
Dolpa	*Khanche*
Central Nepal	*Habre*
Western Nepal (Karnali Region)	*Nautoto*

Chantyaal ethnic group of Gurjakhani, Myagdi district consider red panda to be protective animal. Their shamans use red panda hides as ritual dress while treating the patients. Similar beliefs were also entrenched amongst the Magar ethnic group of Lamjung district (Bista et al. 2016). However, Sharma et al. (2017) mentioned that the red panda are no longer used in rituals in Nepal.

The Government of Nepal has listed red panda under schedule I of NPWC Act 1973. This species is categorized as Endangered by National Red List of Mammals (Jnawali et al. 2011, Amin et al. 2018).

2.3 Ecology

Red panda, a small crepuscular and arboreal mammal, lives in temperate forests with abundant bamboo in the understorey. Red panda spend most of their time alone, except during the mating season and when the mother is with her cubs. Most of the time, they spend on foraging and sleeping on tree branches or in tree hollows during the day (Yonzon & Hunter 1991, Wei & Zhang 2011).

Red panda prefers to live in the forests with close proximity to water sources (within 100-200 m) with moderate tree canopy (>30%), bamboo cover (> 37%) and an average bamboo height greater than 2.9 m (Yonzon et al. 1991, Pradhan et al. 2001, Williams 2006, Dorji et al. 2012). They also prefer gentle to steep slopes with fallen logs, tree stumps, and snags (Zhang et al. 2008, Dorji et al. 2012, Bista et al. 2017a). Red panda shows preference for north, north-west and south-west aspect slopes (Yonzon & Hunter 1991, Pradhan et al. 2001, Dorji et al. 2012, Bista et al. 2017a). Their altitudinal distribution ranges from 2000-4800 m (Roberts & Gittleman 1984, Yonzon et al. 1991).

Bamboo leaves and shoots contribute more than 83% of total red panda diet (Yonzon & Hunter 1991). They use elevated objects, such as shrub branches, fallen logs, or tree stumps to reach bamboo leaves (Wei et al. 2000). Red panda also forages on other foods such as leaves and berries of plants: *Sorbus* spp., *Acer* spp., *Quercus semicarpifolia, Berberis* spp., *Actinidia strigosa, Rhododendron campanulata, Rosa sericera, Abiesspectabilis, Juniperus* spp., *Rubusspp, Schlleriflora* spp. etc (Yonzon & Hunter 1991, Pradhan et al. 2001, Sharma 2008, Panthi et al. 2012, Thapa & Basnet 2015, Panthi et al. 2015). They also feed on birds, eggs, and insects (Yonzon & Hunter 1991). Being primarily a bamboo eater, red panda has a very low metabolic rate (Wei et al. 2000), which reduces its energy requirements (McNab 1988).

Fresh droppings of red panda are spindle-shaped, soft, moist, and light green. Red panda usually has a cluster of 1-15 pellets in a single defecation (pers. observation, D. Bista, 2012), and use the same site for defecation, i.e. latrine sites, where more than 100 pellets can amass (Yonzon 1989).

Red panda breeds in the late winter months, from January to March, and the cubs are born during the monsoon, from June to August (Yonzon & Hunter 1991, Northrop & Czekala 2011). They normally have their nests in a hollow tree or a rock crevice. Red panda gives birth to one to four blind cubs with an average clutch size of two cubs, each weighing 110 to 130 gm. They start to venture out of the nest when they are 3 months old (Robert & Gittleman 1984). The young one leaves mother at about 8 months of age, when the mother begins a new breeding season (Schaller 1994). The young become sexually mature at 18 to 20 months of age and give first birth at 24 to 26 months after 135 days of gestation period (Northrop & Czekala 2011).

Major Conservation Efforts and Achievements

3

3.1 National Conservation Policy

The red panda is listed as 'endangered' in the IUCN Red Data Book and as an Appendix I species in CITES, prohibiting international trade of the live species or its body parts. The species is included in the protected priority mammals list under the National Parks and Wildlife Conservation (NPWC) Act, 1973 in Nepal. The NBSAP 2014-2020 emphasizes priority actions in conserving endangered species including the red panda.

Nepal has strong legal provisions to control wildlife crimes particularly for protected priority mammals. The NPWC Act provisions 'a fine ranging from NPR 500,000 to NPR 1,000,000, or an imprisonment ranging from five years to 15, or both, for offenders and accomplices convicted for illegal trade in red panda body parts. The act also has provision to reward the informants with an amount up to NPR 25,000 for aiding in seizure of its body parts or arrest of red panda criminals.

Red Panda (Photo: Damber Bista)

Effective law enforcement is crucial to control poaching and illegal trade of wildlife including red panda. The field offices of DNPWC tackle illegal trade and poaching related issues within the PAs while the DFOs undertake appropriate actions to curb poaching and illicit trade of red panda outside the PAs. The National Wildlife Crime Control Coordination Committee (NWCCCC) and Wildlife Crime Control Bureau (WCCB) and its respective district units, through proper coordination with relevant authorities, support in curbing illegal wildlife trade and poaching of endangered species including red panda. To fight against organized illegal wildlife trade at regional level, the South-Asia Wildlife Enforcement Network (SAWEN), with its secretariat in Nepal, was established in 2011. SAWEN takes concerted and coordinated actions in eight South Asian countries.

3.2 Conservation Efforts

Establishment of protected areas in mountain region of Nepal is contributing to red panda conservation to some extent. Red panda conservation status within those PAs is better as the threats are minimized by adopting appropriate conservation measures within those areas. Community based conservation initiatives have also been ensured through the buffer zone program in MBNP, SNP, LNP, DHR and RNP. Red panda monitoring is being carried out in LNP. Besides, some of the DFOs are also implementing red panda focused conservation programs outside the PAs in small scale.

The Government of Nepal (GoN) has also adopted landscape level approach for the conservation of mountain ecosystem including the red panda and other associated sympatric species. In Nepal, the red panda habitat is distributed across Kailash Sacred Landscape (KSL), Sacred Himalayan Landscape (SHL), Chitwan-Annapurna Landscape (CHAL) and Kanchenjunga Landscape (KL), but the species presence has been confirmed only from the last three landscapes. Red panda is considered as one of the key flagship species of eastern Himalayan broadleaf and conifer forest in the SHL and KL (Williams 2004, Gurung et al. 2017). This landscape level approach also aims in fostering trans-boundary level cooperation.

The first national red panda survey was conducted in 2016 which is the only study carried out at national level in the entire distribution range. This study provided the baseline scenario on red panda distribution and habitat status in Nepal which will be critical for taking conservation effort forward in the country.

School children are conservation ambassadors (Photo: Saroj Shrestha)

▲ *Red Panda mother with cubs (Photo: Rajiv Paudel)*

Some conservation interventions are being carried out at local level outside the PAs in Nepal including community-based red panda conservation program in Panchthar, Ilam and Taplejung districts since 2010. This program has been recently extended in three districts of western Nepal, namely, Jumla, Jajarkot and Kalikot since 2017. In this conservation model, different aspects of conservation, research, monitoring, education, awareness, capacity building, sustainable livelihoods, and habitat management are included (Bista 2018). Local people are trained as citizen scientists who can handle GPS and camera traps. They are involved in survey and monitoring red panda status, habitat quality and threats. Based on these learning, the GoN has published a protocol on red panda survey and community-based monitoring (MoFSC 2015). Likewise, some of these people are trained as red panda trackers to promote red panda based eco-tourism. These trained local people have made red panda based eco-tourism as one of the most successful interventions in eastern Nepal where one can spot elusive red panda within 3-4 tracking days in the wild. This red panda based tourism is being promoted in five different communities of Ilam, Taplejung and Nuwakot districts.

A population and habitat viability assessment and species conservation strategy workshop for red panda was held in Nepal in 2010. The national and international participants of the workshop expressed a vision for the overall conservation of the species. Participants identified red panda's status, distribution, threats, estimated population, sub-populations, and developed a Vortex based model for assessing the risk of red panda's population decline and extinction.

The vision expressed by the workshop was "to secure viable populations of red panda distributed in contiguous natural habitat throughout the Himalaya regardless of political boundaries where this flagship species brings benefits to the region and is valued and protected by all stakeholders". Based on this vision, the workshop developed goals, objectives, and concrete actions needed for achieving the vision of this flagship species. In addition, several studies on different aspects of red panda have been carried out so far. Out of them, protocol development for identification of individual red panda through their photographs is new to red panda conservation (Shrestha et al. 2015).

4 Conservation Threats

4.1 Threats

Habitat loss, degradation and fragmentation along with poaching are the most pressing anthropogenic threats to red panda conservation. Since the red panda is a habitat specialist, climate change is also likely to possess some impact on red panda survival though it is yet to be studied. Besides, there are some other threats influencing red panda survival which should also be equally addressed. Prevalence of most of the threats could be site specific. Understanding of threats to red panda in different areas of the country is paramount for planning and developing this plan. Therefore, successful conservation of red panda in Nepal will largely depend upon how the threats are addressed at particular sites (Acharya et al. 2018).

4.1.1 Habitat Loss and Degradation

Like many other wildlife species, the red panda is threatened due to habitat alteration of the landscape by humans. The impact of habitat loss and degradation for red panda varies throughout the country (Jnawali et al. 2012). Augmented habitat loss, degradation, and fragmentation due to anthropogenic activities are the main causes of decline in red panda populations and its habitat in Nepal (Acharya et al. 2018). Annual human population growth and infrastructure developmental activities are fueling deforestation, forest fragmentation and habitat loss. Forest fires, the traditional transhumance system of livestock herding, firewood collection, bamboo and non-timber forest products (NTFP) collection, and slash and burn cultivation are important underlying causes for habitat loss and degradation in the Himalayan region (Williams et al. 2011, Panthi et al. 2017, Acharya et al. 2018).

Mass flowering and die-off of bamboo is also one of the major cause behind habitat loss and degradation which could also extirpate a local population of red panda from a particular habitat (Steffens 2004, Paudel 2009). Extirpation of red panda due to this effect has been already reported from some areas in Manang district (Bista et al. 2017a). Due to its small body size, limited movement, and high natural predation, the species is believed to be more susceptible to this problem (Wei & Zhang 2011).

Impact of forest fires on small mammals like red panda has not been well documented, however, anecdotal observations and notes suggest that the forest fire has negative effects on red panda due to its direct effect and contribution in habitat loss. Forest fire that took place during April-May 2009 killed three red panda in Taplejung district (Williams et al. 2011). Despite of this fact, forest fires also have some good aspects as these fires create more space for bamboo growth.

4.1.2 Poaching and Illegal Trade

Red panda are poached for their furs and meat. This trade-induced threat is also reported in other red panda range countries (Glatston et al. 2015). Red panda's meat is consumed in Arunachal Pradesh, India, and Hong Kong, China. During the 9-year period from 2008 to 2016, 74 cases of trafficking red panda hides were reported in Nepal. However, the market where exactly is the demand coming from is yet to be revealed. Consumption of red panda meat has been reported from central and western Nepal (Bista et al. 2016). Although deliberate poaching of red panda is minimal in Nepal, red panda have been found trapped and killed, accidentally, in the traps set for other wildlife (Bista & Paudel 2014).

Law enforcement in some of the mountain PAs' is hindered due to inaccessible terrains, inadequate staffing and is poor in conservation areas and outside PAs (Jnawali et al. 2012). Besides, the porous (open) border of the country further challenges on law enforcement.

Most of the highland herders in Nepal keep guard dogs (generally of Tibetan mastiff breed) in their cowsheds to

provide security to the livestock against the predators. These dogs are reported to kill local wildlife, including red panda. Likewise, the stray dogs attracted due to improper garbage management of the hotels are also reported to be fatal for red panda and other wildlife. Yonzon and Hunter (1991) found that most red panda deaths were connected to the presence of cattle herders and dogs in the LNP area during the monsoon [birth] season. Killing of red panda by guard dogs has also been reported from Taplejung district (Williams et al. 2011). Four adult Red panda were killed by dogs in the KCA in 2011 (Bista & Paudel 2014) and two red panda in Taplejung and Ilam in 2018.

4.1.3 Small and Isolated Populations

Small and isolated populations have a greater tendency towards extinction due to inbreeding depression and natural catastrophes. The potential red panda habitats in Nepal have been fragmented into more than 400 patches indicating red panda occurring in small island populations (Bista et al. 2016). Biological corridors connecting sub-populations are still inadequate and are not sufficiently managed. It is likely that some of the red panda populations in Nepal will face inbreeding problems, due to very small isolated populations, followed by a loss of genetic diversity in the near future. Extinction risk in the mammalian order Carnivora is predicted more strongly than by exposure to rest of anthropogenic effects which is applicable for red pandas as well indicating their vulnerability to extinction risk (Cardillo et al. 2004, Jnawali et al. 2012).

4.1.4 Pathogen and Zoonotic Diseases

Red panda are known to be highly susceptible to parasitic infection, which can have a prominent impact on the population dynamics of this endangered species. The mortality rate of the red panda is very high in the wild (~65%), (Yonzon & Hunter 1991) which can be attributed to several explanations, including parasitic infection (Bista et al. 2017b). Seven different species of gastrointestinal parasites have been reported in red panda (Bista et al. 2017b). The canine distemper virus has been reported as one of the most infectious pathogens resulting nearly 100% mortality rate in red panda (Bush & Roberts 1977, Glatston et al. 2015). Bista et al. (2017b) has reported parasitic strains in red panda across their range in Nepal as one of the detrimental issues for red panda conservation which has raised questions regarding the prevalence, risk, and implication of endoparasites in red panda in Nepal.

4.1.5 Infrastructure Development

Development of some infrastructure activities negatively affect red panda survival. The construction of hotels, roads, and hydropower plants exert pressure on forest resources at high altitude. Furthermore, the linear infrastructures e.g., road and electric transmission lines also result in habitat fragmentation which is likely to have more impact in future. These linear infrastructures further ease an access of poachers to the habitat. Likewise, the mass tourism may also lead to habitat destruction and resource depletion which could turn fatal in the long run (Acharya et al. 2018).

4.1.6 Inadequate Awareness

Although the red panda is on the protected list in Nepal, many people are unaware about its protection and ecological role. Despite some awareness activities carried out in some areas, there is yet a very limited awareness level amongst different stakeholders. However, local people generally have positive attitudes towards Red panda conservation, given their cultural beliefs and that red panda do not come into conflict with people (Sharma et al. 2017).

4.1.7 Climate Change

Climate change is a more critical issue because it is causing more frequent droughts, snow falls, and floods, all resulting in shifting vegetation zones in the Himalayas (Shrestha et al. 2012). Given the red panda's narrow ecological niche, a habitat specialist in nature and feeding primarily upon a single food source (bamboo), the risks due to climate change are greatly increased. Panthi (2018) has predicted the reduction of current suitable habitat by 0.5% in 2070 due to combined effect of climate change, land use and land cover. Many bamboo species are vulnerable to climate change because of their unusual extended reproduction intervals, ranging from 10 to 120 years (Janzen 1976), along with limited seed dispersal ability (Tuanmu et al. 2013). Therefore, climate change is likely to have prominent negative effects on red panda habitat. In addition, change in plant phenology has been observed in many parts of the country, including the mid-montane forests which could be further fragmented into smaller patches (Thapa et al. 2016). In order to cope with this changing scenario, the species is likely to alter its feeding and day-to-day habit. These climate induced changes are likely to invite serious threats on its survival in the wild.

Red Panda (Photo: Saroj Shrestha)

Challenges and Opportunities

5

5.1 Challenges

5.1.1 Limited Resources, Capacities and Incentives

The red panda habitat lies in remote areas mostly with inaccessible terrain which is also considered as one of the major challenges to access these sites. Limited human resources can also be interpreted as availability of insufficient technical human resources. Besides, limited conservation priority at national level is another challenge for red panda conservation in Nepal. Red panda's role as flagship species of the temperate forests has been underestimated so far which could be a turning point for effective conservation of mountain ecosystem if due priority is given to this species.

Several socio-economic factors lead to the destruction of red panda habitat. Herders seem to perceive a higher profit if they use forests and rangeland for grazing their livestock, collecting timber, fuel-wood, and medicinal plants. On the other hand, economic and social incentives to preserve optimal habitats for red panda are insufficient to overcome the above-mentioned perceived benefits. The secondary benefits of eco-tourism and the knowledge of the ecological value of red panda barely overcome this which needs to be upgraded.

5.2 Opportunities

5.2.1 Red panda as Flagship Species

Red panda are attractive animals. They have not been reported with any sort of conflict with local people which makes easier to convince local community and involve them in conservation of this cuddly species. However, conservation in the wild particularly outside the PAs will only be effective through concerted efforts and collaboration at the local level. Red panda can thus serve as a flagship species for the conservation of entire biodiversity of temperate forest ecosystem. As a flagship

species they can also be instrumental in fund raising and developing integrated conservation program in the middle mountain forests in Nepal.

5.2.2 Involvement of Local Community

National red panda survey of 2016 has shown that nearly 70% of the total red panda habitat falls outside the PAs in Nepal (Bista et al. 2016). Conservation interventions targeting this endangered species are very minimal in the majority of its habitat which are either being managed by local CFUGs or directly by the DFOs and their field units. This scenario underpins the need of community-based conservation program that ensures the co-existence of red panda and human being (Bista 2018). Besides, encouraging experience of local communities involved in red panda conservation from Ilam, Panchthar and Taplejung districts have further paved the way to replicate this community-based conservation approach in red panda range area.

5.2.3 Nature Based Ecotourism

Red panda are one of the most charismatic wildlife species to observe in the wild. They therefore offer great opportunities for ecotourism, which can provide an extra source of income for local communities. This intervention has been already successful in six different locations in Nepal, viz., Dobato, Gorkhe and Choyatar in Ilam district; Pathibhara area in Taplejung district, Ghyangphedi and Cholangpati in LNP which could serve as a successful model for further promotion in new areas. However, this species-based tourism should be developed and promoted in highly standard way so that the footprint of tourism activities could be minimal in the long run.

5.2.4 Use of Cutting-edge Technology in Research and Monitoring

Use of cutting-edge technologies on red panda study are lacking so far. Studies based on remote sensing, camera trapping, satellite collaring and non-invasive genetic analysis provides better opportunity for understanding their habitat, ecological, behavioral, physiological and genetics aspects. Despite red panda being a habitat specialist impact of climate change on its distribution and survival is yet to be studied. This could be another pertinent avenue for further exploration based on modern tools and techniques. Likewise, use of smart technologies seems to be equally feasible in red panda study and monitoring.

Red Panda habitat (Photo: Damber Bista)

Red Panda Conservation Action Plan (2019-2023)

6

6.1 Goal

Red panda populations protected and managed in Nepal.

6.2 Objectives

Objective 1: Enhance understanding and knowledge on conservation status, ecology and habitat dynamics of red panda

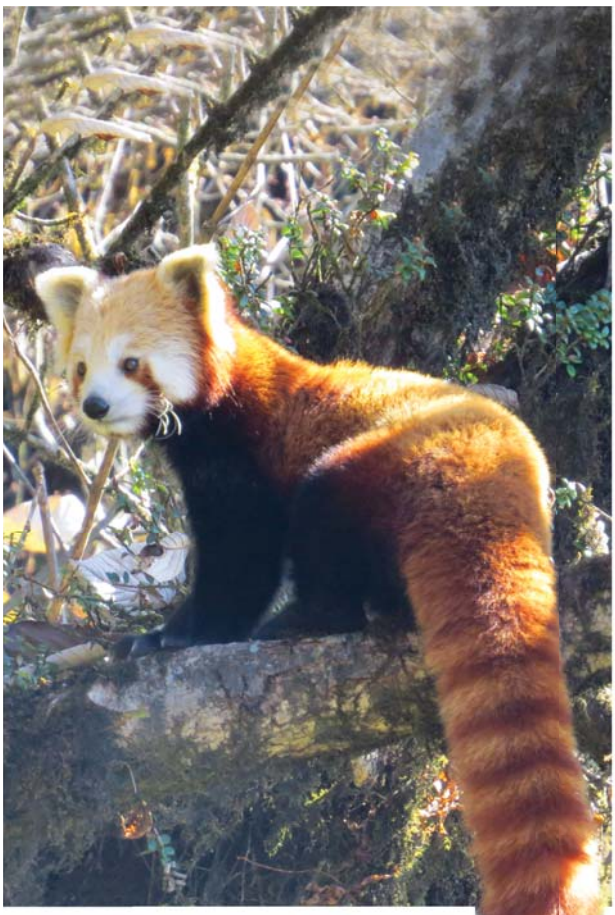
Rationale

National red panda survey 2016 has confirmed presence in 24 districts and seven protected areas in Nepal. The survey did not record presence from some of the previously reported districts, viz. Gorkha, Kaski and Manang, and PAs, namely KNP, MCA, ACA and ANCA. These observations indicate towards the need of reassessment on red panda distribution, habitat status (focusing on bamboo abundance, diversity and phenology) and threats.

In spite of these findings on red panda status and distribution, information on red panda's accurate population within the country is still lacking. Yonzon et al. (1991) estimated the total population to be around 314 individuals whereas the most recent studies have estimated the population within two different ranges: 315-582 (Jnawali et al. 2011) and 237-1061 (Jnawali et al. 2012). Data on exact populations and its distribution is highly crucial for the projection of future trend of red panda population in Nepal (Williams et al. 2011). It needs further assessment with more reliable technique as these estimations were primarily based on habitat suitability analysis. Therefore, it is the most realized need to estimate the more accurate population of red panda through genetic analysis or any other more convenient technique which is crucial for the conservation of this species in the long run.

Study on red panda's ecological and behavioral aspect is insufficient. Only a single intensive study on red panda ecology was carried out during 1980's. There has been a significant progress in the technology used in ecology and behavior study of wildlife since the first study of Red panda carried out in Nepal. Besides, long gap occurred on the study of wild population without considering huge changes that were seen in land use and climate in the last three decades. Therefore, new researches should be conducted to update our knowledge on Red panda ecology, behavior and climate change impact to maintain their survival.

Red Panda (Photo: Ramesh Chaudhary)



Outputs

1.1	Database on red panda occupancy, population, distribution and habitat dynamics enhanced.
1.2	Understanding of ecological and behavioral aspects of red panda improved.
1.3	Central database on red panda established and maintained.
1.4	Impact of climate change on red panda distribution and survival assessed.

Actions

- Carry out the studies on red panda occupancy, population status, distribution and habitat suitability.
- Conduct regular monitoring of red panda in identified important areas.
- Carry out the studies on bamboo diversity, distribution and phenology in red panda habitat considering potential climate change impacts.
- Study feeding and nutritional ecology.
- Study red panda's ecological and behavior through cutting-edge technology (satellite/radio collaring, camera trapping etc.).
- Conduct national red panda population survey based on genetic analysis (or any other appropriate techniques).
- Establish and maintain a central database on red panda information.
- Establish a DNA based database for effective anti-poaching intervention.
- Study climate change impact on red panda and its habitat.
- Establish climate monitoring plots for long-term monitoring.

Objective 2: Curb poaching and illicit trade of red panda.

Rationale

Poaching and illicit trade of red panda and their body parts has been emerging as one of the most serious threats to this species survival. Red panda are not only killed for their furs, but also for their meat. Targeted killings of red panda are negligible in Nepal, red panda have been found trapped and killed, accidentally, in the traps set for other wildlife (Bista & Paudel 2014). During the time period 2008 to 2016, 74 cases of trafficking red panda hides were reported in Nepal with an average of 8 hides per year (RPN 2016). Weak surveillance due to insufficient staffing, capacity and inadequate coordination among relevant enforcement agencies have affected effective control of illegal trade. Besides, reward system for those providing information on poaching and illegal trade of wildlife is not properly established.

Community Based Anti-Poaching Units (CBAPUs) and youth groups are engaged at the grass-root level in awareness generation, anti-poaching tackling wildlife crime. In Panchthar, Ilam and Taplejung districts mobile based application, joint patrolling and CC camera have been found effective to curb and deter wildlife poaching. More importantly, the CFUGs have initiated mainstreaming biodiversity conservation in their operation plans giving high conservation priority to the threatened flora and fauna within their jurisdiction. Besides, local government has started incorporating biodiversity conservation in their local school level curriculum. Furthermore, Nepal police has formed a special branch under the Central Investigation Bureau and their regional investigation team with special responsibility to curb wildlife crimes in Nepal. In this context, this action plan envisions to reinforce the current efforts and build the national and local capacity to combat against wildlife poaching and illegal trade.

Outputs

2.1	Capacity of local and national level law enforcement agencies enhanced on anti-poaching investigation skills to control wildlife crime.
2.2	Cooperation and coordination among enforcement agencies and other stake-holders strengthened.
2.3	Cases of red panda poaching and illegal trade reduced.

Actions

Conduct researches on poaching and illicit trade of red panda.
Conduct awareness campaigns on red panda, anti-poaching and conservation laws.
Conduct capacity building trainings and exposure visits for frontline staff.
Strengthen the wildlife crime investigation process and enhance the evidence collection system.
Establish and functionalize community based anti-poaching units at local level.
Enhance transboundary cooperation with India and China.
Organize transboundary level meeting with India and China (at local and federal level).
Strengthen informant networks, information gathering and communication networks for anti-poaching operation.
Equip enforcement agencies with necessary logistics (equipment, field gears etc).
Conduct capacity building program for community-based organizations.
Enhance local, state and federation level coordination and cooperation.
Formulate rules for the guard dogs and control presence of stray dogs in red panda habitats.

Objective 3: Protect and manage the red panda habitats.

Rationale

Habitat loss, quality degradation and fragmentation is one of the major challenges for red panda conservation and this issue should be seriously considered in future conservation endeavors. Drivers of habitat loss and degradation, however, vary from one place to another place. Therefore, a site-specific assessment is utmost before planning the conservation program for different areas. Available potential red panda habitat is fragmented into nearly 400 patches (Bista et al. 2016) and there should be an intact habitat to support at least 100 mature individuals to maintain genetically viable population (Jnawali et al. 2012). Also, considering the potential impacts of climate change on habitat specialist species like red panda, it is crucial to identify and protect large resilient patches from non-climatic stressors (Thapa et al. 2015) while maintaining connectivity. So, landscape level conservation approach is necessary for ensuring the success of red panda conservation endeavor in Nepal which entails the need of biological corridors and habitat improvement interventions. The livelihoods of people living around red panda habitats depend heavily on natural resources; therefore, red panda conservation planning should include carefully targeted support for livelihood development that links the needs of local villagers to conservation.

Red Panda habitat with bamboo (Photo: RPN)

Outputs

3.1	Key hot-spots and potential corridors identified.
3.2	Habitat contiguity maintained and degraded habitat restored.
3.3	Site-specific drivers of habitat loss and degradation identified and addressed.

Actions

- Identify bottle necks, hotspots, priority areas and site-specific conservation threats.
- Prepare site-specific management plan for identified priority areas.
- Conserve and restore potential habitats and biological corridors.
- Plant bamboo (native and palatable spp.) in identified habitat patches.
- Regulate the use and harvesting of bamboo shoots/clumps and other dietary/shelter tree species.
- Strengthen community-based forest-fire fighting mechanism.
- Diversify livelihood practices to reduce forest dependency.
- Regulate herding practices - rotational grazing, improved herder's sheds and fuel-efficient cooking stoves.
- Promote alternative sources of energy to replace the traditional stoves.
- Support CFUGs for red panda habitat improvement.

Objective 4: Strengthen and extend community based red panda conservation initiative.

Rationale

There are some community based red panda conservation initiatives being implemented in eastern and western Nepal. Some of the interventions practiced in those programs, eg. red panda based eco-tourism initiative, have been already proved to be successful. Learning from these initiatives could be out-scaled in new areas. However, an evaluation of ongoing conservation program would better help improve further actions. Nearly 70% of the total red panda habitat falls outside the protected area system in Nepal (Bista et al. 2016). So, these sort of community-based conservation program would be more effective in conserving red panda and associated biodiversity in the forests outside the PAs through improving livelihood of local community. But, such feasible sites should be identified prior to the extension of community-based conservation program. Local forest user groups and their users should be given priority while implementing the conservation measures.

Outputs

4.1	Priority areas identified for initiating community-based conservation program.
4.2	Local community groups trained, sensitized and involved in red panda conservation.
4.3	Red panda based tourism in place.

Red Panda habitat (Photo: Axel Gebauer)

Actions

Evaluate effectiveness of ongoing community-based conservation program.
Conduct feasibility study to identify new priority areas in collaboration with state and local level for initiating community-based conservation program.
Develop a site-specific management plan for identified priority areas.
Sensitize and aware local forest users/herders, school children and other stakeholders.
Conduct training for local forest users on governance and entrepreneurship.
Train and mobilize selected community members as citizen scientist on red panda monitoring.
Regulate the use and harvesting of forest resources and grazing and control habitat encroachment.
Develop a red panda based eco-tourism promotion manual.
Promote red panda based tourism.
Develop and promote bamboo and NTFP based enterprises.
Establish information/resource centre in support of CFUGs.

Objective 5: Strengthen cooperation and coordination on red panda conservation at national and International level.

Rationale

Preparing this red panda conservation action plan has already brought together a number of key stakeholders. To implement the action plan that collaboration needs to continue at the national level and, most importantly, be developed locally at all the priority sites to fulfill its goal. Nepal's new federal governance system has further manifested the need of cooperation and collaboration amongst the local institutions. Not only the red panda habitat has connectivity with neighboring country, China in the North and India in the East, but also there are some infamous wildlife trafficking routes at transboundary region of these two neighboring countries. Therefore, transboundary cooperation between the neighboring countries is necessary to safeguard the red panda and their habitats. Likewise, exchange and sharing of knowledge is equally important to enhance impact of conservation program.

Outputs

5.1	Transboundary cooperation strengthened for red panda conservation.
5.2	Increased support for red panda conservation at local, state and federation level.

Actions

Organize transboundary meetings at local and national levels.
Organize sharing meeting at local, state and federation levels.
Organize an international conference on red panda.
Initiate and strengthen cooperation among red panda range countries and conservation organizations.
Organize exchange visits to learn and share best practices at local and transboundary levels and red panda range countries.

7 Plan Implementation & Monitoring

7.1 Implementing Agency

The DNPWC will take a lead role in overall implementation of this action plan and undertake the activities inside the PAs while the DFSC will be responsible for implementation of the activities outside the PAs. Both departments will coordinate with the state governments (Ministry of Industry, Tourism, Forest and Environment) and local governments for implementation of this plan. In addition, the conservation partner organizations will also contribute to implement the action plan.

Most of the researches and studies will be supported by IUCN, NTNC, RPN, WWF, ZSL and Nepalese universities in partnership and coordination with DNPWC and/or DFSC. Similarly, other research organizations/individuals will also be encouraged to support and conduct researches on red panda conservation. Technical and financial support from these conservation partners will be acquired while implementing the plan. Besides, state and local governments, Buffer Zone Management Committees, BZUCs, CFUGs and other Community-based Organizations, CBAPUs, security forces and various government and non-government agencies will also have significant contribution in the implementation of this plan.

7.2 Financial Plan

Total estimated cost for the implementation of the action plan is NPR 303,050,000 (Table 2). The fund will be managed from government regular budget, and existing conservation partners like RPN which has been working in red panda conservation in Nepal since 2010. The other national and international conservation organizations will be encouraged to seek the fund for the plan implementation. Detail breakdown of the budget is presented in the Annex-2.

Red Panda (Photo: Kuniko Kai)

Table 2: Summary of indicative budget

Goal: Red panda populations protected and managed in Nepal		
Objectives	Total Indicative Budget	
	Amount (000) (NPR)	Percentage Weight
Enhance understanding and knowledge on conservation status, ecology and habitat dynamics of red panda	52,000	17.16
Curb poaching and illicit trade of red panda	48,650	16.05
Protect and manage the red panda habitat	69,350	22.88
Strengthen and extend community based red panda conservation initiative	106,750	35.23
Strengthen cooperation and coordination on red panda conservation at national and International level	25,050	8.27
Monitoring and evaluation of action plan	1,250	0.41
Total	**303,050**	**100**

7.3 Monitoring and Evaluation of the Plan Implementation

The monitoring and evaluation of the implementation of this action plan will be carried out regularly during the five-year period. The work plan (Annex 2), will guide conservation partners for program development and implementation in the field. Monitoring of the progress will be carried out by the respective implementing partners and that will be shared during the review meetings. In addition, a mid-term and final review will also be conducted by involving a team of independent consultants.

Latrine site of Red Panda (Photo: RPN)

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Annexes

Annex 1: Logical Framework

Narrative Summary	Indicators	Means of Verification	Assumptions/Risk
Goal: Red panda populations protected and managed in Nepal			
Objective 1: **Enhance understanding and knowledge on conservation status, ecology and habitat dynamics of red panda**	**Number of studies on red panda increased**	**DFSC & DNPWC's record of research permits granted; research reports, academic degree thesis and number of scientific papers published in peer reviewed journals**	**Government policy remain supportive and funding source remain available to carry out research.** **Conservation partners including academic institutions prioritize and support research on red pandas.**
Outputs			
Database on red panda occupancy, population, distribution and habitat dynamics enhanced	Presence/absence status of red panda in different districts and PAs assessed	Research reports and papers published	
	Available potential red panda habitat (occupied and non-occupied) identified	Research reports and papers published	
	Distribution and type of bamboo, and their phenology studied	Research reports, papers published and distribution maps	
	National red panda population estimated	Research report, genetic analysis report	
	Six red panda collared	Annual report of DFSC & DNPWC	

Understanding of ecological and behavioral aspects of red panda enhanced	Information on daily movement/activity pattern, home range, habitat use etc. updated	Research reports and papers published	
Central database on red panda established and maintained	Central data sharing portal established	Electronic database portal system established by DNPWC	
	DNA based database on red panda prepared	Electronic database portal system established by DNPWC	
Impact of climate change on red panda distribution and survival assessed	Red panda population and habitat under threat due to climate change impact identified	Paper published	

Actions

- Study red panda occupancy, population status, distribution and habitat suitability
- Conduct regular monitoring of red panda in identified important areas
- Study bamboo diversity, distribution and phenology in red panda habitat
- Study feeding and nutritional ecology
- Study red panda's ecological and behaviour through cutting-edge technology (radio collaring, camera trapping etc.)
- Conduct national red panda population survey based on genetic analysis (or any other appropriate techniques)
- Establish and maintain a central database on red panda information
- Establish a DNA based database for effective anti-poaching intervention
- Study climate change impact on red panda and its habitat
- Establish climate monitoring plots for long-term monitoring

Objective 2: **Curb poaching and illicit trade of red panda**	**Red panda population increased;** **Red panda crime related cases decreased**	**Reports of DFSC, DNPWC, DFOs, red panda survey/ monitoring reports**	**Conservation partners prioritize this issue;** **Proactive participation and willingness of local communities.**
Outputs			
Capacity of local and national level law enforcement agencies enhanced on anti-poaching investigation skills to control wildlife crime	Sources/market of demand, and players involved in red panda illegal trade identified	Research reports	
	Increased no. of government officials (DFSC & DNPWC staff) and security agencies involved in anti-poaching operations	Project reports and annual reports of DFSC, DNPWC and other conservation partners	
	Number of people familiar with existing legal provisions related with red panda crime increased	Project monitoring/evaluation report	
	Number of anti-poaching units/ CFUGs/BZUCs involved in anti-poaching patrolling/ operations increased	Project reports and annual reports of DFSC, DNPWC and other conservation partners	

Cooperation and coordination among enforcement agencies and other stakeholders strengthened.	Collaboration and communication of local CFUGs/BZUC with enforcement agencies improved	Project reports and annual reports of DFSC, DNPWC and other conservation partners	
	Number of sharing/ collaboration meeting organized at local levels increased	Project reports and annual reports of DFSC, DNPWC and other conservation partners	
Cases of red panda poaching and illegal trade reduced.	Number of Red panda killed by dogs and viral diseases, especially Canine Distemper reduced	Project monitoring/evaluation report, and records maintained at DFSC, DNPWC and their field offices	
	red panda poaching and illegal trade cases reduced	Project monitoring/evaluation report, and records maintained at DFSC, DNPWC and their field offices	

Actions

- Research on poaching and illicit trade of red panda
- Conduct awareness campaigns on red panda, anti-poaching and conservation laws
- Capacity building trainings and exposures for frontline staff
- Strengthen the wildlife crime investigation process and enhance the evidence collection system
- Establish and functionalize community based anti-poaching units at local level
- Enhance transboundary cooperation with India and China
- Organize transboundary level meeting with India and China (at local and federal level)
- Strengthen informant networks, information gathering and communication networks for anti-poaching operation
- Equip enforcement agencies with necessary logistics (equipments, field gears etc.)
- Conduct capacity building program for community based organizations
- Enhance local, state and federation level coordination and cooperation
- Control stray dogs in red panda habitats

Objective 3: **Protect and manage the red panda habitat**	**Area of habitat conserved through habitat restoration and corridor development increased**	**Reports of DFSC, DNPWC, and other conservation partners**	**DFSC, DNPWC, conservation partners prioritize red panda conservation;** **Socio-political and geographical situation remains conducive.**
Outputs			
Key hot-spots and potential corridors identified	Map of hotspots and potential corridors produced	Research reports and GIS/ remote sensing based maps	
	Number of priority areas, hot spots and corridors identified and conserved	Project reports and annual reports of DFSC, DNPWC and other conservation partners	
	Management plan for identified priority areas prepared	Management plan	
Habitat contiguity maintained and degraded habitat restored	Area of potential habitat conserved	Project reports and annual reports of DFSC, DNPWC and other conservation partners	
	Area of degraded habitat restored	Project reports and annual reports of DFSC, DNPWC and other conservation partners	
	No. of degraded water sources restored	Project reports and annual reports of DFSC, DNPWC and other conservation partners	

Site-specific drivers of habitat loss and degradation identified and addressed	No. of local families supported for livelihood diversification increased	Project reports and annual reports of DFSC, DNPWC and other conservation partners	
	Consumption of fuelwood, timber, fodder, bamboo shoots and culms reduced	Project monitoring/evaluation report	
	No. of herders adopting improved herding practices increased	Project reports and annual reports of DFSC, DNPWC and other conservation partners	

Actions

- Identify bottle necks, hotspots, priority areas and site-specific conservation threats
- Prepare site-specific management plan for identified priority areas
- Conserve and restore potential habitats and biological corridors
- Bamboo plantation (native and palatable spp.) in identified habitat patches
- Regulate the use and harvesting of bamboo shoots/culms and other dietary/shelter tree species
- Strengthen community-based forest-fire fighting mechanism
- Diversify livelihood practices to reduce forest dependency
- Regulate herding practices - rotational grazing, improved herder's sheds and fuel-efficient cooking stoves
- Promote alternative sources of energy to replace traditional stoves
- Support CFUGs for red panda habitat improvement

Objective 4: **Strengthen and extend community based red panda conservation initiative**	**Number of local families involved in red panda conservation increased;** **No. of local people benefitted from red panda based entrepreneurship/ tourism increased**	**Baseline and end-line reports; Annual reports of DFSC, DNPWC and other conservation partners**	**DFSC, DNPWC, conservation partners prioritize red panda conservation;** **Socio-political and geographical situation remains conducive;** **Proactive participation and willingness of local communities**
Outputs			
Priority areas identified for initiating community-based conservation program	New sites feasible for community based red panda conservation program identified	Feasibility study reports	
Local community groups trained, sensitized and involved in red panda conservation	Community based red panda conservation program implemented in new locations	Project reports and annual reports of DFSC, DNPWC and other conservation partners	
	Local people's knowledge towards red panda conservation issues enhanced	Project monitoring/evaluation report	
	No. of local people trained as citizen scientists increased	Project reports and annual reports of DFSC, DNPWC and other conservation partners	
	Report on red panda signs/sightings increased	Monitoring datasheets and reports	

	Red panda poaching and illegal trade cases reduced	Official records of DFSC, DNPWC and their field offices	
	No. of CFUGs/ BZUGs endorsing red panda conservation provisions increased	Operation Plans of CFUGs/ BZUGs, project reports, annual reports of DFSC, DNPWC and other conservation partners	
Red panda based tourism in place	Red panda based tourism promotion sites increased	Project reports and annual reports of DFSC, DNPWC and other conservation partners	
	No. of families benefitted from tourism promotion increased	Project monitoring/evaluation report	
	No. of tourists visiting for red panda sighting increased	Visitors record maintained in tourism promoted sites	

Actions

- Evaluate effectiveness of ongoing community-based conservation program
- Conduct feasibility study to identify new priority areas in collaboration with state and local level for initiating community-based conservation program
- Develop a site-specific management plan for identified priority areas
- Sensitize and aware local forest users/herders, school children and other stakeholders
- Conduct training for local forest users on governance and entrepreneurship
- Train and mobilize selected community members as citizen scientist on red panda monitoring
- Regulate the use and harvesting of forest resources and grazing and control habitat encroachment
- Develop a red panda based eco-tourism promotion manual.
- Promote red panda based tourism
- Develop and promote bamboo and NTFP based enterprise
- Establish information/resource center in support of CFUGs

Objective 5: **Strengthen cooperation and coordination on red panda conservation at national and International level**	**No. of meetings organized at national/ International, transboundary and state level increase; Budget being spent on red panda research and conservation increased**	**Reports of DFSC, DNPWC, and other conservation partners**	**Conservation partners including government and non-government agencies equally prioritize red panda conservation**
Outputs			
Transboundary cooperation strengthened for red panda conservation	No. of transboundary level meetings increased	Project reports and annual reports of DFSC, DNPWC and other conservation partners	
	Cooperation and funding received from International agencies increased	Annual work plan/budget of DFSC, DNPWC and other conservation partners	
Increased support for red panda conservation at local, state and federation level	No. of meetings organized at federal, state and local level increased	Project reports and annual reports of DFSC, DNPWC and other conservation partners	
	Budget allocated for red panda conservation at federal, state and local level increased	Project monitoring/evaluation report, and records maintained at DFSC, DNPWC and their field offices	
Actions			
■ Organize transboundary meetings at local and national levels ■ Organize sharing meeting at local, state and federation levels ■ Organize an international conference on red panda ■ Initiate and strengthen cooperation among red panda range countries and conservation organizations ■ Organize an exchange visits to learn and share best practices at local and transboundary levels			

Red Panda mother with a cub (Photo: Ramesh Chaudhary)

Annex 2: Estimated budget for five year plan (2019-2023)

SN	Objectives/Activities	Annual Budget (NPR in 000)						%
		Year 1	Year 2	Year 3	Year 4	Year 5	Total	
Objective 1: Enhance understanding and knowledge on conservation status, ecology and habitat dynamics of red panda								
1.1	Study red panda occupancy, population status, distribution and habitat suitability	3,500	2,500	2,500	-	-	8,500	
1.2	Conduct regular monitoring of red panda in identified important areas	3,000	3,000	3,000	3,000	1,000	13,000	
1.3	Study bamboo diversity, distribution and phenology in red panda habitat	2,000	1,000	1,000	-	-	4,000	
1.4	Study feeding and nutritional ecology	1,500	1,000	1,000	-	-	3,500	
1.5	Study red panda's ecological and behavior through cutting-edge technology (radio collaring, camera trapping etc.)	3,500	2,000	500	-	-	6,000	
1.6	Conduct national red panda population survey based on genetic analysis (or any other appropriate techniques)	2,500	2,000	2,000	-	-	6,500	
1.7	Establish and maintain a central database on Red panda information	-	1,500	1,500	500	-	3,500	
1.8	Establish a DNA based database for effective anti-poaching intervention	-	-	2,000	1,500	-	3,500	
1.9	Study climate change impact on Red panda and its habitat	1,500	1,000	-	-	-	2,500	
1.10	Establish climate monitoring plots for long-term monitoring	500	500				1,000	
Sub-total		**18,000**	**14,500**	**13,500**	**5,000**	**1,000**	**52,000**	**17.16**

Objective 2: Curb poaching and illicit trade of red panda								
2.1	Study poaching and illicit trade status of red panda	1,500	500	-	-	-	2,000	
2.2	Conduct awareness campaigns on red panda, anti-poaching and conservation laws.	1,000	1,000	500	500	500	3,500	
2.3	Capacity building trainings and exposures for frontline staff	1,250	1,250	1,250	1,000	500	5,250	
2.4	Strengthen the wildlife crime investigation process and enhance the evidence collection system	1,500	1,500	1,000	1,000	1,000	6,000	
2.5	Establish and functionalize community based anti-poaching units at local level	2,000	2,500	2,500	2,000	1,000	10,000	
2.6	Organize transboundary level meeting with India and China (at local and federal level)	500	750	750	1,000	1,000	4,000	
2.7	Strengthen informant networks, information gathering and communication networks for anti-poaching operation	750	1,000	1,000	1,000	750	4,500	
2.8	Equip enforcement agencies with necessary logistics (equipments, field gears etc.)	500	800	800	800	500	3,400	
2.9	Conduct capacity building program for community based organizations	1,000	1,000	1,000	600	300	3,900	
2.10	Enhance local, state and federation level coordination and cooperation	500	700	700	600	500	3,000	
2.11	Control stray dogs in red panda habitats	500	750	750	600	500	3,100	
Sub-total		**11,000**	**11,750**	**10,250**	**9,100**	**6,550**	**48,650**	**16.05**

Objective 3: Protect and manage the red panda habitat								
3.1	Identify bottle necks, hotspots, priority areas and site-specific conservation threats	1,200		-	-	-	1,200	
3.2	Prepare site-specific management plan for identified priority areas	1,000	750	750	-	-	2,500	
3.3	Conserve and restore potential habitats and biological corridors	1,000	3,000	2,000	3,000	500	9,500	
3.4	Bamboo plantation (native and palatable spp.) in identified habitat patches	750	1,000	1,000	1,500	500	4,750	
3.5	Regulate the use and harvesting of bamboo shoots/culms and other dietary/ shelter tree species	200	200	300	300	150	1,150	
3.6	Strengthen community based forest-fire fighting mechanism	1,500	1,000	1,000	1,500	1,000	6,000	
3.7	Diversify livelihood practices to reduce forest dependency	1,500	1,500	1,500	1,000	750	6,250	
3.8	Regulate herding practices: rotational grazing, improved herder's sheds and fuel efficient cooking stoves	4,000	4,000	3,000	2,000	1,000	14,000	
3.9	Promote alternative sources of energy to replace traditional stoves	1,000	3,000	3,000	2,500	-	9,500	
3.10	Support CFUGs for red panda habitat improvement	2,000	3,000	3,000	3,000	3,000	14,500	
Sub-total		**14,150**	**17,450**	**15,550**	**14,800**	**7,400**	**69,350**	**22.88**

Objective 4: Strengthen and extend community based red panda conservation initiative								
4.1	Evaluate effectiveness of ongoing community based conservation program	750	-	-	-	-	750	
4.2	Conduct feasibility study to identify new priority areas in collaboration with state and local level for initiating community based conservation program	750	750	-	-	-	1,500	
4.3	Sensitize and aware local forest users/herders, school children and other stakeholders	2,500	1,000	1,000	1,000	750	6,250	
4.4	Conduct training for local forest users on governance and entrepreneurship	500	1,000	1,000	1,000		3,500	
4.5	Train and mobilize selected community members as citizen scientist on red panda monitoring	1,250	1,500	1,500	1,500	750	6,500	
4.6	Regulate the use and harvesting of forest resources and grazing and control habitat encroachment	1,000	1,250	1,250	1,000	500	5,000	
4.7	Develop a red panda based eco-tourism promotion manual.	400	350	-	-	-	750	
4.8	Promote red panda based tourism	3,500	12,000	10,000	12,000	10,000	47,500	
4.9	Develop and promote bamboo and NTFP based enterprises	1,000	2,000				3,000	
4.10	Establish information/resource center in support of CFUGs	12,000	15,000	5,000			32,000	
Sub-total		**23,650**	**34,850**	**19,750**	**16,500**	**12,000**	**106,750**	**35.23**

Objective 5: Strengthen cooperation and coordination on red panda conservation at national and International level								
5.1	Organize transboundary meetings at local and national levels	500	500	500	500	500	2,500	
5.2	Organize sharing meeting at local, state and federation levels	1,000	1,000	1,000	800	700	4,500	
5.3	Organize an international conference on red panda		6,000	-	-	-	6,000	
5.4	Initiate and strengthen cooperation among red panda range countries and conservation organizations	1,000	1,500	1,500	1,500	1,000	6,500	
5.5	Organize exchange visits to learn and share best practices at local and transboundary levels	1,000	1,250	1,250	1,250	800	5,550	
Sub-total		**3,500**	**10,250**	**4,250**	**4,050**	**3,000**	**25,050**	**8.27**
Monitoring and evaluation of Action Plan (2019-2023)								
	Mid-term review			500			500	
	Final review					750	750	
Sub-total		**-**	**-**	**500**	**-**	**750**	**1,250**	**0.41**
Total estimated budget for 5 year plan (2019-2023)		**70,300**	**88,800**	**63,800**	**49,450**	**30,700**	**303,050**	

The Red Panda Conservation Action Plan for Nepal (2019-2023) has been prepared in collaboration with Red Panda Network, NTNC, WWF Nepal and ZSL Nepal

RED PANDA NETWORK

NTNC

WWF

ZSL LET'S WORK FOR WILDLIFE

Department of Forests and Soil Conservation
Babarmahal, Kathmandu
Tel : 00977-1-4220303, 422123, 4216379
Fax : 977-1-4227374
Email : info@dof.gov.np
www.dof.gov.np

Department of National Parks and Wildlife Conservation
Babarmahal, Kathmandu, Nepal
Tel 00977-1-4227926, 4220850, 4220912
Fax: 00977-1-4227675
Email: info@dnpwc.gov.np
www.dnpwc.gov.np