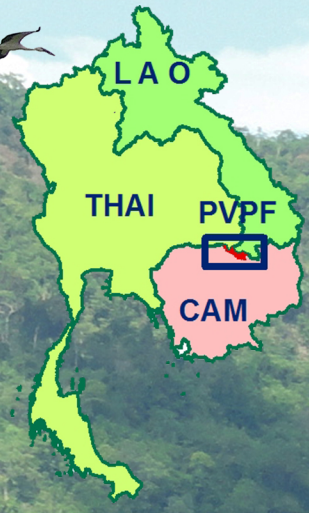
MANAGEMENT PLAN 2016-2020

PREAH VIHEAR PROTECTED FOREST FOR PLANT AND WILDLIFE GENETIC RESOURCES CONSERVATION



FORESTRY ADMINISTRATION

MARCH 2016

THE MANAGEMENT PLAN OF THE PREAH VIHEAR PROTECTED FOREST FOR PLANT AND WILDLIFE GENETIC RESOURCES CONSERVATION

Forestry Administration (FA)
#40, Preah Norodom Blvd.
Phnom Penh, Cambodia
Tel: (855-23) 214 651
Fax: (855-23) 212 201
Website: http://www.forestry.gov.kh/

International Tropical Timber Organization (ITTO)
International Organization Center, 5th Floor
Pacifico-Yokohama, 1-1-1, Ninato-Mirai, Nishi-Ku
Yokohama, 220-1012, Japan
Tel: (81-45) 223-1110
Fax: (81-45) 223-1111
Web Page: http://www.itto.int

Financial support: Forestry Administration, Government of Japan through the International Tropical Timber Organization

Recommended citation: Forestry Administration (FA), 2016. *The Management Plan of the Preah Vihear Protected Forest for Plant and Wildlife Genetic Resources Conservation 2016-2020*. Phnom Penh, Cambodia

Photos, data and maps credits: FA, ITTO, CAT, CWRP, WCS

Preface

The purpose of preparing this revised and updated management plan for the Preah Vihear Protected Forest was to strengthen the technical underpinnings of conservation and sustainable natural resource use that will improve local community livelihoods and contribute to economic growth. This management plan, which has been developed under the theme of 'Forests for People and Sustainable Development,' is people-centred, socially oriented, and directed to maintaining and enhancing the economic viability and ecological integrity of the ecosystems of the Preah Vihear Protected Forest.

The Preah Vihear Protected Forest management plan is organized around six interrelated sets of program activities that encompass (1) Natural Resource Conservation and Management; (2) Recreation and Nature-based Tourism Management; (3) Integrated Community Livelihood Development and Engagement; (4) Trans-boundary Protected Forests and Protected Areas Collaborative Management; (5) Institutional and Human Resource Development; and (6) Research and Monitoring. Its revision and updating was developed through a participatory process that integrated the results of consultations with local communities living in and around the Preah Vihear Protected Forest for Plant and Wildlife Genetic Resources with the contributions of various technical specialists from different departments and offices in the Forestry Administration.

The planning horizon of this management plan is from 2016 through 2020, at which time a succeeding five-year management plan will be prepared on the basis of strengthened and expanded research results and the lessons learned during the previous periods of active management of the Preah Vihear Protected Forest for Plant and Wildlife Genetic Resources.

The Forestry Administration expresses its sincere appreciation for the financial and specialized technical support for preparing this management plan that was provided through International Tropical Timber Organization ITTO project PD 577/10 Rev.1 (F) on "Management of the Emerald Triangle Protected Forests Complex to Promote Cooperation for Trans-boundary Biodiversity Conservation between Thailand, Cambodia and Laos (Phase III)" – Cambodia Project Component.

The long-term collaborative efforts of the Forestry Administration of the Kingdom of Cambodia and the International Tropical Timber Organization have supported the activities of on-site research, promoted sound management of forest resources, strengthened technical capacities, and expanded the sharing of scientific and technical information and publications.

It is of considerable importance in the implementation of this management plan to recognize that there must be active commitment from, and participation of, local and national stakeholders, as well as the continued cooperation and support of our international development partners.

DR. CHHENG KIMSUN
Delegate of the Royal Government in charge as
Head of the Forestry Administration

Contents

Preface ----ii
Contents ----iii
Acknowledgements ---- vii
Project Team and Contributors ---- viii
Abbreviations ----ix
Introduction and Objectives----xi

Chapter 1
General Conditions

1.1 Location ----1
1.1.1 Geography----1
1.1.2 Administrative Location----1
1.2 Soil types in the PVPF ----1
1.3 Topography and geology----2
1.4 Climate----3
1.4.1 Rainfall ----3
1.4.2 Temperature----3
1.4.3 Humidity----3
1.5 Forest Gene Ecological Zonation ----3
1.6 Forest Type and Wildlife----3
1.6.1 Forest Type ----3
1.6.2 Vegetation and flora ----6
1.6.3 Wildlife ----6
1.7 Road network and river system---- 11
1.8 Strategic resources ---- 11

Chapter 2
Social and Environmental Status

2.1 Social status ---- 14
2.1.1 Population ---- 14
2.1.2 Education and training---- 15
2.1.3 Land use and Management---- 16
2.1.4 Occupation and income---- 17
2.1.5 Health ---- 19
2.1.6 Religion and beliefs ---- 19
2.2 Environmental status---- 20
2.2.1 Water resource ---- 20
2.2.2 Land cover---- 20
2.2.3 Agriculture ---- 21
2.2.4 Handicraft and industry ---- 23
2.2.5 Social and Environmental Issues ---- 23

Chapter 3
ZONING AND CLASSIFICATION OF PERMANENT FOREST ESTATE

3.1 Zoning Objectives ---- 31
3.2 Protected Forests ---- 32

3.2.1 Communities uses, cultural heritage and religious forests ---------- 34
3.2.2 Nature-based Tourism Site ---------- 34
3.2.3 Reserved Forests for Special Ecosystems ---------- 35
3.2.4 Watershed Protection Site ---------- 35
3.2.5 Forest Restoration Site---------- 36

Chapter 4
Management Strategies

4.1 Management Strategies---------- 37
4.2 Management Programmes---------- 37
4.2.1 Natural Resource Conservation and Management---------- 37
4.2.1.1 Reduce incidences of illegal forest- and wildlife-related crimes---------- 37
4.2.1.2 Strengthen conservation and sustainable forest resources and wildlife management 38
4.2.1.3 Maintain the ecological integrity of forests in and around the PVPF and improve the quality of wildlife habitats ---------- 38
4.2.2 Recreation and Nature-based Tourism Management Program ---------- 38
4.2.2.1 Promote the effective management of nature-based tourism resources and activities 38
4.2.2.2 Expand nature-based tourism markets ---------- 39
4.2.2.3 Strengthen interpretative programs and services ---------- 39
4.2.3 Integrated Community Livelihood Development and Engagement Program ---------- 39
4.2.3.1 Reduce Dependency on Natural Resources ---------- 39
4.2.3.2 Enhance Local Community Participation in Management---------- 40
4.2.3.3 Awareness Raising ---------- 40
4.2.4 Trans-boundary Protected Forests and Protected Areas Collaborative Management Program---------- 40
4.2.4.1 Strengthen trans-boundary collaborative management ---------- 40
4.2.4.2 Expand cross-border exchanges in support of environmental and natural resources conservation ---------- 41
4.2.5 Institutional and Human Resources Development Program---------- 41
4.2.5.1 Strengthen Institutions---------- 41
4.2.5.2 Develop Human Resources ---------- 41
4.2.5.3 Increase Internal Cooperation---------- 41
4.2.6 Research and Monitoring Program ---------- 42
4.2.6.1 Evaluate Management Applications of Research Results---------- 42
4.2.6.2 Expand Research on Selected Landmark Wildlife Species and Plant Communities -- 42
4.2.6.3 Broaden Research on Land and Natural Resources of the PVPF ---------- 42
4.2.6.4 Increase Understanding of Local Communities ---------- 42

Chapter 5
ACTION PLAN AND BUDGET ALLOCATION

Management activities for targets proposed 2016–2020---------- 43

Chapter 6
Conclusions

Conclusions ---------- 54

Bibliography & References ---------- 55
Glossary ---------- 58

Appendices

Appendix 1.1: Monthly Rainfall From 2002-2015 ---- 65
Appendix 1.2: Monthly Temperatures From 1994-2012 ---- 66
Appendix 1.3a: Key Forest Trees Species of PVPF ---- 68
Appendix 1.3b: List of Timber and Non-Timber Species in the PVPF ---- 74
Appendix 1.4a: Key mammal species in the PVPF ---- 86
Appendix 1.4b: List of Mammals in the PVPF ---- 93
Appendix 1.5a: Key Bird species in the PVPF ---- 96
Appendix 1.5b: List of Birds in the PVPF ---- 100
Appendix 1.6a: Key reptile species in the PVPF ---- 109
Appendix 1.6b: List of Reptile in the PVPF ---- 111
Appendix 2.1: Socio-economic data for Choam Ksant and Chheb districts within and around the PVPF ---- 113
Appendix 3.1: Conceptualized Management Zones ---- 115

Tables

Table 1.1 Forest Cover Change in the PVPF from 2002 to 2014 ---- 5
Table 1.2 Numbers of wildlife species classified by taxa reported country-wide and in the PVPF 2010-2014 ---- 7
Table 2.1 Population of districts and communes in and around the PVPF in 2013 ---- 14
Table 2.2 Classrooms by districts in and around the PVPF ---- 16
Table 2.3 Pagodas in two districts around the PVPF ---- 20
Table 2.4 Land cover in PVPF 2009-2014 ---- 20
Table 3.1 Proposed PVPF Zones and Compartment Numbers ---- 32
Table 5.1 Natural Resource Conservation and Management Programme ---- 43
Table 5.2 Recreation and Nature-based Tourism Management Program ---- 45
Table 5.3 Integrated Community Livelihood Development and Engagement Program ---- 47
Table 5.4 Trans-boundary Protected Forests and Protected Areas Collaborative Management Program ---- 48
Table 5.5 Institutional and Human Resources Development Program ---- 50
Table 5.6 Research and Monitoring Program ---- 51

Maps

Map 1.1 : Administrative Location of the PVPF ---- 1
Map 1.2 : Soil types in PVPF ---- 2
Map 1.3 : Watershed and Slope ---- 2
Map 1.4 : 2014 Forest Cover of the PVPF ---- 4
Map 1.5 : Forest Cover Change of the PVPForest 2002-2014 ---- 4
Map 1.6 : Road access system of the Preah Vihear Protected Forest ---- 11
Map 2.1 : Population living below the poverty line in the PVPF ---- 18
Map 2.2 : Land cover of the PVPF ---- 21
Map 3.1 : Proposed Zones and Compartments of the PVPF ---- 33
Map 1.5.1 : Pileated Gibbon of PVPF ---- 87
Map 1.5.2 : Dhole of PVPF ---- 88
Map 1.5.3 : Leopard of PVPF ---- 89
Map 1.5.4 : Asian Elephant of PVPF ---- 90
Map 1.5.5 : Eld's Deer of PVPF ---- 91
Map 1.5.6 : Red Muntjac of PVPF ---- 91
Map 1.5.7 : Banteng of PVPF ---- 92

Map 1.5.8 : Gaur of PVPF ---------- 92
Map 1.6.1 : Green Peafowl of PVPF ---------- 96
Map 1.6.2 : White-winged Duck of PVPF ---------- 97
Map 1.6.3 : Sarus Crane of PVPF ---------- 97
Map 1.6.4 : Giant Ibis of PVPF ---------- 98
Map 1.6.5 : Lesser Adjutant of PVPF ---------- 99
Map 1.6.6 : Greater Adjutant of PVPF ---------- 99

Figure

Figure 2.1 : Sources of income in the PVPF ---------- 18
Figure 2.2 : Social and environmental issues in the PVPF ---------- 23
Figure 3.1 : The Zoning Process ---------- 31

ACKNOWLEDGEMENTS

The Cambodia Project Team expresses its appreciation to everyone involved in facilitating the preparation of this revised and updated *Preah Vihear Protected Forest Management Plan 2016 - 2020*. It would not have been possible without the support and encouragement of the Forestry Administration in Phnom Penh, especially H.E. Dr. Chheng Kimsun, Delegate of Royal Government in charge as Head of the Forestry Administration, H.E. Ung Sam Ath – Deputy Director of the Forestry Administration and Dr. Keo Omaliss, Director of the Department of Wildlife and Biodiversity.

We would like to express our gratitude, as well, to the Governor of Preah Vihear province, its provincial military and police commanders, and other relevant authorities for their assistance and cooperation, and to local communities for their cooperative and collaborative participation in management programs undertaken in the Preah Vihear Protected Forest.

The production of this management plan was funded through the ITTO PD 577/10 Rev.1 (F) project on "Management of the Emerald Triangle Protected Forests Complex to Prromote Cooperation for Trans-boundary Biodiversity Conservation between Thailand, Cambodia and Laos (Phase III)" - Cambodia Component and we acknowledge our appreciation of the financial support received from the Government and the people of Japan, as well as the support and encouragement that has been provided by Mr. Takeshi Goto, Assistant Director, Division of Forest Management and Dr. Hwan Ok Ma, Projects Manager of ITTO.

Our sincere thanks also go to Mr. Hiroshi Nakata-Technical Advisor to Director General of Forestry Administration and his staff, Ms. Naomi Matsue, Project Administrative Coordinator of JICA funded CAM-REDD Project and Ms. Ches Sopheap, Office Manager. Their support and providing advice and assistance during the course of project phase III implementation is greatly appreciated.

We have benefited from the active participation in the preparation of this management plan of Forestry Administration Officers of the Preah Vihear Forestry Administration Cantonment, Chheb, and Choam Ksant Forestry Administration Division, and Forestry Administration Triage, especially Mr. Khim Pann, Mr. Ith Phoumara, Mr. Mak Panha, and Mr. Tan Setha, as well as from the comments and other inputs into the formulation of this management plan provided by Mr. Alistair Mould, Technical Advisor of the Wildlife Conservation Society Northern Plains Project.

The Forestry Administration recognizes the collective contributions of the ITTO PD 577/10 Rev.1 (F) Project Team in leading the preparation of this revised and updated management plan for the Preah Vihear Protected Forest, especially, Mr. Chheang Dany, Dr. J. Dennis Cengel, Mr. Nhan Buthan, Ms. Lim Sopheap, Mr. Kim Sobon, Mr. Pang Phanit, Mr. Pheng Sopheak, Mr. Say Sinly, Mr. Yi Narom, Mr. Yu Kimleng, and Mr. Sem Sinoun.

Finally, we would like to express our appreciation to each of the specialists who contributed their time and expertise to advise, review and comment on previous versions of this revised and updated Preah Vihear Protected Forest Management Plan.

Project Team and Contributors to the Management Plan of the Preah Vihear Protected Forest for Plant and Wildlife Genetic Resources Conservation 2016 – 2020

Forestry Administration Project Team

Department of Wildlife and Biodiversity

H.E. Dr. Chheng Kimsun	Director General, Forestry Administration, Project Director
Mr. Chheang Dany	Project Manager (PM)
Dr. Dennis J. Cengel	Technical Advisor (TA)
Mr. Kim Sobon	Forest Land-Use Planning Specialist and Field Manager
Mr. Nhan Bunthan	GIS Specialist
Ms. Lim Sopheap	Project Accountant and Administration
Mr. Pang Phanith	Forest and Biodiversity Conservation Officer
Mr. Ith Phoumara	Specialist for Establishing Plant Nursery
Mr. Pheng Sophak	Community Livelihood Development Officer
Mr. Say Sinly	Project Field Assistant for Forest Land-Use Planning
Mr. Sem Sinoun	Project Field Assistant for Community Livelihood Development
Mr. Yi Narom	Project Field Assistant for Community Livelihood Development
Mr. Yu Kimleng	Project Field Assistant for Forest and Biodiversity

ABBREVIATIONS

a.s.l.	above sea level
ADB	Asian Development Bank
CAT	Cat Action Treasury
CBeT	Community Benefit Through Tourism
CFA	Contonment Forestry Administration
CITES	Convention on International Trade in Endangered Species
CTSP	Cambodia Tree Seed Project
CWRP	Community Wildlife Ranger Program
DWB	Department of Wildlife and Biodiversity (Forestry Administration)
EM	Enzyme (chemical fertilizer)
FA	Forestry Administration
GDP	Gross Domestic Product
GIS	Geographic Information System
GPS	Global Positioning System
GTZ	German Technical Cooperation
IUCN	The World Conservation Union
MAFF	Ministry of Agriculture, Forestry and Fisheries
MOC	Ministry of Culture
MOE	Ministry of Environment
MOT	Ministry of Tourism
NGOs	Non Governmental Organizations
NP	National Park
NPRS	National Poverty Reduction Strategy
NTFP	Non Timber Forest Products
pH	potential Hydrogen
RCG	Royal Government of Cambodia
RIs	Research Institutes
SSC	Species Survival Commission
UTM	Universal Transverse Mercator
WSC_1	1^{st} Watershed Classification
WB	World Bank
WCS	Wildlife Conservation Society
WPO	Wildlife Protection Office
WS	Wildlife Sanctuary
X	Axis
Y	Ordinate

Zoning categories

CUCR	Communities' uses, cultural heritage and religious forest
NbT	Nature-based Tourism
RFSE	Reserve Forests for special ecosystems
WP	Watershed Protection
FR	Forest Restoration Site
PVPF	Preah Vihear Protected Forest

MAP NOTES & ORTHOGRAPHY

- **Boundaries -** International boundaries should not be considered authoritative.
- **Generalization -** All maps in this management plan have a high degree of generalization due to the small scale of the data sources.
- **Detail -** Greater map detail at the local level should refer to information at larger scale maps or field checks.
- **Orthography -** Province, district, commune & village, and topography place names generally follow the spelling on the *USAMSFE 1:100,000 maps of Cambodia compiled from the best available source materials on 1970, 1972 & 1973.*

These maps and the USAMSFE 1960's 1:50,000 series are still the best and most widely used for field work. Numerous other maps and documents consulted during preparation of the PVPF Management Plan contain up to nine different spellings of the same single important place names, due to phonetic translation from the original Khmer by different organizations at different points in time.

The original consistent place names on the USAMFSE maps have priceless historical value, since many villages were abandoned during the war years. Field researchers using these maps can determine the original location of villages and original local names for topographic features. This information can be used to determine to what extent post-war villages have changed location, and where new settlements have been established

It is recommended that all future spellings in documents and maps regarding the Preah Vihear Protected Forest use the conventions listed on the following page in order to avoid confusion and provide consistency over the long term among the various documents prepared by different individuals and organizations.

An Seh	Important Cambodia – Thailand local border crossing in the northwest section of the Preah Vihear Protected Forest, scheduled for upgrading to an official international border crossing and construction of a paved road.
Chendar	Chendar Plywood Company & Logging Concession adjacent to the PVPF
Chheb	District & District Town
Choam Ksant	District & District Town
Chunh	Traditional Community
Dang Phlet	Traditional Community
Dangrek	Mountain range along the Cambodia-Thailand border
Kakhoeuk	Abandoned village, now a PVPF Ranger Station Kampong Sralao Community
Kantout	Community
Malis	Traditional Community (Formally called Cha-eh)
Molu Prey	Traditional Community
Mombei	Tri-border area of Cambodia-Lao PDR-Thailand
O Chheuteal	Ranger Station O = seasonal stream in Khmer
O Chunh	Preah Vihear Forest and Wildlife Research Station
O Krasang	Intermittent stream
Robonh	Traditional Community
Sen Rung Reung	Newly-established Community
Sen Dek Chas	Newly-established Community
Decho Morokot	Newly-established Community
Thbeng Meanchey	Preah Vihear Province capital
Teuk Kraham	Community
Tonle Lapov	Important river along the Cambodia-Laos border Tonle = stream or river in Khmer
Trapeang Pring	Preah Vihear Protected Forest Headquarters Trapeang = seasonal pond in Khmer
Veal Krous	Ranger Station Veal = large open grassy area within the forest

INTRODUCTION

The Preah Vihear Protected Forest (PVPF) of Cambodia is a part of the Indo-Burma Biodiversity Hotspot, one of the 35 Global Hotspots on our planet. This area is home to 57 mammal species existing in Cambodia and home to about 255 species of birds, 58 species of reptiles and numerous species of amphibians. The PVPF is part of the Indochinese Dry Forest.

Abundance of flora in the planning area is closely related to constant high humidity (74%), abundant rainfall (the average days of rain per year is 97 days a year, with average rainfall 1,301-2,035 mm a year), warm temperatures (33^{o}C, average maximum temperature), geological formations and the composition of the soils.

Because of its diversity of vegetation environments, the PVPF is home to a mosaic of ecosystems and supports a large number of wildlife species. The Asian Development Bank has classified this area as a part of the nine High Priority Biodiversity Conservation Corridors in the Greater Mekong Sub-region.

Understanding the high value of the countries forest resources, the Royal Government of Cambodia (RGC) took the following actions:

- By early 1999, 12 logging concession agreements had been cancelled, illegal logging reduced, equipment and illegally harvested logs and wildlife seized, hundreds of sawmills closed, and policy and legal initiatives introduced.
- December 2001, MAFF issued a declaration (Prakas) on the Postponement of Logging in Coupes of All Forest Concessions.
- On July 30th, 2002, The RGC issued *Sub-decree 76* to establish the ***Preah Vihear Protected Forest for Plant and Wildlife Genetic Resources Conservation***.

These efforts are evidence of the commitment of the Royal Government of Cambodia to conserve biodiversity, protect forest cover and comply with international agreements associated with the Government's forestry sector reform program. The specific measures undertaken by the Royal Government of Cambodia have been fully supported by the international community.

Several sectors of the Cambodian economy, including agriculture, forestry, fisheries, tourism, energy, industry, infrastructure development and the strengthening of local livelihoods depend on the maintenance of healthy natural ecosystems. The loss of forests, forest resources, and biodiversity in the region, however, has been continuing at an alarming rate at the same time that comparable demands for forest natural resources for national economic development have been increasing.

These developments have provided a strong impetus for the preparation of the ***Preah Vihear Protected Forest Management Plan 2016 – 2020.*** Its preparation is intended to provide a road map of interrelated strategies and management activities designed to ensure the sustainable development of the natural resources in the area.

The revised and updated PVPF Management Plan is for a period of five years, from 2016 to 2020. The plan, which provides a general framework for conservation and sustainable development objectives, includes five main sets of program activities:

- Natural Resource Conservation and Management;
- Recreation and Nature-based Tourism Management;
- Integrated Community Livelihood Development and Engagement;

- Trans-boundary Protected Forests and Protected Areas Collaborative Management;
- Institutional and Human Resource Development; and
- Research and Monitoring.

The PVPF Management Plan is designed to be a flexible document that can be readily modified to respond to changes and variations in socio-economic and environmental conditions consistent with the policies of the Royal Government of Cambodia. The plan describes the overall objectives, zoning classifications, and main program activities for conserving the resources and maintaining the biodiversity of the Preah Vihear Protected Forest.

Objectives

The Royal Government of Cambodia's Forest Policy Statement specifies the following objectives of Protected Forests:

- Conserve the forest resources and promote sustainable management initiatives in order to maximize contributions to the socio-economic development of the region.
- Promote the participation of the private sector and local communities in the development and implementation of management plans.
- Ensure wide-ranging coordination with all relevant institutions and multi-stakeholders to reduce conflicts and enhance cooperation.
- Continue reforestation and rehabilitation efforts to enhance forest productivity.

Article 1 of the Royal Government of Cambodia Sub-Decree No. 76 in 2002 stipulates that the PVPF in particular should be established with the following objectives:

- Protect and conserve all species of plants and wildlife, especially threatened and endangered species.
- Maintain a balanced ecological system for wildlife to live and to breed.
- Conduct scientific and technical research on the genetic resources and wildlife.
- Protect and maintain water sources.
- Promote education, awareness, and community development.
- Promote and develop ecotourism.
- Preserve cultural heritage and historical sites.

Chapter 1

GENERAL CONDITIONS

1.1 Location

1.1.1 Geography

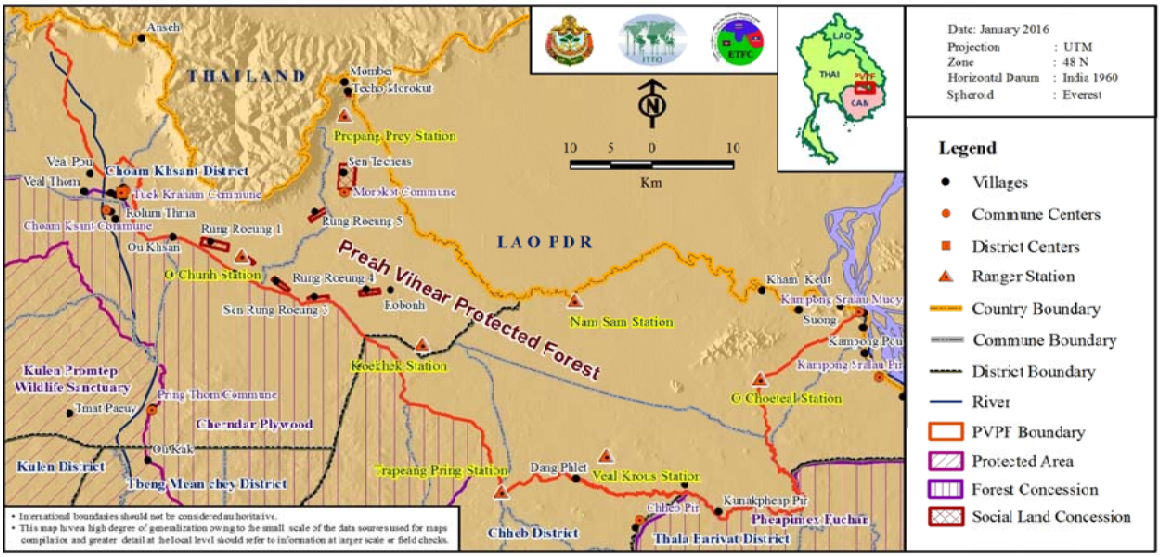
The Preah Vihear Protected Forest (PVPF) is located between 13º51'19" and 14º25'01" of latitude north, 104º51'42" and 105º47'04" of longitude east. It is 300 kilometres from the Phnom Penh capital city of Cambodia and about 64 kilometres from Thbeng Meanchey, the Preah Vihear provincial capital.

1.1.2 Administrative Location

The PVPF cuts across two districts - Chhep and Choam Ksan - in Preah Vihear province (see Map 1.1) and shares its boundary with:

- Thailand and Lao PDR to the North.
- Kampong Sralou Muoy and Chhep Pir communes of Chhep district to the East.
- Chendar Plywood Forest Concession area to the South.
- Choam Ksant and Teuk Kraham commune, Choam Ksant district to the West.

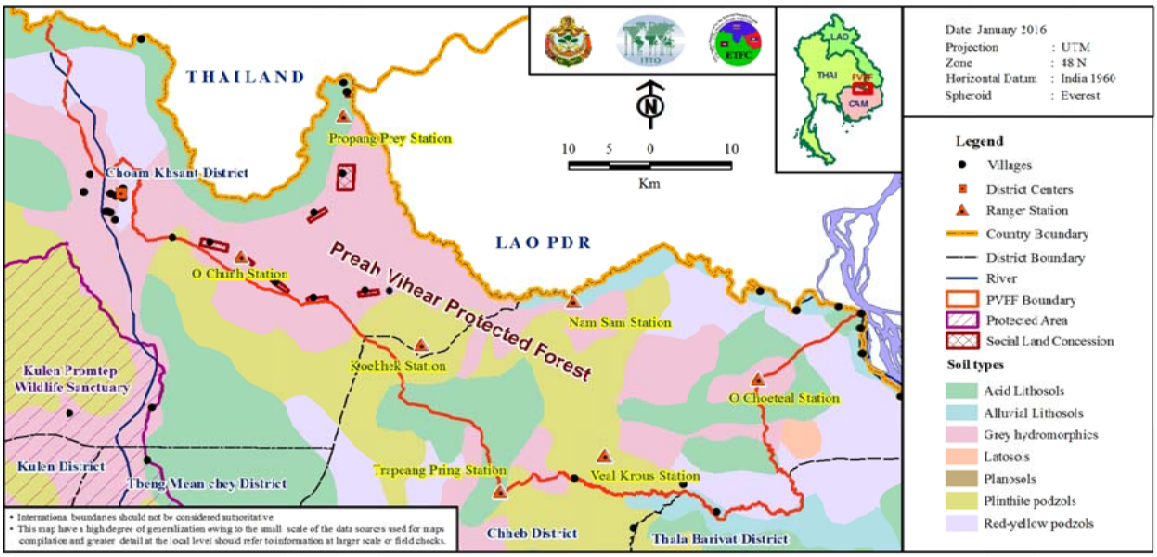
Map 1.1. Administrative location of the PVPF.



1.2 Soil Types in the PVPF

Soil is an important factor affecting the growth of plants. The soils of the PVPF developed under a humid to sub-humid tropical climate with alternate wet-dry conditions from the decomposition of acid or basic rocks and alluvial outwash from either or both of these rock types. Soil types in the PVPF include Acid Lithosols (44,494 ha), Alluvial Lithosols (7,029 ha), Grey Hydromorphics (73,756 ha), Phinthite Podzols (38,488 ha) and Red-yellow Podzols (26,260 ha). Soils in the planning area are fertile in Choam Ksant district for rainfed rice production, but are less fertile in Chheb district.

Map 1.2. Soil types in the PVPF.

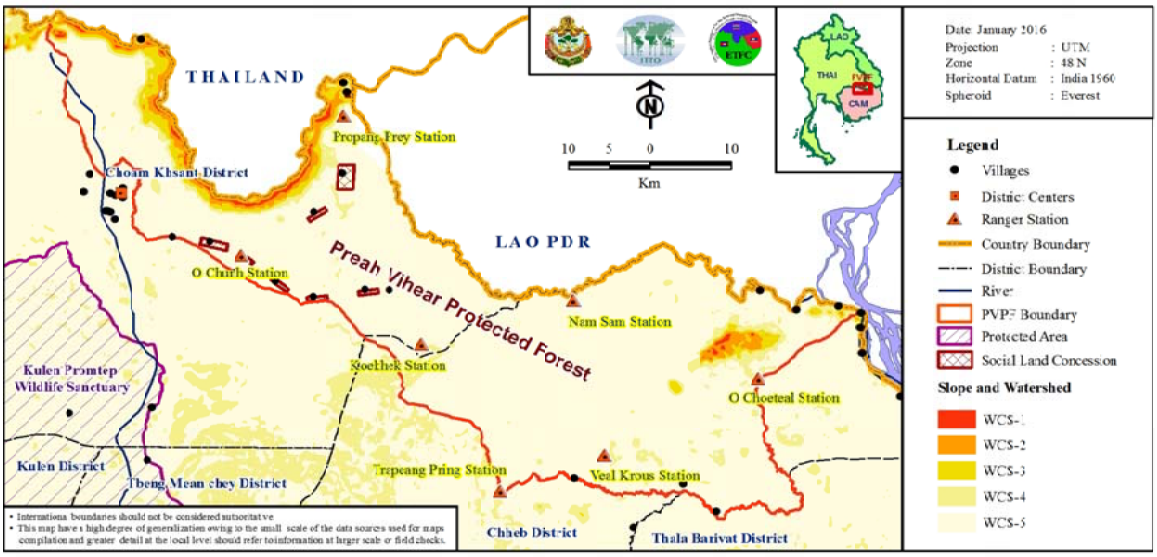


1.3 Topography & Geology

The PVPF is primarily a lowland area, although its northern part is composed of the steep mountains of the Dangrek Mountain Range along the border of Thailand through the triangle area at the northwest of the planning area. The Dangrek Mountain Range consists of the steep edge of the Korat plateau that extends over much of northeastern Thailand.

The area has a gradual, decreasing slope from the north to the southeast. The highest altitude in the PVPF is 766 m. above sea level (a.s.l.) in the triangle area of the Dangrek Mountain Range bordering Thailand; the lowest altitude is 66 m. a.s.l. in Choam Ksant district. Hill features are primarily sandstone Phnoms, which are a characteristic of the landscape in this part of Cambodia, but some higher ground has outcrops of unclassified rock. The relatively high ground of the plateau (not including phnoms) appears free draining with sandy soils, while other areas have red soils and evidence of laterite deposits. During the wet season, the comparatively higher ground, perhaps only 30 m higher than other areas, contrasts with the inundated grasslands of the lower areas. The veals and features influenced by man, such as trapeangs, together with open deciduous dipterocarp forest, provide near ideal conditions for both large water birds and ungulate species.

Map 1.3. Watershed and slope



1.4 Climate

Preah Vihear province borders Siem Reap, Stung Treng and Kompong Thom provinces and the climate in the PVPF is similar to that of those provinces, which is characterized by a tropical monsoon dry zone climate.

1.4.1 Rainfall

Precipitation is very dependent on the monsoon. During the six-month-monsoon season from April to October, it rains almost everywhere. Data from the meteorological station in Preah Vihear Province (Kulen Meteology, Siem Reap province from 1998-2015, Appendix 1.1) indicate that:

- The average annual rainfall is 1,594 mm.
- The maximum annual rainfall is 2,035 mm.
- The minimum annual rainfall is 1,301 mm.
- The average days of rain per year is 97 days.

1.4.2 Temperature

Data from the meteorological station in Preah Vihear Province (Kulen Meteology, Siem Reap province from 1998-2012, Appendix 1.2) indicate that:

- The average annual temperature is 32.94ºC.
- The average annual maximum temperature is 35.24ºC.
- The average annual minimum temperature is 25.99ºC.

1.4.3 Humidity

The humidity depends on rainfall. Data provided by the meteorological station in Preah Vihear Province indicate that:

- The average humidity per year is 73.55%.
- The annual average maximum humidity is 99.35%.
- The annual average minimum humidity is 54.50%.

1.5 Forest Gene Ecological Zonation

The Preah Vihear Protected Forest is located within Ecological Zone Type A Central Lowlands. Most of the PVPF is composed of dry deciduous forest, which is influenced by the Dangrek Mountain Range, with an altitude ranging from 66 m. to 766 m. a.s.l. It is as the result of several factors that are similar in the region, including ecological zone, climate, topography and geology, and soil type, that seeds may be brought from nearby provinces, such as Kampong Thom, Siem Reap, Oddar Meanchey, Stung Treng and Ratanakiri, as well as from other areas of the dry forest components of the Indo-Burma Ecoregion.

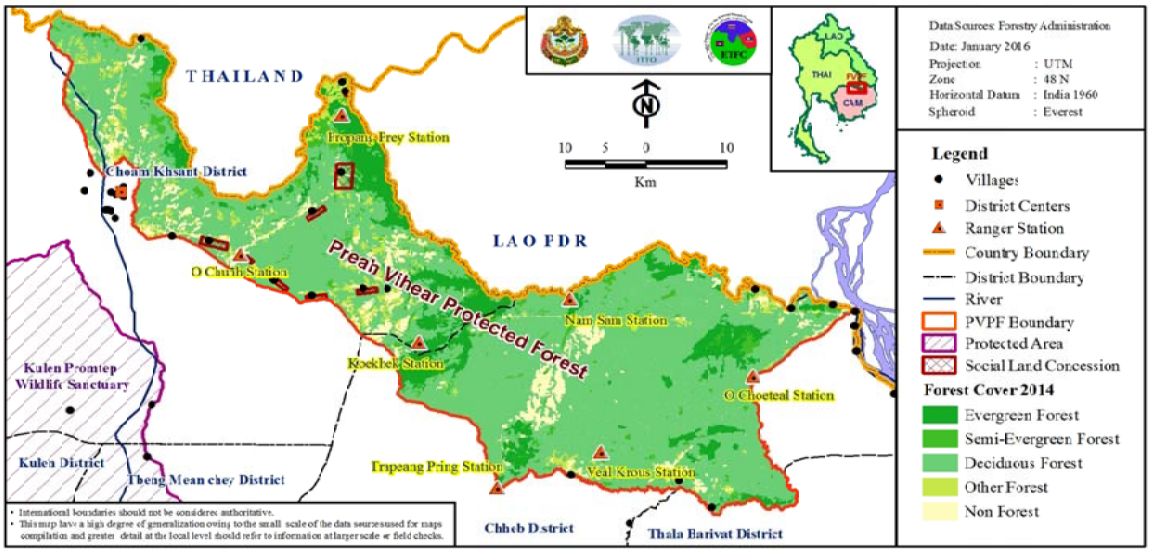
1.6 Forest Types and Wildlife

1.6.1 Forest Types

The Preah Vihear Protected Forest has a land surface area of 190,027 hectares. Its forest types include evergreen, semi-evergreen, deciduous, wood & shrubland evergreen, wood & shrubland dry, and other forestland. The dry deciduous forest, which is the dominant forest type, accounts for more than 59% of the land surface of the PVPF (Forest Cover 2014). The forest cover has

declined to some extent between 2002 and 2014, particularly between 2010 and 2014, but still accounts for 91.11% of the land surface area of the PVPF (see Table 1.1). The changes in forest cover during that period, which suggest the conversion of some evergreen and semi-evergreen forest to deciduous forest, as well as the conversion of forestland to non-forestland, are illustrated in Maps 1.4 and 1.5.

Map 1.4. 2014 Forest Cover of the Preah Vihear Protected Forest.



Map 1.5. Forest Cover Change of the Preah Vihear Protected Forest between 2002 and 2014.

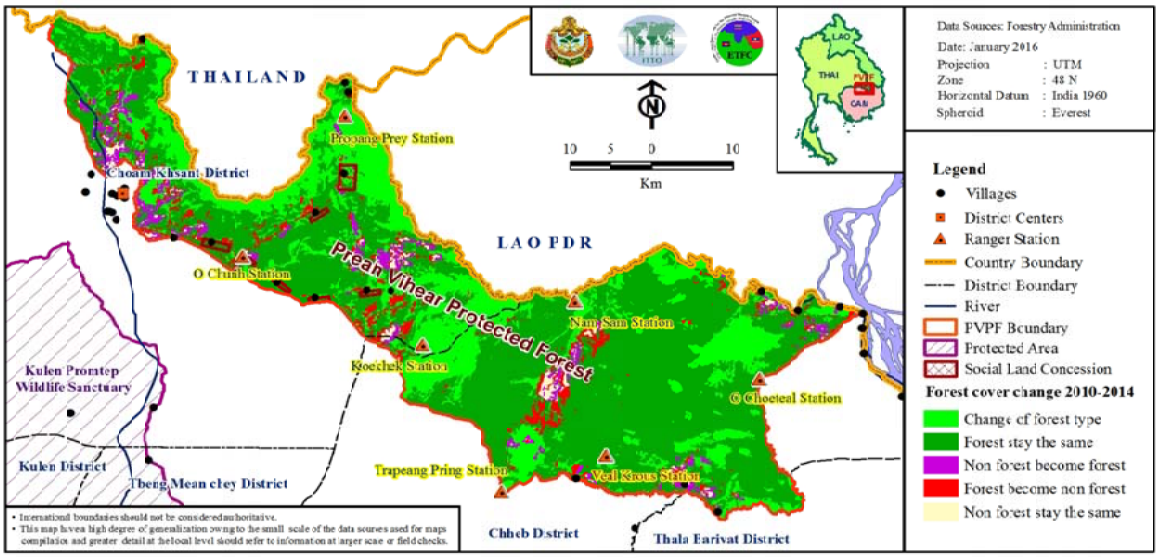


Table 1.1. Forest Cover Change in the PVPF from 2002 to 2014.

Type of Forest	2002		2006		2010		2014		Change 2002-2014		Annual rate
	ha	%	ha	%	ha	%	ha	%	ha	%	
Evergreen forest	33,586.37	17.68	35,708.86	18.79	35,673.88	18.78	33,836.48	17.81	250.11	0.13	0.011
Semi-evergreen forest	18,511.64	9.74	18,230.85	9.59	18,188.95	9.57	16,387.71	8.62	-2,123.93	-1.12	-0.093
Deciduous forest	130,949.2	68.91	127,196	66.94	125,004	65.78	112,480	59.19	-18,469.20	-9.72	-0.810
Other forests	2,455.85	1.29	2,256.9	1.19	2,283.89	1.2	10,429.42	5.49	7,973.57	4.20	0.350
Total of Forest Area	**185,503.1**	**97.62**	**183,392.6**	**96.51**	**181,150.72**	**95.33**	**173,133.61**	**91.11**	**-12,369.49**	**-6.51**	**-0.543**
Non-forest type	4,523.95	2.38	6,634.39	3.49	8,876.28	4.67	16,893.39	8.89	12,369.44	6.51	0.543
Total	***190,027***	***100***	***190,027***	***100***	***190,027***	***100***	***190,027***	***100***			

Source: *Forestry Administration, 2016*

1.6.2 Vegetation and Flora

The Preah Vihear Protected Forest is a component of the *Indo-Burma Biodiversity Hotspot*, which is one of *35 Global Hotspots*. It contains the most extensive remaining contiguous block of natural deciduous forest in Southeast Asia and is one of 9 Biodiversity Corridors in the Greater Mekong Sub-region.

On the basis of the most recent forest cover assessment conducted in 2014, the PVPF has a forest cover of 91.11 %. That is down from a forest cover of 97.62% in 2002 at the time of the establishment of the PVPF, but it is still much higher than that of the countrywide forest cover of 48.49% that was recorded in 2014.

The PVPF is a primarily lowland area with some high altitude areas on the escarpment of the Dangrek Mountain Range. Since the area is rich in forest resources and there is relatively limited accessibility for management, some illegal activities, including forestland encroachment, illegal logging, and illegal wildlife hunting, do occur intermittently and must be monitored and controlled. Forest fires occur every year during the dry season, as well, especially in areas of deciduous forest and bamboo. Most of those fires are started to increase hunting effectiveness, although some are initially ignited by means of lightning strikes.

The richness of plants species in the PVPF is to a considerable extent attributable to the relatively constant, moderately high humidity (74%), abundant rainfall (124 days a year with an average annual rainfall of 1,594- 2,035 mm), warm temperatures (33 ^{o} C), geological formations, and composition of soils. The composition of plant species shares an affinity with those of the *Indochinese floristic province, Indo-Malayan region.*

The landscape of the PVPF is composed of hill evergreen forest, lowland evergreen forest, open forest, dried deciduous forest, grassland, and wetlands. There is a primarily seasonal network of rivers and streams that flows through the PVPF prior to the confluence of the rivers and streams with the Mekong River. It is as the result of the diversity of its plant communities that the PVPF is home to a mosaic of ecosystems that provide habitats for a large number of wildlife species, many of which are threatened or endangered. There is also a variety of plant species that are useful to humans in the PVPF (see Appendix 1.3a &1.3b).

Semi-Evergreen Forest and Dry Deciduous Forest during the rainy season in the Preah Vihear Protected Forest.

1.6.3 Wildlife

The PVPF provides habitats for many globally threatened species and is probably the most important site worldwide for the critically endangered **Giant Ibis** (*Thaumatibis gigantea)* and the most important site in Southeast Asia for three critically endangered vultures: the **White-**

rumped Vulture *(Gyps bengalensis)*, **Slender-billed (or Long-billed) Vulture** *(Gyps tenuirostris)*, and **Red-headed Vulture** *(Sarcogyps calvus)*. It also has important populations of **Asian Elephant** *(Elephas maximus)*, **Banteng** *(Bos javanicus)*, **Eld's Deer** *(Rucervus eldii)*, **Fishing Cat** *(Prionailurus viverrinus)*, **Dhole** *(Cuon alpinus)*, and **White-winged Duck** *(Asarcornis scutulata)*, all of which are endangered or vulnerable. Other vulnerable species include **Gaur** *(Bos gaurus)*, **Northern Pig-tailed Macaque** *(Macaca leonine)*, **Green Peafowl** *(Pavo muticus)*, and **Sarus Crane** *(Antigone antigone)*.

The Forestry Administration (formerly the Department of Forestry and Wildlife) has conducted several biodiversity surveys in the PVPF in cooperation with the Cat Action Treasury from 1998 to 2005, with the Wildlife Conservation Society from 1999, and in Phase II (2008-2010) and Phase III (2012-2016) of the ITTO Emerald Triangle Trans-boundary Biodiversity Conservation Project. The results of those surveys have documented the presence of a fauna that is probably unique in Southeast Asia for its representation of large mammal and bird species in dry dipterocarp forests and other habitats, many of which are in rapid decline elsewhere in the region. There are at least 57 mammal species, 255 bird species, and 58 reptile species that have been documented in the PVPF. The fauna in the PVPF is representative of a large portion of the species that are currently extant in Cambodia (see Table 1.2).

Table 1.2. Numbers of wildlife species classified by taxa reported country-wide and in the Preah Vihear Protectd Forest in 2010 and 2014.

No.	Taxa	Country-wide (species) 2010-2014	In the PVPF (species)
1	Mammals	125-135	> 57
2	Birds	540-635	>255
3	Reptiles	73-95	58
4	Amphibians	62-65	No formal study conducted
5	Insects and butterflies	>400	No formal study conducted

- ***Mammals***

The field surveys, which have documented at least 57 mammal species in the PVPF, have focused predominantly on larger species, as well as bats. The smaller rodents and insectivores are, thus, less well known in the PVPF. Interviews with local people indicate that other species are probably present, but those records remain to be confirmed (see Appendix 1.4a & 1.4b).

There is a number of species that formerly occurred in the PVPF, but apparently are no longer there. These include the **Asian Two-horned Rhinonoceros** *(Dicerorhinus sumatrensis)*, **Lesser One-horned Rhinoceros** ***(****Rhinoceros sondaicus)* (last observed in Cambodia in the 1930s), **Kouprey** *(Bos sauveli)* (the last confirmed observation in Preah Vihear was in 1964 (Wharton 1964)), and **Wild Water Buffalo** *(Bubalus bubalis)* (the last confirmed observation in Preah Vihear was in 1964 (Wharton 1964)). Taxonomy, nomenclature and order for these species follow Francis (2008).

Asian Elephant *(Elephas maximus)*

Gaur *(Bos gaurus)*

Banteng *(Bos javanicus)*

ld's Deer *(Rucervus eldii)*

Northern Serow *(Naemorhedus sumatraensis)*

Leopard *Panthera pardus*

- ***Birds***

There are at least 255 species of birds recorded in the PVPF, including five of the rarest species in the world: the **Giant** and **White-shouldered Ibises** *(Thaumatibis gigantea and Pseudibis davisoni)* and the **White-rumped, Slender-billed,** and **Red-headed Vultures** *(Gyps bengalensis, Gyps tenuirostris,* and *Sarcogyps calvus)*, each of which is Critically Endangered.

There is an impressive number of other rare and threatened species that provides an important attraction to birding tourists and researchers, as well, and many other species will probably be identified as more surveys are conducted in the PVPF.

The Bird Nest Protection project, which was established across the Northern Plains of Cambodia in partnership with WCS and local communities, has allowed resource managers in the PVPF to monitor and protect some highly threatened species, including ibises, cranes, storks, and vultures.

The numbers of very rare species have increased and it is an important activity to ensure effective management of threatened birds in the PVPF. This initiative also has the further benefit of providing small increments of incomes to local community members. Many of these birds are already included in the new proposed list of protected birds in Cambodia described in Appendix 1.5a & 1.5b.

Giant Ibis ***(****Thaumatibis gigantea)*

Sarus Crane ***(****Antigone antigone)*

Green Peafowl ***(****Pavo muticus)*

Monthly vulture restaurant

- ***Reptiles***

Some of the more important species of reptiles in the PVPF include the **Siamese Crocodile** *(Crocodylus siamensis)*, the **Bengal Monitor** *(Varanus bengalensis)*, and the **Asiatic Softshell Turtle** *(Amyda cartilaginea)*. Some of Cambodia's reptiles and amphibians have recognizable economic, cultural and ecological values, as well as medicinal importance, as the result of the demand expressed in local markets, as well as in markets abroad. The Forestry Administration has tentatively identified 58 species of reptiles in the PVPF and more potential species have been recorded in interviews with local people (see Appendix 1.6a & 1.6b).

Bengal Monitor *(Varanus bengalensis)*

Elongated Tortoise ***(****Indotestudo elongata)*

Burmese Python *(Python bivittatus)*

- ***Amphibians***

This group of animals has heretofore received minimal attention from scientists and conservationists in Cambodia. Amphibians are good general indicators of habitat diversity and environmental degradation and by surveying and monitoring amphibians, it is possible to evaluate and monitor ecological diversity and well-being. Amphibians, moreover, assume an important role in maintaining healthy ecosystems as predators and prey of a wide range of other animals both on land and in water.

- ***Insects***

Insects have a very significant role in the breakdown and recycling of dead vegetation and animals. There are some that are beneficial, as well as some that are harmful. Some provide vital prey for birds, bats, reptiles and spiders, some are significant pollinators of forest plants, and some provide silk, honey, wax, and food for humans, as well as pharmaceutical substances. There are also some wasp species that act as biological control agents and environmental disturbance indicators, some termites that are responsible for the destruction of wooden structures, and other insect species that are crop pests and transmitters of diseases, including malaria, dengue and filariasis.. It is expected that there might be 200-300 species of insects in the PVPF.

- ***Fish***

Cambodia is well-known in the region for its abundant fish harvests. Fish is the primary source of protein for Cambodians, who consume, on average, 30-40 kg/year/person of fish (Chheang at al. 2002). The PVPF has considerable fresh water, particularly during the rainy season, but in the dry season, the pools and trapeangs that still have surface water, as well as the pools remaining in river channels, provide the only source of drinking water. As the result of these seasonal disruptions, some of these water sources are heavily utilized, particularly as fisheries. Some are even drained to increase the catch of fish. The physical characteristics (e.g., muddy or grass-edged, abundance of reeds, canopy cover), location, dynamics of water level changes, and prevalence of fish and amphibians of each of these water bodies are probably the primary influences on the distribution of large water birds.

1.7 Road network and river system

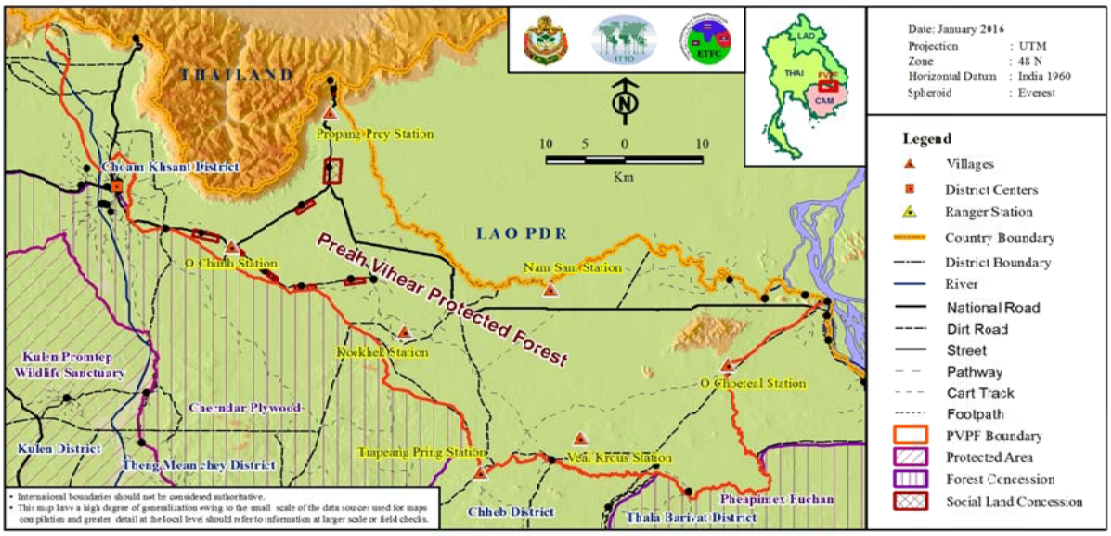
-National Route 6 connects Phnom Penh to the intersection of two roads at the junction in Kompong Svay district in Kompong Thom province, one that goes to Siem Reap province (**6**) and one that goes to Preah Vihear province (**64**),. The distance is 175 km.

-National Route 64 connects to National Route 6 at the junction in Kompong Svay district, Kompong Thom province, and continues to Thbeng Meanchey, the provincial town of Preah Vihear province, via Salavisay commune, Prasat Balang district, in Kompong Thom province.

Other Primary Roads accessible from Tbeng Meanchey to the PVPF (see Map 1.11):

- **Road 62** from Tbeng Meanchey to the center of Choam Ksant district, a distance of 91.3 km, continues to the entrance of the PVPF at Or Aban, Cha-eh village, Toeuk Kraham commune, Choam Ksant district.
- **Road 69 B** from Choam Ksant district center.
- **Road 211** from Choam Ksant district to Chheb district.
- **Road 214** from Tbeng Meanchey to the center of Chheb district, a distance of 64 km, across the Stung Sen River and 5 streams with newly built bridges.

Map 1.6. Road access system of the Preah Vihear Protected Forest.



Source: Forestry Administration, 2015.

There are tributaries of the Stung Sen River that originate in the Dangrek Mountain Range that may be accessed by boat to Tbeng Meanchey town in the rainy season. The Tonle Ropov, along the border between Cambodia and Lao PDR, also originates in the Dangrek Mountain Range and flows through Labakhon in Steung Treng province.

1.8 Strategic resources

Forest Resources of the PVPF

The PVPF consists predominantly of dry deciduous forest, although there are significant areas of other forest types, as well. Some areas maintain high commercial timber value even though its forests were part of a forest concession between 1993 and 2001. The evergreen and semi-evergreen forests, which in 2014 covered 16.9% of the land surface area of the PVPF, contain several valuable timber species, including Thnong *(Pterocarpus macrocarpus,* Kurz.), Chhoeteal

(Dipterocarpus altatus), Phdeak *(Anisoptera costata),* and Koki *(Hopea odorata)*. The deciduous forest, which in 2014 covered 70.2% of the PVPF, contain numerous luxury timber species, including Neang Noung *(Disoxylon oliveri),* Beng *(Afzelia xylocarpa* (Kruz.) Craib), Kro kos *(Sindora cochinchinensis,* Baill*),* and Ph'chek *(Shorea obtuse)*. There are still many high-value timber trees that represent a significant forest resource if managed in a sustainable manner.

Climate change is becoming an important global concern and managing forests for carbon storage has the potential to represent a cost-effective strategy for reducing the emissions of greenhouse gases (GHG). The United Nations Framework Convention on Climate Change (UNFCCC) has established a mechanism to certify reduced emissions from deforestation and forest degradation (REDD+) and the PVPF might be a source of significant revenues to the Cambodian government as part of its national REDD+ strategy.

Water Resources

Preah Vihear province has a fairly low annual rainfall since it is in the rain-shadow of the Dangrek Mountain Range, which trends east-to-west along the Cambodia-Thailand border. The PVPF is part of the watershed that serves the people living in Preah Vihear province and the Central Lowlands of Cambodia. It provides vital livelihood support for local communities through the provision of drinking water, as well as water for agriculture and fisheries. The forested watershed reduces wet season flooding and provides opportunities for rice growing and other agricultural activities in downstream areas. The maintenance of forest cover in the PVPF ensures the regulation of annual flow regimes in the rivers into the reservoirs and reduces sedimentation to decrease reservoir dredging.

Agricultural Resources

Some of the soil in the lowland areas to the south of the PVPF is fertile, providing opportunities for high-value crop production (e.g., rice, fruit orchards, oil palm trees) in areas that are not part of the forest estate. Some of the PVPF consists of steep-sided mountains with thin soil cover, however, which provides very few agricultural opportunities, although it may be possible to harvest some forest products in a sustainable manner in some of those areas. Those products might include relatively high-value non-timber forest products (NTFPs) such as bamboo, rattan, cardamom, and resin.

Cultural Resources

Numerous sites containing the remains of ancient temples are dispersed throughout the PVPF. These sites underscore the importance of the PVPF as an area of cultural significance for Cambodia. Koh Ker in southern Preah Vihear was the capital in the early 10^{th} century under Jayavarman IV. Preah Khan in Kampong Svay, also in southern Preah Vihear, was the largest temple complex ever constructed by the empire with an enclosure measuring 5 × 5 km. Beyond these sites, in north and northwestern Cambodia and adjacent parts of Thailand and Laos, are the remains of many small temple complexes revealing a pattern of human settlements that in some areas may have been greater than the current human population.

Nature-based tourism

The PVPF has the resources to provide long-term revenues through nature-based tourism, particularly bird-watching, trekking on forest trails, and camping. The PVPF provides the potential, moreover, to link nature-based tourism in the PVPF with cultural tourism at the Preah Vihear Temple UNESCO World Heritage Site.

Scientific Research and Education

The PVPF contains a very high number of plant and animal species, some of which may become valuable for medicinal or other purposes. The **Red Jungle-fowl** - the ancestor of domestic chickens – contains genetic material that may be vital for disease control in domestic poultry. Yet, as the result of cross-breeding with domestic chickens, there are very few sites around the world that now contain genetically pure populations of the Red Jungle-fowl. The PVPF is one such site.

Medicinal plants in the PVPF may also provide potential cures for human diseases and, as such, the PVPF is also a gene bank for species that provide potential financial returns for Cambodia. Its forests become increasingly valuable as other forested areas in Asia are lost and degraded and fewer countries retain those genetic resources.

The PVPF also has the potential to become a site of international importance for research and education as the result of its high biodiversity, wealth of threatened species, and value as a representative site to study ecosystem services and climate change-related matters. The research station that was constructed in the PVPF under the 'Management of the Emerald Triangle Protected Forests Complex to Promote Cooperation for Trans-boundary Biodiversity Conservation between Thailand, Cambodia and Laos (Phase III) project is intended to link sustainable management activities in the PVPF with national education interests through universities and other academic institutions, as well as with those of international research institutes, universities, museums and herbariums.

Chapter 2

SOCIAL AND ENVIRONMENTAL STATUS

2.1 Social status

2.1.1 Population

The Preah Vihear Protected Forest (PVPF) includes portions of two districts, Choam Ksant and Chheb, encompassing 5 communes and 21 villages. Choam Ksant district is located in the northwest part of the PVPF with Chheb district in the northeast. The communes and villages of the two districts are widely distributed in and around the PVPF.

In and around the PVPF, there are 6,478 families, including 4,830 families in Choam Ksant district and 1,648 families in Chheb district that comprise a population of 28,436. Approximately 97% of the population is Cambodian, while nearly 3% is ethnic. Life expectancy is increasing and according to a relatively recent report is 58 years for women and 54 years for men (NIS, 2013).

The population density almost doubled with an increase from 8 to 15 persons/km^2 in the project area between 2006 and 2014, primarily as the result of the establishment of several social land concessions and immigration driven by economic development and increases in land prices (see Table 2.1). Those developments occurred notwithstanding the lack of water in the dry season, undeveloped roads and other infrastructure, and the relatively little land that is suitable for intensive agriculture, although some irrigated agriculture is practiced in areas that are inundated in the rainy season. Nevertheless, the growth of development is slow and there are few employment opportunities.

Local communities in the PVPF mostly depend on natural resources and without greater employment opportunities for youth, there will be continued pressure on the natural environment as expanding households clear new land for agriculture and forage for forest products. Rapid population growth in rural areas often results in deforestation, land degradation, the depletion of water resources and a reduction in biodiversity.

Table 2.1. Population of districts and communes in and around the PVPF in 2013.

Location	Population				Age > 18 years			Density
	Families	Female	Male	Total	Total	Female		
						Number	%	
Preah Vihear province	**52,492**	**113,471**	**114,619**	**228,090**	**115152**	**58695**	50.97	**12.68**
Chheb district	**1,648**	**4,126**	**4,171**	**8,297**	**9904**	**5087**	51.36	
Chheb Pir commune	630	1,698	1,534	3,232	1511	761	50.36	
Sangke Mouy commune	332	788	829	1,617	724	353	48.76	
Kampong Sralou Mouy commune	686	1,640	1,808	3,448	1557	807	51.83	
Choam Ksant district	**4,830**	**10,126**	**10,013**	**20,139**	**26527**	**13644**	51.43	
Choam Ksant commune	2,153	4,719	4,406	9,125	4305	2169	50.38	
Toeuk Kraham commune	1,498	3,005	3,349	6,354	3329	1659	49.83	
Morokot commune	1,179	2,401	2,259	4,660	2056	1068	51.95	
Total	***6,478***	***14,252***	***14,184***	***28,436***	**7058**	**3679**	52.13	***15***

Source: *Ministry of Planning, December 2014.*

2.1.2 Education and training

On the basis of statistics available from the Ministry of Planning in 2013, the percentage of the population between 6-17 years of age attending school in the project area in Preah Vihear was 64%. Illiteracy is still considered high, especially for women, and illiterate women between 15-35 years old accounted for 6,670 of 36,813 women (18%) between those ages. The combined illiteracy figure for both males and females was 9,483 of 74,048 individuals (12%) as described in Appendix 2.1.

These outcomes are the result of a number of social, cultural and economic factors. While girls enroll at about the same age as boys, earlier drop out rates occur with the onset of puberty as family responsibilities start to predominate. Parents are often less willing to invest in educating females, which is a critical factor when parental contributions are a large share of education spending. Few rural villages in the planning area have secondary shcools, so attending secondary shcool typically entails travelling long distances or staying away from home, which is culturally unacceptable for girls.

The shortage of teachers is particularly acute in remote areas. Currently, every new teacher graduate is required to complete a two-year posting in a remote area (SCW, 2006). With no provision of housing, support or adequate income, however, most teachers consider these conditions to be extremly difficult. There is a shortage of schools classrooms and learning centers, as well (see Table 2.2), and class sizes are often excessive, the number of actual teaching, or learning, hours is inadequate, new curricula are not yet fully implemented and there is a shortage of core and supplementary teaching materials.

Teachers are often ill motivated because of low salaries and poor working conditions. The socioeconomic and professional status of teachers is also poor. There are few non-monetary incentives, such as scholorships, training opportunities, career development opportunities or public recognition.

Several years ago, however, the government promoted the education sector by increasing the salaries of teachers and encouraging the local education of newly-settled children of military families by providing primary schools and other facilities to every newly setlled-village. Consequently, one secondary shool and eight primary schools were established in those villages.

Over many generations, people in this area have received little vocational training although there has been some training by non-govermental organiznations in agricutural practices, nature-based tourism, animal husbandry and other livelihood subjects. While training centers in the two districts are lacking, people from the planning areas have been trained in the provincial capital of Preah Vihear.

During the implementation of the third phase of the International Tropical Timber Organization (ITTO) 'Management of the Emerald Triangle Protected Forests Complex to Promote Cooperation for Trans-boundary Biodiversity Conservation between Thailand, Cambodia and Laos' project, more than 1,790 beneficiaries from 8 villages in the PVPF attended 25 training sessions to promote agricultural skills and increase economic opportunities to promote community incomes. The trainings introduced techniques for planting vegetables, raising chickens, improving rice productivity, promoting agroforestry and integrated agricultural systems, and preparing home garden crops.

Table 2.2. Classrooms by districts in and around the PVPF.

No.	Districts	Primary	Secondary	High School
1	Chheb	228	39	7
2	Choam Ksant	89	21	6
	Total	**317**	**60**	**13**

Source: *Commune Data, 2015.*

2.1.3 Land use and management

- **Management of the PVPF**

The Forestry Administration through the Department of Wildlife and Biodiversity, and local Forestry Administration, including Inspectorate, Cantonment, Division and Triage levels, has the administrative responsibility of managing Permanent Forest Reserves.

The Forestry Administration collaborates with the International Tropical Timber Organization (ITTO) and the Wildlife Conservation Society (WCS) to support the management program of the PVPF. That program consists of a law enforcement component that enforces the Forestry Law in which rangers collaborate with military police to patrol the PVPF. There is also a community outreach component, which promotes alternative livelihoods to those communities living within the PVPF and provides them with incentives to support conservation-compatible lifestyles and activities.

The program has also effectively engaged with communities in the buffer zone of the PVPF to secure the management of some of its border areas. There is an on-going program of research to ensure that the biological, ecosystem services and climate change-related values of the PVPF are better understood and properly accessed. There is also a monitoring component, as well as participatory land-use planning - including residential and agriculture land mapping and demarcation of the Permanent Forest Estate - nature-based tourism, and information education and awareness components.

In order to effectively manage the PVPF, the Forestry Administration through the ITTO-funded project on 'Management of the Emerald Triangle Protected Forests Complex to Promote Cooperation for Trans-boundary Biodiversity Conservation between Thailand, Cambodia and Laos' has developed, as well as revised and updated, this management plan. It provides a road map of interrelated strategies and management activities designed to ensure sustainable development of the natural resources in the PVPF.

- **Land use in and around the PVPF**

The PVPF is primarily covered by deciduous dipterocarp forests, some parts of which are flooded in the rainy season. Irrigated agriculture meets primary requirements in inundated areas in Choam Ksant district, while highland agriculture is insufficient to meet those requirements in Chheb district (Chheb Forestry Administration Division, 2007).

Agriculture is predominantly organized on the basis of small farmer communities. The plight of these communities in relation to access to natural resources and land ownership is possibly one of the most significant factors affecting land use in the planning area. Participatory land use planning has only been formulated in one pilot village.

Land is cleared within the protected forest every year for swidden agriculture, which usually involves the planting of rain-fed rice. Local impacts of such activity may be high because villagers often conceal their clearings by cutting and clearing areas within mixed or evergreen blocks of forest so that their chamkars are not easily visible to patrols. The impacts of such activity include potential loss of nest trees and disturbances to forest blocks that might be important habitats or refuges for larger ungulates (Wharton, 1961).

Expansion of the agricultural areas adjacent to the PVPF and several villages within the PVPF to grow paddy rice is an increasing problem, which community teams are attempting to control through participatory mapping and planning discussions with village committees. Uncontrolled encroachment into seasonally flooded areas impacts, especially, on feeding and nesting areas for the Giant Ibis, Sarus cranes and Adjutant storks.

2.1.4 Occupations and income

- **Occupations**

People living in and around the PVPF engage in various businesses depending on actual conditions and locations. Agriculture is the core livelihood activity. Rain-fed rice cultivation in the rainy season is considered to be especially important for food security. Besides rice production, community residents grow subsistence food crops and plant home gardens to meet the requirements of daily consumption. Fruit trees are also grown, especially around family homes.

Some households fish in the rainy and dry seasons. Large permanent ponds are regarded as a primary source of fish in the dry season when many streams and ponds dry up. Villagers use traditional fishing gear, but some local people also use electro-fishing gear, which is recognized to be harmful to fish productivity.

Livestock, including cattle, pigs, chicken and ducks, is raised for consumption, as well as for sale. Observations indicate that cattle are the primary source of income local people are able to generate to purchase agricultural machinery and construct family houses. Cattle, including buffaloes, however, still remain the principal motive force used to prepare agricultural land.

Livelihoods of the local people still depend on natural resources to a considerable extent, especially for those who live close to, or in, the planning area. The non-timber forest products that they collect include resin, wildlife, honey, orchids and wild vegetables, wild fruits, fuelwood, grass for thatch, bamboo, and wood for constructing houses.

Several households are also engaged in small scale trading and wage labor. Hunting is a source of food and income among some villagers, as well. Dogs have been used by hunters and the most common species hunted are the water monitor and tortoise. Hunting occurs year round, but peaks during the early part of the rainy season.

Resin tapping is practiced by some villagers who possess resin trees. Their villages are close to areas where Dipterocarp resin-producing trees are abundant. Resin trees are claimed by individual households under a traditional tenure system. Dry resin is much less valuable than wet resin, however, and the trees that produce it are considered common property. Wet and dry resins represent the primary sources of income generated among the non-timber forest products that are collected.

- **Income generation**

Past surveys conducted by the Cambodian Forest Industry Association have indicated that income is earned from the collection of timber and non-timber forest products. In those surveys, 49% of families earned incomes of 0.4-1.3 million Riel per year from selling agricultural products. They did not rely entirely on natural resources, but did use some natural resources to reduce daily family spending. The assessment that was conducted on sustainable livelihoods in 2015 during Phase III of the 'Management of the Emerald Triangle Protected Forests Complex to Promote Cooperation for Trans-boundary Biodiversity Conservation between Thailand, Cambodia and Laos' project indicated that the annual family income in the PVPF was about US$ 460 with forest-based resources accounting for 30% of the income of traditional communities and 12% of the income of more recent inhabitants. Of the population in the Preah Vihear Proected Forest, 36% to 44% remained under the poverty line in 2014 with various differences occuring between vllages (see Map 2.1) (NPRS, 2002).

Income earned from the sale of timber and non-timber forest products and agricultural, fish and animals products (see Figure 2.1) is relatively small, but contributes to families' income and allows them to purchase motorbikes, bicycles, boats, tractors, cars, televisions and thatched, concrete, and tin houses.

Map 2.1. Population living below the poverty line in the PVPF.

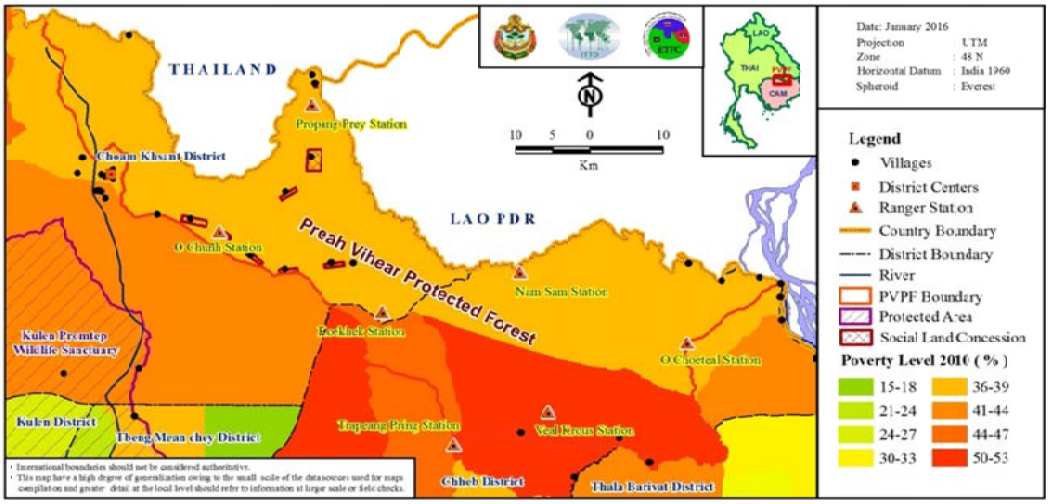
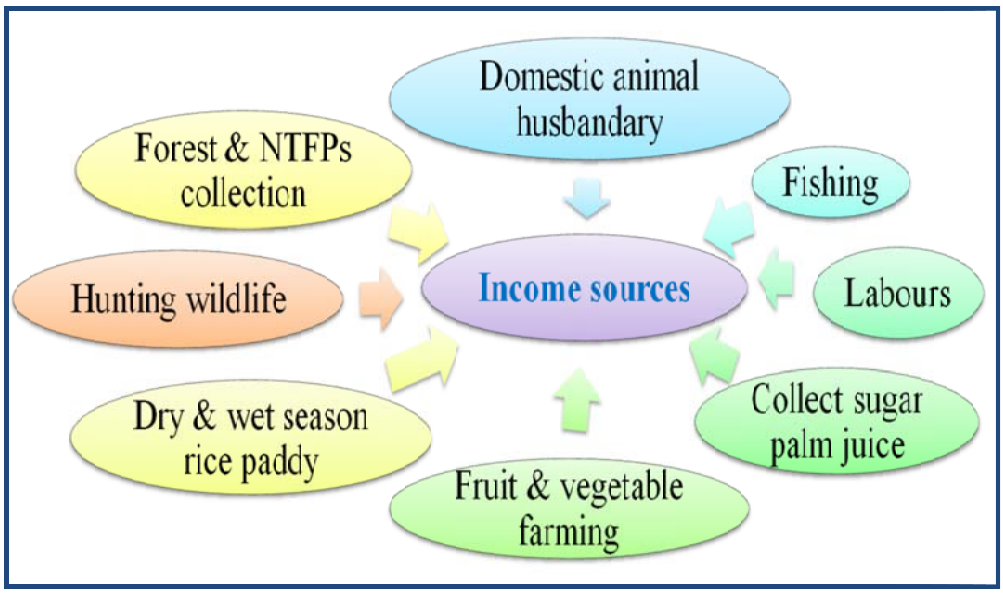


Figure 2.1. Sources of income in the PVPF.



2.1.5 Health

Despite the marked progress made by the Royal Government of Cambodia in the health sector, the health status of the people of Cambodia has been among the lowest in the region (SCW, 2006). Maternal mortality remains high and many children die of preventable diseases. The public health-funded services, especially those provided to the rural poor, are inadequate and overall rates of utilization are low. Out-of-pocket spending on healthcare for most people is an important concern because of its relationship to indebtedness. In and around the planning area, there are seven health care centers. Hospitals and professional clinics are lacking.

There is a large number of people in the PVPF that does not have access to health care at all. Moreover, many of those with access are unable to afford it. The public-funded, resource-poor facilities present in rural areas are unable to respond to all of the health requirements of the population, especially to those of households situated in remote areas.

It is because of the limited health facilities and inadequate resources that people resort to visiting unskilled physicians and family pharmacies for treatment, which is often expensive. These practices have a negative impact on their health and socioeconomic well-being. Some local people also use traditional spirit prayers for treating their families.

The low salaries of public health officials and limited medical equipment and drugs contribute to the poor motivation of staff. There are also concerns with health service management regarding limited capacity. It is as the result of limited access, local perceptions, the quality of health care, financial constraints, and traditional practices and beliefs that there is a preference among local people for using traditional healers and birth attendants.

Rainwater and surface water is collected by the local people to meet water requirements, but sanitation is almost non-existent. These conditions are compounded by poor sanitation practices. In spite of widespread awareness, few people use latrines, clean water jars, boil drinking water or properly wash their hands.
These conditions contribute to the poor health of the people in the planning area. The primary consequences of a lack of access to safe drinking water and sanitation facilities, coupled with poor hygiene practices, are communicable diseases such as cholera, parasitic infections and diarrhea.

In addition to those diseases, malaria, tuberculosis (TB), HIV and AIDS are among the most dangerous diseases affecting people in the planning area. Local people in the PVPF are frequently infected with malaria, especially those living close to or within forest areas without preventive measures and basic materials such as a mosquito net.

The primary factors causing TB, which is a potentially fatal disease, are low socioeconomic status, poor nutrition and overwork. The rapid spread of HIV further reinforces the spread of TB and anti-tuberculosis drug resistance.

2.1.6 Religion and beliefs

There are 13 Buddhist pagodas in and around the PVPF (see Table 2.3). Many of those pagodas are in poor condition because the believers living in the PVPF are not able to renovate or rebuild the pagodas for traditional service and some of the pagodas are not recognized by the Department of Cults and Religion. In and around the PVPF there are no churches or mosques and there are no incidents involving religious disputes and discrimination that have been reported.

Table 2.3. Pagodas in and around the PVPF.

No.	Districts	Buddhist Pagodas	Mosques	Churches
1	Chheb	4	NA	NA
2	Choam Ksant	9	NA	NA
	Total	**13**	NA	NA

Source: *Cults and Religion offices in the two districts.*

2.2 Environmental status

2.2.1 Water resources

In and around the PVPF there are many temporary streams and rivers flowing from the mountains to the lowlands in the rainy season from June to September. In the dry season, from October to May, most of those streams dry out. The two main rivers, the Mekong and the La Pov), which are located to the northeast of the PVPF, retain permanent water.

With the start of the monsoon rains in late May, the rivers and streams revive their flow and attain their highest levels in September or October. The Mekong and the La Pov assume an important role in the region not only with regard to transportation, but also with regard to their contributions to local socioeconomic conditions.

2.2.2 Land cover

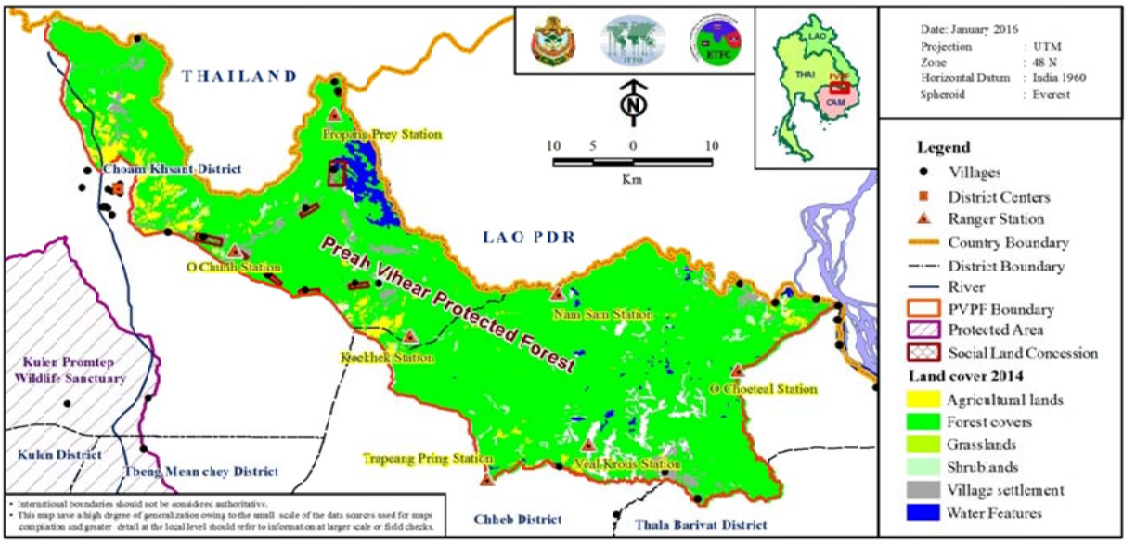
Land cover assessments in the PVPF that were conducted in 2009 and 2014 reflect significant social changes as the result of migration patterns involving primarily military families that were manifest in substantial increases in the areas of village settlements and agricultural land used for growing wet season rice during that period (see Table 2.5 and Map 2.2). Those increases were the result of comparable declines in forest cover, particularly in the deciduous forests of the PVPF.

Table 2.4. Land cover in the PVPF from 2009 to 2014.

No	CATEGORY	NAME	Land use in 2009		Land use in 2014		Change	
			AREA (ha)	%	AREA (ha)	%	AREA (ha)	%
1	Village settlements	Village settlements	99.65	0.052	6258	3.293	6158.35	3.24
2	Agricultural lands	Shifting cultivation	300.53	0.158	259.71	0.137	-40.82	-0.02
		Wet season rice	1128.87	0.594	7541.88	3.969	6413.01	3.37
3	Forest cover	Mixed forest (evergreen and deciduous)	29386.09	15.464	28581.83	15.041	-804.26	-0.42
		Deciduous forest	93992.32	49.463	87438.76	46.014	-6553.56	-3.45
		Dry deciduous (open) forest	17759.47	9.346	15432.51	8.121	-2326.96	-1.22
		Dry evergreen broadleaf or semi-evergreen forest	20428.96	10.751	20100.88	10.578	-328.08	-0.17

No	CATEGORY	NAME	Land use in 2009		Land use in 2014		Change	
			AREA (ha)	%	AREA (ha)	%	AREA (ha)	%
		Riparian forest	9439.43	4.967	8889.58	4.678	-549.85	-0.29
		Secondary forest	2597.69	1.367	2460.75	1.295	-136.94	-0.07
4	Swamp/ Grasslands	Grasslands	210.19	0.111	189.84	0.100	-20.35	-0.01
		Abandoned fields covered by grass	5443.54	2.865	4632.1	2.438	-811.44	-0.43
5	Shrublands	Abandoned field covered by shrub	1036.88	0.546	937.19	0.493	-99.69	-0.05
		Shrublands	209.3	0.110	209.3	0.110	0	0.00
		Shrublands and scattered trees	2777.39	1.462	1938.71	1.020	-838.68	-0.44
6	Water features	Marshes	5210.57	2.742	5152.93	2.712	-57.64	-0.03
		Rivers	3.08	0.002		0.000	-3.08	0.00
		Lakes	3.03	0.002	3.03	0.002	0	0.00
		Totals	**190,027**	**100**	**190,027**	**100**		

Map 2.2. Land cover in the PVPF.



2.2.3 Agriculture

Agriculture is central to the domestic economy of Cambodia and integral to the fabric of Cambodian rural life. According to direct government observations, people in the PVPF earn their living by practicing agricultural cultivation because farm rice production remains a very important factor in ensuring the food security of the largely subsistent population of farmers and their families, and, as a result, rice consumption is high.

Agriculture in communities in and around the planning area, however, is a low input and low output endeavor. The low inputs, generally consisting of poor soil quality and highly seasonal availability of water resources, contribute to the comparatively low yields of less than 2 (1.9) metric tons/ha. Rice production in the planning area lies in the rain-fed Upland Rice Eco-region.

Preah Vihear province has experienced rice surpluses, but many of the farm households consider it difficult to meet their daily requirements and still have a surplus available for sale to generate income. Some communities, especially in Chheb district, sometimes experience chronic shortages. Production may be considered fragile as it is highly susceptible to floods and drought.

The direct observations of communities have revealed that many farmers use small tractors rather than cattle for preparing land because small tractors are more convenient, powerful and time-saving and may also be used for transporting commodities, as well as for other purposes.

Apart from rain-fed rice production, subsistence fishing, animal husbandry, crop cultivation and home gardens are among the available options to earn a living. Some local families practice agricultural cultivation and fish, but most of them depend at least to some extent on forest resources to sustain their lifestyles and collect timber and non-timber forest products for customary use , as well as sale.

Shifting cultivation. In the aftermath of the country's civil war and social dislocations, local communities in and around the PVPF area became more reliant on shifting agriculture than in the pre-conflict era. The predominant form of shifting agriculture in the southern portion of the PVPF used to involve the slashing and burning of forests surrounding their villages, although this practice is now rarely used. The crops that are grown include rice, sugar cane, pepper, peanuts, bananas, cassava, sweet potatoes, and rice. This system is now partially swidden in nature. That is, it involves the reuse of previously cleared areas within a rotation cycle.

Some communities still practice traditional shifting cultivation, but more modern agricultural skills have been introduced by the Cambodian Center for Study and Development in Agriculture (CEDAC), including the System of Rice Intensification (SRI), which is a technique that is widely employed to improve rice productivity.

Paddy. Some areas that border or are inside the PVPF were once areas of larger-scale paddy production. Several factors account for the lower current level of paddy agriculture. The civil war and its aftermath resulted in the desertion of the area’s rice paddies and the loss of the majority of the water buffalo population. The reuse of those paddy areas was subsequently forestalled by the difficulty of turning the compacted paddy fields after several decades of non-use and the limited number of tillage animals.

Crop cultivation and fruit tree orchards. Crop cultivation and fruit tree orchards in the PVPF have been small-scale and limited to a few crops, such as bananas and pineapples, which have been historically important to villagers' well-being. As the lands south of the PVPF have developed reliable transport access to district and provincial markets, and as food prices have increased, however, crop cultivation (e.g., peanuts) and fruit orchards around the PVPF have become commercial-scale operations. This expansion poses a threat to forested areas of the PVPF situated on fertile soils and has been a major driver of deforestation in this area.

Livestock raising. Most of the animal rearing in and around the PVPF is linked to the supply of household subsistence requirements and the sale of surplus livestock to other villagers. The typical animals raised by villagers include chickens, pigs, cattle and water buffalo, as well as ducks and geese.

Fertilization. Cambodian farmers have used natural fertilizers to manage their crops, but have less understanding of the use of chemical fertilizers. Natural fertilizers include animal

dung, kitchen wastes, ashes, leaves, straw and salt. Villagers often do not yet clearly understand the proper use of chemical fertilizers, especially with regard to considerations of quantities, timing, and the matching of soil types with different crops. The majority of rice paddies are sterile and the utilization of agricultural fertilizers is very important for enhancing high yields to ensure food security as the population continues to grow.

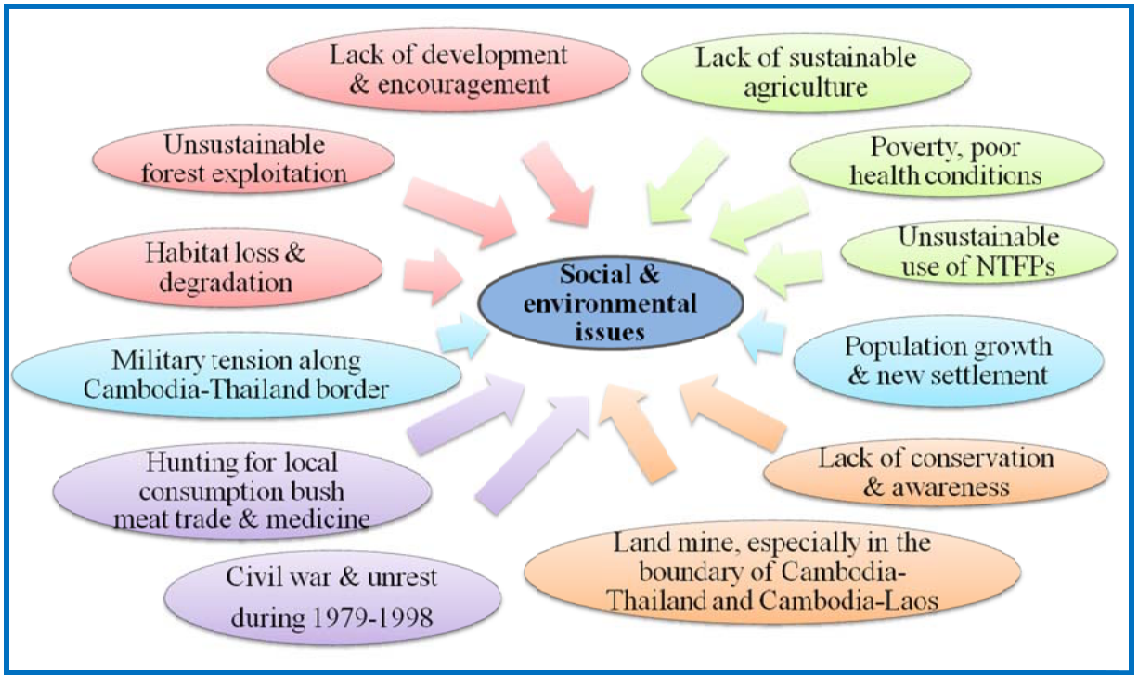
Chemical fertilizers have been used in the cultivation of long- and short-term crops to improve growth, and insecticides have been utilized with fruit trees. In some cases, herbicides are used in fruit tree plantations. Education and awareness raising on the potential dangers of the utilization of chemical fertilizers and insecticides and the significance of the use of natural fertilizers (compost or effective microorganism (EM) fertilizers) has been organized by the Ministry of Agriculture, Forestry and Fisheries and some local non-governmental organizations (NGOs). Local communities realize that the use of chemical fertilizer may result in land degradation, which is unfavorable to rice production in the long term.

2.2.4 Handicrafts and industry

There are no legal handicraft and wood processing industries in and around the PVPF, but there are three sites for mining exploration located in four communes - Teuk Kraham in Chaom Ksant district and Kampong Sralou Mouy, Chheb Pir, and Sangke Mouy communes in Chheb district.

2.2.5 Social and environmental issues

Figure 2.2. Social and environmental issues in the PVPF.



There are a number of social and environmental problems that affect the management and conservation of forest resources in the PVPF (see Figure 2.2). The principal problems include:

Poverty and the lack of sustainable agriculture practices. Poverty is an underlying cause of the degradation of forests and the loss of wildlife in the PVPF. Local people do not

have sufficient food available through their current agriculture practices and must seek additional sources of food by hunting and collecting forest products for sale.

Social instability. Civil war and social dislocations from 1979 to 1998 compelled some local people to resettle in pristine forest areas. Those settlements have since expanded through shifting cultivation. The construction of houses, clearing of land for agriculture, poaching and hunting have contributed to deforestation and the loss of wildlife.

Population growth and new settlements. Communities established around the PVPF are growing rapidly as the result of the high birth rates and patterns of in-migration. This growth impacts the forests in the PVPF that lie close to the expanding communities because the demand for land pushes village boundaries closer to the PVPF. Limited agricultural land and pre-designated communal lands mean that many migrants have nowhere to settle and are more liable to clear and burn forestlands.

Lack of conservation awareness. The socioeconomic survey that was previously conducted by the ITTO and Conservation Areas through Landscape Management (CALM) project teams in the PVPF revealed a lack of understanding on the part of local people about the importance of conserving wildlife, as well as other forest resources. There have been limited information campaigns to educate villagers about forestry and wildlife laws and the Land Law. Some one-third of those who were interviewed who were not commercial poachers said that the interviews had contributed to their understanding of the importance of conserving wildlife and protecting, especially, large mammals such as the elephant, tiger, gaur, Asiatic black bear, and banteng.

The respondent respondents in the interviews said that they were aware that commercial poachers were causing the disappearance of these species and because of their disappearance, poachers were now targeting deer species, as well as the Sunda pangolin, Bengal monitor, water monitor, Malayan sun bear, and other primate species. They thought that, soon, there would be very few, or no, large mammals remaining. There have, indeed, been no confirmed records of tiger in the PVPF since 2003.

Habitat loss and degradation. Land encroachment, the expansion of cultivated areas into forest areas, and cutting trees for charcoal manufacturing impact the integrity of forests and ecosystem and wildlife habitats in the PVPF and surrounding areas.

The clearing of forests for agriculture is practiced by local communities who live in and around the PVPF. They typically clear and burn land for their crop production in a 2-4 year cycle. The predominant form of these practices involves clearing communal land for agricultural purposes.

These activities exert pressure on the PVPF forests that lie on communal land within the borders of the PVPF. Local communities are eligible to engage in these shifting cultivation practices on communal land, but it is prohibited in natural intact forests according to Article 37 of the Forestry Law.

Land clearance for shifting agriculture (slush and burn cultivation) in some locations in the PVPF is a potential threat. This activity not only is capable of destroying wildlife habitat, but also of increasing human activity in adjacent areas that pushes large mammals out of the area. Soil erosion may cause degradation of small wetlands and streams, as well.

The loss of habitat impacts wildlife in the planning area, especially large mammals such as the Asian elephant, as the fragmentation of habitat has caused it to live in much smaller herds

isolated from other groups, thus reducing opportunities for breeding, and compromising the species' genetic viability.

Most local people residing in the area burn land for cultivating crops and the nutrient-deprived soil may only be cultivated for crops for two or three years before other land has to be cleared. The abandoned land, once rich in flora and fauna, is then overgrown by bamboo, vines, thatch grasses, and other small plants.

Non-Timber Forest Products (NTFPs). Article 40 of the Forestry Law confirms that local communities living in or near Permanent Forest Reserves have customary user rights and are allowed to collect certain NTFPs, including dead wood, honey, resin, and wood to build houses. It is evident from livelihood assessments that have been conducted in local communities that natural resources are fundamental to peoples' livelihoods.

Rural people have devised various livelihood strategies that include the collection of NTFPs, rice farming, livestock raising, home gardens, paid employment and the establishment of small businesses. It was established in a previous assessment of NTFPs that was conducted in the PVPF that NTFPs provided the most significant contribution to livelihood strategies for both low- and medium-income households. Those results confirmed the intrinsic role that NTFPs continue to assume in the lives of local people living in and around the PVPF.

Participatory Rural Appraisal activities with local communities have identified over 25 different NTFPs that are utilized for food, income, fence-building, basket-weaving, boats, fish traps, medicine, fishing lines, and fuel. The most common NTFPs that are used include fuelwood, charcoal, vines, mushrooms, bamboo and bamboo shoots, wild fruits and wild vegetables, medicinal plants for traditional use, poles, resin and rattan. The use of these products represents a wealth of indigenous ecological knowledge. Probably the most important NTFP is resin, which is the third most important livelihood activity, behind plantations and rice, for local communities living in and around the PVPF.

NTFP collection by local communities exerts a relatively small pressure on the forests of the PVPF due to the low numbers of people involved and their relatively low impact, sustainable approach to NTFP collection. The principal threat occurs when NTFP collectors engage in illegal hunting activities while in the forest, or when dogs accompany hunters into the forest. Domestic dogs pose significant risks to wildlife, both in terms of disturbing or capturing wild animals and the risk of disease transmission to the Asian wild dog (*Cuon alpinus).*

Hunting for local consumption, commercial trade and medicine. Evidence indicates that the harvesting of wildlife continues in the PVPF. There appear to be three primary drivers of these practices:

- The indirect harvest of animal predators in village 'chamkars' and rice fields;
- The harvest of animals for domestic use; and
- The harvest of animals for the wildlife trade.

Snares and the use of primitive weapons, such as cross-bows, are the primary devices used in harvesting wildlife. Common forest animals, such as wild pigs and monkeys, are the primary harvest species. The overall lack of protein sources in the PVPF means that these harvest activities offer a supplementary source of animal protein to local communities.

Larger animals used to be hunted using more sophisticated weaponry, including AK 47's. The harvest rates for larger mammals have significantly declined in the past several years, including for elephant, tiger, gaur, and banteng, however, as the result of law enforcement efforts combined with the relatively low numbers of animals that make hunting a more

problematic endeavor. There are no data available for the harvest of bird species, although where harvesting occurs primitive sling-shots are the primary harvesting tool.

There are dozens of communities situated in and around the planning area. The members of these communities, including many from the armed forces, hunt with snares and occasionally use guns. Hunters not only poach to provide meat for their families, but also occasionally to offer for sale at local markets, where meats, skins and antlers are sold. Overall, however, the PVPF is considered to represent one of the most intact and species-rich extents of dry forests in the region and it is very suitable for landscape conservation.

Land mines. The PVPF contains a relatively large area near the international border that has land mines. These mines are predominantly concentrated in the northernmost areas of the PVPF. There is a very small number of mines also located in a small area in the east central region of the PVPF in an area that was once a Khmer Rouge stronghold. Land-mine clearance is ongoing, with emphasis on clearing the mines near the road that runs parallel to the northern border of the PVPF. Threats from land mines impact monitoring and management activities in affected areas of the PVPF.

Logging. During the 1980s, Khmer Rouge forces occupied and controlled most of what is now the PVPF and in the 1990's the area was part of a logging concession prior to the establishment of the PVPF in 2002.

In the 1990s, formalized systems of commercial logging concessions were issued over much of the forest areas in the PVPF. Those concessions provided harvesting rights to private companies. Subsequent to the announcement of a logging moratorium on timber harvesting in Cambodia by the Prime Minister in 2002, those rights were suspended and were effectively ended in the PVPF when the Preah Vihear Protected Forest was established that same year.

Villagers still use forests to supply timber to meet domestic subsistence requirements. Trees are harvested to provide for the repair of local bridges and the building of houses and community buildings (e.g., schools and pagodas), as well as for other purposes.

Highlight of Interventions for Community Livelihood Development of ITTO PD577/10 Rev.1(F)




The monitoring of Community Livelihood Enhancement activities involving the establishment of rice banks and the installation of solar panels.


Demonstration of the planting of luxury tree species and fruit trees to improve land cover, reduce soil erosion, and increase adaptation to climate change planted around the pond constructed under the project at O Chunh primary school.

Training provided on home garden preparation, animal raising, and integrated agroforestry systems to local communities and military families.

Exchange visit of Teuk Kraham and Morokot commune councils, village chiefs and local communities to the multi-agricultural and fish farming and rice and cow bank development activities implemented through the Tbeng lech Community Forestry Committee in Banteay Srey district and the manufacture of souvenirs and furniture from NTFPs by local communities in Sot Nikum district, Siem Reap province.


The monitoring of Community Livelihood Enhancement activities involving the establishment of cow banks


Provision of study materials and commercial tree seedlings to local primary schools and the organization of question and answer sessions on forest conservation.




Collaboration with the Seoul National University team and interacting with community students at O' Chunh Primary School to provide a new classroom, table, chairs, and study materials, install solar panels and provision of study materials and commercial tree seedlings to local primary schools in the Preah Vihear Protected Forest.

The distribution of seedlings of high value commercial timber species, as well as fruit trees, to military families and local communities from the Morokot Nursery at the O Chunh project office in the Preah Vihear Protected Forest.

The distribution of seedlings of high value commercial timber species, as well as fruit trees, to military families and local communities from the Morokot Nursery at the O Chunh project office in the Preah Vihear Protected Forest.

Chapter 3

ZONING AND CLASSIFICATION OF THE PERMANENT FOREST ESTATE

3.1. Zoning Objectives

The foundation of the Permanent Forest Estate classification in Cambodia is the Forestry Law of 2002. It is stipulated in that law that the Permanent Forest Estate shall consist of Permanent Forest Reserves and Private Forests. The Permanent Forest Reserves shall include Production Forests, Protection Forests, Private Forests, and Converted Forestland that has been reassigned to some other development purpose.

Zoning is the most practical means for achieving an appropriate level of protection of the natural values of protected areas and for managing activities that may have adverse impacts on those values. The number of management zones in a protected area will usually vary depending on both biophysical features and management objectives, but at least three-quarters of the area of the PVPF for Forest and Wildlife Genetic Resources Conservation should reflect the primary objectives of its establishment, which are described in the Introduction to the management plan.

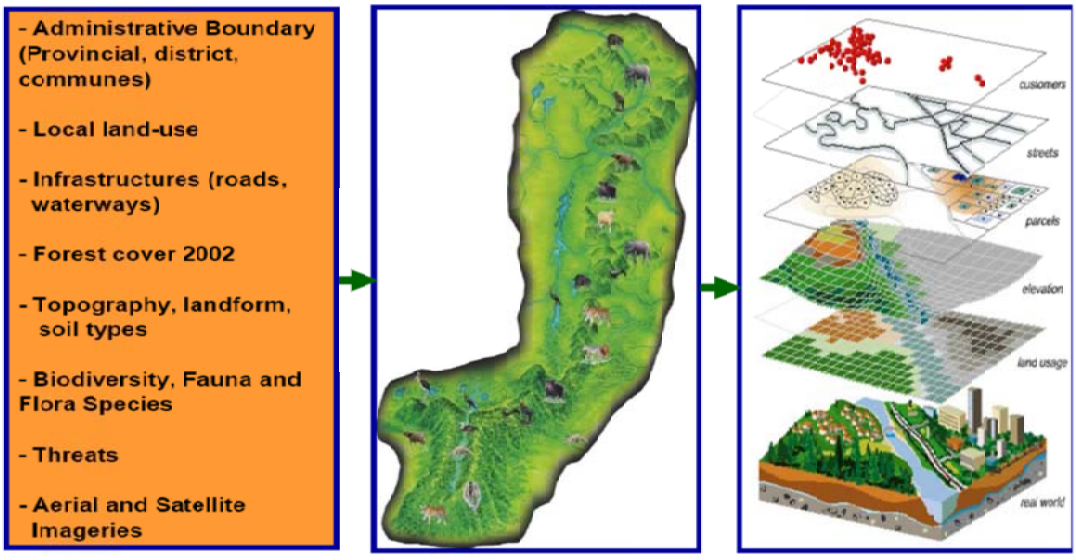
The zoning plan for the PVPF should not only respond to management objectives, but should also support biodiversity conservation across boundary lines. Long-term survival of the wildlife species in the PVPF is predominantly dependent on the cooperation of stakeholders who reside outside of the area's boundaries. Indeed, not only do the results and conclusions of GIS models indicate that suitable habitats for several landmark species are not completely circumscribed within the boundaries of the PVPF, but it is also recognized that wildlife seasonally migrate from one location to another irrespective of boundary designations. It is, therefore, essential to define proper ecological management zones to conserve biodiversity in the PVPF.

The objectives of developing a comprehensive zoning system include the following:

- To provide protection of critical or representative habitats, ecosystems, and ecological processes in the PVPF;
- To protect natural and cultural qualities while allowing reasonable human use of the PVPF; and
- To facilitate animal migration and plant and animal dispersal patterns in a fragmented landscape.

The pictorial representation of the embedding of the zonation process into a GIS model is provided in Figure 3.1.

Figure 3.1. The zoning process.



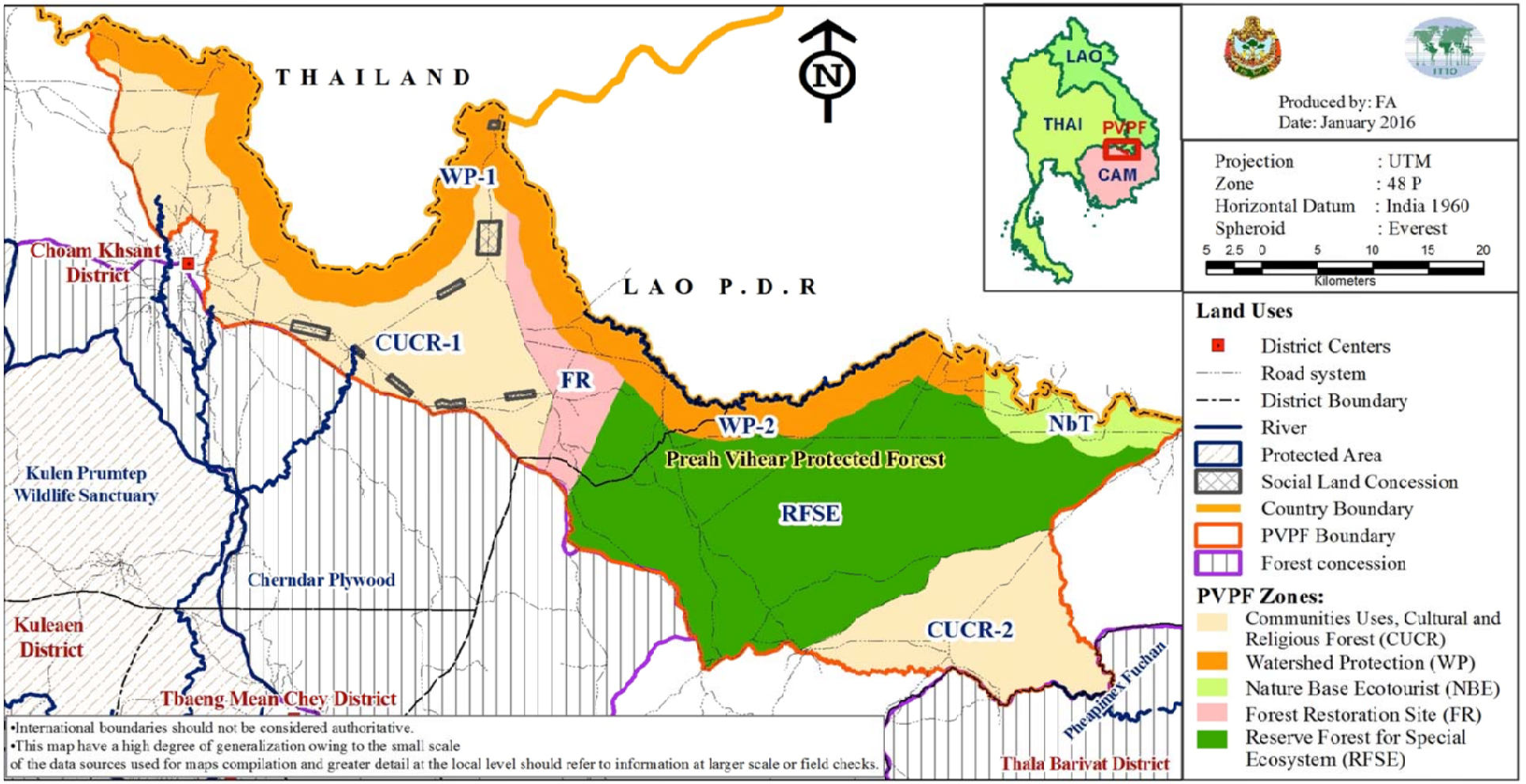
3.2 Protected Forests

In accordance with Article 10 of the Forestry Law, which states that "*The Protected Forests shall be maintained primarily for protection of the forest ecosystems and natural resources therein,*" the management team proposes use of the subdivisions of protected forest zones in the PVPF that are depicted in Table 3.1 and Map 3.1:

Table 3.1. Proposed PVPF Zones and Compartment Numbers.

No.	Description	Compartment	Area of Compartment (ha)	Administrative Location
1	Community Use, Cultural Heritage, and Religious Forests (CUCR)	CUCR-1	40,800	Teuk Kraham, Morokot, and Choam Ksant communes, Choam Ksant district
		CUCR-2	22,222	Chheb Pi commune, and Kampong Sralau Mouy commune, Chheb district
2	Nature-based Tourism (NbT)	NbT	6,809	Kampong Sralau Mouy commune, Chheb district
3	Reserve Forests for Special Ecosystems (RFSE)	RFSE-1	3,965	Morokot commune, Choam Ksant district
		RFSE-2	67,473	Kampong Sralau Mouy commune and Chheb Pi commune, Chheb district
4	Watershed Protection (WP)	WP-1	30,594	Choam Ksant, Teuk Kraham and Morokot communes, Choam Ksant district
		WP-2	8,937	Kampong Sralau Mouy commune, Chheb district
5	Forest Restoration Site (FR)	FR	9,227	Morokot commune, Choam Ksant district
Total			***190,027***	

Map 3.1. Proposed Zones and Compartments of the PVPF.



3.2.1. Community Use, Cultural Heritage and Religious Forests

The Community Use, Cultural Heritage and Religious Forests zone is sub-divided into two compartments. There are several small village settlements, as well as agricultural land that includes rice fields and farmland for local community use, and swidden (chomkar velchum) areas, located in these two compartments. The CUCR zone has 63,022 ha and contains many temple sites, areas in which local people regularly collect non-timber forest products for subsistence use, and areas allocated for settlement under Social Land Concessions. The zone contains most of the land that has been granted to the military to police border areas. Local communities have customary user rights to collect forest and non-forest products for household use in a transparent, sustainable manner in these areas in accordance with the Forestry Law. Since the PVPF is classified as permanent forest estate, or state land, local communities living in and around the PVPF may submit formal requests through local authorities to obtain legal status to tenure, or to use this land. These requests must receive formal endorsement from the Forestry Administration and other relevant government agencies, however, to approve the registration of land tenure in accordance with the Land Law, Commune Land Use Planning Sub-decree, and other relevant land use legislation.

The cultural heritage and religious and spirit forests in which local communities have retained their beliefs in accordance with their traditions and culture, are retained as religious and cultural forests in this zone. The PVPF contains many sites with cultural significance, including ancient temples, as well as sacred forests. The project team with the assistance of local communities has identified 17 sites of ancient ruined temples in the PVPF. Some local people have reported that, there are several other sites in the PVPF that have small temples, as well, but it is quite difficult to access those sites because of land mines and unexploded ordnance that remain underground around those sites. Some of those temples, moreover, may have been destroyed by war, forest fires, lack of maintenance, the growth of the roots and branches of plants, including large trees, on the structures of those temples, and illegal excavations around those temples.

3.2.2 Nature-based Tourism Sites

The Nature-based Tourism Sites zone has Special Natural Landscapes for recreation and nature-based tourism that include wetlands and scenic settings such as the Lapov river that marks the international border between Cambodia and Lao PDR. The zone comprises areas with high potential value for nature-based tourism activities and it has the scenic and cultural resources required to generate considerable long-term revenues through nature-based tourism. There is a wide range of nature-based tourism features to attract visitors that want to experience nature. Those include wildlife viewing, bird-watching, trekking, mountain biking, boating, and rafting, and there are opportunities to establish high-end eco-lodges, helicopter over-flights, and other services, as well. Cultural and traditional recreational activities are also encouraged to provide tourists with the opportunity to visit local villages in the PVPF to experience the traditions and customs of ethnic minority communities and the ways of life of local people. The PVPF is included in national plans to expand nature-based tourism in Cambodia and provides optimal locations such as that of the Preah Vihear Temple to link nature-based tourism in Preah Vihear province with tourism along the mountain range of northern Cambodia.

3.2.3. Reserved Forests for Special Ecosystems

The Reserved Forests for Special Ecosystems zone has characteristics that are compatible with ecological management core zones. The two compartments in this zone are primarily for research and contain a large number of plant and animal species important for biodiversity conservation. Some of the species in this zone may be especially valuable for medicinal, captive breeding, nature-based tourism, or other purposes and the ecosystems in this zone act as gene banks that might eventually provide substantial financial returns to the country. The zone, moreover, will become increasingly valuable as other forested areas throughout Asia are lost and fewer countries maintain these genetic resources.

The Reserved Forests for Special Ecosystems zone is characterized by high elevation plant communities and wildlife habitats, wetlands, hill and mountainous evergreen forests, and core areas for numerous wildlife species, including the Asian Elephant, Gaur, Banteng, Asiatic Black Bear, Malayan Sun Bear, Sunda Pangolin, Leopard, Pileated Gibbon, Indochinese Silver Langur, Slow Loris, Pig-tailed Macaque, Long-tailed Macaque, Southern Serow, Sambar Deer, Red Muntjac, Crab-eating Mongoose, Binturong, Common Palm Civet, Smooth-coated Otter, Dhole, Asiatic Jackal, Giant Ibis, White-winged Duck, Sarus Crane, Green Peafowl, Silver Pheasant, Siamese Fireback, Red Junglefowl, Alexandrine Parakeet, Spot-billed Eagle, Red-headed Vulture, White-rumped Vulture, Great Hornbill, Siamese Crocodile, Bengal Monitor, Water Monitor, Burmese Python, Elongated Turtle, Malayan Snail-eating Turtle, and Asian Soft-shell Turtle.

The zone has several species of commercial tree species, medical plants, herbs and non-timber forest species, as well, and has exceptionally high biodiversity conservation values, Each of the species in the PVPF that is listed as Endangered or Rare in the Wildlife List Declaration (Prakas) of MAFF and the International Union for the Conservation of Nature (IUCN) are present in this zone. The Reserved Forests for Special Ecosystems zone should be managed primarily for biodiversity conservation and activities in this zone should be closely monitored to ensure that they do not violate the Forestry Law and that they have minimal impacts on biodiversity conservation.

3.2.4. Watershed Protection

There are two compartments in the zone reserved for Watershed Protection and regulating water resources. The priority use in this zone is to protect the forest areas and steep slopes, or watershed catchments, that are most susceptible to erosion. Most of the zone consists of mountainous areas of watershed classes II and III along the Cambodia-Thailand border that provide watershed services to lowland areas around the northern Great Lake (Tonle Sap) and neighboring provinces. The zone covers much of the border area of the PVPF, underscoring the importance of its role in watershed management in Northern Cambodia. The management of the zone should ensure that activities have minimal impacts on watershed values and the role of the PVPF in the regulation of water resources. This is especially critical considering the significant investments that have been made in the PVPF with regard to irrigation, agriculture, forestry, and freshwater fisheries. The zone is an important indicator of the forest ecosystem services that are provided by the PVPF.

The most significant forest ecosystem services provided in the PVPF are carbon sequestration, unpolluted air, the prevention of land degradation, erosion and siltation of rivers, the regulation of water resources, and the provision of high quality drinking water. These watersheds contribute vital livelihood support through the delivery of high quality drinking water to thousands of local people, as well as water for agriculture and fisheries activities in downstream areas for communities throughout Preah Vihear province, as well as in the

country's northern flood plain. The PVPF's watersheds are also the source of water for the Tonle Sap Great Lake and the Mekong River.
The relatively high density of forest cover in the PVPF and its annual rainfall pattern from 1,345.5-2,035.5 mm ensures an evenly regulated flow regime for the rivers and reduces wet season flooding. It also supports high carbon storage from plant biomass and the reduction of carbon emissions to the atmosphere. The effective management of the PVPF as a carbon storehouse could conceivably generate significant revenue as part of a national strategy to reduce emissions from deforestation and forest degradation. The emphasis in the country is now evolving from a circumscribed definition of forests as a commodity provider (i.e., timber) to a broader forest ecosystem service provider in markets established for trading carbon.

The maintenance of forest cover in the PVPF will not only provide numerous opportunities for promoting national economic growth through the provision of its various ecosystem services, but it will also ensure a regulated supply of high quality drinking water across three provinces, and reduce the risk of flooding, especially in Preah Vihear Province, by regulating river flow regimes.

3.2.5. Forest Restoration Site

This Forest Restoration zone has an area of 8,000 ha that is heavily degraded and requires interventions associated with various forest landscape restoration techniques, including Assisted Natural Regeneration, Enrichment Planting, and the establishment of tree plantations. One of the principal reasons for the loss in forest cover in the PVPF is the increased demand for agricultural and agro-industrial land, especially with regard to the conversion of forestland to Social Land Concessions and Economic Land Concessions. If this trend continues, the current rate of substitution planting of trees would not be able to compensate sufficiently to maintain the current percentage of forest cover in the PVPF.

Chapter 4

MANAGEMENT STRATEGIES

The management strategies developed for this 2nd Preah Vihear Protected Forest management plan reflect revisions and updates that were incorporated into the initial management plan prepared under the Forestry Administration - ITTO 'Management of the Emerald Triangle Protected Forests Complex to Promote Cooperation for Trans-boundary Biodiversity Conservation between Thailand, Cambodia and Laos (Phase II)' project. The production of the 2nd management plan under the five-year planning horizon established in conjunction with the preparation of the 1st management plan is based on the assessment of experiences during the initial planning period from 2010 to 2014. It encompasses internal evaluations of the relative importance of management activities that were included in the initial management plan, as well as consideration of the broad spectrum of management implications associated with the results of planned research activities and lessons learned during the third phase of the 'Emerald Triangle Trans-boundary Biodiversity Conservation' project.

Vision

The underlying vision of the Preah Vihear management plans is:

To conserve the Preah Vihear Protected Forest by establishing a sustainable equilibrium between Economic, Social, and Ecological demands consistent with the National Forest Policy Statement, National Strategic Development Plan, National Poverty Reduction Strategy and the Sustainable Development Goals.

4.1. Management Strategies

In order to achieve the Vision established for the PVPF in the most effective and efficient manner, the importance of five priority programs to direct management activities is underscored. The central themes of those five priority programs encompass:

- Natural Resource Conservation and Management;
- Recreation and Nature-based Tourism Management;
- Integrated Community Livelihood Development and Engagement;
- Trans-boundary Protected Forests and Protected Areas Collaborative Management;
- Institutional and Human Resource Development; and
- Research and Monitoring.

4.2. Management Programs

4.2.1. Natural Resource Conservation and Management Program

There are three component strategies of the Natural Resource Conservation and Management Program. Those strategies are designed to:

4.2.1.1. Reduce incidences of illegal forest- and wildlife-related crimes.

This strategic approach will encompass the following set of actions:

- Strengthen cooperation with local authorities and local communities to deter illegal logging, the illegal trade in wildlife, and the incidence of forest clearing and encroachment.
- Expand the use of the Spatial Monitoring and Reporting Tool (SMART) to strengthen the planning of law enforcement patrols in accordance with observed threats and the establishment of measurable responses to those threats.

- Increase law enforcement patrols in critical habitats and in areas in which illegal logging, wildlife poaching, and forest clearing and encroachment are more prevalent.
- Enforce restrictions on the use of firearms in the PVPF.
- Intensify campaigns against poaching and the illegal trade in wildlife, including the consumption of bush meat, and promote environmental education to strengthen understanding and increase awareness of those activities.

4.2.1.2 . Strengthen conservation and sustainable forest resources and wildlife management.

This strategic approach will encompass the following set of actions:

- Increase the number of informal and formal meetings with government officials to strengthen bonds of political support to strengthen biodiversity conservation in the PVPF.
- Strengthen the capacities of rangers by allocating more equipment, including vehicles and field communication and enforcement equipment, as well as more staff, to achieve the Forestry Administration recommended number per unit cost of 8 rangers per station.
- Engage local communities regarding the importance of Biodiversity Hotspots in the PVPF.
- Support efforts directed to the rescue and propagation of rare and endangered wildlife species and the reintroduction of rescued and propagated species into the wild and promote the management of plant species in the same manner with a special emphasis on the experimental propagation of wild orchid species.

4.2.1.3 Maintain the ecological integrity of forests in and around the PVPF and improve the quality of wildlife habitats.

This strategic approach will encompass the following set of actions:

- Install entrance gates, cement boundary posts, and road signs to strengthen infrastructure development in the PVPF.
- Maintain and/or enhance seasonal watering holes (trapeangs) to preserve ecological integrity and mitigate the impacts of climate change on water resources supporting local livelihoods and providing seasonal habitats for waterfowl.
- Promote forest enrichment planting in natural forest areas of native forest trees provided from nurseries in the PVPF.
- Encourage household and community investments to support restoration efforts and the establishment of forest plantations to rehabilitate degraded and encroached reclaimed forests, especially in those instances in which natural succession is inadequate to ensure the ecological recovery of those areas.

4.2.2. Recreation and Nature-based Tourism Management Program

There are three component strategies of the Recreation and Nature-based Tourism Management Program. Those strategies are designed to:

4.2.2.1. Promote the effective management of nature-based tourism resources and activities.

This strategic approach will encompass the following set of actions:

- Promote community nature-based tourism to increase alternative livelihood development opportunities through the establishment of home-stays, guesthouses,

and low-impact eco-lodges and the provision of unique cultural experiences and personal interpretive services in collaboration with local communities.

- Provide specialized training on the benefits of nature-based tourism to local communities.
- Develop training programs for local Forestry Administration officers, protected forest officials, and Community Conservation Forest Committee members on the management of nature-based tourism resources and activities.
- Protect cultural and historical sites and collaborate with the provincial Department of Cultural and Fine Arts to restore deteriorated artifacts, including ancient remains in the PVPF.
- Establish agreements with local communities to strengthen the management of recreation and nature-based tourism to minimize impacts on wildlife, other natural resources, and biodiversity.

4.2.2.2. Expand nature-based tourism markets.

This strategic approach will encompass the following set of actions:

- Develop specialized market niches for non-intrusive recreation and nature-based tourism activities to meet the requirements of diverse groups of visitors.
- Collaborate with the provincial Department of Tourism and local authorities to increase public awareness of recreation and nature-based tourism destinations in and around the PVPF.

4.2.2.3. Strengthen interpretative programs and services.

This strategic approach will encompass the following set of actions:

- Assemble relevant materials on local cultures and traditional knowledge for use in interpretative programs.
- Strengthen interpretative programs to enhance visitors' tourism experiences, as well as their understanding and appreciation of natural and cultural resources, by providing on-site interpretation through the use of signs and labels, the establishment of visitor centers and wayside exhibits, and the preparation of informative brochures, booklets, and guidebooks.
- Encourage wildlife viewing activities at those sites in the PVPF considered to have the most potential for low-impact, nature-based tourism development that are managed to ensure that those activities are sustainable.
- Promote forest trekking as a means of improving local livelihoods by developing and improving trails and collaborate with local communities to control livestock grazing in those areas designated for trekking to enhance nature-based tourism experiences.
- Provide relevant information to tour operators and tourists on the impacts of tourism activities on biodiversity conservation.

4.2.3. Integrated Community Livelihood Development and Engagement Program

There are three component strategies of the Integrated Community Livelihood Development and Engagement Program. Those strategies are designed to:

4.2.3.1. Reduce Dependency on Natural Resources.

This strategic approach will encompass the following set of actions:

- Promote sustainable agriculture and agroforestry in agricultural use zones and community forests in and around the PVPF.
- Collaborate with local authorities, nongovernmental organizations, and other development partners to establish community enterprises to increase alternative income earning opportunities for local communities and provide training to local communities to increase participation in these, as well as other, sustainable livelihood development programs.
- Encourage the planting of trees and other plants that support local livelihoods, such as bamboo, and the cultivation of edible plants, such as mushrooms, to reduce local people's use of wild forest plants.
- Establish and enforce resource use regulations to control access to non-timber forest products used to support the sustainable development of local livelihoods and increase local incomes while maintaining natural resources in the PVPF.

4.2.3.2. Enhance Local Community Participation in Management.

This strategic approach will encompass the following set of actions:

- Support community-based natural resources management in and around the PVPF to reduce the unsustainable utilization of forest resources.
- Institutionalize the use of social instruments that encourage the participation of local people in the management of the PVPF, such as through the establishment of local advisory boards or committees to ensure local participation in management decisions affecting local communities.

4.2.3.3. Raise Awareness.

This strategic approach will encompass the following set of actions:

- Organize workshops, meetings, and training programs involving local communities to enhance the understanding of the contributions to local livelihoods associated with sustainable forest management, biodiversity conservation, and community forestry programs in accordance with national forest development policies and plans.
- Develop environmental education programs that explain the purposes of the PVPF and incorporate information on the environmental effects associated with the unsustainable use of natural resources and the rights and responsibilities of local people with regard to the management of natural resources.
- Strengthen mutually beneficial working relationships by extending outreach and information exchange initiatives with local communities.

4.2.4. Trans-boundary Protected Forests and Protected Areas Collaborative Management Program

There are two component strategies of the Trans-boundary Protected Forests and Protected Areas Collaborative Management Program. Those strategies are designed to:

4.2.4.1. Strengthen trans-boundary collaborative management.

This strategic approach will encompass the following set of actions:

- Expand cooperation with protected area resource managers and local and regional government officials in Cambodia, Thailand, and Lao PDR to enforce control of cross-border illegal logging and the illegal wildlife trade using international convention, such as CITES, as one of the means for organizing action programs.

- Establish more effective operational management programs on the basis of the application of the results of cross-border research conducted in Cambodia, Thailand, and Lao PDR to sustain and enhance plant communities and populations of landmark wildlife species.
- Maintain ecological corridors linking cross-border landscapes and ensure the uninterrupted migration of landmark wildlife species across the Emerald Triangle Protected Forests Complex.

4.2.4.2. Expand cross-border exchanges in support of environmental and natural resources conservation.

This strategic approach will encompass the following set of actions:

- Strengthen the collaborative research network that has been established between universities in Cambodia, Thailand, and Lao PDR.
- Promote management exchange programs with cross-border natural resource managers in adjoining protected areas of Thailand and Lao PDR.

4.2.5. Institutional and Human Resources Development Program

There are three component strategies of the Institutional and Human Resources Development Program. Those strategies are designed to:

4.2.5.1. Strengthen Institutions.

This strategic approach will encompass the following set of actions:

- Promote good governance in the implementation of forest resources management programs in the PVPF.
- Prepare comprehensive descriptions of the activities required to ensure sustainable forest resources management in the PVPF.

4.2.5.2. Develop Human Resources.

This strategic approach will encompass the following set of actions:

- Provide specialized training in biodiversity conservation and sustainable forest resources management to local Forestry Administration officers and protected forest officials at the operational level to strengthen resource management capacities.
- Organize a mass media campaign to increase the public's understanding of the underlying reasons to conserve biodiversity.
- Establish a meaningful rewards system to recognize outstanding performance on the part of local Forestry Administration officers and protected forest officials.
- Organize conservation education activities, such as nature conservation camps, for students enrolled in primary and secondary schools.
- Conduct stakeholder workshops on law enforcement and international conventions supporting biodiversity conservation and sustainable forest management practices.

4.2.5.3. Increase Internal Cooperation.

This strategic approach will encompass the following set of actions:

- Establish effective mechanisms for improving internal cooperation between government and non-government institutions involved with development through the conservation of biodiversity in the PVPF.

- Develop a user-friendly, interactive database that links agencies and organizations to facilitate information exchanges associated with the sustainable management of resources in the PVPF.

4.2.6. Research and Monitoring Program

There are four component strategies of the Research and Monitoring Program. Those strategies are designed to:

4.2.6.1. Evaluate Management Applications of Research Results.

This strategic approach will encompass the following set of actions:

- Review previous research conducted in the PVPF and use the results of those evaluations to strengthen sustainable resource management practices.

4.2.6.2. Expand Research on Selected Landmark Wildlife Species and Plant Communities.

This strategic approach will encompass the following set of actions:

- Organize planned research on selected landmark wildlife species, including rare, endangered and endemic species, to support the development of species-specific management plans.
- Organize a program of research to investigate ecological relationships in plant communities, as well as individual plant species, including native species of wild orchids, insectivorous plants, medicinal plants, and other rare, endangered and endemic plant species, to strengthen management applications.
- Investigate the impacts of recreation and nature-based tourism on natural areas, especially in those areas in the PVPF where the most intensive recreation and nature-based tourism activities occur.
- Organize a study of the impacts of invasive alien species on the ecological integrity of evergreen, semi-evergreen, and deciduous forests in the PVPF.

4.2.6.3. Broaden Research on Land and Natural Resources of the PVPF.

This strategic approach will encompass the following set of actions:

- Conduct periodic studies of the current status and dynamics of the drivers of deforestation and forest degradation affecting land use change in the PVPF.
- Organize assessments of carbon stocks, growth patterns of commercial tree species, and the conservation of gene pools of commercial and non-commercial tree species in the PVPF.
- Conduct economic valuations of selected ecosystem goods and services in the PVPF.
- Organize a long-term study to monitor the transmission of diseases between domestic and wild animals in the PVPF.
- Organize a long-term study to monitor the importance of seasonal watering holes (trapeangs) to domestic animals and wildlife in the PVPF.

4.2.6.4. Increase Understanding of Local Communities.

This strategic approach will encompass the following set of actions:

- Organize periodic surveys to monitor variations in the socio-economic characteristics of local communities living in and around the PVPF.
- Conduct periodic surveys of the attitudes of local communities toward protected forest, natural resource conservation, and biodiversity and use the results in environmental education and public outreach programs.

Chapter 5

ACTION PLAN AND BUDGET ALLOCATION

Management Activities for Targets proposed: 2016–2020

Table 5.1. Natural Resource Conservation and Management Program

Project Management Activities	Priority Value	Year of operation					Responsible agencies	Supporting organizations	Sources	Budget MM Riel
		1st	2nd	3rd	4th	5th				
Reduce incidences of illegal forest- and wildlife-related crimes.										
1. Strengthen collaboration with local authorities and encourage the participation of local communities in natural resources monitoring and patrolling actions to deter illegal forest activities.	5	**44**	**44**	**44**	**44**	**44**	FA, PV-CFA, Chheb and CK-DFA	Local authorities, DPs	RGC, Donors, DPs	**220**
2. Expand the use of SMART applications to strengthen forest monitoring and forest crime reporting and rapid response actions.	4-5	**55**	**55**	**44**	**44**	**44**	FA, PV-CFA, Chheb and CK-DFA	Local authorities, DPs	RGC, Donors, DPs	**242**
3. Increase the number and coverage of patrols in critical habitats and areas in which forest crimes are more prevalent and restrict the use of firearms to reduce illegal logging and the illegal trade of wildlife.	4-5	**385**	**385**	**385**	**385**	**385**	FA, PV-CFA, Chheb and CK-DFA	DPs	RGC, Donors, DPs	**1,925**
4. Intensify campaigns against poaching and the illegal trade in wildlife, including the consumption of bush meat, and promote environmental education to strengthen understanding and increase awareness of those activities.	4	**35**	**35**	**35**	**30**	**30**	MAFF, FA	PS, Donors, DPs	RGC, Donors, PS, DPs	**165**
Strengthen conservation and sustainable forest resources and wildlife management.										
5. Increase the number of informal and formal meetings with government officials to strengthen bonds of political support to strengthen biodiversity conservation in the PVPF.	4	**30**	**34**	**34**	**30**	**30**	FA	PS, Donors, DPs	RGC, Donors, PS, DPs	**158**
6. Strengthen the capacities of rangers by allocating more equipment to ranger stations and increasing the number of	3-4	**30**	**30**	**30**	**30**	**30**	MAFF, FA	PS, Donors, DPs	RGC, Donors, PS, DPs	**150**

Project Management Activities	Priority Value	Year of operation					Responsible agencies	Supporting organizations	Sources	Budget MM Riel
		1st	2nd	3rd	4th	5th				
rangers.										
7. Engage local communities regarding the importance of Biodiversity Hotspots in the PVPF.	3-4	**45**	**45**	**45**	**45**	**45**	MAFF, FA	PS, Donors, DPs	RGC, Donors, PS, DPs	**225**
8. Support efforts directed to the rescue and propagation of rare and endangered wildlife species and the reintroduction of rescued and propagated species into the wild and promote the management of plant species in the same manner with a special emphasis on the experimental propagation of wild orchid species.	2	**12**	**12**	**12**	**12**	**12**	MAFF, FA	PS, Donors, DPs	RGC, Donors, PS, DPs	**60**
Maintain the ecological integrity of forests in and around the PVPF and improve the quality of wildlife habitats.										
9. Install entrance gates, cement boundary posts, and road signs to strengthen infrastructure development in the PVPF.	4	**80**	**80**	**80**	**44**	**44**	MAFF, FA	PS, Donors, DPs	RGC, Donors, PS, DPs	**328**
10. Maintain and/or enhance seasonal watering holes (trapeangs) to preserve ecological integrity and mitigate the impacts of climate change on water resources supporting local livelihoods and providing seasonal habitats for waterfowl.	4	**55**	**55**	**55**	**55**	**55**	MAFF, FA	PS, Donors, DPs	RGC, Donors, PS, DPs	**275**
11. Promote forest enrichment planting in natural forest areas of native forest trees provided from nurseries in the PVPF.	3	**55**	**55**	**34**	**34**	**34**	MAFF, FA	PS, Donors, DPs	RGC, Donors, PS, DPs	**212**
12. Encourage household and community investments to support restoration efforts and the establishment of forest plantations to rehabilitate degraded and encroached reclaimed forests.	3	**22**	**22**	**22**	**22**	**22**	MAFF, FA	PS, Donors, DPs	RGC, Donors, PS, DPs	**110**
Totals		**848**	**852**	**820**	**775**	**775**				**4,070**

***Agencies and Organizations**: *FA=Forestry Administration; PV=Preah Vihear; CFA=Cantonment Forestry Administration; CK=Choam Ksant; DFA= Division Forestry Administration; RGC= Royal Government of Cambodia; MAFF=Ministry of Agriculture, Forestry and Fisheries; PS=Private Sector; DPs=Development Partners.*

Table 5.2. Recreation and Nature-based Tourism Management Program

Project Management Activities	Priority Value	Year of operation					Responsible agencies	Supporting organizations	Sources	Budget MM Riel
		1st	2nd	3rd	4th	5th				
Promote the effective management of nature-based tourism resources and activities.										
1. Promote community nature-based tourism to support alternative livelihood development opportunities through the establishment of home-stays, guesthouses, and low-impact ecolodges and the provision of unique cultural experiences and personal interpretive services in collaboration with local communities.	4	**55**	**65**	**65**	**65**	**55**	FA, PV-CFA, Chheb and CK-DFA	Local authorities & communities, Donors, DPs, PS	RGC, Donors, PS, DPs	**305**
2. Provide specialized training on the benefits of nature-based tourism to local communities.	4	**20**	**20**	**12**	**12**	**12**	FA, PV-CFA, Chheb and CK-DFA, DPs, PS	Local authorities & communities, DPs	RGC, Donors, PS, DPs	**76**
3. Train local Forestry Administration officers, protected forest officials, and Community Conservation Forest Committee members on the management of nature-based tourism resources and activities.	4	**20**	**20**	**12**	**12**	**12**	FA, MoC	Local authorities, DPs	RGC, Donors, PS, DPs	**76**
4. Protect cultural and historical sites dispersed throughout the PVPF.	4	**14**	**14**	**14**	**14**	**14**	FA, MoC	Local authorities,	RGC, Donors, PS,	**70**
5. Establish agreements with local communities to strengthen the management of recreation and nature-based tourism to minimize impacts on wildlife, other natural resources, and biodiversity.	4	**5**	**5**	**5**	**5**	**5**	FA, PV-CFA, Chheb and CK-DFA	Local authorities, DPS	RGC, Donors, DPs	**25**
Expand nature-based tourism markets.										
6. Develop specialized market niches for non-intrusive recreation and nature-based tourism activities to meet the requirements of diverse groups of visitors.	3	**22**	**30**	**30**	**30**	**22**	FA, MoC	Local authorities, DPs	RGC, Donors, PS, DPs	**134**
7. Collaborate with the provincial Department of Tourism and local authorities to increase public awareness of recreation and nature-based tourism destinations in and around the PVPF.	3	**12**	**12**	**12**	**12**	**12**	FA, MoC	Local authorities, DPs	RGC, Donors, PS, DPs	**60**

Project Management Activities	Priority Value	Year of operation					Responsible agencies	Supporting organizations	Sources	Budget MM Riel
		1st	2nd	3rd	4th	5th				
Strengthen interpretive programs and services.										
8. Assemble relevant materials on local cultures and traditional knowledge for use in interpretive programs.	3	**5**	**10**	**5**	**5**	**5**	FA, MoC	Local authorities, DPs	RGC, Donors, PS, DPs	**30**
9. Strengthen interpretive programs to enhance visitors' tourism experiences, as well as their understanding and appreciation of natural and cultural resources, by providing on-site interpretation through the use of signs and labels, the establishment of visitor centers and wayside exhibits, and the preparation of informative brochures, booklets, and guidebooks.	3	**10**	**12**	**12**	**10**	**10**	FA, MoC	Local authorities, DPs	RGC, Donors, PS, DPs	**54**
10. Encourage wildlife viewing activities at those sites in the PVPF considered to have the most potential for low-impact, nature-based tourism development that are managed to ensure that those activities are sustainable.	3	**12**	**14**	**14**	**12**	**12**	FA, MoT	Local authorities, DPs	RGC, Donors, PS, DPs	**64**
11. Promote forest trekking as a means of improving local livelihoods by developing and improving trails and collaborate with local communities to control livestock grazing in those areas designated for trekking to enhance nature-based tourism experiences.	3	**10**	**12**	**12**	**12**	**10**	FA, MoT	Local authorities, DPs	RGC, Donors, PS, DPs	**56**
12. Provide relevant information to tour operators and tourists on the impacts of tourism activities on biodiversity conservation.	3	**5**	**5**	**5**	**5**	**5**	FA, MoT	Local authorities, DPs	RGC, Donors, PS, DPs	**25**
Total		**195**	**219**	**198**	**194**	**174**				**975**

***Agencies and Organizations**: *PS=Private Sector; MoC=Ministry of Culture; FA=Forestry Administration; PV=Preah Vihear; CK=Choam Ksant; CFA=Cantonment Forestry Administration; DFA=Division Forestry Administration; RGC= Royal Government of Cambodia; MoT=Ministry of Tourism; DPs=Development Partners.*

Table 5.3. Integrated Community Livelihood Development and Engagement Program

Project Management Activities	Priority Value	Year of operation					Responsible agencies	Supporting organizations	Sources	Budget MM Riel
		1st	2nd	3rd	4th	5th				
Reduce dependency on natural resources.										
1. Promote sustainable agricultural and agroforestry practices in designated commune agricultural zones by establishing field demonstration plots and providing local communities with equipment and training required to implement those practices to enhance local livelihoods.	5	**35**	**40**	**40**	**40**	**40**	FA, PV-CFA, Chheb and CK-DFA	DPs, local authorities & communities	RGC, Donors, DPs	**195**
2. Collaborate with local authorities, nongovernmental organizations, and other development partners to establish community enterprises to increase alternative income earning opportunities for local communities and provide training to local communities to increase participation in these, as well as other, sustainable livelihood development programs.	4	**20**	**20**	**20**	**20**	**20**	FA, PV-CFA, Chheb and CK-DFA, DPs, PS	DPs, local authorities & communities	RGC, Donor, PS, DPs	**100**
3. Encourage the planting of trees and other plants that support local livelihoods, such as bamboo, and the cultivation of edible plants, such as mushrooms, to reduce local people's use of wild forest plants.	4	**22**	**34**	**34**	**34**	**34**	FA, PV-CFA, Chheb and CK-DFA, DPs, PDA	DPs, local authorities & communities, PS	RGC, Donors, PS, DPs	**158**
4. Establish and enforce resource use regulations to control access to non-timber forest products used to support the sustainable development of local livelihoods and increase local incomes while maintaining natural resources in the PVPF.	3	**20**	**20**	**20**	**20**	**20**	FA, PV-CFA, Chheb and CK-DFA, DPs	DPs, local authorities & communities, CP	RGC, Donors, DPs	**100**
Enhance local community participation in management.										
5. Support community-based natural resources management in and around the PVPF to reduce the unsustainable utilization of forest resources.	5	**24**	**24**	**24**	**24**	**24**	FA, PV-CFA, Chheb and CK-DFA, DPs	CP, local authorities & communities, DPs, PS	RGC, Donors, DPs	**120**
6. Establish local advisory boards or committees to ensure local participation in management decisions affecting local communities.	4	**10**	**10**	**10**	**10**	**10**	FA, PV-CFA, Chheb and CK-DFA, DPs	CP, local authorities & communities DPs, PS	RGC, Donors, DPs	**50**
Raise awareness.										

Project Management Activities	Priority Value	Year of operation					Responsible agencies	Supporting organizations	Sources	Budget MM Riel
		1st	2nd	3rd	4th	5th				
7. Organize workshops, meetings, and training programs to enhance the understanding among local communities of the contributions to local livelihoods associated with sustainable forest management, biodiversity conservation, and community forestry programs.	5	**10**	**15**	**15**	**10**	**12**	FA, PV-CFA, Chheb and CK-DFA, DPs	CP, local authorities & communities, DPs, PS	RGC, Donors, DPs	**67**
8. Develop environmental education programs that explain the purposes of the PVPF and incorporate information on the environmental effects associated with the unsustainable use of natural resources and the rights and responsibilities of local people with regard to the management of natural resources.	4	**10**	**10**	**10**	**10**	**10 2**	FA, PV-CFA, Chheb and CK-DFA, DPs	CP, local authorities & communities, DPs, PS	RGC, Donors, DPs	**50**
9. Strengthen mutually beneficial working relationships by extending outreach and information exchange initiatives with local communities.	4	**10**	**10**	**10**	**10**	**10**	FA, PV-CFA, Chheb and CK-DFA, DPs	CP, local authorities & communities, DPs, PS	RGC, Donors, DPs	**50**
Total		**161**	**183**	**183**	**183**	**180**				**890**

***Agencies and Organizations**: *DPs=Development Partners; CP=Concerned Parties; PS=Private Sector; FA=Forestry Administration; PV= Preah Vihear; CFA= Cantonment Forestry Administration; CK= Choam Ksant; DFA= Division Forestry Administration; RGC= Royal Government of Cambodia; PDA=Provincial Department of Agriculture.*

Table 5.4. Trans-boundary Protected Forests and Protected Areas Collaborative Management Program

Project Management Activities	Priority Value	Year of operation					Responsible agencies	Supporting organizations	Sources	Budget MM Riel
		1st	2nd	3rd	4th	5th				
Strengthen trans-boundary collaborative management.										
1. Increase the organization of cross-border Bilateral Meetings and other related mechanisms to reinforce trans-boundary actions to reduce illegal forest activities, especially in high-risk areas in and around the PVPF and adjoining protected areas of Thailand and Lao PDR.	4-5	**22**	**24**	**24**	**25**	**25**	FA, PV-CFA, Chheb and CK-DFA	Local authorities & communities, DPs	RGC, Donors, DPs	**120**
2. Establish more effective operational management programs on the basis of the application of the results of cross-border research conducted in Cambodia, Thailand, and Lao PDR to sustain and enhance plant communities and	3-4	**15**	**20**	**20**	**20**	**15**	MAFF, FA	PS, Donors, DPs	RGC, Donors, PS, DPs	**90**

Project Management Activities	Priority Value	Year of operation					Responsible agencies	Supporting organizations	Sources	Budget MM Riel
		1st	2nd	3rd	4th	5th				
populations of landmark wildlife species.										
3. Collaborate with resource managers in adjoining cross-border protected areas of Thailand and Lao PDR to maintain established migratory routes and enhance the connectivity of ecological corridors to facilitate the uninterrupted travel of landmark wildlife species throughout the Emerald Triangle Protected Forests landscape.	3-4	**15**	**20**	**25**	**25**	**20**	MAFF, FA	PS, Donors, DPs	RGC, Donors, PS, DPs	**105**
Expand cross-border exchanges in support of environmental and natural resources conservation.										
4. Increase joint research activities and cooperative research agreements with forestry and resource management departments in participating universities in Thailand, Cambodia, and Lao PDR.	5	**25**	**25**	**35**	**35**	**35**	FA	RUA, RIs, DPs	RGC, Donors, DPs	**155**
5. Promote management exchange programs with cross-border natural resource managers in adjoining protected areas of Thailand and Lao PDR.	3	**20**	**20**	**25**	**25**	**25**	MAFF, FA	PS, Donors, DPs	RGC, Donors, PS, DPs	**155**
Total		**97**	**109**	**129**	**130**	**120**				**585**

*** Agencies and Organizations**: *DPs=Development Partners; RUA=Royal University of Agriculture; FA=Forestry Administration; RIs=Research Institutes; RGC= Royal Government of Cambodia; PV= Preah Vihear; CFA= Cantonment Forestry Administration; CK=Choam Ksant; DFA= Division Forestry Administration; PS=Private Sector; MAFF=Ministry of Agriculture, Forestry and Fisheries.*

Table 5.5. Institutional and Human Resources Development Program

Project Management Activities	Priority Value	Year of operation					Responsible agencies	Supporting organizations	Sources	Budget MM Riel
		1st	2nd	3rd	4th	5th				
Strengthen institutions.										
1. Promote good governance in the implementation of forest resources management programs in the PVPF.	5	**10**	**10**	**10**	**10**	**10**	FA, PV-CFA, Chheb and CK-DFA	CP, RUA, RIs, DPs, PS	RGC, Donors, PS, DPs	**50**
2. Prepare comprehensive descriptions of the activities required to ensure sustainable forest resources management in the PVPF.	4	**5**	**5**	**5**	**5**	**5**	FA, PV-CFA, Chheb and CK-DFA	MAFF, CP, RUA, RIs, DPs	RGC, Donors, PS	**25**
Develop human resources.										
3. Provide specialized training in biodiversity conservation and sustainable forest resources management to local Forestry Administration officers and protected forest officials at the operational level to strengthen resource management capacities.	3	**25**	**25**	**25**	**25**	**25**	FA, PV-CFA, Chheb and CK-DFA	RUA, RIs, DPs	RGC, Donors, DPs	**125**
4. Organize a mass media campaign to increase the public's understanding of the underlying reasons to conserve biodiversity.	3	**20**	**20**	**20**	**20**	**20**	FA, PV-CFA, Chheb and CK-DFA	JICA, PDA, RUA, RIs, DPs	DPs, Donors, DPs	**100**
5. Establish a meaningful rewards system to recognize outstanding performance on the part of local Forestry Administration officers and protected forest officials.	3	**10**	**10**	**10**	**10**	**10**	FA, PV-CFA, Chheb and CK-DFA	MoT, MoE, PDA, RUA, JICA, RIs, DPs	DPs, Donors, DPs	**50**
6. Organize conservation education activities, such as nature conservation camps, for youth enrolled in primary and secondary schools.	2	**10**	**10**	**10**	**10**	**10**	FA, PV-CFA, Chheb and CK-DFA, DPs	PS, local authorities & communities, DPs, PS, CP	RGC, Donors, PS, DPs	**50**
7. Conduct stakeholder workshops on law enforcement and international conventions supporting biodiversity conservation and sustainable forest management practices.	2	**10**	**10**	**10**	**10**	**10**	FA, PV-CFA, Chheb and CK-DFA, DPs	PS, local authorities & communities, DPs, PS, CP	RGC, Donors, PS, DPs	**50**

Project Management Activities	Priority Value	Year of operation					Responsible agencies	Supporting organizations	Sources	Budget MM Riel
		1st	2nd	3rd	4th	5th				
Increase internal cooperation.										
8. Establish effective mechanisms for improving internal cooperation between government and non-government institutions involved with development through the conservation of biodiversity in the PVPF.	3	**10**	**10**	**10**	**10**	**10**	FA, PV-CFA, Chheb CK-DFA DPs	PS, local authorities & communities, DPs, CP	RGC, Donors, PS, DPs	**50**
9. Develop a user-friendly, interactive database that links agencies and organizations to facilitate information exchanges associated with the sustainable management of resources in the PVPF.	3	**10**	**10**	**10**	**10**	**10**	FA, PV-CFA, Chheb CK-DFA DPs	PS, local authorities & communities, DPs, CP	RGC, Donors, PS, DPs	**50**
Total		**110**	**110**	**110**	**110**	**110**				**550**

*** Agencies and Organizations***: *DPs=Development Partners; MoT=Ministry of Tourism; RUA=Royal University of Agriculture; FA=Forestry Administration; RIs=Research Institutes; CP=Concerned Parties; RGC= Royal Government of Cambodia; PV= Preah Vihear; CFA= Cantonment Forestry Administration; CK=Choam Ksant; DFA=Diivision Forestry Administration; PS=Private Sector; MAFF=Ministry of Agriculture, Forestry and Fisheries; PDA=Provincial Department of Agriculture; MoE=Ministry of Environment; JICA=Japanese International Cooperation Agency.*

Table 5.6. Research and Monitoring Program

Project Management Activities	Priority Value	Year of operation					Responsible agencies	Supporting organizations	Sources	Budget MM Riel
		1st	2nd	3rd	4th	5th				
Evaluate management applications of research results.										
1. Review previous research conducted in the PVPF and use the results of those evaluations to strengthen sustainable resource management practices.	5	**10**	**10**	**10**	**10**	**10**	FA, PV-CFA, Chheb and CK-DFA	DPs, JICA, DAD, RUA, RIs, DTM	RGC, Donors, PS, DPs	**50**
Expand research on selected landmark wildlife species and plant communities.										

2. Organize planned research on the ecology, habitats, and distributions of selected landmark wildlife species, including rare, endangered and endemic species, to support the development of species-specific management plans.	5	**30**	**30**	**30**	**30**	**30**	FA	RUA, RIs, DPs	RGC, Donors, DPs	**150**
3. Organize a program of research to investigate ecological relationships in plant communities, as well as individual plant species, including native species of wild orchids, insectivorous plants, medical plants, and other rare, endangered and endemic plant species, to strengthen management applications.	4	**10**	**10**	**10**	**10**	**10**	FA	RUA, RIs, DPs	RGC, Donors, DPs	**50**
4. Investigate the impacts of recreation and nature-based tourism on natural areas, especially in those areas in the PVPF where the most intensive recreation and nature-based tourism activities occur.	4	**10**	**10**	**10**	**10**	**10**	FA, PV-CFA, Chheb and CK-DFA	Donors, JICA, DPs, RUA, RIs	RGC, Donors, PS, DPs	**50**
5. Organize a study of the impacts of invasive alien species on the ecological integrity of evergreen, semi-evergreen, and deciduous forests in the PVPF.	3	**10**	**10**	**10**	**10**	**10**	FA, PV-CFA, Chheb and CK-DFA	Donors, JICA, DPs, RUA, RIs	RGC, Donors, PS, DPs	**50**
Broaden research on land and natural resources of the PVPF.										
6. Conduct periodic studies of the current status and dynamics of the drivers of deforestation and forest degradation affecting land use change in the PVPF and incorporate the results of those assessments into a model used to predict land use change.	4	**10**	**10**	**10**	**10**	**10**	FA, PV-CFA, Chheb and CK-DFA	Donors, JICA, DPs, RUA, RIs	RGC, Donors, DPs	**50**
7. Organize assessments of carbon stocks, growth patterns of commercial tree species, and the conservation of gene pools of commercial and non-commercial tree species in the PVPF.	4	**25**	**25**	**25**	**25**	**25**	FA, PV-CFA, Chheb and CK-DFA	Donors, JICA, DPs, RUA, RIs	RGC, Donors, PS, DPs	**125**
8. Conduct economic valuations of selected ecosystem goods and services in the PVPF.	4	**10**	**15**	**15**	**15**	**10**	FA, PV-CFA, Chheb and CK-DFA	Donors, JICA, DPs, RUA, RIs	RGC, Donors, PS, DPs	**65**
9. Organize a long-term study to monitor the transmission of diseases between domestic and wild	3	**15**	**15**	**20**	**15**	**15**	FA, PV-CFA, Chheb and CK-DFA	Donors, JICA, DPs, RUA, RIs	RGC, Donors, PS, DPs	**80**

animals in the PVPF.										
10. Organize a long-term study to monitor the importance of seasonal watering holes (trapeangs) to domestic animals and wildlife in the PVPF.	3	**14**	**14**	**14**	**14**	**14**	FA, PV-CFA, Chheb and CK-DFA	Donors, JICA, DPs, RUA, RIs	RGC, Donors, PS, DPs	**70**
Increase understanding of local communities.										
11. Organize periodic surveys to monitor variations in the socio-economic characteristics of local communities living in and around the PVPF.	4	**12**	**12**	**12**	**12**	**12**	FA, PV-CFA, Chheb and CK-DFA	Donors, JICA, DPs, RUA, RIs	RGC, Donors, PS, DPs	**60**
12. Conduct periodic surveys of the attitudes of local communities toward protected areas, natural resource conservation, and biodiversity and use the results in environmental education and public outreach programs.	3	**10**	**10**	**10**	**10**	**10**	FA, PV-CFA, Chheb and CK-DFA	Donors, JICA, DPs, RUA, RIs	RGC, Donors, PS, DPs	**50**
Total		**166**	**171**	**176**	**171**	**166**				**850**

*__Agencies and Organizations:__ *CFA= Cantonment Forestry Administration; CK= Choam Ksant; DFA= Division Forestry Administration; FA=Forestry Administration; JICA=Japanese International Cooperation Agency; DPs=Development Partners; PS=Private Sector; PV= Preah Vihear; RIs=Research Institutes; RGC= Royal Government of Cambodia; RUA=Royal University of Agriculture.*

Chapter 6

CONCLUSIONS

The Preah Vihear Protected Forest (PVPF), which is located in Northern Cambodia, is an important component of the Indo-Burma Biodiversity Hotspot. The forests and forest resources of the PVPF have national significance and assume vital socioeconomic and biodiversity protection roles, while contributing to the mitigation of the impacts of climate change not only in Cambodia, but throughout the region.

The forest resources of the PVPF provide fuelwood, charcoal, wood for construction and other uses in Preah Vihear and neighboring provinces if the utilization of those resources is accountable and in accordance with the Forestry Law.

The revised and updated ***Preah Vihear Protected Forest Management Plan 2016 - 2020*** describes the objectives, zoning classifications, and principal program activities and budget requirements for conserving the resources and maintaining the biodiversity of the PVPF. Immediate interventions are included as part of a comprehensive package of management measures required to protect, maintain, and implement this management plan.

The budget requirements for funding the main elements of the management plan amount to 7,746 million Riels (equivalent to US $ 1,936,500) over a period of five years. The implementation of the program activities will provide:

- Employment to 200 local people.
- Income of US $ 1.25 million for improving community living standards and the local economy.
- Use of the Preah Vihear Forest and Wildlife Research Station with equipment for supporting planned research and monitoring activities.
- Protection of 200,000 hectares of Permanent Forest Reserve.
- Increased Government revenues through the collection of taxes, royalties on nature-based tourism services, and other infrastructure constructed while implementing this management plan.

Managing the natural resources of the Preah Vihear Protected Forest in a sustainable manner that is consistent with the socioeconomic goals of the National Forestry Policy and Sustainable Development Goals will require:

- Participation, manpower, funding, and political support from concerned institutions and stakeholders to implement the six program activities that are outlined in Chapter 4 and Chapter 5 of this management plan.
- The training of local Forestry Administration officers, protected forest rangers, and other stakeholders in natural resources and forest management, watershed protection and biodiversity conservation, community-based nature-based tourism and natural resources management.
- Supplies, equipment, and facilities, as well as additional staff for managing the PVPF.

Implementation of these Program activities over the long term will:

- Improve the standard of living of local communities living in and around the planning area, as well as ensure food security throughout the region.
- Strengthen the capacity of forestry officers, local communities and involved authorities to practice transparent forest resources management and contribute to the development and use of natural resources in a sustainable and equitable manner.
- Strengthen good governance associated with forest resources management and enhance the effectiveness of law enforcement.
- Increase the productivity of forests and forest resources.
- Assure protection of plant and wildlife biodiversity.

BIBLIOGRAPHY & REFERENCES

Asian Development Bank (May 2005 *Strategic Framework and Technical Assessment 2005-2014.* Greater Mekong Sub-region (GMS) Biodiversity Conservation Corridors Initiative.

Bryan L. Stuart, Peter Paul van Dijk and Douglas B. Hendrie (2001) *A Photographic Guide to the Turtles of Thailand, Laos, Vietnam and Cambodia*. Wildlife Conservation Society.

Cambodia Tree Seed Project (CTSP), 2001, Some Endangered Species of Cambodia, Unpublished

Charles D. Crocker, (1962) *The soils of Cambodia*. Ministrére de L'Agriculture, Royaume du Cambodge

Chheang Dany, (2002) *Species Monographs. The 21 Priority Tree Species for Forest Gene Conservation in Cambodia.* CTSP, DFW-DANIDA, Unpublished

Chheang C., Weiler H., Kuy T., Sam H. (2001). *Chow Rovess: A report on the status, distribution and issues surrounding the domesticated Asian elephant in Cambodia.*

Chheang Dany, Hunter W., Kuy Tong & Sam Han (2001). *The Status, Distribution and Management of the Domesticated Asian Elephant in Cambodia. In Giants On Our Hands, pp. 79-88*. RAP publication: 2002/30, Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific. Bangkok, Thailand 2002.

Collar, N.J. Crosby, M.J & Stattersfield, A.J. (1994) *Birds to watch2: The World List of Threatened Birds.* BirdLife Conservation Series4, Cambridge, UK.

Community Wildlife Ranger Program of FA-CAT (2005) *Programme Report of Project Activities.*

Cox, M.J. (1991) *The Snakes of Thailand and their Husbandry*. Krieger, Malabar, Florida.

Craig Robson A Field Guide to the Birds of South-East Asia, Thailand, Peninsular Malaysia, Singapore, Myanmar, Laos, Vietnam, Cambodia.

Dy Phon, 2000, *Dictionary of Plants used in Cambodia.*

Dy Phon, P., (1982) *Végétation du Cambodge: endemisme et affinités de sa flore avec les région voisines, C.R. Séances Soc*. Biogéogr, 58 (3): 135-144.

Dy Phon, P., (1981) *Contribution a l'Etude de la Vegetation du Cambodge*. Ph.D Thesis, Universite de Paris –Sud, Centre d'Orsay, Paris.

FAO, (2015) *Global Forest Resource Assessment 2015.* Food and Agriculture Organization of the United Nations; Rome, 2015.

Forestry Administration, (2016). *Cambodia Forest Cover Assessment 2014 (*Draft).

Forestry Administration, (2012). *Cambodia Forestry Statistics 2010.*

Forestry Administration, (2011) *Cambodia's Forest Cover Assessment 2010.*

Forestry Administration, (2010). *The Management Plan of the Preah Vihear Protected Forest for Plant and Wildlife Genetic Resources Conservation 2010-2014*. Phnom Penh, Cambodia

Forestry Administration, (2005). *Explanation of Terminology Used in Forestry Law*.

Forestry Administration (2004) *List of Trade Names of Commercial Wood in Cambodia, Trade Names of Commercial Wood*, unpublished.

ITTO, (2005) *Achieving the ITTO Objective 2000 and Sustainable Forest Management in the Kingdom of Cambodia*

IUCN, (2016) Red List of threatened species. www. Redlist.org.

IUCN, (1995) *Centres of Plant Diversity, Volume 2 –Australia, Asia and the Pacific*. IUCN, Gland, Switzerland.

IUCN, (1994) *Categories, Objectives and Criteria for Protected Areas*. IUCN, Gland, Switzerland.

IUCN, (1984) *Guidelines for Protected Area Management Categories*. IUCN, Gland, Switzerland.

Joint Royal Government of Cambodia and Donor Committee (2004) *Independent Forest Sector Review.*

Khorn Saret (2002) *Distribution of Selected Tree Species for Gene Conservation in Cambodia.*

Men Soriyun, Joe Walston (2008) *A Guide to The Mammals of Cambodia FA/WCS/MoE.*

Merel J. Cox, Peter Paul van Dijk, Jarujin Nabhitabhata and Kumthorn Thirakhupt, (1988) *A Photographic Guide to Snakes and Other Reptiles of Peninsular Malaysia, Singapore and Thailand.* New Holland.

Miller, K.R and Hamilton, L.S., (1999) *Editorial: Bioregional approach to Protected areas. Parks 9:1-6.*

Ministry of Planning (2016). *Cambodia Agriculture Census 2014. Phnom Penh, Cambodia.*

National Institute of Statistic, (2014). *Commune Database, 2013.* Ministry of Planning.

Royal Forest Department, (2015). The management Plan of The Pha Taem protected Forest Complex (Revised). Bangkok, Thailand.

Royal Government of Cambodia (2015). *National Strategic Development Plan 2014-2018.*

Royal Government of Cambodia 2004: "*Rectangular Strategy*" for Growth, Employment, Equity and Efficiency".

Royal Government of Cambodia 2002: "*National Poverty Reduction Strategy 2003-2005"*.

Soun Phalla (2002), *Wildlife Identification for Law Enforcement*, DFW, WCS and TRAFFIC Southeast Asia-Indochina.

Turner, M.G., Gardner, R.H and O'Neill, R.V., (2001) *Landscape Ecology in Theory and Practices: Pattern and Process.* Springer, New York, USA.

Sareun Sithika (2004). *A study of Wood Consumption in Thbeng Meanchey District of Cambodia*

Seila Programme 2008: http:\\www.seila.gov.kh

World Bank, (2004) *Cambodia Independent Forestry Sector Review – Comments and Proposals Going Forward', October 2004.*

Zich, F.A. and Compton J., (2001) *The Final Frontier: Towards Sustainable Management of Papua New Guinea's Agarwood Resource*. TRAFFIC Oceania, WWF South Pacific Programme

FOREST MANAGEMENT REGULATIONS, LEGISLATIONS AND GUIDELINES

Law on Forestry (2002)

Law on Environmental Protection and Natural Resource Management (Nov. 1996)

Royal Government of Cambodia, (2002) Statement of the Royal Government on National Forest Sector Policy.

Sub Decree No. 53 on Legal Procedure for Establishment, Classification and Registration of the Permanent Forest Estates (Apr. 2005)

Sub Decree No. 118 on the State land Management (2005)

Sub-decree No. 76 on Establishment of *Preah Vihear Protected Forest for Forest and Wildlife Genetic Resources Conservation* 30 July 2002

Declaration Number 089, dated 14 February 2005: The Forest-Non Timber Forest Product are prohibited. Ministry of Agriculture Forestry and Fisheries.

Declaration Number 020, dated 25 January 2007: The Classification and List of Wildlife Species. Ministry of Agriculture Forestry and Fisheries.

Guidelines for Sustainable Forest Management, (2000, Department of Forestry and Wildlife). Phnom Penh Cambodia

a) Guidelines for Forest Concession Management Planning System;
b) Construction Guidelines for Forest Engineering Works;
c) Guidelines for Special Management Area Management;
d) Bio-diversity Conservation Guidelines for the Managed Forests;
e) Guidelines for Socio-Economic Surveys of Communities Surrounding Forest Concession Areas.
f) Guidelines for Environmental Impact Assessment for Forest Concessions;
g) Guidelines for the Evaluation of Environmental Impact Assessment for Forest Concessions.

Glossary used in the Management Plan of the Preah Vihear Protected Forest for Plant and Wildlife Genetic Resources Conservation

Classification of Forest Types

Forest Definition
According to FAO Forest definition, forest cover is defined as follow:

- An area is considered as forest if the tree cover (= crown cover) is more than 10% and area of more than 0.5 hectares. The trees should be able to reach height 5 meters.

The 1996/1997 interpretation of MRC/GTZ contained eighteen categories, including structure and density elements. These were, of necessity, merged in this study into five global Cambodia forest and land cover types 2002. These included evergreen forest (evergreen dense, disturbed and mosaic), semi-evergreen forest (semi-evergreen dense, disturbed and mosaic), deciduous forest (including deciduous mosaic), other forest (including re-growth, wood and shrubland, stunted, plantations, mosaic of cropping, bamboo, and mangrove forest) and non-forest (including grassland, wetland, agriculture land, water body and urban areas).

Evergreen Forest: Evergreen forests are usually multi-storied with trees that maintain their leaves throughout the year. They are usually sited on hilly plateaus and along streams and rivers (gallery forest). The identification of evergreen forests on satellite images is facilitated by the appearance of a particular dark red tone and medium to rough texture that is characteristic of this forest type.

Semi-(or Mixed) Evergreen Forest: *Semi*-evergreen forests contain variable percentages of evergreen and deciduous trees, the percentage of evergreen trees varying from 30 to 70%. Semi-evergreen forests continue to appear evergreen throughout the year, even when the percentage of deciduous trees is high. Since deciduous trees drop their leaves in the dry season, the spectral signature at that time of the year generally appears more brownish or grayish. The variability of this land cover type class is high and depending on the proportion of leaf shedding trees and overall appearance, some parts of dry evergreen forests may have been mapped into this land cover type.

Deciduous Forest: This land cover type contains dry mixed deciduous forests and dry Dipterocarp forest. Deciduous forests drop their leaves more or less completely during dry season. Its spectral signature varies from brownish green to bluish grey during the dry season with a medium to smooth texture. The incidence of human impacts, including fire, is usually much higher in deciduous forests than in other forest types. Dry Dipterocarp forests naturally have an open character. Since, undisturbed, they may have a crow cover of only 40%, soil and grass may have a significant impact on reflections from these from these forests. As a result, it is almost impossible to separate deciduous forest from shrubland during the dry season.

Other Forest: This land cover type included re-growth, wood and shrubland, stunted forest, bamboo forests, mangrove forests, inundated forests, and industrial forest plantations. Re-growth of secondary forest is representative of a continuous, usually dense, layer of smaller trees. Stunted forests grow very slowly because of poor site conditions on hydromorphic soils and rock outcrops.
Heavily disturbed forest like mosaic of forest is more than 40%, and areas of old re-growth and young secondary forest in the process of regenerating after clear cutting, are also included in this category.

Non Forest: This category merges agriculture areas, urban areas, bodies of water, and grassland.

The Permanent Forest Estates consist of:

1- Permanent Forest Reserves; and
2- Private Forests

The Permanent Forest Reserves consist of three categories:

1- Production Forests shall be maintained in a manner to allow for the sustainable production of Forest Products and By-products, and their protection function considered as a secondary priority. Production Forests consist of the following:
- Forest Concessions;
- Production Forests not under concession;
- Forests rehabilitated;
- Reserve Forestland for reforestation or tree plantation;
- Reserved forestland for forest regeneration;
- Degraded Forestland; and
- Community Forests under agreement.

2- Protection Forests shall be maintained primarily for protection of the forest ecosystems and natural resources therein. Protection Forests consist of the followings:
- Reserve Forests for special ecosystems;
- Research forests;
- Forests for regulating water sources;
- Forests for watershed protection;
- Recreation forests;
- Botanical gardens; and
- Religious forests.

Local communities have customary user rights to collect Forest Products & by-products within the Protection Forest with minor impact of the forests.

3- Conversion Forestland for other development purposes is idle land, comprised mainly of secondary vegetation, not yet designated for use by any sector that shall be classified as Permanent Forest Reserves until the Royal Government decide to use and develop the land for another purpose.

Private Forest shall be maintained by the owners with the interesting rights to manage, develop, and harvest, use, sell and distribute the products by themselves.

Production Forest: Forest area having the primary function for sustainable production of Timber and Non-Timber Forest Products. Production forest includes forest concession; forest permitted for harvesting, degraded forest, forest to be rehabilitated, reserved area for forest regeneration or forest plantation, reforested areas and forest areas under agreement between the Forestry Administration and the local community.

Protection Forest: Forest area having the primary function for protecting the forest ecosystem including the water resources regulation; conservation of biodiversity, land, water, watershed and catchments areas; wildlife habitat, fishes, prevention of floods, erosions, sea water intrusion; soil fertility and valuable for cultural heritage which serve the public interests. Protection forest under this Law does not include the protected areas under the jurisdiction of Ministry of Environment pursuant to the Environmental Protection and Natural Resources Management Law.

Conversion forestland for other development purposes: Idle forestland, covered mainly by secondary vegetation that is not yet designated for any use, and shall be classified temporarily as Permanent Forest Reserve. Private Forest shall be maintained by the owners with the interesting rights to manage, develop, and harvest, use sell and distribute the products by themselves. It is also idle area, comprised mainly of secondary vegetation, not yet designated for use by any sector that shall be classified as Permanent Forest Reserves until the RGC decides to use and develop the land for another purpose.

Permanent Forest Reserve: State forest covered on lands, excluding land that is privately owned, and categorized as production forest, protection forest and conversion forestland for other development purposes.

Forest Concessions: A part of State Production Forests and having potential product supply that the RGC may grant temporary (or can be suspended) to any person, legal entity who is professional career and personal resource through public bid in order to obtain sustainably the rights of management, development and harvesting of forests within specific term based on Investment Agreement and the Forestry Law and Related Regulations under the law,

Production Forests not under Forest Concession: A part of Production Forests that is not under Forest Concession or Production Forests have been prepared for annual forest coup by the Forestry Administration with the priority use to meet domestic annual consumption for Forest Products and By-products (NTFPs).

Forests Rehabilitated: A part of Production Forest territory that is under low degraded condition and require to intervene silviculture through Enrichment Tree Planting of indigenous species or maintaining Natural Regeneration.

Degraded Forestland: A part of Production Forests which is forest cover and forest resources have been continuously decreased for a long period, including the changing of Forest Structure.

Reserved Forestland for Reforestation or Tree Planting: A part of Production Forest territory that is under a very long time degraded condition and have been reserved for Forest Re-growth by Tree Planting or Seed Sowing.

Reserved Forestland for Regeneration and Seed Source: A part of Production Forest territory or In-Situ Ecosystem where are abundant valuable forest genetics and have potential seed supply that have been reserved for Mother Trees and conservation of genetics, valuable substances for generation, and potential for supply as seed source, silviculture or for generation naturally.

Community Forests under Agreement - State Forest which has been provided to community under an Agreement between Cantonment of Forestry Administration and CF committee based on the concept of Forests for livelihood and Traditional Use of Local People and have been agreed on sustainable management and utilization of the forests.

Private Forests: Dimensioning/ demarcating on the map and at the field site as Forest Cover, Area, Forest Types, Stock, and Boundary and attach map.

Private Forest: Forest plantation or trees, whether planted or naturally grown on private land under registration and legal title in pursuant to authorized legislation and procedures.

Reserve Forests for Special Ecosystems - A protected territory where is the ecosystem provides special habitats for forest vegetation or wildlife species.

Research Forests: A part of Protection Forests where has been established for the purpose of research studies, experiments or demonstration of silvi-culture techniques or forestry science.

Forests for Regulating Water Resources: A part of Protection Forests that has its function of regulation to the priority of water resources and water cycle.

Forests for Watershed Protection: A part of Protection Forests that has with the priority use to meet its protection functions of the forest area and steep slope easily to worn out by erosion or called Watershed Catchments.

Recreation Forests: A part of Protection Forests that has Special Natural Landscape and have been established for recreation service and eco-tourist.

Memorial Gardens: An area or station for tree planting in the occasion of National Anthem or Wedding Ceremony…

Botanical Gardens: An area or Experimental Station for planting indigenous species represented various environment both in-situ & ex-situ. The botanical garden can be forested area represented forest ecology that is conserved origin plant composition as sample.

Spirit and Religious Forests: A part of Protection Forests where is local community has retained belief/ spirits in accordance with their tradition and culture, and have been kept as religious forest.

Forestland for converting to Other Development Purposes: Forestland for converting to other Development Purposes is idle land, comprised mainly of secondary vegetation, not yet designated for use by any sector that shall be classified as Permanent Forest Reserves until the RGC decides to use and develop the land for another purpose.

Forest Resources: Biological resources within a specific forest area including forest vegetation and wildlife resources, all categories and species and other non-biological resources located therein, except mines underground.

Forest: A unit of natural or artificial forest ecosystem, in the form of wet, inundated or dry land, covered by mixed vegetation, either natural or planted, including wildlife and other natural resources located therein, which the main utilizations are the production of Timber Products and Non-Timber Forest Products, and other forest services. Lands to which this law does not apply include all land designated by the State as permanent agricultural land, including: farms, idle land to be designated for other agriculture production than timber production, industrial areas, and land for urbanization and construction.

Forest Products & By-products: Products provided by the forest including Timber Products and Non-Timber Forest Products, their processed products and other services provided by the forest.

Forestry Administration: The government authority at all level with the mandate to manage the forest consistent with the National Forest Policy and this law.

Permanent Forest Estate: The overall forest complex, natural and planted, in the Kingdom of Cambodia, including State and Private, designated as two main categories: the Permanent Forest Reserve and Private Forest, to be maintained to ensure a sustainable permanent forest cover and use.

Local Community: Community tribe or a group of people whose home residence is inside or nearby the State forest and having their custom, religious belief and culture that depend on Forest Products& By-products for their subsistence.

Forestry Community: A voluntary community that assembles under a Community Forest Agreement for implementing the sustainable use and development of forest resources conforming to the provision of this law.

Non-Timber Forest Products: Products other than timber that are extracted from the forest including Non-Timber plant products, Wildlife products and services provided by forests. These products shall be determined by Prakas of Ministry of Agriculture, Forestry and Fisheries.

Land of Indigenous Community: Land eligible for registration by the State as community property under the Land Law.

Forest Ecosystem: The community dynamic complex and interaction of living (Forest and Wildlife vegetation and microorganism) and non-living (climate, microclimatic, soil and water) organism within a specific forest area that contributes to its edification and plays the role as a functional unit on the planet. Humans with their economic, traditional, cultural and environmental needs are also an integral part of forest ecosystem.

- Permanent Forest Reserves can be declassified to develop other development sectors such as Industrial Crops, Agro-Industrial Crops or other sectors which are higher economical and social benefits than previous demands of forest products. The Ministry of Agriculture, Forestry and Fisheries may request the RGC to designate other idle forestland for the purposes of protection and reforestation to replace areas of Permanent Forest Reserves that have been declassified.

IUCN Endangerment Status Categories

- **Extinct (Ex)**

  A species is Extinct when there is no reasonable doubt that the last individual has died.

- **Extinct in the Wild (EW)**

A species is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range. A species is presumed extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal annual throughout its historic range have failed to record an individual. Surveys should be over a timeframe appropriate to the species' life cycle and life form.

- **Critically Endangered (CR)**

A species is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.

- **Endangered (EN)**

A species is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future.

- **Vulnerable (VU)**

A species is vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future.

- **Lower Risk (LR)**

A species is Lower Risk when it has been evaluated, but does not satisfy the criteria for any of the categories of Critically Endangered or Vulnerable.

- **Data Deficient (DD)**

A species is Data Deficient when there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status. A species in this category may be well studied and its biology well known but appropriate data on abundance and/or distribution are lacking Data Deficient is therefore not a category of threat or Lower Risk. Listing of species in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many eases, great care should be exercised in choosing between DD and threatened status. If the range of a species is suspected to be relatively circumscribed, or if a considerable period of time has elapsed since the last record of the species, threatened status may well be justified.

- **Not Evaluated (NE)**

  A species is Not Evaluated when it has not yet been assessed against the criteria.

The CITES appendix

These categories reflect the level of threat posed by international trade. Unlike global and national threat categories, CITES categories have a regulatory effect in trade between countries that are parties to the Convention on International trade in Endangered Species of Wild Fauna and Flora. Cambodia is one of these countries, having signed an agreement to be part of this convention.

Appendix I: Species threatened with extinction that are or may be affected by trade. Trade in specimens between parties is only authorized in exceptional circumstances (such as import and export of scientific purposes).

Appendix II: Species, which although not necessarily now threatened with extinction may become so unless trade in specimens is subject to strict regulation in order to avoid over-utilization. Species may also be listed in Appendix II because their similarity to more threatened species, as an aid to enforcement. Commercial trade in wild specimens listed on Appendix II is permitted between members of the convention, but is controlled and monitored through licensing system.

Appendix III: Species for which trade in wild specimens is permitted, but for which in certain CITES signatory countries requires appropriate regulation and documentation.

Appendix 1.1: Monthly Rainfall from 2002-2015

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2002	0	0	5	129	191	256.5	114.5	328.5	337.5	54	78.5	17	**1,511.50**
2003	0	13	48	56.5	301	227	194	208	286	100	29	7	**1,469.50**
2004	0	16	27	51.5	84.5	219	178	234	317.5	195	23	0	**1,345.50**
2005	0	0	11	74	166	190	233	195	327	146	64	46	**1,452.00**
2006	0	34	79	86	127	154	282.5	258.5	201	264.5	0	38	**1,524.50**
2007	0	0	14	89.5	319.5	134	457	590.5	257.5	107	66	0	**2,035.00**
2008	2.2	8.2	49.7	150	336.9	279.7	209.1	145.9	320	250.9	53	0	**1,805.60**
2009	0	3.7	13.8	94.6	179.9	177.3	310.5	152.7	532.4	126.2	41.8	0	**1,632.90**
2010	15.3	0	0.1	12.6	81.3	157.9	270.5	264.1	272.9	226	0	0	**1,300.70**
2011	0	0	86.1	175.7	111.7	190.5	194.8	225.1	537.2	294.6	29.8	4.6	**1,850.10**
2012	0.4	0	3.2	39.1	147.6	153.9	212.7	164.1	500	160.3	61.9	15	**1,458.20**
2013			61.0	183.1		188.2		178.8	503.6	326.2	-	-	**1,440.90**
2014	-	49.0		159.0	135.4	289.5	348.6	248.6	249.5	99.7	10.0		**1,589.30**
2015		-	44.5	51.6	79.6	154.5	409.6	281.8	184.4	153.2			**1,359.20**
Total	**17.9**	**74.9**	**336.9**	**958.5**	**2046.4**	**2139.8**	**2656.6**	**2766.4**	**3889**	**1924.5**	**447**	**127.6**	
Monthly mean	**1.49**	**9.53**	**34.03**	**96.59**	**173.95**	**198.00**	**262.68**	**248.26**	**344.75**	**178.83**	**35.15**	**10.63**	**1,593.89**
Max	**15.3**	**49.0**	**86.1**	**183.1**	**336.9**	**289.5**	**457.0**	**590.5**	**537.2**	**326.2**	**78.5**	**46.0**	**2,035.00**

Source: Kulen Meteorology, Siem Reap province from 2002-2015

Appendix 1.2: Monthly Temperature from 1994-2012

A-Monthly Maximum Temperature from 1994-2012

Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
1994	31	32.9	34.3	37.8	35.2	32.5	32.5	32.9	31.5	32	29.3	29	**32.5**
1995	31.2	32.3	32.6	38.9	35	34.5	32	30.6	31.3	30.2	30	29	**32.3**
1996	31.6	32.5	33.2	37.5	36.9	33.6	32.6	31.5	32	29.8	30.2	29.1	**32.5**
1997	31.2	32	33.6	36.8	36.5	33.8	30.3	31	31	29	30.1	30	**32.1**
1998	31.5	33.2	34.5	35.9	34.6	35.6	32.2	31.5	32	29.6	29.8	30.6	**32.6**
1999	31.4	32.3	35.2	35.6	35.6	33.4	32.5	31.6	31.5	30	29	30.2	**32.4**
2000	30.3	35.2	35.3	35.6	35.4	33.1	32.6	31.3	30.6	30.5	29.5	30.5	**32.5**
2001	31.5	34.4	36.2	35.7	35.6	33	32	32	30.4	30.6	29.6	30	**32.6**
2002	34.7	35.5	37.9	38.6	37.7	37	34.7	34	32.5	32.5	32.6	32.7	**35**
2003	33.2	34.5	36.2	37.8	38.5	36.5	35.6	34.7	33	0	0	0	**35.6**
2004	32.0	32.8	35.7	36.6	35.5	33.2	33.0	32.6	31.8	31.7	32.4	30.9	**33.2**
2005	31.3	34.0	35.0	36.5	35.6	32.3	32.2	32.2	31.5	31.5	31.4	29.3	**32.7**
2006	31.6	33.2	34.2	34.9	35.0	34.6	32.8	32.4	31.7	31.0	32.0	31.5	**32.9**
2007	31.6	32.9	34.8	35.7	33.5	33.9	32.9	32.1	32.4	31.3	30.9	31.6	**32.8**
2008	31.8	31.9	33.9	35.5	33.1	32.9	32.9	32.9	31.4	32.2	30.1	29.7	**32.4**
2009	31.8	31.9	34.2	34.9	33.2	33.0	33.2	32.9	31.4	31.9	30.3	29.4	**32.3**
2010	31.9	34.2	37.0	39.2	37.7	35.6	33.7	32.2	32.6	31.8	31.2	31.6	**34.1**
2011	30.4	32.7	32.3	32.4	34.1	32.2	33.0	31.9	30.1	30.5	32.5	30.3	**31.9**
2012	31.8	34.0	34.7	35.9	35.8	34.4	33.8	33.4	30.7	32.3	32.8	33.6	**33.6**
Monthly Total	**317.6**	**333.9**	**349.0**	**370.2**	**361.0**	**343.0**	**327.0**	**321.1**	**315.8**	**274.2**	**270.1**	**271.1**	
Monthly Mean	**31.7**	**33.3**	**34.8**	**36.4**	**35.5**	**34.0**	**32.9**	**32.3**	**31.5**	**29.4**	**29.1**	**28.9**	**32.9**
Max	**34.7**	**35.5**	**37.9**	**39.21**	**38.5**	**37**	**35.6**	**34.7**	**33**	**32.5**	**32.8167**	**33.5677**	**35.6**

Source: Kulen Meteorology, Siem Reap province from 1994-2012

B. Monthly Minimum Temperature from 1994-2012

Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
1994	20.9	21.9	25.5	23.8	24.5	24.4	24.9	25	25.1	23.2	24.2	24	**24**
1995	22.2	21.4	23.6	25.3	25.1	24.7	24.7	24.7	24.6	24.4	24	23.5	**24**
1996	20.3	22.1	24.4	25.7	25.5	24.7	25	25	25.1	25.1	24.7	23.5	**24.3**
1997	19.8	22	27.4	25	25.2	24.6	24.8	24.8	24.4	24	22.8	21.3	**23.8**
1998	19.4	22.1	29.5	24.8	25.5	24.7	24.5	24.5	23.8	23.2	21.6	20.6	**23.7**
1999	19.8	18.8	23.6	24.6	24.7	24.8	24.7	24.7	24.6	23.5	21.4	19.3	**22.9**
2000	19.6	20.8	24.7	25.6	26.1	24.9	24.9	25.2	24.7	24.6	22.8	20.1	**23.7**
2001	19.9	20.5	25.2	25.3	25.5	25	25.1	25.4	24.9	24.3	23.2	19.8	**23.7**
2002	29.5	31.5	31.7	32.3	28.5	30.8	30	27.6	28.5	29	27.2	28.9	**29.6**
2003	26.8	29.5	29.8	31.3	31.5	31.6	29.9	28.8	30	-	-	-	**29.9**
2004	21.6	22.2	24.5	25.2	25.7	24.7	25.1	25.5	24.9	23.9	23.4	19.5	**23.9**
2005	20.1	23.0	23.9	25.7	25.7	24.3	24.8	24.7	31.7	24.2	23.3	20.6	**24.3**
2006	21.0	23.1	24.1	24.6	24.5	24.2	24.5	24.4	24.2	24.3	23.5	20.8	**23.6**
2007	19.7	21.3	24.7	25.1	24.7	25.8	24.7	24.9	24.9	23.7	20.0	21.0	**23.4**
2008	18.5	19.6	21.8	24.0	24.2	24.4	24.3	24.5	24.0	24.3	22.2	20.1	**22.7**
2009	21.0	21.4	23.5	25.5	25.2	25.4	25.2	25.0	24.7	25.2	22.6	20.1	**23.7**
2010	21.8	24.1	24.8	26.8	27.0	26.1	25.3	25.2	25.4	25.9	22.9	21.6	**24.7**
2011	18.9	22.4	22.8	23.9	25.5	24.8	24.9	24.9	25.1	24.3	23.6	20.3	**23.5**
2012	21.8	23.7	23.9	25.6	26.3	25.7	25.3	25.8	24.9	25.5	26.1	23.6	**24.9**
Monthly Total	**402.5**	**431.3**	**479.5**	**490.1**	**490.8**	**485.5**	**482.5**	**480.6**	**485.6**	**442.7**	**419.5**	**388.7**	
Monthly Mean	**21.2**	**22.7**	**25.2**	**25.8**	**25.8**	**25.6**	**25.4**	**25.3**	**25.6**	**24.6**	**23.3**	**21.6**	**24.4**
Min	**18.5**	**18.8**	**21.8**	**23.8**	**24.2**	**24.2**	**24.3**	**24.4**	**23.8**	**23.2**	**20.0**	**19.3**	**22.7**

Source: Kulen Meteorology, Siem Reap province from 1994-2012

Appendix 1.3a: Key Forest Trees Species of PVPF

In accordance with Species Monograph of 21 Priorities Forest Trees Species for Forest Gene Conservation in Cambodia (Chheang Dany 2002), the PVPF contains several priority forest tree species.

***Dalbergia oliveri* (IUCN:** EN)
Taxonomy and Commercial Grade

Cambodian name	: Neang Nuon
Scientific name	: *Dalbergia oliveri*
Synonym	: *Dalbergia dongnaiense* Pierre
	: *Dalbergia bariensis* Pierre
Family	: Fabaceae
Sub-family	: Faboideae
Commercial Grade-Cambodia	: Luxury

Distribution and Habitat: Present throughout Cambodia, Laos, Thailand and Vietnam (Dy Phon, 2000), trees of *Dalbergia oliveri* occur individually or in groups of 5 to 10 trees, and usually in evergreen tropical forests or semi-deciduous forests that are dominated by *Lagerstroemia* and dipterocarps. The species is usually found at low altitudes (< 900 m), and generally in moist areas, along streams and rivers, and on hill sides. Trees can tolerate some level of shade at an early age, but they generally prefer light. Individuals of this species often produce many seeds, but natural regeneration is often poor due to low germination rates or disadvantageous weather and site conditions. Trees generally grow slowly in both natural and man-made forests (CTSP, 2001).

Within Cambodia, this species is found in Kratie, Preah Vihear, Kampong Thom, Ratanakiri, Stung Treng, Pursat and Siem Reap (Khorn, 2002), Kampong Speu and Koh Kong province.

Uses: Easy to polish, the wood is widely used for making high quality furniture, luxury cabinets, art and handicrafts, decorations etc.

Current Status: Due to its economic value, *Dalbergia oliveri* is facing serious depletion by illegal cutting. The number of remaining individual trees is very low, and these are disappearing on a local level. In many areas of its natural range, mature and large sized trees are rarely to be found. Efforts to regenerate the species on a large scale have been few and limited. The species is facing the possibility of extinction if no effective protection measures are taken (CTSP, 2001).

In 2002, the second CTSP meeting on the Forest Gene Conservation Strategy defined *Dalbergia oliveri* as a priority species, and one that is in need of immediate conservation interventions and appropriate protection. This species is protected by Cambodian Forestry Law.

***Dalbergia cochinchinensis* Pierre (IUCN:** VU)
Taxonomy and Commercial Grade

Cambodian name	: Kra-nhourng
Scientific name	: *Dalbergia cochinchinensis* Pierre.
Synonym	: *Dalbergia cambodiana* Pierre.
Family	: *Fabaceae*
Sub-family	: *Faboideae*
Commercial Grade-Cambodia	: Luxury

Distribution and Habitat: Native to Indochina and adjacent countries, this tree species is shade-tolerant when young. It usually occurs sparsely in open and semi-deciduous forests from 400 to 500 m a.s.l., and prefers deep sand, clays, or calcareous soils (Khorn, 2002). This rosewood prefers uniform rainfall that ranges from 1200-1650 mm per year. The species requires high amounts of light to thrive, and is drought tolerant and able to grow on most soils (DFSC, 2000). Within Cambodia, the species is found in Kampong Thom, Preah Vihear, Ratanakiri, Pursat, Siem Reap, Kratie, Koh Kong, Stung Treng, and Modulkiri Province (Khorn, 2002).

Uses: Wood can be exported at a high price, and is used for making high quality furniture, art handicrafts, and musical instruments. The root base and root can also be used for high quality art handicrafts (CTSP, 2001).

Current Status: *Dalbergia cochinchinensis* has been found during field surveys in concessions (commercial forest), protected areas, and various regions in the Northern Highlands of Cambodia. Illegal cutting in many areas has resulted in few and sparse populations of this species. This presents difficulties in finding germplasm sources within and outside protected forests/national parks.

In 2002, the second CTSP meeting on the Forest Gene Conservation Strategy defined *Dalbergia cochinchinensis* Pierre as a priority species in need of immediate conservation intervention and appropriate protection. This species is protected by Cambodian Forestry Law.

***Afzelia xylocarpa* (Kruz.) Craib (IUCN:** EN A1cd)
Taxonomy and Commercial Grade

Cambodian name	: Beng
Scientific name	: *Afzelia xylocarpa* (Kruz.) Craib.
Synonym	: Pahudia cochinchinensis Pierre
Family	: *Fabaceae*
Sub-family	: *Caesalpinioideae*
Commercial Grade-Cambodia	: Luxury

Distribution and Habitat: This species is found in Laos, Thailand, Cambodia and Vietnam. It is a light demanding species, occurring on well-drained flatlands or transitional zones between evergreen and dry open dipterocarp forest, usually from 500 to 700 m a.s.l. The species also occurs above 900 m (Dy Phon, 2000) in mixed forest. The tree is often associated with *Dalbergia oliveri*, *Pterocarpus macrocarpus*, *Lagerstroemia calyculata*, *Dipterocarpus tubinatus* and *Tetrameles nudilora.* Trees occur in a scattered manner in mixed forests, and do not usually form pure stands. Within Cambodia, this species is found in Kampong Thom, Kratie, Stung Treng, Preah Vihear, Siem Reap, Battambang, Ratanakiri, Mondulkiri, Kampot and Pursat province (Khorn, 2002).

Uses: The wood beng is valuable on account of its rich dark or light-red colours, prominent veins, hardness and durability. The wood is used in various ways, including house construction, cabinet and furniture-making, and high quality handicrafts (CTSP, 2001). The bark is used for tanning animal skins, and also in local medicine and also in veterinary medicine (Dy Phon, 2000). The fatty cotyledons of young seeds are edible (DFSC, 2000).

Current Status: Because the wood of *beng* is very valuable, this species is over-exploited and in danger of extinction if adequate protection measures are not implemented. Within most of its area of distribution, mature trees have been reduced dramatically, and sometimes it is very difficult to find them for seed collection. The number of mature trees has been

reduced significantly and it is now difficult to find significant sources of germ-plasm.
In 2002, the second meeting on the Forest Gene Conservation Strategy defined *Afzelia xylocarpa* (Kruz.), Craib Pierre as a priority species in need of immediate protection and conservation. This species is protected by Cambodian Forestry Law No.35.

***Pterocarpus macrocarpus* Kurz (IUCN:** VU A1d)
Taxonomy and Commercial Grade

Cambodian name	: Thnong
Scientific name	: *Pterocarpus macrocarpus* Kurz
Family	: Fabaceae
Commercial Grade-Cambodia	: Luxury

Distribution and Habitat: This species is a common constituent of tropical deciduous forests in Cambodia, Laos and Vietnam (FIPI, 1996). In Cambodia the species usually occurs in dense deciduous or cleared forests up to 700 m a.s.l. (Dy Phon, 2000). The species is rarely found in primary forests. The tree is often mixed with many other species, but often occurs as a dominant plant. It is a light-demanding, drought tolerant tree that is suitable for well drained, light textured soils with shallow depths and little humus (Khorn, 2002). It is found in Kampong Thom, Stung Treng, Preah Vihear, Rattanakiri, Kratie, Siem Reap, Kampot, Pursat and Mondulkiri (Khorn, 2002), Kampong Speu and Koh Kong province.

Uses: This species is used in making luxury furniture, cabinetwork, art handicrafts, musical instruments and flooring (FIPI, 1996).

Current Status: In Cambodia, *Pterocarpus macrocarpus* occurs mostly in the North. Most timber is harvested from natural forests and the species is suffering from over-exploitation and agricultural expansions (CTSP, 2001). Its natural habitats are being destroyed, and the species is facing the possibility of extinction if protection measures are not taken.

In 2002, the second CTSP meeting on the Forest Gene Conservation Strategy defined *Pterocarpus macrocarpus* as a priority species in need of immediate conservation intervention and appropriate protection. This species is protected by Cambodian Forestry Law.

***Diospyros cruenata* Thwaites**
Taxonomy and Commercial Grade

Cambodian name	: Cheou kmao
Scientific name	: *Diospyros cruenata Thwaites*
Family	: Ebanaceae
Commercial Grade-Cambodia	: Luxury

Distribution and Habitat: Found in dense and mixed forests of Eastern Asia.

Uses: The wood of *Diospyros cruenata* is valued for the manufacture of ornamental trinkets, and is excellent for firewood (Dy Phon, 2000).

Current Status: Because the wood is very valuable and has very high demand in the market, this species is over-exploited and in danger of extinction if adequate protection measures are not implemented. Its distribution is scattered and its habitats have been destroyed by forestland conversions and clear-cutting. Moreover, trees are selectively cut. The number of mature trees has been reduced significantly and it is now difficult to find significant sources of germplasm.

In 2002, the second CTSP meeting on the Forest Gene Conservation Strategy defined *Diospyros cruenata* Thwaites Pierre as a priority species in need of immediate protection and conservation. This species is protected by Cambodian Forestry Law.

***Diospyros bejaudii* Lecomte**

Taxonomy and Commercial Grade

Cambodian name	: Angkat khmao
Scientific name	: *Diospyros bejaudii* Lecomte
Family	: Ebenaceae
Commercial grade-Cambodia	: Luxury

Distribution and Habitat: *Diospyros bejaudii* Lecomte is found in dense and semi-dense forests of Cambodia, where it is a narrow endemic (Dy Phon, 2000).

Uses: This species is much in demand for the manufacture of knife handles, and often, musical instruments (Dy Phon, 2000).

Current Status: Because its wood has a high value, this species is over-exploited and in danger of extinction if adequate protection measures are not implemented. Its distribution is scattered and its habitat is destroyed through forestland conversion, selective illegal logging. The number of mature trees has been reduced significantly and it is now difficult to find significant sources of germplasm.

In 2002, the second CTSP meeting on the Forest Gene Conservation Strategy defined *Diospyros bejaudii* Lecomte as a priority species in need of immediate conservation intervention and appropriate protection. This species is protected by Cambodian Forestry Law.

***Fagraea fragrans* Pit**

Taxonomy and Commercial Grade

Cambodian name	: Ta trao
Scientific name	: *Fagraea fragrans* Pit
Family	: Loganiaceae
Commercial grade-Cambodia	: Luxury

Distribution and Habitat: This species is widely distributed in Vietnam, Cambodia, Laos, Thailand, Java, Sumatra, Malaysian Peninsular, and India. In Cambodia, it is usually found in semi-deciduous forests and rarely in dense or open forests (FA, 1997). The tree prefers sandy soils that are periodically inundated along streams or rivers, usually below 800 m a.s.l. This is a pioneer species in burnt forestlands (FIPI, 1996). It is found in Koh Kong, Pursat, Stung Treng, Kratie, Kampong Thom, Mondulkiri and Preah Vihear province (Khorn, 2002; see map).

Uses: The wood is used for house pillars in construction, but also in the manufacture of furniture coffins (FIPI, 1996). In Khmer culture, *Fagraea fragrans* Pit is used for making doors and doorframes, particularly in some historic temples (FA, 1997). The bark is used in traditional medicine. The tree can be planted to provide shade (FIPI, 1996).

Current Status: Because this wood is very valuable and in high demand, the species is over-exploited and in danger of extinction if adequate protection measures are not implemented. Its distribution is scattered and its habitats are being destroyed by forestland conversion and selective, illegal logging. The number of mature trees has been reduced significantly and it is now difficult to find significant sources of germplasm.

In 2002, the second CTSP meeting on the Forest Gene Conservation Strategy defined *Fagraea fragrans* Pit as a priority species, in need of immediate protection and conservation intervention. This species is protected by Cambodian Forestry Law No.35.

***Pinus merkusii* Jungh et de Vries**
Taxonomy and Commercial Grade

Cambodian name	: Sral
Scientific name	: *Pinus merkusii* Jungh et de Vries
Family	: Pinaceae
Commercial grade-Cambodia	: 2nd Grade

Distribution and Habitat: This species occurs throughout South-East, including Myanmar, Cambodia, Laos, Vietnam, Indonesia (Sumatra) and Philippines (Luzon and Mindoro islands). *Sral* was probably introduced onto the island of Hainan (China) (Hidayat and Hansen, 2002). In Cambodia it is found in large stands or small groups, and usually in mixed deciduous or evergreen forest. The largest stands of *sral* in Cambodia are found on the Kirirom Plateau, and cover a total of 12,000 hectares (Dy Phon, 2000). The species occurs from 30-1800 m a.s.l.. It is a light-demanding, heat- and drought-tolerant tree, growing well on many different types of soil, such as sandy and red soils, and in varying climates (Hidayat and Hansen, 2002). It is slow-growing during the first five years, but grows quickly as an adult (Khorn, 2002). Experience suggests that this is one of the principal tree species to plant on bare or bushy hills, as it provides protection against erosion and land-deformation (FIPI, 1996). It is found in Preah Vihea, Kampong Thom, Koh Kong, Pursat, Kampong Speu, Koh Kong and Mondulkiri province.

Uses: The wood is used in house construction, joinery, match-making, pulp, common furniture, pit props, electricity poles, shipbuilding, chopsticks, and vehicle-building (FIPI, 1996). The species provides high resin yields and commercial tapping is often practiced. Old trees can yield 30-60 kg of crude gum per year, equalling 20-40 kg of pure resin and 7-14 kg of turpentine (Hidayat and Hansen, 2002). The resin is also used in medicine, paints, printing and the perfume industry. In Cambodia, the resin is also used to make torches. In traditional medicine, the decoction of the dried out resin is used to treat diseases such as furunculosis, abscesses, and bad blood circulation (Dy Phon, 2000). This species is often used for the rehabilitation of degraded areas due to its tolerance to fire and poor soil conditions (Hidayat and Hansen 2002).

Current Status: As this wood is very valuable and has very high demand in markets, this species is over-exploited and in danger of extinction if adequate protection measures are not implemented. Distribution is scattered and its habits have been destroyed by forestland conversions and selective illegal logging. The number of mature trees has been reduced significantly and it is now difficult to find significant sources of germplasm.

In 2002, the second CTSP meeting on the Forest Gene Conservation Strategy defined *Pinus merkusii* Jungh et de Vries as a priority species in need of immediate conservation intervention and appropriate protection. Resin tapping (harvesting) is prohibited by Cambodian Forestry Law (1988) unless special permission is granted by MAFF.

***Cinnamomum cambodianum* Lecomte**
Taxonomy and Commercial Grade

Cambodian name	: Tep porou
Scientific name	: *Cinnamomum cambodianum* Lecomte
Family	: Lauraceae
Commercial Grade-Cambodia	: Unclassified

Distribution and Habitat: This species is distributed in wet, dense, piedmont forests from 600-700 ma.s.l. (Dy Phon, 2000). It is also plentiful on the upper slopes of the Bokor and Cardamom Mountains. It has disjunct populations in Ratanakiri and Kampong Thom, as illustrated on the map. This species is endemic to Cambodia (FA, 2000). It is a shade-demanding tree when young, growing well in deep soil. It usually grows in clusters of 5-10 trees in the primary of secondary forest, at altitudes below 1,500 m above sea level (Khorn, 2002).

Uses: Timber of this species is used in house construction and as fuelwood (FA, 2000). The bark can be chewed with betel, or used in the kitchen. In traditional medicine, it is used against a variety of diseases, such as indigestion, tuberculosis, and regulation of periods (Dy Phon, 2000).

Current Status: As the wood is very valuable and in high demand. This species is under high pressure from over-exploitation and is in danger of extinction unless measures are taken to provide adequate protection illegal logging. The number of mature trees has been reduced significantly and it is now difficult to find significant sources of germplasm.

In 2002, the second CTSP meeting on the Forest Gene Conservation Strategy defined *Cinnamomum cambodianum* Lecomte as a priority species in need of immediate conservation intervention and appropriate protection.

Orchids

The PVPF contains a wide range variety of orchid species that are targeted for collection for trade both locally and internationally. Orchids were yet chosen as a conservation target because too little are known about the distribution and conservation status species and the severity of threats to these species at this time.

Appendix 1.3b: List of Timber and Non-timber species in Preah Vihear Protected Forest

No	Khmer Name	Scientific Name	Family	Timber Classification	Habitat			Cambodia Status	CITES	IUCN Red List	Other uses	
					EF	SF	DF				Medicinal Plant	Edible Plant
Forest Tree Species												
1	Kreul	*Melanorrhera laccifera*	Anacarliaceae	L	+	-	-	C			√	
2	Cheung chab	*Dasymaschalon lomentaceum*	Annoceae	L	+	-	-	C				√
3	Neang Nourn	*Disoxylon oliveri*	Caesalpinioideae	L	+	+	-	En		EN	√	
4	Angkanh	*Cassia Siamea*	Caesalpinioideae	L	-	-	+	C			√	√
5	Tra Yeung	*Diospyros pilosanthera*	Ebenaceae	L	+	+	-	C		NE	√	
6	AngkotKmao	*Diospyros bejaudii* Lecomte	Ebenaceae	L	+	+	+	R				
7	Chheu Kmao	*Diospyros spp*	Ebenaceae	L	+	-	-	R	II			
8	Beng	*Afzelia xylocarpa* (Kruz.) Craib	Caesalpinioideae	L	-	+	+	En		EN	√	
9	Chres	*Albizia lebbeck* (L.) Benth	Fabaceae	L	+	+	-	C			√	
10	Kranhoung	*Dalbergia cochinchinensis*	Leguminosae	L	-	-	+	En	II	VU		
11	Tatrav	*Fagraea fragrans*	Loganiaceae	L	+	-	-	R			√	
12	Thnong	*Pterocarpus macrocarpus*, Kurz.	Papilionaceae	L	-	-	+	En		VU	√	
13	Krokoh	*Sindora cochinchinensis*, Baill	Caesalpiniaceae	1	+	++	+	C				√
14	Trasek	*Peltophorum ferruginium*	Caesalpinioideae	1	+	+	+	C			√	
15	Popel	*Hopea recopei*	Caesalpinioideae	1	+	+	+	C			√	
16	Chhlik	*Terminalia tomentosa*	Combretaceae	1	-	-	+++	C			√	
17	Phcheuk	*Shorea obtuse*	Diperocarpaceae	1	-	-	+++	C			√	
18	Koki Dek	*Hopea ahelferi*	Dipterocarpaceae	1	+	+	-	R		CR		
19	Koki Msaov	*Hopea odorata*	Dipterocarpaceae	1	+	-	-	nt		VU	√	
20	Koki Thmor	*Hopea ferrea*	Dipterocarpaceae	1	+	-	-	R		EN		
21	Raing Phnom	*Shorea siamensis*	Dipterocarpaceae	1	+	-	-	C				
22	KraLanh	*Dialium cochinchinensis*	Fabaceae	1	+	-	-	C				√
23	Sroloav	*Lagerstroemia sp.*	Lythraceae	1	+	+	-	C				
24	Yeang	*Chukrasia tabularis*	Meliaceae	1	+	-	-	C				
25	Sokrum	*Xylia dolabriformis*	Minosoideae	1	+	+	-	nt			√	
26	Dounchem	*Heritiera javanica*	Sterculiaceae	1	+	-	-	R				
27	Popol	*Vitex sp*	Verbenaceae	1	+	+	-	C			√	√
28	Popolo Thmor	*Vitex pinnata*	Verbenaceae	1	+	-	-	C			√	
29	Sakaut Tmart	*Stereospermum chelonoides*	Bignoniaceae	1	-	-	+	C				
30	Sampor	*Artocarpus nitidus*	Moraceae	1	-	-	+	C				

No	Khmer Name	Scientific Name	Family	Timber	Habitat						Other uses	
31	Phdeak	*Anisoptera costata*	Diperocarpaceae	2	++	++	-	En		EN	√	
32	Tbeng	*Dipterocarpus obtusifoliius*	Diperocarpaceae	2	-	-	+++	C				
33	Khlong	*Dipterocarpus turberculatus*	Diperocarpaceae	2	-	+	+++	C				
34	Chromas	*Vatica astrotricha*	Diperocarpaceae	2	++	++	+	C				
35	Chheul Teal	*Dipterocarpus altatus*	Diperocarpaceae	2	+++	++	-	C		EN	√	
36	Chheul Teal Thngor	*Dipterocarpus dyeri*	Diperocarpaceae	2	+	-	-	C				
37	Chor Chong	*Shorea vulgaris*	Diperocarpaceae	2	+	+	-	R				
38	Chheul Teal Bangkouy	*Dipterocarpus costatus*	Diperocarpaceae	2	+	-	-	C				
39	Trolatt	*Vatica philastreana,* Pierre	Dipterocarpaceae	2	+	-	-	C				
40	Trach	*Dipterocarpus intricatus*	Dipterocarpaceae	2	-	-	+++	C			√	
41	Koki Ksach	*Hopea pierrei,* Pierre	Dipterocarpaceae	2	+++	-	-	C		CR	√	
42	Lum Bor	*Shorea sp.*	Dipterocarpaceae	2	+++	-	-	C				
43	Chham Chha	*Toona febrifuga.*M.Roem	Meliaceae	2	++	-	-	C				
44	Khvav	*Haldinia cordifolia*	Rubiaceae	2	+++	-	-	C			√	
45	Srokum	*Madhuca major*	Sapotaceae	2	+++	+	+++	C			√	
46	Phcheuk Otdom	*Shorca thorelli,* Pirre	Dipterocarpaceae	2	+	-	-	C			√	
47	Svay Chamreang	*Swintonia pierrei,* Hance	Anacardiaceae	3	+	-	+	C			√	√
48	Svay Prey	*Mangifera indica*	Anacardiacees	3	+	-	+	C			√	√
49	Kray	*Polyalthia cerasoides,*Benth & Hook	Annonaceae	3	+	+	+	C				
50	Bram Damleung	*Terminalia mucronata, Graib ct Huth*	Combretaceae	3	-	-	+++	C				
51	Krobaov	*Hydnocarpus annamensis*	Flacourtiaceae	3	-	+	-	C				
52	Phaong	*Callophyllum sp*	Guttiferae	3	+	+	-	C			√	
53	Tromoung	*Garcinia oliveri,* Pierre	Guttiferae	3	+	+	+	C			√	√
54	Langeang	*Cratoxylon prunifolium,* Dyer	Hypericaceae	3	+++	+++	+++	C			√	√
55	Kandol	*Careya sphaerica,* Pierre	Moraceae	3	-	-	+++	C			√	√
56	Khnol Prey	*Artocarpus chaphash* Roxb	Moraceae	3	+	-	-	C				
57	Sma Krabei	*Knema corticosa,*Lour.	Myristicaceae	3	+	-	++	C			√	
58	Pring	*Eugenia sp.*	Myrtaceaa	3	+	-	-	C			√	
59	Smach	*Melalcuca leucadendrom*	Mytaceae	3	+	+	+	C			√	
60	Tromeng	*Carallia lucida,* Roxb.	Rhizophoraceae	3	+	+++	-	C			√	

No	Khmer Name	Scientific Name	Family	Timber	Habitat						Other uses	
61	Thlork	*Parinarium annamensis*	Rosacees	3	+	+	-	C			√	√
62	Chang ourt thmat	*Vitex pinnata*,L.	Verbenaceae	3	+++	-	-	C			√	
63	Check Tum	*Cinnamomum litsacfolium*, Thw	Lauraceae	3	+	-	-	C			√	
64	Bankoav	*Aglaia cambodiana*, Pierre	Meliaceae	3	+	-	-	C				
65	Bay Pouvaing	*Aglaia spectabilis*,S.K.Jain & Benn	Meliaceae	3	+	-	-	C				
66	Prous	*Garcinia schefferi, Pierre*	Guttiferae	3	+	-	-	C				
67	SamPong	*Tetrameles nudiflora*	Datiscaceae	3	+++	-	+	C			√	
68	Pring Doskrobei	*Syzygium cumini*	Myrtaceae	3	+	+	-	C			√	√
69	Pring Phnom	*Syzygium lineatum*	Myrtaceae	NG	+	-	+++	C				√
70	Ramdoul	*Miliusa mesnyi*	Annonaceae	NG	-	+	+	C			√	√
71	Dork Por	*Markhamia stipulacea pierrei*	Bignoniaceae	NG	+	+	-	C			√	
72	Roka	*Bombax ceiba or Bombax malabaricum*	Bombacacea	NG	+++	+++	-	C			√	
73	Trab Tum	*Crypteronia paniculata*	Crypteroniaceae	NG	+	-	-	C				√
74	Plou Thom	*Dillenia ovata*	Dilleniaceae	NG	+	-	-	C			√	√
75	Phlov Neang	*Cleistanthus tomentosus*	Euphorbiaceae	NG	+	+	-	C				
76	Khos	*Lithocarpus elegans*	Fagaceae	NG	+	-	-	C				√
77	Prous	*Garcinia schefferi*	Guttiferae	NG	+	-	+++	C				
78	Tepirour	*Cinnamomum cambodianum*	Lauraceae	NG	-	-	+	C			√	
79	Snoul	*Dalbergia nigrescens*	Leguminosae	NG	+	-	-	C				√
80	Char	*Butea monosperrna*	Leguminosae - Papilionoidae	NG	-	+	+	C			√	√
81	Chamreark	*Albizia corniculata*	Leguminosae-Mimosoideae	NG	+	-	-	C			√	
82	Trabek Prey	*Lagertroemia floribunda*	Lythraceae	NG	+	-	-	C			√	
83	Sdok Sdol	*Walsura villosa*	Meliaceae	NG	+	+	-	C			√	
84	Lvea Prey	*Ficus hispida*	Moraceae	NG	-	-	+	C			√	√
85	Smach Dom	*Syzygium zeylanicum*	Myrtaceae	NG	+	-	-	C			√	
86	Pong Ro	*Scheicheria trijuga*	Sapindaceae	NG	+	-	-	C			√	√
87	Semorn	*Nephelium hypoleucum*	Sapindaceae	NG	+++	+	-	C				√
88	Savmav Prey	*Nephelium lappaceum*	Sapindaceae	NG	+++	+	-	C			√	√
89	Chambak	*Irvingia malayana*	Simaroubaceae	NG	+	+	+	C				
90	Samrong	*Sterculia lychnophora* Hance.	Sterculiaceae	NG	-	-	+	C				

No	Khmer Name	Scientific Name	Family	Timber	Habitat						Other uses	
91	Samrorng	*Scaphium macropodium*	Sterculiaceae	NG	+	-	-	C				√
92	Kropul Buy	*Litsca glutinosa*	Lauraceae	NG	+	+	-	C				
93	Chhke Sreng	*Cananga latifolia*	Annonaceae	NG	+++	-	-	C			√	√
94	Chor Chhork	*Antiaris toxicaria*	Moraceae	NG	+++	-	-	C			√	√
95	Chhrey Kreum	*Ficus benjamina*	Moraceae	NG	+	-	-	C			√	√
96	Chheu Phleung	*Diopyros hermaphroditica*	Ebenaceae	NG	+++	-	-	C			√	
97	Chheu Romors	*Schima wallichii*	Theaceae	NG	+++	-	-	C			√	
98	Thkov	*Anthocephalus chinensis*	Rubiaceae	NG	+	-	-	C			√	
99	Popel Khe	*Terminalia bialata*	Combretaceae	NG	+	-	-	C			√	
100	Porn	*Spondias pinnata*	Anacardiaceae	NG	-	-	+	C			√	
101	Preah Phnov	*Terminalia triptera*	Combretaceae	NG	+++	-	-	C			√	
102	Sdao	*Azadirachta indica*	Meliaceae	NG	+	-	+	C			√	√
103	Sleng	*Strychnos nux-vomica*	Loganiaceae	NG	+	-	-	C			√	
104	Svay Reanov	*Azadirachta indica*	Rutaceae	NG	+	-	-	C			√	√
105	KanSeng	*Strychnos nux-vomica*	Xanthophyllaceae	NG	+	-	-	C			√	
106	Dangkov Khmoch	*Azadirachta indica*	Ebennaceae	NG	-	-	+	C			√	√
107	Pnheav	*Strychnos nux-vomica*	Euphorbiaceae	NG	+	-	-	C			√	√
108	Khmea	*Maclura cochinchinensis*	Moraceae	NG	+	-	+	C			√	√
109	Chheu Daikhmao	*Wrightia annamensis*	Apocynaceae	NG	+	-	-	C			√	√
110	Talatt	*Canarium album*	Burseraceae	NG	+	-	+	C			√	√
111	Thmear	*Acacia intsia*	Leguminosae-Mimosoideae	NG	+	-	+	C			√	
112	Phnov	*Aegle marmelos*	Rutaceae	NG	+	-	+	C			√	
113	Preah Thlork	*Ellipanthus tomentosus*	Connaraceae	NG	+	-	+	C			√	
114	Lvearng	*Dillenia indica*	Dilleniaceae	NG	+	+	+	C				
115	Raing Teuk	*Barringtonia acutangula*	Lecythidaceae	NG	+	+	+	C			√	√
116	Lve	*Dillenia pentagyna*	Dilleniaceae	NG	+	-	-	C			√	√
117	Sro Mor	*Terminalia chebula*	Combretaceae	NG	-	-	+	C				
118	Ach Kandol	*Diospyros cambodiana*	Ebenaceae	NG	-	+	-	C			√	
119	Daiy Khla	*Wrightia annamensis*	Apocynaceae	NG	-	-	+	C				√
120	Trobek Chou	*Terminalia pierrei*	Combretaceae	NG	+++	-	-	C				
121	Popel Khe	*Alstonia scholaris*	Apocynaceae	NG	++	-	+	C			√	
122	Cheung kor	*Tetracera scadens*	Dilleniaceae	NG	+	-	-	C			√	√

No	Khmer Name	Scientific Name	Family	Timber	Habitat						Other uses	
123	Mean Prey	*Aporusa planchoniana*	Euphorbiaceae	NG	+++	-	-	C			√	√
124	Kantourt Prey	*Phyllanthus emblica*	Euphorbiaceae	NG	+++	-	-	C			√	√
125	Krong	*Aporusa filicifolia*, Baill.	Euphorbiaceae	NG	-	-	+++	C			√	
126	Phlorng	*Memecylon acuminatum*	Melastomaceae	NG	+	-	-	C				
127	Phlorng Chou	*Memecylon edule*	Melastomaceae	NG	+	-	+	C			√	√
128	Sro Ngam	*Tristaniopsis burmannica*	Myrtaceae	NG	+	-	-	C				
129	Lveang	*Cathunaregam tomentosa*	Rubiaceae	NG	+	-	+++	C			√	√
130	Krovann	*Amomum krevanh*	Medical Plant	NG	+	-	+	C			√	
131	Kor Mouy	*Euonymus cochinchinensis*	Celastraceae	NG	+	-	+	C			√	
132	Kram Puk	*Randia uliginosa*	Rubiaceae	NG	+	-	++	C			√	
133	Khmea	*Memecylon edule*	Melastomaceae	NG	+	-	-	C			√	
134	Reiy	*Anogeissus rivularis*	Combretaceae	NG	-	-	+	C				
135	Steav	*Homalium brevidens*	Flacourtiaceae	NG	+++	-	-	C				
136	Angkea sel	*Ochna integerrima*	Ochnaceae	NG	++	-	+	C			√	
137	Krokhub Prey	*Scolopia spinosa*	Flacourtiaceae	NG	++	-	-	C			√	√
138	Kanthom Thet Prey	*Cassia timoriensis*	Leguminosae-Caesalpinioideae	NG	+	-	+	C			√	√
139	Sleng Kong	*Hoarrhena pubescens,Wrightia pubescens*	Apocynaceae	NG	+++	-	+	C			√	
140	ChunLous	*Erioglossum edul, Lepisanthes rubiginosa*	Sapindaceae	NG	+	-	+	C			√	√
141	Chrey Teuk	*Ficus subpyriformis*	Moraceae	NG	+	-	+	C				√
142	Chrey Leap	*Ficus racemosa*	Moraceae	NG	+	+	+	C			√	√
143	ChheuKao	*Murraya paniculata*	Rutaceae	NG	+	+	+	C				
144	Bak Dang	*Gardenia philastrei*	Rubiaceae	NG	+	-	-	C				
145	Brodakk	*Mitrephora maingayi*	Annonaceae	NG	-	-	+	C				√
146	Prich	*Melienthes suavis*	Opiliaceae	NG	-	+	-	C				√
147	Pring Oul	*Syzygium bracteatum*	Myrtaceae	NG	-	-	+	C				√
148	Roleay Chheam	*Lasianthus Kamputensis*	Rubiaceae	NG	+++	-	-	C			√	
149	Roleay Thom	*Neonauclea scssilitlora*	Rubiaceae	NG	+	-	+	C			√	
150	Sang Khor	*Zizyphus oenoplia*	Rhamnaceae	NG	+	-	-	C			√	√
151	Phlaing	*Glycosmis pentaphylla*	Rutaceae	NG	+	-	+	C			√	√
152	Deum Yuthaka	*Randia fasciculata Dc*	Rubiaceae	NG	+	-	-	C			√	
153	Nhor Prey	*Morinda tomentosa*	Rubiaceae	NG	+++	-	+	C			√	
154	Daiy Khla	*Gardenia angkoriensis*	Rubiaceae	NG	+++	-	-	C			√	

No	Khmer Name	Scientific Name	Family	Timber	Habitat						Other uses	
155	Tromoung Sek	*Suregada multiflorum*	Euphorbiaceae	NG	+	-	+	C			√	
156	Tromouch	*Antidesma acidum*	Euphorbiaceae	NG	+	-	-	C			√	√
157	Tumpong Phleung	*Croton oblongifoius*	Euphorbiaceae	NG	+	-	+	C			√	
158	Porphlea	*Grewia asiatica.L*	Tiliaceae	NG	+	-	-	C			√	√
159	Pika or Sromdav	*Oroxylum indicum*	Bignoniaceae	NG	+	-	+	C			√	√
160	Sromor Pipheth	*Terminaha bellirica*	Combretaceae	NG	+	-	-	C			√	

Timber Classification: L= Luxury, 1 = First Grade, 2 = Second Grade, 3 = Third Grade, NG = Non-Grade.

Notes:

1) Habitats: EF = Evergreen Forest; SF = Semi-evergreen Forest; DF = Deciduous Forest.
2) Plant Occurrence: Ù = Present; X = Absent.
3) Cambodia Classification: RS = Rare Species.

Shrub plant species.

No	Khmer Name	Scientific Name	Family	Other uses	
Shrub Plant Species				**Medicinal plant**	**Edible Plant**
1	Phnom Phneng	*Hymnocardia wallichii*	Euphorbiaceae		√
2	Snay	*Streblus asper*	Moraceae	√	√
3	KorkTong	*Crotalaria juncea*	Leguminosae	√	√
4	KanhcheuBaydach	*Cappris micracantha*	Capparidaceae	√	√
5	Kantrork Damrey	*Clausena excavata var.*	Rutaceae	√	
6	KanTaing Buysor	*Sida acuta subsp. Acuta*	Malvaceae	√	
7	Kamreuk Kum	*Spirolobium cambodianum*	Apocynaceae	√	
8	Krabei Trork	*Ficus paumila Lim*	Moraceae	√	
9	KroPort Chrouk	*Sida cordifolia*	Malvaceae	√	
10	Ngop	*Sauropus androgynus*	Euphorbiaceae	√	√
11	ChumPouChrolouk	*Bixa orellana*	Bixaceae	√	√
12	Cheu Em	*Albizia myriophylla*	Leguminosae	√	
13	Nhenh	*Petunga roxburghi De*	Rubiaceae	√	
14	Dang Heth	*Cassia alata*	Leguminosae	√	
15	Dash Reach	*Brucea javanica*	Simaroubaceae	√	
16	Dong Preah	*Arenga pinnata*	Palmae	√	
17	Deum Pramath Mnus	*Brucea javanica*	Simaroubaceae	√	
18	TumPaing Bachouprey	*Ampelocissus arachnoidea*	Vitaceae	√	√
19	Damrey Bramdork	*Ploiarium alternifolium*	Theaceae	√	
20	BuyKdaing	*Leea indica*	Leeaceae	√	
21	Pourch	*Rhodomyrtus tomentosa*	Myrtaceae	√	√
22	Preah Khlorb	*Mimosa pudica*	Leguminosae	√	
23	Mrech Tunsay	*Baeckea frutescens*	Myrtaceae	√	
24	Smaov Cheung Toke	*Coldenia procumbens*	Borginacee	√	
25	Ang Krorng	*Zizyphus cambodiana*	Rhamnaceae	√	
26	Anchanh	*Gmelina asiatica*	Vebenaceae	√	√
27	AnTungSor	*Eurycoma longifolia*	Simaroubaceae	√	
28	DangKeabKdam	*Antidesma ghaesembilla*	Euphorbiaceae	√	√
29	KantuyTrokourt	*Phyllodium elegans*	Leguminosae-Papilinoidae	√	
30	Kantrok Samlor	*Murraya koenigii*	Rutaceae	√	√
31	Kantrok Khmoch	*Clausena excavata var. villosa*	Rutaceae	√	
32	Kam Rotesh	*Ixora chinensis*	Rutaceae	√	√
33	Kam RoteshDorng	*Ixora flavescens*	Rutaceae	√	
34	KhtumKork	*Cephalanthus angustifolius*	Rubiaceae	√	
35	Leach Phtous	*Lasianthus hoensis*	Rubiaceae	√	
36	Mchou Preuk	*Embelia ribes*	Myrsinaceae	√	√
37	Tronum kamphen	*Dendrolobium lanceoarium*	Leguminosae-Papilionoidae	√	√
38	Tronum Bangkouy	*Dendrolobium baccatum*	Leguminosae-Papilionoidae		√
39	Preal	*Colona auriculata*	Tiliaceae		
40	PhlouBath	*Dillenia hookeri*	Dilleniaceae	√	√
41	Yi houp	*Mangliatia candollii*	Magnoliaceae		
42	Sangke Prey	*Callicarpa brevipes*	Verbenaceae	√	
43	Snov	*Sesbania javanica*	Leguminosae-Papilionoidae		√

Climber and vine species.

No	Khmer Name	Scientific Name	Family	Other uses	
Climber and Vine Species				**Medicinal plant**	**Edible Plant**
1	Vor Kuy	*Willughbeia edulis*, Roxb	Apocynaceae	√	
2	Vor Chuy	*Steptocaulon juventas*	Asclepiadaceae	√	
3	Vor Doh Kun	*Tetracera indica*	Dalleniaceae	√	
4	Vor Meas	*Cassytha filiformis*	Lauraceae	√	
5	Vor Em	*Albizia myriophylla*	Leguminosae-Mimosoideae	√	
6	Vor Yeav	*Stryehnos axillaris*	Logariaceae	√	
7	Vor Bandolpich	*Tinospora crispa*	Menispermaceae	√	
8	Vor Phlou	*Cyclea peltata*	Menispermaceae	√	
9	Vor Sangkhor	*Zizyphus oenoplia*	Rhamnaceae	√	
10	Vor Tumpaing Buychou	*Ampelocissus arachnoidea*	Vitaceae	√	√
11	Vor Khanma	*Ancistrocladus harmandii*	Ancistrocladaceae		
12	Vor Andatt Trokourt	*Aniseia martinicensis*	Convolvulaceae		√
13	Vor AngKreng Angkrorng	*Abrus precatorius*	Papilionoideae	√	
14	Vor Banla Saett	*Acacia concinna*	Mimosoideae	√	
15	Vor Buy damneub	*Acacia thailandica*	Mimosoideae	√	
16	Vor ThmorTeab	*Acacia pennata*	Mimosoideae		
17	Koma Pich	*Stephania rotunda*	Menispemaceae	√	√
18	Kdouch	*Dioscorea hispida*	Dioscoreaeae	√	√
19	Khleng Por	*Bauhinia bassacensis*	Leguminosae	√	
20	Thmenh Trey	*Bridelia cambodiana*	Euphorbiaceae	√	
21	Vor Kor Mouy	*Parameria loevigata*	Apocynaceae	√	
22	Vor Kleb	*Pothos sp*	Araceae	√	
23	Vor Chhaeung Pours	*Jasnitnum scandens*	Oleaceae	√	
24	Vor Chundeusva	*Bauhinia harmandiana*	Caesal piniaceae	√	
25	Vor Tri	*Ichnocarpus frutescens*	Apocynaceae	√	
26	Vor Thmenh Tri	*Ichnocarpus oxypetalus*	Apocynaceae	√	
27	Vor Totong	*Loeseneriella dinhensis*	Hippocrateaceae	√	
28	Vor Treal Sva	*Uvaria rufa*	Annonaceae	√	√
29	Vor RumPours	*Connarus semidecandrus*	Connaraceae	√	
30	Vor Sav mav	*Passiflora foetida*	Passifloraceae	√	√
31	Vor Khnanh	*Lygodium flexuosum*	Schiceaceae	√	
32	Vor AnTong	*Derris elliptica*	Leguminosae	√	
33	Sleng DangDeung	*Gloriosa superba*	Liliaceae	√	
34	Vor Angkhournh	*Entada pursaetha subsp.prusaetha*	Leguminosae-Papilinoidae	√	√
35	Angkhournh Sva	*Bauhinia bassacensis*	Leguminosae-Papilinoidae	√	
36	Brunh Sva	*Archidendron quocense*	Leguminosae-Papilinoidae	√	
37	KroLam Per	*Aganosma marginata*	Apocynaceae	√	√
38	Dam LongChvaprey	*Dioscorea esculenta*	Dioscoreaceae		√
39	Damlong Chrouk	*Dioscorea oryzetorum*	Dioscoreaceae		√
40	Damlong Chheam Meann	*Dioscorea alata*	Dioscoreaceae	√	√
41	Damlong Teuk	*Dioscorea pentaphylla*	Dioscoreaceae		√
42	Damlong Tearn	*Dioscorea brevipetiolata*	Dioscoreaceae		√
43	Vor Cha	*Butea superba*	Leguminosae-Papilinoidae	√	
44	Vor Koury	*Myxopyrum smilacifolium*	Rosaceae	√	
45	Kambor Phnom	*Vallaris solanacea*	Apocynaceae	√	
46	Khnhe	*Mucuna pruriens*	Leguminosae-Papilinoidae	√	
47	Trocheak Tunsay	*Argyreia obtecta*	Convolvulaceae		
48	Trocheak Krash	*Hoya kerrei*	Asclepiadaceae	√	
49	Vor Trodett	*Cayratia trifolia*	Vitaceae	√	
50	Vor Tros	*Combretum trifoliatum*	Combretaceae	√	
51	Treal DohKrobei	*Anomianthus dulcis*	Annonaceae		√
52	Treal Thom	*Rauwenhoffia siamensis*	Annonaceae	√	√
53	Vor Tolprey	*Gymnema sylvestris*	Asclepiadaceae	√	
54	Sleuk Bas	*Coccinia grandis*	Cucubbitaceae	√	√
55	Vor Phorm	*Paederia scandens*	Rubiaceae	√	√
56	PhkaKrodas	*Bougainvillea hybride*	Nyctaginaceae		
57	Pol Ek	*Trichosanthes tricuspidata*	Cucubbitaceae	√	√

No	Khmer Name	Scientific Name	Family	Other uses	
Climber and Vine Species				**Medicinal plant**	**Edible Plant**
58	Mlou	*Piper betle*	Piperaceae	√	√
59	Vor Khnay Morn	*Dalbcrgia horrida var. glaberseceus*	Leguminosae-Papilinoidae	√	
60	Vor Ta Euk	*Merremia hederacca*	Convolvulaceae	√	
61	Vor Ampel Sleuk			√	
62	Vor Taling			√	
63	Vor Chout			√	

Palm and bamboo species.

No	Khmer Name	Scientific Name	Family	Other uses	
Palmae Species				**Medicinal plant**	**Edible Plant**
1	Traing	*Carypha umbraculifera*	Palmae	√	
2	Tun Se	*Caryota urens*	Palmae		√
3	Pha Av	*Licuala spinosa*	Palmae	√	√
4	Sla	*Areca catechu*	Palmae	√	√
5	Chak	*Nypa fruticans*	Palmae		√
6	Pdao Teuk	*Calamus godefroyi*	Palmae		
7	Pdao Krek	*Calamus viminalis*	Palmae		
8	Pdao Tresh	*Plectocomia pierreana*	Palmae		
9	Sla Prey	*Areca triandra*	Palmae	√	
10	Pdao Chhaing	*Calamus palustris var. cochinchinensis*	Palmae		√
11	Pdao Soam	*Korthalsia lacinosa*	Palmae		
12	Preah Pdao	*Korthalsia bejaudii*	Palmae		
13	Pdao Snoh or Tresh Anhmorn	*Myrialepis paradoxa*	Palmae		
14	Pdao Dambang	*Calamus rudentum*	Palmae		√
15	Sla Taornn	*Oncosperma tigillarium*	Palmae		√
16	Treak	*Livistonia saribus*	Palmae		
17	Pdao Rampeak	*Calamus salicifolius*	Palmae	√	√
Bamboo Species					
1	Rusey Khley	*Bambusa bambos*	Gramineae		√
2	Rusey Khley Srok	*Gigantochloa albociliata*	Gramineae	√	√
3	Rusey Teu Srokchin	*Bambusa multiplex*	Gramineae		√
4	Rusey Prich	*Arundinaria pusilla*	Gramineae		√
5	Rusey Prey	*Dendrocalamus giganteus*	Gramineae		√
6	Rusey Srok	*Dendrocalamus membranaceus*	Gramineae	√	√
7	Rusey Pinh Pong	*Arundinaria falcata*	Gramineae		√
8	Rusey Keo	*Bambusa vulgaris*	Gramineae	√	√
9	Rusey Thngor	*Bambusa procera*	Gramineae		√
10	Rusey Sach	*Glochidion lanceolarium*	Euphorbiaceae		√
11	Rusey Roleak	*Bambusa blumeana*	Gramineae		√

Mushroom species.

No	Khmer Name	Scientific Name	Family	Other uses	
Mushroom				**Medicinal plant**	**Edible Plant**
1	Phsett	*Cyathus striatus*	Agaricaceae		
2	Phsett Kngork	*Amanita hemibapha*	Amanitaceae		√
3	Phsett Trocheak Kandol	*Auricularia polytricha*	Auriculariaceae	√	√
4	Phsett	*Auriscalpium vulgare*	Auriscalpiaceae		
5	Phsett	*Leccinellum griseum*	Boletaceae		
6	Phsett	*Phylloporus bellus*	Boletaceae		
7	Phsett Kraing Meas	*Tylopilus balloui*	Boletaceae		
8	Phsett	*Cantharellus cibarius*	Cantharellaceae		
9	Phsett	*Clavaria miyabeana*	Clavariaceae		
10	Phsett Korny	*Calocera cornea*	Dacrymycetaceae		
11	Phsett	*Dacryopinax spathularia*	Dacrymycetaceae		
12	Phsett	*Mollisia cinerea*	Dermateaceae		
13	Phsett	*Hydnotrya tulasnei*	Discinaceae		
14	Phsett	*Porodisculus pendudus*	Fistulinaceae		
15	Phsett	*Ganoderma chalceum*	Ganodermataceae		
16	Phsett Linh Cheuy	*Ganoderma ludidum*	Ganodermataceae		
17	Phsett Phork	*Geastrum triplex*	Geastraceas		
18	Phsett	*Gomplus floccosus*	Gomphaceae		
19	Phsett	*Hydnum repandum*	Hydnaceae		
20	Phsett	*Hygrocybe cantharellus*	Hygrophoraceae		
21	Phsett	*Crustodontia chrysocreas*	Incertae sedis		
22	Phsett	*Rigidoporus microporus*	Meripilaceae		
23	Phsett	*Abortiporus biennis*	Meruliaceae		
24	Phsett	*Stereopsis burtiana*	Meruliaceae		
25	Phsett	*Xeromphalina tenuipes*	Mycenaceae		
26	Phsett Ambosh	*Lentinus sajor-caju*	Polyporaceae		√
27	Phsett Chromash	*Lentinus squarrosulus*	Polyporaceae		√
28	Phsett	*Microporus affinis*	Polyporaceae		
29	Phsett	*Microporus xanthopus*	Polyporaceae		
30	Phsett	*Pycnoporus coccineus*	Polyporaceae		
31	Phsett	*Trametes suaveolens*	Polyporaceae		
32	Phsett	*Trametes trogii*	Polyporaceae		
33	Phsett	*Psathyrella candolleana*	Psathyrellaceae		
34	Phsett	*Lactarius volemus*	Russulaceae		
35	Phsett	*Russula japonica*	Russulaceae		
36	Phsett	*Scleroderma columnare*	Scleromataceae		
37	Phsett	*Stereum ostrea*	Stereaceae		
38	Phsett	*Gymnopilus liquiritiae*	Strophariaceae		
39	Phsett	*Daldinia concentrica*	Xylariaceae		
40	Phsett	*Xylaria filiformis*	Xylariaceae		
41	Phsett	*Xylaria longipes*	Xylariaceae		
42	Phsett	*Xylaria mellissii*	Xylariaceae		

Spermatophytes and pteridophytes.

No	Khmer Name	Scientific Name	Family	Other uses	
Spermatophytes				**Medicinal plant**	**Edible Plant**
1	Kor Pramneum	*Goniothalamus laoticus*	Annonaceae	√	
2	BroLao Amper	*Aganosma marginata*	Apocynaceae	√	√
3	Smao Kantuy Kamprok	*Uraria lagopodioides*	Leguminosae - Papilionoidae	√	
4	Smao Chunchean	*Paspalum commcrsonii*	Gramineae	√	
5	Smao Chumpou	*Carthamus tinctorius*	Compositae	√	
6	Smao Cheung Krass	*Eleusine indica*	Poaceae	√	
7	Smao Cheung Kok	*Lindernia crustacean*	Scrophulariaceae	√	
8	Smao Thnok Teuk	*Xyris indica*	Xyridaceae	√	
9	Trokoun Beung	*Ipomoea aquatic*	Convolvulaceae	√	√
10	Vor Sdom Prey	*Dioscorea bulbifera*	Dioscoreaceae	√	√
11	Smao Ruy	*Vemonia cincrea*	Compositae	√	
12	San Seum Doch	*Drosera indica*	Droseraceae	√	
13	An Takk RuyPhka Sor	*Drosera peltata*	Droseraceae		
14	Sang Keuch	*Impatiens relaxata*	Fabaceae	√	
15	Chang Krorng SvaSleuk Bram	*Crotalaria quinquefolia*	Leguminosae - Papilionoidae	√	
16	Tronum Ban Kouy	*Dendrolobium lanceolatum*	Fabaceae		
17	Chang Kesh Angkrorng	*Tadehagi triquetrum*	Fabaceae	√	
18	Trum Khmoch	*Tephrosia purpurea*	Fabaceae	√	√
19	Cho Hook	*Uraria crinite*	Fabaceae	√	
20	Smao	*Canscora andrographioides*	Gentianaceae		
21	Smao	*Cracosna xyridiformis*	Gentianaceae		
22	Pulvea or Brovek	*Strychnos nux-blanda*	Loganiaceae		
23	Kamping Pouykork	*Catharanthus roseus*	Lythraceae	√	
24	Smao	*Rotala wallichii*	Lythraceae		
25	Kobas prey	*Hibiscus tiliaceus*	Malvaceae	√	
26	Nhenh Bath	*Melastoma saigonense*	Melastomaceae	√	
27	Tabun	*Xylocarpus granatum*	Meliaceae		
28	Chhnok Batt	*Ardisia helferiana*	Myrsinaceae	√	
29	Prolett	*Nymphaea nouchali*	Nympheaeceae		√
30	Chheam Antong	*Gomphia serrata*	Ochnaceae	√	
31	Kamping Puyteuk	*Ludwigia adscendens*	Onagraceae	√	√
32	Smao	*Anthogonium gracile*	Orchidaceae		
33	Smao	*Dendrobium ellipsophyllum*	Orchidaceae		
34	Smao	*Dendrobium pseudotenellum*	Orchidaceae		
35	Smao	*Eria Panea*	Orchidaceae		
36	Champos Tea	*Cyanotis cristata*	Commelinaceae	√	
37	KanTraing Hekrohum	*Polygonum chinense*	Polygonaceae		
38	KanTraing He	*Polygonum tomentosum*	Polygonaceae	√	√
39	Smao Angkam (Smao Dek)	*Darsilanthus disjunctus*	Restionaceae		
40	Smao	*Mimulus orbicularis*	Scrophulariaceae		
41	Sambok Cheas	*Helicteres angustifolia*	Sterculiaceae		
42	Kantuy Kamprok	*Helicteres hirsute*	Sterculiaceae		
43	Smao Krochao (Krocheb)	*Melochia corchorifolia*	Sterculiaceae		
44	Popork Rosatt	*Waltheria indica*	Sterculiaceae		
45	So Phii	*Anneslea fragrans*	Theaceae		
46	Preal Chulous or Preal Vinh Kse	*Colona auriculata*	Tiliaceae		
47	Krochork Andeuk	*Curcuma sparganiifolia*	Zingiberaceae		√
48	Krokor Sbatt	*Elettaria cardamornum*	Zingiberaceae	√	√
49	Smao Krochork	*Impatiens balsamina*	Balsaminaceae	√	
50	KroKor Prey	*Hedychium coccineum*	Zingiberaceae	√	√

No	Khmer Name	Scientific Name	Family	Other uses	
Pteridophytes				**Medicinal plant**	**Edible Plant**
1	Bandett	*Humata angustata*	Davalliaceae		
2	Sroka Chrass	*Humata repens*	Davalliaceae		
3	Sourng Sang	*Dicranopteris linearis*	Gleicheniaceae		
4	Kantury Kngork	*Helminthostachys zeylanica*	Ophioglossaceae		
5	PorProk SleukTouch	*Drynaria rigidula*	Polypodiaceae		
6	PorProk	*Drynaria quercifolia*	Polypodiaceae	√	
7	Srom Dav	*Microsorum punctatum*	Polypodiaceae	√	
8	Samnum Preahream	*Platycerium cororium*	Polypodiaceae		
9	Sambok Sromoch	*Lecanopteris sinuosa*	Polypodiaceae		
10	Bangorng Cheat	*Loxogramme avenia*	Polypodiaceae		
11	Brang Teuk	*Acrostichum aureum L*	Adiantaceae	√	
12	Chork Toch	*Salvinea cucullata*	Salviniaceae	√	
13	Chantul Phnom	*Marsilea quadrifolia*	Marsileaceae	√	
14	BroMoy Damrey	*Bolbitis copelandii*	Asplen Iaceae	√	
15	Banheu Kaek	*Viscum articulatum*	Loranthaceae	√	
16	Banheu Kaek Thom	*Scurrula ferruginae*	Loranthaceae	√	
17	Oh Kide	(More than 30 Species)			

Appendix 1.4a: Key mammal species

PHOLIDOTA
Manidae
Sunda Pangolin *Manis javanica* (EN)
This species is rarely observed and has been recorded in a camera trap with other observations from Buffer Zones 1 and 2 (WCS 2008). It is now endangered as a result of hunting for the trade in traditional medicines.

CHIROPTERA
Molossidae
Bats were studied in PVPF by Walston & Bates (2000) who recorded 10 species during a short study (see Appendix 1.6) in 2000. The most notable finding was the capture of Wroughton's Free-Tailed Bat *Otomops wroughtoni* (DD) south of Kahkeuk sub-station in the Chhep district area of PVPF close to Cherndar concession. This species was previously only known from north-east India (Walston & Bates 2000). This extraordinary record indicates how little we know about the bats of south-east Asia. Additionally, one Flying Fox species *Pteropus* sp. is known to occur in PVPF, but it has not been identified to species.

PRIMATES
Lorisidae
Bengal Slow Loris *Nycticebus bengalensis* (VU)
There are a small number of records of this species in PVPF which is widely hunted in south-east Asia for traditional medicine (WCS 2008). Thus it is rapidly disappearing from most its known range. Protection of large areas of habitat, such as the forests of PVPF, will ensure the survival of the loris in Cambodia.

Cercopithecidae
Indochinese Silvered Langur *Trachypithecus germaini* (EN)
Known from the O Koki riverine forest and from two areas in the Buffer Zone 2, of which one is in Cherndar concession (WCS 2008). Found mostly within evergreen, semi-evergreen and riverine forest which is being cleared rapidly outside protected forests. Like other large mammals, it is also vulnerable to hunting, particularly where habitat is fragmented. It has a small global distribution, thus PVPF is of global importance for the conservation of this species as it is well protected at this site.

Northern Pig-tailed Macaque *Macaca leonina* (VU)
Found near O Koki and also quite numerous records in the Cherndar Plywood concession (WCS 2008). This species relies on large areas of high forest for its survival. Forest clearance is probably the main threat to this species in Cambodia. Although it is not a popular hunting quarry species, hunting may also pose a threat where habitat is fragmented.

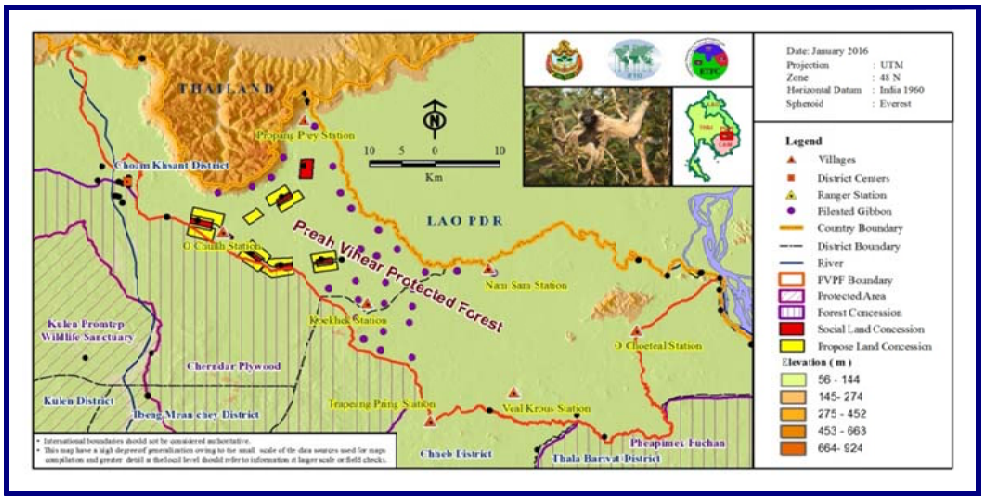
Long-tailed Macaque *Macaca fascicularis* (LC)
Widely distributed across PVPF, although it prefers dense forest (WCS 2008). Although this species is not considered globally threatened, because of the very high levels of live capture of this species for captive-breeding for the pharmaceutical industry, it is now thought to be highly threatened outside protected forests in Cambodia. It is possible that without reductions in live capture of this species, sites like PVPF will be the only locations which continue to hold populations of this species.

Hylobatidae

Pileated Gibbon *Hylobates pileatus* (EN)

Widely distributed across PVPF wherever there is evergreen and mixed deciduous-evergreen forest (WCS 2008). The species is confined to forest areas in south-east Thailand and Cambodia to the Mekong River (Brockelman 1975; Brockelman & Gittins 1984; Marshall & Sugardjito 1987). Its range is therefore relatively small and its distribution within that range is declining rapidly as forest is cleared. If this trend continues, then it is likely that, as in Thailand, it will only be found in protected forests within Cambodia. The high quality of management and the intact nature of the forests of PVPF make this site of special importance for this species. Additionally, as PVPF is adjacent to Yot Dom Wildlife Sanctuary and Phu Jong Na Yoi National Park in Thailand where Rungnapa & Brockelman found small populations of gibbons, there is connectivity with other protected areas which increases the overall importance of PVPF for pileated gibbons. A review of the population of pileated gibbon for Cambodia by Traeholt *et al*. (2005) should be disregarded as it is based on extrapolation.

Map 1.5.1: Pileated Gibbon of PVPF



CARNIVORA

Canidae

Dhole *Cuon alpinus* (EN)

The dhole is probably the most frequently recorded of all the large carnivores in PVPF with records across much of the site (WCS 2008). Dhole have disappeared from large areas of their range in northern Asia and there are estimated to be only 2,500 adults remaining globally (Durbin et al. 2008). Tropical dry and moist deciduous forest is thought to be optimal habitat and deer are its main prey base. Thus PVPF is of great significance for this species as there is a large area of high quality habitat and increasing numbers of typical prey species.

Map 1.5.2: Dhole of PVPF

Ursidae

Sun Bear *Helarctos malayanus* (VU)

There are relatively few confirmed sightings of this species in PVPF, but this may be due to the difficulties of identifying the two species of bear found here; there are many more records of unidentified bear species than of confirmed identifications of either species. Most bear records of this species and unidentified species are distributed across the forest, but with most observations coming from the evergreen, semi-evergreen and riverine forest of the Core Zone and Buffer Zone 2 (WCS 2008). Bears are probably most threatened by loss of habitat and some hunting. As bears are not predators of large herbivores, the loss of prey base is probably not a significant threat to this species.

Asian Black Bear *Ursus thibetanus* (VU)

As for the preceding species, there are relatively few confirmed records of Asian Black Bear. Most bear records of this species and unidentified species are distributed across the forest, but with most observations coming from the evergreen, semi-evergreen and riverine forest of the Core Zone and Buffer Zone 2 (WCS 2008).

Mustelidae

Ferret-badger sp. *Melogale* sp. (DD/LC)

The two Ferret-badger species are very difficult to distinguish except by examining the dentition. Thus, although it is believed that the Large-toothed Ferret-badger *Melogale personata* (DD) has been recorded in PVPF from camera traps, the presence of Small-toothed Ferret-badger *Melogale moschata* cannot be ruled out (WCS 2008).

Hog Badger *Arctonyx collaris* (NT)

There have been few observations, mostly from evergreen forest in the Core Zone and Buffer Zone 2 (WCS 2008). The paucity of observations may be due to the nocturnal habits of Hog Badgers. This species, like many smaller species may be threatened mostly by habitat loss as well as by trapping using snares.

Smooth Otter *Lutrogale perspicallata* (VU)

Known from a few sight observations, thus exact identification remains to be confirmed (WCS 2008). Threats to this species include loss of prey base by intensive fishing, capture in fishing nets and illegal hunting.

Viverridae

Large Indian Civet *Viverra zibetha* (NT)

Widely distributed throughout PVPF, in both dry dipterocarp forest and more moist forest (WCS 2008).

Large-spotted Civet *Viverra megaspila* (VU)

Found mostly in dry dipterocarp forest as well as some more moist forest (WCS 2008). More frequently recorded than the Large Indian Civet which suggests it may be more common than that species. However, if it prefers more open forest, then the relative frequency of observations may be related to its greater visibility in this more open habitat.

Felidae

There are no records of Clouded Leopard *Neofelis nebulosa* (VU) from PVPF which is somewhat remarkable. Additionally, there are very few records of Marbled Cat *Pardofelis marmorata* (VU) and Asiatic Golden Cat *Pardofelis temminckii* (NT). Details of other key felid species are detailed below.

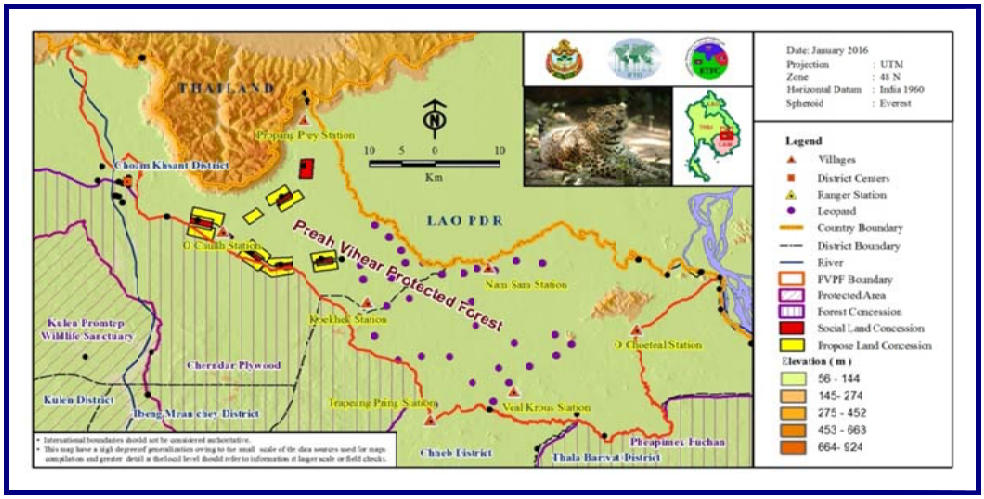
Tiger *Panthera tigris* (EN)

There have been no confirmed observations of this species for over five years in PVPF (WCS 2008). Camera-trapping and measurement of large cat footprints are being used to assess the veracity of recent reports of tigers in PVPF.

Leopard *Panthera pardus* (NT)

Widely distributed across PVPF with many records from the south-east (WCS 2008) dry dipterocarp forest and also the evergreen forest of the Core Zone and Buffer Zone 2. Although this species is widespread from Africa to East Asia, it is disappearing with loss of habitat, hunting and loss of prey base. Large areas of intact habitat with large numbers of prey animals such as PVPF are of key importance for the long term survival of this species in south-east Asia.

Map 1.5.3: Leopard of PVPF



Fishing Cat *Prionailurus viverrinus* (EN)

This species is recorded from sites across PVPF in a number of different habitats. It is the most frequently recorded of the small cats alongside the Jungle Cat *Felis chaus* (LC). Given its endangered status, its relative abundance at this site indicates that PVPF may be of considerable importance for the global conservation of this species.

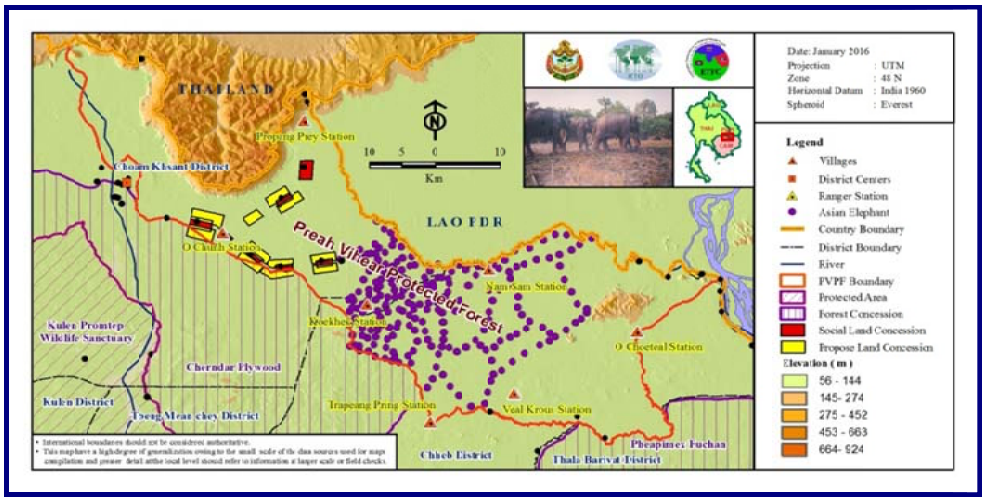
PROBOSCIDEA

Elephantidae

Asian Elephant *Elephas maximus* (EN)

There are numerous records of this species from all seasons indicating that it is resident in PVPF although no data is yet available on the elephant population size here. Given that habitats in areas adjoining PVPF are similar to those within the forest's boundaries, it is likely that Asian Elephants may also cross the international border to Lao PDR and also travel into the Cherndar Plywood concession. It is possible that its range may have changed somewhat in recent years, perhaps through the influence of changing hunting or disturbance patterns. However, given that surveys and patrolling effort have not been identical in all years and as we do not have meteorological data which we can use to assess the effects of rainfall on elephant movements, it is not possible to say if these range changes are real or not. Although previously the PVPF elephant population may have been connected to that in Kulen Promtep Wildlife Sanctuary (KPWS) through Cherndar concession, there is no evidence to suggest that elephants still move into KPWS. A recent range-wide review of elephant abundance and distribution indicated that there is no data on the elephant population in Lao PDR adjacent to PVPF. Thus we do not know if the PVPF is part of a wider regional population which would increase its global significance.

Map 1.5.4: Asian Elephant of PVPF



ARTIODACTYLA

Suidae

Eurasian Wild Pig (LC)

This species is widespread and abundant throughout most of PVPF in the Core Zone and Buffer Zones 1 and 2. It is one of the most frequently reported crop-raiding species. It is important as prey for large carnivores.

Cervidae

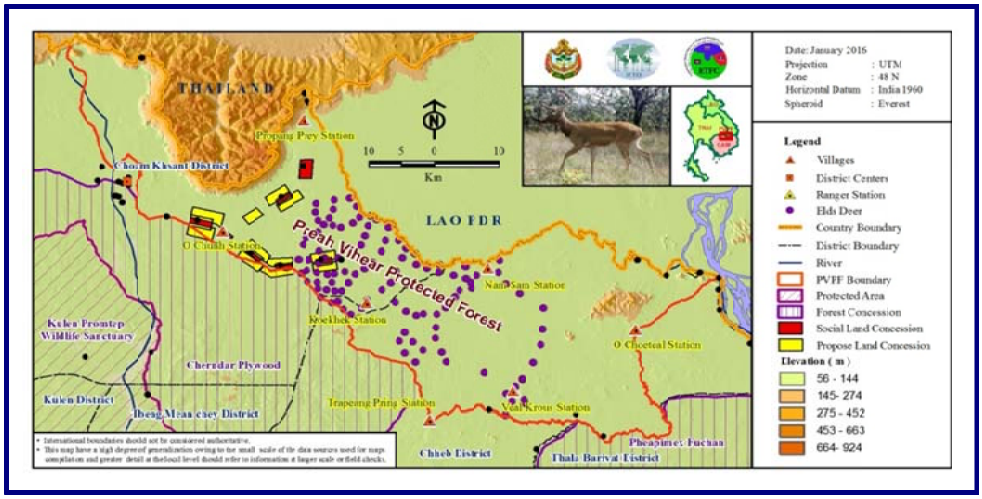
Sambar *Rusa unicolor* (VU)

Widespread and frequently recorded in most habitats. As this species is in itself vulnerable as well as being an important prey species for large carnivores, the abundance of Sambar is an indicator of conservation success for the current PVPF management approach.

Eld's Deer *Rucervus eldii* (EN)

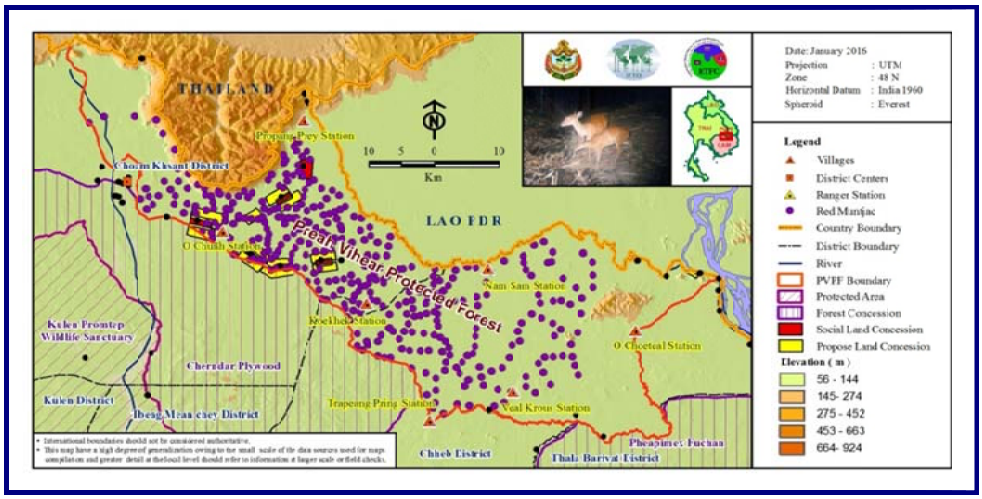
Eld's Deer are found most frequently recorded in dry dipterocarp forest, particularly in three main areas: in the forests south of Roboinh village, between the O Koki and Dangphlat village and in the south-east of PVPF. PVPF is possibly one of the most important sites for this species in the world as dry dipterocarp forest, on which this species relies, has disappeared from so much of its original range in south-east Asia. Additionally, as an important prey species for large carnivores, its abundance has wider implications.

Map 1.5.5: Eld's Deer of PVPF



Red Muntjac *Muntiacus muntjak* (LC)
This species is widespread and abundant throughout most of PVPF. It is important as prey for large carnivores.

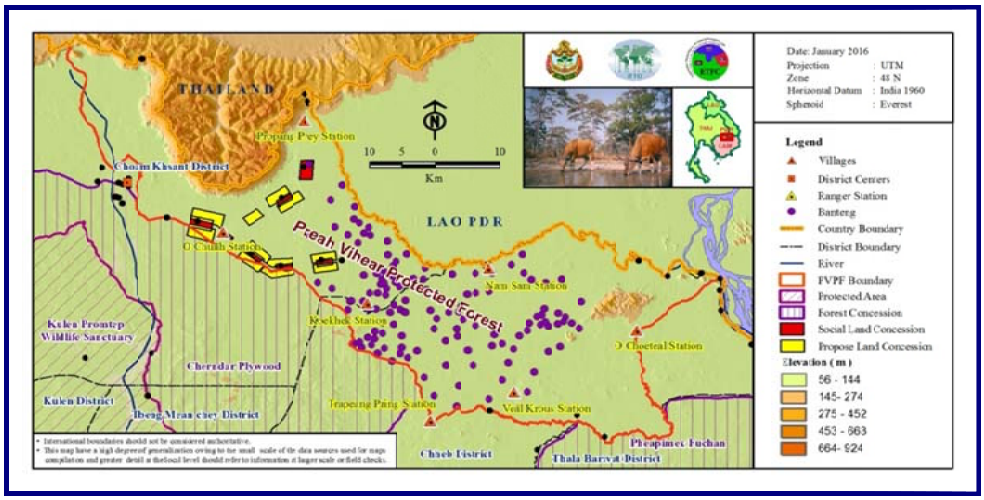
Map 1.5.6: Red Muntjac of PVPF



Bovidae
Banteng *Bos javanicus* (EN)
This species is widespread across the PVPF and Cherndar Plywood concession. It is observed relatively frequently from camera traps, prints and direct observation. In general, it is thought that this species prefers more open forest than gaur and this may be the case in PVPF. Although we do not yet have adequate abundance data from surveys of PVPF, this site is almost certainly of international importance for this species. This species has disappeared from most of the rest of its range in south-east Asia and it is only in the northern and eastern

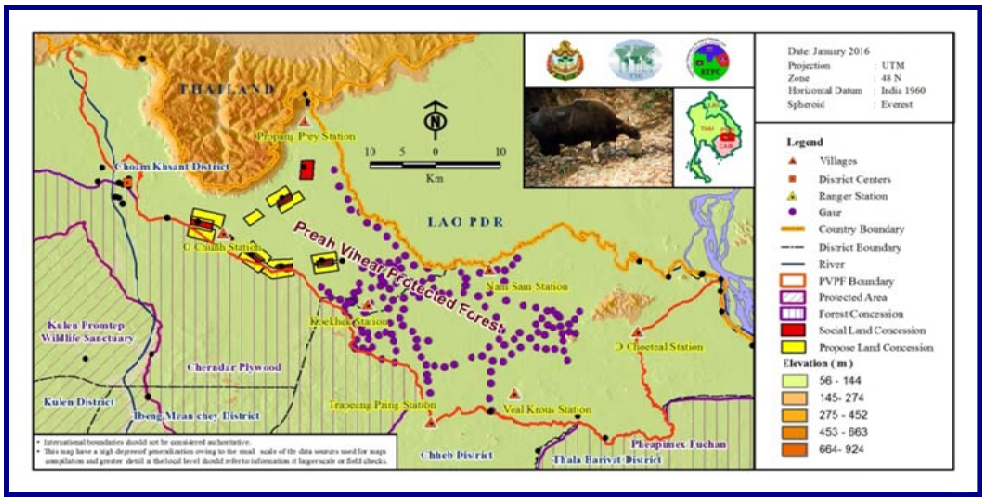
plains of Cambodia that this species is relatively widespread. Elsewhere fragmented populations are found in small areas of their former distribution. Law enforcement activities to control hunting and illegal clearance of habitat are the most important safeguards for this species in PVPF.

Map 1.5.7: Banteng of PVPF



Gaur *Bos gaurus* (VU)
Gaurs are most common in the central part of PVPF and in Cherndar concession. This may be because they favour evergreen, semi-evergreen and riverine forest which is more abundant in this area. This species is recorded relatively frequently during annual large mammal surveys in PVPF, although as for Banteng, the data do not yet allow estimates of the population size. Although this species has a wider global distribution, regionally in south-east Asia it may even be more threatened than Banteng and has disappeared from much of its former range. The population in PVPF linked to other sites in the northern and eastern plains of Cambodia is therefore likely to be of international importance.

Map 1.5.8: Gaur of PVPF



Northern Serow *Capricornis milneedwardsii* (NT)
There are a small number of records of this species from a Phnom to the east of PVPF. This species is generally restricted to rocky mountains and steep cliffs throughout its range.

Appendix 1.4b: List of Mammals of PreahVihear Protected Forest

No	Khmer Name	English name	Scientific name	IUCN	CITES	Cambodia Classification
PHOLIDOTA						
Manidae						
1	ពង្រ្កាល	Sunda Pangolin	*Manis javanica*	CR	II	Rare
CHIROPTERA						
Pteropodidae						
2	ជ្រឹង	Flying Fox sp.	*Pteropus sp.*	?	II	
Rhinolophidae						
3	ប្រចៀវ	Shamel's Horseshoe Bat	*Rhinolophus shameli*	LC		
4	ប្រចៀវ	Acuminate Horseshoe Bat	*Rhinolophus acuminatus*	LC		
5	ប្រចៀវ	Intermediate Horseshoe Bat	*Rhinolophus affinis*	LC		
6	ប្រចៀវ	Indochinese Horseshoe Bat	*Rhinolophus chaseni*	LC		
Hipposideridae						
7	ប្រចៀវ	Diadem Roundleaf Bat	*Hipposideros diadema*	LC		
Verspertilionidae						
8	ប្រចៀវ	Peter's/Asian Whiskered Myotis	*Myotis ater/muricola*	LC		
9	ប្រចៀវ	Greater Asian House Bat	*Scotophilus heathii*	LC		
10	ប្រចៀវ	Least False-Serotine	*Hesperoptenus blanfordii*	LC		
11	ប្រចៀវ	Hardwicke's Woolly Bat	*Kerivoula hardwickii*	LC		
Molossidae						
12	ប្រចៀវភ្នំត្បែង	Wroughton's Free-tailed Bat	*Otomops wroughtoni*	DD		
PRIMATES						
Lorisidae						
13	រញីប្រផេះ	Bengal Slow Loris	*Nycticebus coucang*	VU	I	Rare
Cercopithecidae						
14	ស្វាព្រាម	Indochinese Silvered Langur	*Trachypithecus germaini*	EN	II	Rare
15	ស្វាត្រោស	Pig-tailed Macaque	*Macaca nemestrina*	VU	II	Common
16	ស្វាក្តាម	Long-tailed Macaque	*Macaca fascicularis*	LC	II	Common
Hylobatidae						
17	ទោចម្កុដ	Pileated Gibbon	*Hylobates pileatus*	EN	I	Rare
CARNIVORA						
Canidae						
18	ឆ្កែចចក	Golden Jackal	*Canis aureus*	LC	III	Common
19	ឆ្កែព្រៃ	Dhole	*Cuon alpinus*	EN	II	Common
Ursidae						
20	ខ្លាឃ្មុំតូច	Sun Bear	*Ursus malayanus*	VU	I	Rare
21	ខ្លាឃ្មុំធំ	Asian Black Bear	*Ursus thibetanus*	VU	I	Endangered
Mustelidae						
22	សំពោចកលឿង	Yellow-throated Marten	*Martes flavigula*	LC	III	Common
23	ឆ្លួក	Ferret-Badger sp	*Melogale sp*	DD		Common

No	Khmer Name	English name	Scientific name	IUCN	CITES	Cambodia Classification
24	ជ្រូកពោន	Hog Badger	*Arctonyx collaris*	NT		Rare
25	ភេខ្លួនរលោង	Smooth coated Otter	*Lutrogale perspicillata*	VU	II	
Viverridae						
26	ខ្ចីន	Large Indian Civet	*Viverra zibetha*	NT	III	Common
27	សំពោចធំ	Large-spotted Civet	*Viverra megaspila*	VU	III	Common
28	សំពោចវល្លិ៍	Small Indian Civet	*Viverricula indica*	LC	III	Common
29	សំពោចក្រអូប	Common Palm Civet	*Paradoxurus hermaphroditus*	LC	III	Common
30	សំពោចភ្នុំ	Binturong	*Arctictis binturong*	VU	III	Common
Herpestidae						
31	ស្កាតូច	Small Asian Mongoose	*Herpestes javanicus*	LC	III	Common
32	ស្កាធំ	Crab-eating Mongoose	*Herpestes urva*	LC	III	Common
Felidae						
33	ខ្លាធំ	Tiger	*Panthera tigris*	EN	I	Endangered
34	ខ្លារខិន	Leopard	*Panthera pardus*	NT	I	Rare
35	ខ្លាភ្លីថ្នែវ	Marbled Cat	*Pardofelis marmorata*	NT	I	Rare
36	ខ្លាឈ្មៀងមាស	Asiatic Golden Cat	*Pardofelis temminckii*	NT	I	Rare
37	ឆ្មាដាវ	Leopard Cat	*Prionailurus bengalensis*	LC	II	Common
38	ខ្លាត្រី	Fishing Cat	*Prionailurus viverrinus*	EN	II	Common
39	ឆ្មាព្រៃ	Jungle Cat	*Felis chaus*	LC	II	Common
PROBOSCIDEA						
Elephantidae						
40	ដំរី	Asian Elephant	*Elephas maximus*	EN	I	Endangered
ARTIODACTYLA						
Suidae						
41	ជ្រូកព្រៃ	Eurasian Wild Pig	*Sus scrofa*	LC		Common
Tragulidae						
42	ក្តាន់ឡែងតូច	Lesser Mousedeer	*Tragulus kanchil*	LC		Common
Cervidae						
43	ប្រើស	Sambar	*Rusa unicolor*	VU		Common
44	រមាំង	Eld's Deer	*Rucervus eldii*	EN	I	Endangered
45	ឈ្លូស	Red Muntjac	*Muntiacus muntjak*	LC		Common
Bovidae						
46	ទន្សោង	Banteng	*Bos javanicus*	EN		Rare
47	ខ្ទីង	Gaur	*Bos gaurus*	VU	I	Rare
48	កែះ	Southern Serow	*Naemorhedus sumatraensis*	VU	I	Rare
RODENTIA						
Scuiridae						
49	កំប្រុកធំ	Black Giant Squirrel	*Ratufa bicolor*	NT	II	Rare
50	កំប្រុកពណ៌	Variable Squirrel	*Callosciurus finlaysonii*	LC		Common

No	Khmer Name	English name	Scientific name	IUCN	CITES	Cambodia Classification
51	កង្ហិចកម្ពុជា	Cambodian Striped Squirrel	*Tamiops rodolphi*			Common
52	កង្ហែន	Indochinese Striped Squirrel	*Menetes berdmorei*	LC		Common
53	ឆ្មាបាកន្ទុយខ្មៅ	Indian Giant Flying Squirrel	*Petaurista philippensis*	LC		Rare
54	កំប្រុក	Small Flying Squirrel sp	*Hylopetes sp*			
Hystricidae						
55	ប្រម៉ា	East Asian Porcupine	*Hystrix brachyura*	VU		Common
56	ប្រមោញ	Asian Brush-tailed Porcupine	*Atherurus macrourus*	LC		Common
LAGOMORPHA						
Leporidae						
57	ទន្សោយគល់	Burmese Hare	*Lepus peguensis*	LC		Common

Critically Endangered	CR
Endangered	EN
Vulnerable	VU
Near-threatened	NT
Data Deficient	DD
Least Concern	LC

Appendix 1.5a:Key Bird Speciesin PVPF

GALLIFORMES
Phasianidae

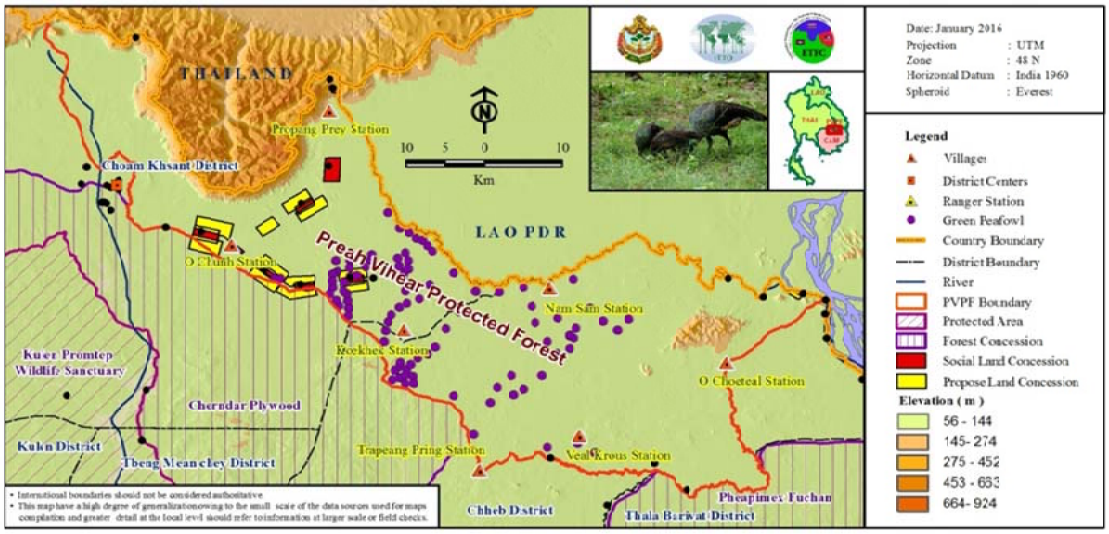
Red Jungle Fowl *Gallus gallus* (LC)

Red Jungle Fowl is still reasonably common in PVPF even though the size of this bird makes it quite attractive for substantial hunting by local people.

Green Peafowl *Pavo muticus* (VU)

Green Peafowl are known from south and west of Kahkeuk station and along the catchment of the O'Kapok. As it is thought to prefer undisturbed dry dipterocarp forest near streams and wetlands, these areas of PVPF may be the most suitable for this species. Elsewhere within its range it is declining rapidly and the only large populations remaining globally are believed to be in northern and eastern Cambodia and west-central Vietnam. Hence, the well protected forests of PVPF are likely to be of international importance for this species. Habitat degradation and hunting are likely to be the biggest threats to this species in the region and fragmentation of habitat may increase is vulnerability to both hunting and disturbance. Its threat status is being reviewed currently and it is likely to be upgraded to Endangered.

Map 1.6.1: Green Peafowl of PVPF



ANSERIFORMES

Anatidae

White-winged Duck *Cairina scutulata* (EN)

This large duck is found at a small number of sites in riverine forest near Roboinh village, Kahkeuk station (the O Koki and O Kapok and in Buffer Zone 2 in Cherndar concession). It is found only where there is dense forest with permanent water pools or rivers and low levels of disturbance. This species is a popular target species for birding tourists. Its global population is now highly fragmented and only in Cambodia and Myanmar do important populations remain. Thus, PVPF is of international importance for this species.

Map 1.6.2: White-winged Duckof PVPF

BUCEROTIFORMES

Bucerotidae

Great Hornbill *Buceros bicornis* (NT)

This iconic species is known from a few records from the forest around Kahkeuk stationof PVPF.

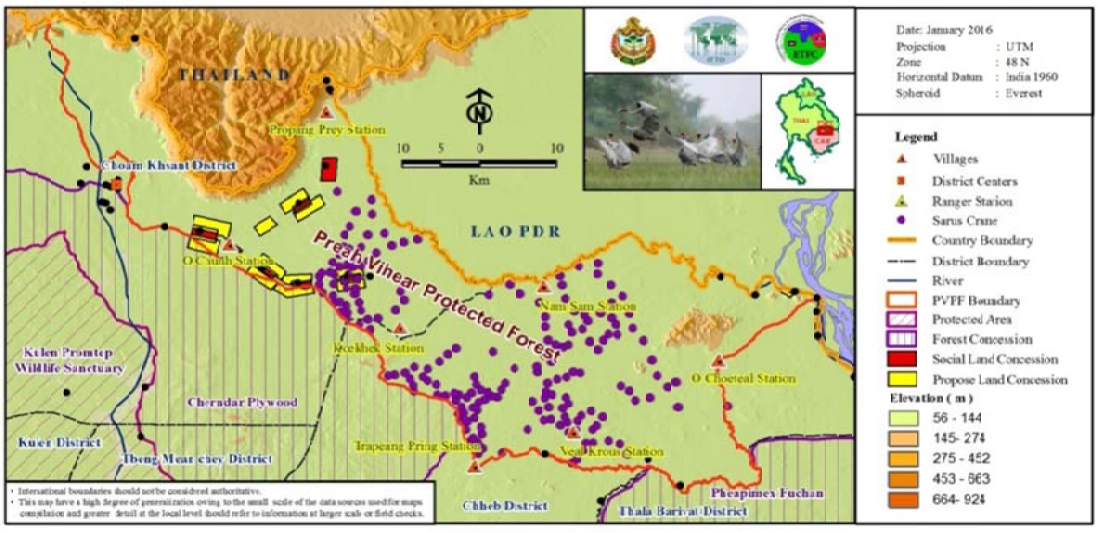
GRUIFORMES

Gruidae

Sarus Crane *Grus antigone* (VU)

Numbers of this threatened species have increased dramatically in PVPF since the nest protection project started in 2004: 16 nests were found in 2004 and 33 nests were found in 2008. Before direct nest protection started, many eggs and chicks were taken by local community members and military personnel and sold to Thailand. This threat has now been largely eliminated. Other threats include disturbance and loss of habitat which have now been reduced, but remain a problem outside PVPF. The cranes breeding in PVPF are part of the largest population in south-east Asia. They are thought to travel to An Trapeang Thmor in Banteay Mencheay in the non-breeding dry season.

Map 1.6.3: Sarus Craneof PVPF



FALCONIFORMES

Accipitridae

White-rumped Vulture *Gyps bengalensis* (CR)
This species breeds in small numbers here (in 2007-2008 breeding season, four nests were found of which two were successful) and over 40 were found at the annual Cambodian vulture census in June 2008. It is also regularly recorded at monthly vulture restaurants when over 60 may be recorded. Vultures in PVPF and elsewhere breed in loose colonies in trees, often selecting sites close to reliable food sources. This species is threatened globally by the use of the veterinary drug diclofenac which is extremely toxic to vultures as well as by limited food availability, habitat loss, nest predation and loss, and locally, incidental poisoning targeting other species. PVPF is probably the most important site for this species in south-east Asia. As this vulture is rapidly declining in the main parts of its range in south Asia due to the effects of diclofenac, the south-east Asian sub-population of this species will be the only remaining which is not affected by this drug. PVPF is therefore critical for its survival as a species.

Slender-billed Vulture *Gyps tenuirostris* (CR)
This species is recorded regularly in PVPF at vulture restaurants and at the June 2008 census, 11 were recorded, a large proportion of the minimum known population size in Cambodia. Threats are similar to those for the preceding species, however, the population size of this species is even smaller and thus it may be even more threatened. As part of the network of sites supporting vultures, PVPF plays a vital role in Slender-billed Vulture conservation.

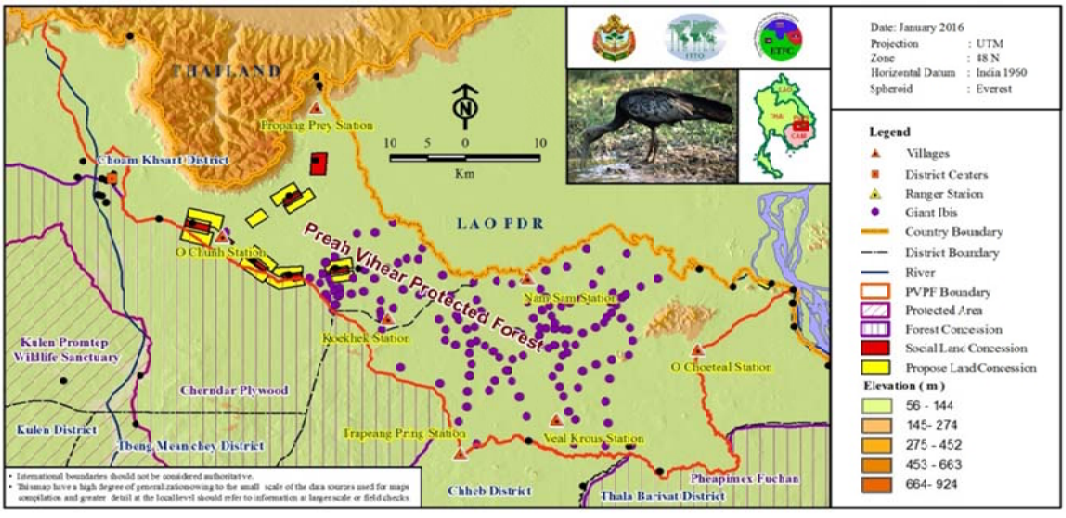
Red-headed Vulture *Sarcogyps calvus* (CR)
Red-headed Vultures are found in the highest numbers in PVPF and 19 were found in the 2008 census. It also breeds at this site. This species is not as social as other vultures and may feed more often away from larger carcasses such as those used at vulture restaurants. It may therefore be under-recorded using this technique. However, it suffers the same threats as for the *Gyps* species and PVPF is vital for its survival globally.

CICONIIFORMES

Threskiornithidae

Giant Ibis *Pseudibis gigantea* (CR)
PVPF is the most important site globally for this Critically Endangered species. Up to 36 nests have been found here in recent years, so it is likely that the total population here exceeds 100 birds if there are as many non-breeding individuals as there are adults; the global population was most recently estimated at approximately 200 individuals. As ibises are not vulnerable to nest predation by humans, the bird nest protection scheme is not used for protecting this species, although it can be used for monitoring the population size. Critically Endangered White-shouldered Ibis are not observed frequently in PVPF, although it is possible that they may be found here regularly in some areas.

Map 1.6.4: Giant Ibisof PVPF



Ciconiidae

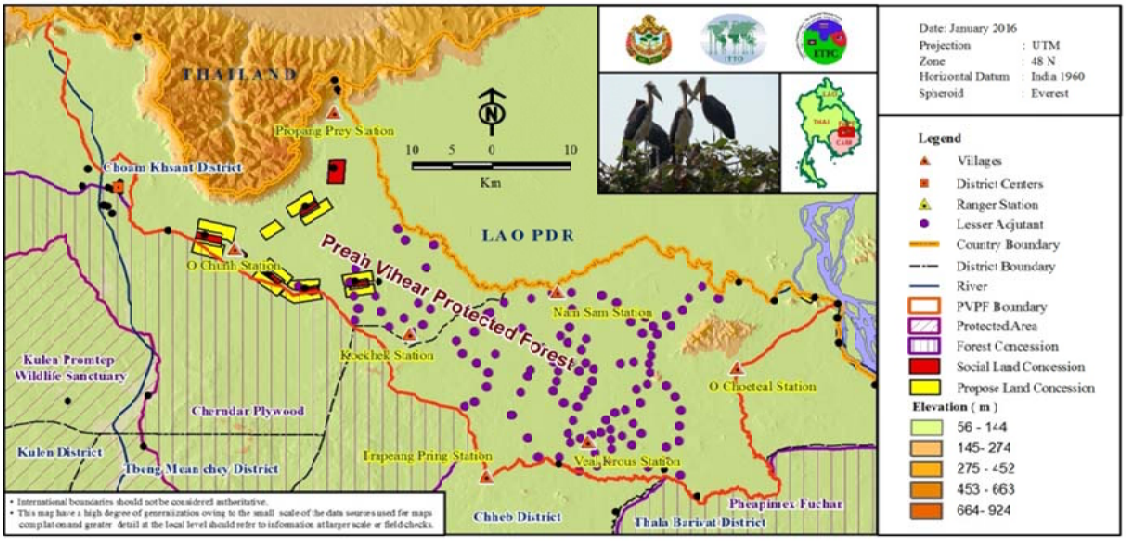
Black-necked Stork *Ephippiorhynchus asiaticus* (NT)

This species breeds in small numbers in PVPF, but is not very abundant. It prefers larger grasslands or veals with some flooding.

Lesser Adjutant *Leptoptilos javanicus* (VU)

This species breeds in large numbers in colonies across PVPF. The largest count was in 2007 when 115 nests were found. It is commonly found at trapeangs and other wetlands and can be seen easily in PVPF. It is found in wetlands in both open forest and evergreen forest. It is part of a very large Northern Plains population which may surpass the population of Tonle Sap Biosphere Reserve in size. Additionally, the population in PVPF seems to be increasing which indicates the effectiveness of the bird nest protection project. The PVPF population can be considered as internationally important as the global population is believed to be declining.

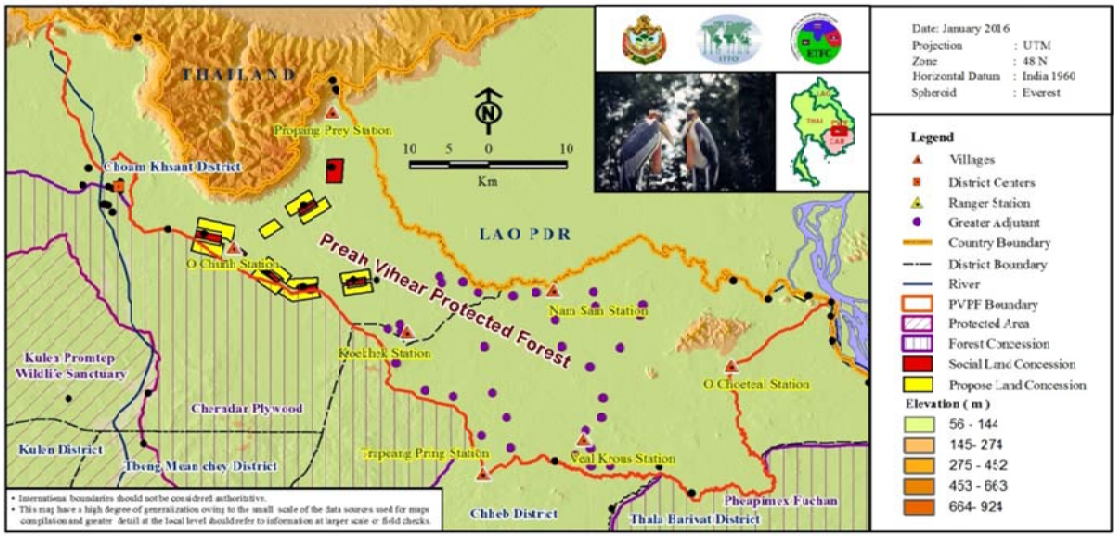
Map 1.6.5: Lesser Adjutant of PVPF



Greater Adjutant *Lepoptilos dubius* (EN)

This species is found rarely in PVPF, mostly in the south-east of the site in both the Core Zone and Buffer Zone 1. It does not breed here and is not thought to be resident.

Map 1.6.6: Greater Adjutant of PVPF



Appendix 1.5b: List of Birds of Preah Vihear Protected Forest

No	Khmer Name	English name	Scientific name	IUCN	CITES	Cambodia Classification
	Francolins, Partridges and Pheasants (Phasianidae)					
1	ទទា	Chinese Francolin	*Francolinus pintadeanus*	LC		Common
2	មាន់ព្រៃ	Red Junglefowl	*Gallus gallus*	LC		Common
3	មាន់ទោពណ៌ប្រាក់	Silver Pheasant	*Lophura nycthemera*	LC		Common
4	ស្តេចកូលីត	Siamese Fireback	*Lophura diardi*	**LC**		
5	ក្អែក	Green Peafowl	*Pavo muticus*	**EN**	II	Rare
	Whistling-ducks (Dendrocygnidae)					
6	ប្រវឹក	Lesser Whistling-duck	*Dendrocygna javanica*	LC		Common
	Ducks and Pygmy-geese (Anatidae)					
7	ទាព្រៃសាបស	White-winged Duck	*Cairina scutulata*	**EN**	I	Endangered
	Buttonquails (Turnicidae)					
8	ក្រូចអឺតជើងលឿង	Yellow-legged Buttonquail	*Turnix tanki*	LC		Common
9	ក្រូចអឺត	Barred Buttonquail	*Turnix suscitator*	LC		Common
	Piculets and Woodpeckers (Picidae)					
10	ត្រសេះតូចខ្មៅស	Grey-capped Woodpecker	*Dendrocopos canicapillus*	LC		Common
11	ត្រសេះមធ្យមខ្មៅស	Fulvous-breasted Woodpecker	*Dendrocopos macei*	LC		Common
12	ត្រសេះតូចក្បាលលឿង	Yellow-crowned Woodpecker	*Dendrocopus mahrattensis*			Common
13	ត្រសេះពោះត្នោត	Rufous-bellied Woodpecker	*Dendrocopos hyperythrus*	LC		Common
14	ត្រសេះត្នោតចំពុះខ្មៅ	Rufous Woodpecker	*Celeus brachyurus*	LC		Common
15	ត្រសេះធំពោះស	White-bellied Woodpecker	*Dryocopus javensis*	LC	I	Common
16	ត្រសេះតូចកំប៉ោយលឿង	Lesser Yellownape	*Picus chlorolophus*	LC		
17	ត្រសេះធំកំប៉ោយលឿង	Greater Yellownape	*Picus flavinucha*	LC		Common
18	ត្រសេះតូចក្បាលក្រហម	Laced Woodpecker	*Picus vittatus*	LC		Common
19	ត្រសេះបៃតងទ្រូងពណ្តាក់	Streak-throated Woodpecker	*Picus xanthopygaeus*	LC		Common
20	ត្រសេះបៃតងក្បាលខ្មៅ	Black-headed Woodpecker	*Picus erythropygius*	LC		Common
21	ត្រសេះបៃតងក្បាលប្រផេះ	Grey-headed Woodpecker	*Picus canus*	LC		Common
22	ត្រសេះតូចខ្នងភ្លើង	Common Flameback	*Dinopium javanense*	LC		Common
23	ត្រសេះធំខ្នងភ្លើង	Greater Flameback	*Chrysocolaptes lucidus*	LC		Common
24	ត្រសេះពពាលបំពង់ក-ស	Heart-spotted Woodpecker	*Hemicircus canente*	LC		Common
25	ត្រសេះដំរី	Great Slaty Woodpecker	*Mulleripicus pulverulentus*	VU		Common
	Asian Barbets (Megalaimidae)					
26	ប៉ោលតោកក្បាលព្រលែត	Lineated Barbet	*Megalaima lineata*	LC		Common
27	ប៉ោលតោកត្រចៀកបៃតង	Green-eared Barbet	*Megalaima faiostricta*	LC		Common
28	ប៉ោលតោកថ្ងាសខ្មៅ	Blue-eared Barbet	*Megalaima australis*			Common
29	ប៉ោលតោកអំបុក	Coppersmith Barbet	*Megalaima haemacephala*	LC		Common

No	Khmer Name	English name	Scientific name	IUCN	CITES	Cambodia Classification
Hornbills (Bucerotidae)						
30	កែងកងតូច	Oriental Pied Hornbill	*Anthracoceros albirostris*	LC	II	Common
31	កែងកងធំ	Great Hornbill	*Buceros bicornis*	**NT**	I	Rare
Hoopoes (Upupidae)						
32	បាគូ	Common Hoopoe	*Upupa epops*	LC		Common
Trogons (Trogonidae)						
33	ចាបចៀបពោះលឿង	Orange-breasted Trogon	*Harpactes oreskios*	LC		Common
Rollers (Coraciidae)						
34	ទៀវខៀវ	Indian Roller	*Coracias benghalensis*	LC		Common
35	ទៀវព្រៃ	Dollarbird	*Eurystomus orientalis*	LC		Common
Smaller Kingfishers (Alcedinidae)						
36	ចចាតក្រឹម	Common Kingfisher	*Alcedo atthis*	LC		Common
Larger Kingfishers (Halcyonidae)						
37	កដបព្រៃ	Banded Kingfisher	*Lacedo pulchella*			Common
38	ងាវកក	Stork-billed Kingfisher	*Halcyon capensis*			Common
39	កដបទ្រូងស	White-throated Kingfisher	*Halcyon smyrnensis*	LC		Common
40	កដបក្បាលខ្មៅ	Black-capped Kingfisher	*Halcyon pileata*	LC		Common
Pied Kingfishers (Cerylidae)						
41	កដបខ្មៅស	Pied Kingfisher	*Ceryle rudis*	LC		Common
Bee-eaters (Meropidae)						
42	ត្រដេវព្រៃ	Blue-bearded Bee-eater	*Nyctyornis athertoni*	LC		Common
43	ត្រដេវតូច	Green Bee-eater	*Merops orientalis*	LC		Common
44	ត្រដេវក្បាលបៃតង	Blue-tailed Bee-eater	*Merops philippinus*	LC		Common
45	ត្រដេវក្បាលត្នោតខ្ចី	Chestnut-headed Bee-eater	*Merops leschenaulti*	LC		Common
Cuckoos (Cuculidae)						
46	តាវៅកំប៉ោយ	Chestnut-winged Cuckoo	*Clamator coromandus*	LC		Common
47	តាវៅធំ	Large Hawk Cuckoo	*Hierococcyx sparverioides*	LC		Common
48	តាវៅក្បាលប្រផេះស្រាល	Indian Cuckoo	*Cuculus micropterus*	LC		Common
49	តាវៅពោះអង្កន់លឿង	Oriental Cuckoo	*Cuculus saturatus*	LC		Common
50	តាវៅខ្លួនអង្កន់ត្នោត	Banded Bay Cuckoo	*Cacomantis sonneratii*	LC		Common
51	តាវៅភូមិ	Plaintive Cuckoo	*Cacomantis merulinus*	LC		Common
52	តាវៅបៃតង	Asian Emerald Cuckoo	*Chrysococcyx maculatus*	LC		Common
53	តាវៅស្វាយ	Violet Cuckoo	*Chrysococcyx xanthorhynchus*	LC		Common
54	តាវៅខ្មៅ	Drongo Cuckoo	*Surniculus lugubris*	LC		Common
55	តាវៅ	Asian Koel	*Eudynamys scolopacea*	LC		Common
56	តុកកាគូ	Green-billed Malkoha	*Phaenicophaeus tristis*	LC		Common
Coucals (Centropodidae)						
57	ល្ហ្ួតធំ	Greater Coucal	*Centropus sinensis*	LC		Common
58	ល្ហ្ួតស្បៃវ	Lesser Coucal	*Centropus bengalensis*	LC		Common
Parrots and Parakeets (Psittacidae)						
59	សេកក្រិច	Vernal Hanging Parrot	*Loriculus vernalis*	LC	II	Common

No	Khmer Name	English name	Scientific name	IUCN	CITES	Cambodia Classification
60	សេកសោម	Alexandrine Parakeet	*Psittacula eupatria*	NT	II	Rare
61	សេកកន្ទុយខៀវលឿង	Grey-headed Parakeet	*Psittacul afinschii*	NT	II	Common
62	សេកអាត់	Blossom-headed Parakeet	*Psittacula roseata*	NT	II	Common
63	សេកសក	Red-breasted Parakeet	*Psittacula alexandri*	NT	II	Common
Swifts (Apodidae)						
64	ត្រចៀកកាំធំខ្នងត្នោត	Brown-backed Needletail	*Hirundapus giganteus*	LC		Common
65	ត្រចៀកកាំដើមត្នោត	Asian Palm Swift	*Cypsiurus balasiensis*	LC		Common
66	ត្រចៀកកាំកន្ទុយឆែក	Fork-tailed Swift	*Apus pacificus*	LC		Common
Treeswifts (Hemiprocnidae)						
67	ត្រចៀកកាំព្រៃ	Crested Treeswift	*Hemiprocne coronata*	LC		Common
Barn and Bay Owls (Tytonidae)						
68	ខ្លែងស្រោក	Barn Owl	*Tyto alba*	LC	II	Common
69	ឌីឡក្របី	Oriental Bay Owl	*Phodilus badius*	LC	II	Common
Typical Owls (Strigidae)						
70	ឌីឡឡឹក	Collared Scops Owl	*Otus bakkamoena*	LC	II	Common
71	ទីទុយធំព្រៃ	Spot-bellied Eagle Owl	*Bubo nipalensis*	LC	II	Rare
72	ទីទុយត្រីថ្ងាសត្នោត	Brown Fish Owl	*Ketupa zeylonensis*	LC	II	
73	មៀមធំវ៉ូ	Spotted Wood Owl	*Strix seloputo*	LC	II	Common
74	មៀមធំគួក	Brown Wood Owl	*Strix leptogrammica*	LC	II	Common
75	មៀមតូចព្រៃ	Asian Barred Owlet	*Glaucidium cuculoides*	LC	II	Common
76	មៀមតូចភូមិ	Spotted Owlet	*Athene brama*	LC	II	Common
77	មៀមខ្លែង	Brown Hawk Owl	*Ninox scutulata*	LC	II	Common
Frogmouths (Batrachostomidae)						
78	ចាបមាត់កង្កែប	Javan Frogmouth	*Batrachostomus javensis*	LC		Common
Eared Nightjars (Eurostopodidae)						
79	ពន្លក់ធំ	Great Eared Nightjar	*Eurostopodus macrotis*	LC		Common
Typical Nightjars (Caprimulgidae)						
80	ពន្លក់ចង់	Large-tailed Nightjar	*Caprimulgus macrurus*	LC		Common
81	ពន្លក់តូច	Indian Nightjar	*Caprimulgus asiaticus*	LC		Common
82	ពន្លក់ជ្រិច	Savanna Nightjar	*Caprimulgus affinis*	LC		Common
Pigeons and Doves (Columbidae)						
83	ពពូលក្បាលព្រំលែត	Pale-capped Pigeon	*Columba punicea*	**VU**		Rare
84	លលកបាយធំ	Oriental Turtle Dove	*Streptopelia orientalis*	LC		Common
85	លលកបាយ	Spotted Dove	*Streptopelia chinensis*			Common
86	លលកទ្រាំង	Red Collared Dove	*Streptopelia tranquebarica*	LC		Common
87	លលកស្លាបបៃតង	Emerald Dove	*Chalcophaps indica*	LC		Common
88	លលកតូច	Peaceful Dove	*Geopelia striata*	LC		Common
89	ពពូលក្បាលបៃតង	Orange-breasted Green Pigeon	*Treron bicincta*	LC		Common
90	ពពូលចំពុះធំលឿង	Thick-billed Green Pigeon	*Treron curvirostra*	LC		
91	ពពូលជើងលឿង	Yellow-footed Green Pigeon	*Treron phoenicoptera*	LC		Common
92	ព្រាបព្រៃ	Green Imperial Pigeon	*Ducula aenea*	LC		Common
Cranes (Gruidae)						
93	ក្រៀល	Sarus Crane	*Grus antigone*	**VU**	II	Rare

No	Khmer Name	English name	Scientific name	IUCN	CITES	Cambodia Classification
Rails, Crakes and Coots (Rallidae)						
94	មាន់ទឹក	White-breasted Waterhen	*Amaurornis phoenicurus*	LC		
Snipe, Sandpipers and Dowitchers (Scolopacidae)						
95	ចឡជើងល្មៀត	Common Greenshank	*Tringa nebularia*	LC		Common
96	ទីតលីតស្លាបក្រោមភ្នោតចាស់	Green Sandpiper	*Tringa ochropus*	LC		Common
97	ទីតលីតជើង ខ្លីលឿង	Temminck's Stint	*Calidris temminckii*	LC		Common
98	ទីតលីតជើងវែងលឿង	Long-toed Stint	*Calidris subminuta*	LC		Common
Jacanas (Jacanidae)						
99	ព្រហីតខ្មៅ	Bronze-winged Jacana	*Metopidiusindicus*	LC		Common
Thick-knees (Burhinidae)						
100	ជង្គង់ក្រាស់ត្រសក់	Eurasian Thick-knee	*Burhinus oedicnemus*	LC		Rare
Stilts, Plovers and Lapwings (Charadriidae)						
101	សត្វក្អាលធំរ័ណ្តូងខ្មៅ	Little Ringed Plover	*Charadrius dubius*	LC		Common
102	ត្រដេវរិចក្បាលប្រផេះ	Grey-headed Lapwing	*Vanellus cinereus*	LC		Common
103	ត្រដេវរិចទួល	Red-wattled Lapwing	*Vanellus indicus*	LC		Common
Hawks, Eagles and Vultures (Accipitridae: Accipirinae)						
104	ស្វាំងខ្មៅស ស្លាបឆែក	Black Baza	*Aviceda leuphotes*	LC	II	Common
105	រអាតឃ្មុំ	Oriental Honey-buzzard	*Pernis ptilorhyncus*	LC		
106	ស្វាំងលលក	Black-shouldered Kite	*Elanus caeruleus*	LC	II	Common
107	ខ្លែងខ្មៅ	Black Kite	*Milvus migrans*	LC	II	Rare
108	ខ្លែងឆាបលឿង ក្រម៉ៅ	Brahminy Kite	*Haliastur indus*	LC	II	Common
109	អកត្រីក្បាលប្រផេះ	Grey-headed Fish Eagle	*Ichthyophaga ichthyaetus*		II	Common
110	ត្មាតផេះ	White-rumped Vulture	*Gyps bengalensis*	**CR**	II	Rare
111	ត្មាតភ្នោត	Slender-billed Vulture	*Gyps tenuirostris*	**CR**	II	Rare
112	ត្មាតភ្លើង	Red-headed Vulture	*Sarcogyps calvus*	**CR**	II	Rare
113	អកពស់ព្រៃ	Crested Serpent Eagle	*Spilornis cheela*	LC	II	Common
114	ស្វាំងស្លាបឆែកកំប៉ោយខ្លី	Crested Goshawk	*Accipiter trivirgatus*	LC		
115	ស្វាំងស្លាបឆែក	Shikra	*Accipiter badius*	LC	II	Common
116	ស្វាំងស្លាបឆែកព្រៃ	Besra	*Accipiter virgatus*	LC	II	Common
117	រអាតភ្នោត	Rufous-winged Buzzard	*Butastur liventer*	LC	II	Common
118	រអាតវាល	Common Buzzard	*Buteo buteo*	LC	II	Common
119	អកខ្មៅដីសើម	Greater Spotted Eagle	*Aquila clanga*	**VU**	II	Rare
120	ស្វាំងពោះភ្នោត	Rufous-bellied Eagle	*Hieraaetus kienerii*		II	Common
121	អកព្រៃច្រើនពណ៌	Changeable Hawk Eagle	*Spizaetus cirrhatus*		II	Common
Falcons (Falconidae)						
122	ស្វាំងស្លាបស្រួចចុងខ្នងស	White-rumped Falcon	*Polihierax insignis*	**NT**	II	Common
123	ស្វាំងតូចស្លាបស្រួច	Collared Falconet	*Microhierax caerulescens*	LC	II	Common
124	ស្វាំងទទាក់ម្សៅ	Common Kestrel	*Falco tinnunculus*	LC	II	Common
125	ស្វាំងធំស្លាបស្រួច	Peregrine Falcon	*Falco peregrinus*	LC	I	Common
Darters (Anhingidae)						

No	Khmer Name	English name	Scientific name	IUCN	CITES	Cambodia Classification
126	ស្មៅញ	Oriental Darter	*Anhinga melanogaster*	**NT**	II	Common
Herons, Egrets and Bitterns (Ardeidae)						
127	កុកគ្រោងតូច	Little Egret	*Egretta garzetta*	LC		Common
128	ក្រសាប្រផេះ	Grey Heron	*Ardea cinerea*	LC		Common
129	កុកគ្រោងមធ្យម	Intermediate Egret	*Mesophoyx intermedia*		III	Common
130	កុកគោ	Cattle Egret	*Bubulcus ibis*	LC	III	Common
131	កុកក្រកក្បាលត្នោតចាស់	Chinese Pond Heron	*Ardeola bacchus*	LC		Common
132	ក្រសាស្វាយ	Little Heron	*Butorides striatus*			Common
133	កុកម្ទេសទុំ	Cinnamon Bittern	*Ixobrychus cinnamomeus*	LC		Common
Ibises and Spoonbills (Threskiornithidae)						
134	ត្រយ៉ងចង្កុំកស	White-shouldered Ibis	*Pseudibis davisoni*	**CR**		Endangered
135	ត្រយ៉ងយក្ស	Giant Ibis	*Pseudibis gigantea*	**CR**		Endangered
Storks (Ciconiidae)						
136	ចង្រៀលខ្យង	Asian Openbill	*Anastomus oscitans*	LC		Common
137	សត្វកស	Woolly-necked Stork	*Ciconia episcopus*	VU		Common
138	អង្កត់ខ្មៅ	Black-necked Stork	*Ephippiorhynchus asiaticus*	**NT**		Endangered
139	ត្រដក់តូច	Lesser Adjutant	*Leptoptilos javanicus*	**VU**		Rare
140	ត្រដក់ធំ	Greater Adjutant	*Leptoptilos dubius*	**EN**		Endangered
Pittas (Pittidae)						
141	ប៉ាក់ខ្មៀវពោះបង្គង់	Bar-bellied Pitta	*Pitta elliotii*	LC		Common
Fairy Bluebirds and Leafbirds (Irenidae)						
142	ចេកខ្ចីស្លាបខៀវ	Blue-winged Leafbird	*Chloropsis cochinchinensis*	LC		Common
143	ចេកខ្ចីថ្ងាសភ្លើង	Golden-fronted Leafbird	*Chloropsis aurifrons*	LC		Common
Shrikes (Laniidae)						
144	ចាបដូនតាខ្នងអង្កន់	Tiger Shrike	*Lanius tigrinus*	LC		Common
145	ចាបដូនតាខ្នងត្នោត	Brown Shrike	*Lanius cristatus*	LC		Common
146	ចាបដូនតាខ្នងត្នោតពោះស	Burmese Shrike	*Lanius collurioides*	LC		Common
Jays, Magpies and Crows (Corvidae: Corvinae: Corvini)						
147	ឆ្កែងឆ្កួតខៀវ	Red-billed Blue Magpie	*Urocissa erythrorhyncha*	LC		Common
148	ឆ្កែងឆ្កួតលឿង	RufousTreepie	*Dendrocitta vagabunda*	LC		Common
149	ទ្រមាក់ខ្លា	Racket-tailed Treepie	*Crypsirina temia*	LC		Common
150	ក្អែក	Large-billed Crow	*Corvus macrorhynchos*	LC		Common
Woodswallows (Corvidae: Corvinae: Artamini)						
151	ត្រចៀកកាំក្បាលធំ	Ashy Woodswallow	*Artamus fuscus*	LC		Common
Orioles, Cuckooshrikes, Minivets (Corvidae: Corvinae: Oriolini)						
152	ចេកទុំ	Black-naped Oriole	*Oriolus chinensis*	LC		Common
153	ចេកទុំក្បាលខ្មៅ	Black-hooded Oriole	*Oriolus xanthornus*	LC		Common
154	អល់អែកធំ	Large Cuckooshrike	*Coracina macei*	LC	II	Common
155	អល់អែកសក្រោមកន្ទុយ	Indochinese Cuckooshrike	*Coracina polioptera*	LC		Common
156	អល់អែកស្លាបស្តុចខ្មៅ	Black-winged Cuckooshrike	*Coracina melaschistos*	LC		Common
157	ចេកទេសផ្កាឈូក	Swinhoe'sMinivet	*Pericrocotus cantonensis*	LC		Common

No	Khmer Name	English name	Scientific name	IUCN	CITES	Cambodia Classification
158	ចេកទេសខ្មៅ-ស	Ashy Minivet	*Pericrocotus divaricatus*	LC		Common
159	ចេកទេសតូច	Small Minivet	*Pericrocotus cinnamomeus*	LC		Common
160	ចេកទេសធំ	Scarlet Minivet	*Pericrocotus flammeus*	LC		Common
161	អល់អែកស្លាបខ្មៅឆ្ពិតស	Bar-winged Flycatcher-shrike	*Hemipus picatus*	LC		Common
Fantails (Corvidae: Dicrurinae: Rhipidurini)						
162	កញ្ជាក់ស្លាចិញ្ចើមស	White-browed Fantail	*Rhipidura aureola*	LC		Common
Drongos (Corvidae: Dicrurinae: Dicrurini)						
163	អន្ទេបខ្មៅ	Black Drongo	*Dicrurus macrocercus*	LC		Common
164	អន្ទេបប្រផេះ	Ashy Drongo	*Dicrurus leucophaeus*	LC		Common
165	អន្ទេបខ្មៅរលើប	Bronzed Drongo	*Dicrurus aeneus*	LC		Common
166	អន្ទេបកំប៉ោយខ្សែ	Spangled Drongo	*Dicrurus hottentottus*	LC		Common
167	អន្ទេបទងកន្ត្រៃ	Greater Racket-tailed Drongo	*Dicrurus paradiseus*	LC		Common
Monarchs (Corvidae: Dicrurinae: Monarchini)						
168	ពពិចបន្ទូលក្បាលខ្មៅ	Black-naped Monarch	*Hypothymis azurea*	LC		
169	សត្វស៊ីរុយកន្ទុយវែង	Asian Paradise-flycatcher	*Terpsiphone paradisi*	LC		
Ioras (Corvidae: Aegithininae)						
170	ចេកចៅស្លាបខ្មៅ- ស	Common Iora	*Aegithina tiphia*	LC		
171	ចេកចៅស្លាបខ្មៅ	Great Iora	*Aegithina lafresnayei*	LC		
Woodshrikes (Corvidae: Malaconotinae)						
172	អល់អែកមធ្យម	Large Woodshrike	*Tephrodornis gularis*	LC		
173	អល់អែកតូច	Common Woodshrike	*Tephrodornis pondicerianus*	LC		
Thrushes and Shortwings (Muscicapidae: Turdinae)						
174	ពពិចថ្ម ក-ស	White-throated Rock Thrush	*Monticola gularis*	LC		
175	ពពិចថ្មខ្លួនស្រកា	Scaly Thrush	*Zoothera dauma*	LC		
176	ពពិចខ្មៅស្លាបប្រផេះ	Eurasian Blackbird	*Turdus merula*	LC		
Flycatchers (Muscicapidae: Muscicapinae: Muscicapini)						
177	ចាបស៊ីរុយខ្នងត្នោត	Asian Brown Flycatcher	*Muscicapa dauurica*	LC		
178	ចាបស៊ីរុយច្រើនពណ៌	Mugimaki Flycatcher	*Ficedula mugimaki*	LC		
179	ចាបស៊ីរុយកក្រហម	Red-throated Flycatcher	*Ficedula parva*	LC		
180	ចាបស៊ីរុយខ្លួនខៀវពោះ-ស	Blue-and-white Flycatcher	*Cyanoptila cyanomelana*	LC		
181	ចាបស៊ីរុយ ក-ខៀវ	Blue-throated Flycatcher	*Cyornis rubeculoides*	LC		
182	ចាបស៊ីរុយវាលទំនាប	Tickell's Blue Flycatcher	*Cyornis tickelliae*	LC		
183	ចាបស៊ីរុយក្បាលប្រផេះ	Grey-headed Canary Flycatcher	*Culicicapa ceylonensis*	LC		
Robins, Chats (Muscicapidae: Muscicapinae: Saxicolini)						
184	ចាបវាលស្រែ ក-ក្រហម	Siberian Rubythroat	*Luscinia calliope*	LC		
185	ល្វាចេកទ្រូងលឿង	Siberian Blue Robin	*Luscinia cyane*	LC		
186	ល្វាចេក	Oriental Magpie Robin	*Copsychus saularis*	LC		
187	ល្វាចេកព្រៃ	White-rumpedShama	*Copsychus malabaricus*	LC		
188	ពពិចថ្មទ្រូងត្នោត	Common Stonechat	*Saxicola torquata*	LC		
189	ពពិចថ្មខ្មៅចុងខ្នង-ស	Pied Bushchat	*Saxicola caprata*	LC		
Starlings and Mynas (Sturnidae)						

No	Khmer Name	English name	Scientific name	IUCN	CITES	Cambodia Classification
190	កញ្ជ្រៀចកន្ទុយស្នោត	Chestnut-tailed Starling	*Sturnus malabaricus*	LC		
191	កញ្ជ្រៀចស្មា-ស	White-shouldered Starling	*Sturnus sinensis*	LC		
192	គ្រលឹងគ្រលង ត្រចៀក-ស	Asian Pied Starling	*Sturnus contra*	LC		
193	គ្រលឹងគ្រលោង	Black-collared Starling	*Sturnus nigricollis*	LC		
194	កញ្ជ្រៀច	Vinous-breasted Starling	*Sturnus burmannicus*	LC		
195	រីកឬសារិកាកែវគោ	Common Myna	*Acridotheres tristis*	LC		
196	សារិកាកែវវង	Hill Myna	*Gracula religiosa*	LC		
Nuthatches (Sittidae)						
197	ត្រសេះតូចពោះស្នោតទុំ	Chestnut-bellied Nuthatch	*Sitta castanea*	LC		
198	ត្រសេះតូចចំពុះក្រហម	Velvet-fronted Nuthatch	*Sitta frontalis*	LC		
Tits (Paridae)						
199	ពពិចក្បាលមូល	Great Tit	*Parus major*	LC		
Swallows and Martins (Hirundinidae)						
200	ត្រចៀកកាំ	Barn Swallow	*Hirundo rustica*	LC		
201	ត្រចៀកកាំចុងខ្នងក្រហម	Red-rumped Swallow	*Hirundo daurica*	LC		
202	ត្រចៀកកាំចុងខ្នង-ស	Asian House Martin	*Delichon dasypus*	LC		
Bulbuls (Pycnonotidae)						
203	ពពិចក្បាលខ្មៅកំប៉ោយ	Black-crested Bulbul	*Pycnonotus melanicterus*	LC		
204	ពពិចក្បាលខ្មៅចុងខ្នង ស	Sooty-headed Bulbul	*Pycnonotus aurigaster*	LC		
205	ពពិចពុកមាត់លឿង	Stripe-throated Bulbul	*Pycnonotus finlaysoni*	LC		
206	ចាបក្រួច	Yellow-vented Bulbul	*Pycnonotus goiavier*	LC		
207	ពពិចត្រចៀកឆ្នូត	Streak-eared Bulbul	*Pycnonotus blanfordi*	LC		
208	ពពិចបំពង់កសទ្រូងលឿងចាស់	Puff-throated Bulbul	*Alophoixus pallidus*	LC		
209	ពពិចបែតងគូថច្រេះ	Grey-eyed Bulbul	*Iole propinqua*	LC		
210	ពពិចខ្មៅ	Black Bulbul	*Hypsipetes leucocephalus*	LC		
Cisticolas and Prinias (Cisticolidae)						
211	ចាបដង្កូវធំ	Brown Prinia	*Prinia polychroa*	LC		
212	ចាបដង្កូវស្លាបច្រេះ	RufescentPrinia	*Prinia rufescens*	LC		
213	ចាបដង្កូវទ្រូងប្រផេះ	Grey-breasted Prinia	*Prinia hodgsonii*	LC		
214	ចាបដង្កូវលឿង	Yellow-bellied Prinia	*Prinia flaviventris*	LC		
215	ចាបដង្កូវចិញ្ចើមស	Plain Prinia	*Prinia inornata*	LC		
Warblers and Tailorbirds (Sylviidae: Acrocephalinae)						
216	ចាបដូនតាឆ្នូតចុងខ្នង	Lanceolated Warbler	*Locustella lanceolata*	LC		
217	ចាបដូនតាចិញ្ចើមខ្មៅ- ស	Black-browed Reed Warbler	*Acrocephalus bistrigiceps*	LC		
218	ចាបដូនតាវាលស្រែ	Manchurian Reed Warbler	*Acrocephalus tangorum*	**VU**		
219	ចាបដូនតា	Oriental Reed Warbler	*Acrocephalus orientalis*			

No	Khmer Name	English name	Scientific name	IUCN	CITES	Cambodia Classification
220	ចាបដូនតាចំពុះធំ	Thick-billed Warbler	*Acrocephalus aedon*	LC		
221	ចាបតេត	Common Tailorbird	*Orthotomus sutorius*	LC		
222	ចាបតេតព្រៃ	Dark-necked Tailorbird	*Orthotomus atrogularis*	LC		
223	ចាបដូនតាគំរបក្រោមកន្ទុយក្រាស់	Radde's Warbler	*Phylloscopus schwarzi*	LC		
224	ចាបដូនតាចិញ្ចើមលឿង	Yellow-browed Warbler	*Phylloscopus inornatus*	LC		
225	ចាបដូនតាឆ្នូតស្លាបពីរ	Two-barred Warbler	*Phylloscopus plumbeitarsus*			
226	ចាបដូនតាក្បាលប្រផេះ	Pale-legged Leaf Warbler	*Phylloscopus tenellipes*	LC		
Laughingthrushes (Sylviidae: Garrulacinae)						
227	ចកវ៉ែកកំប៉ោយ ស	White-crested Laughingthrush	*Garrulax leucolophus*	LC		
228	ចកវ៉ែកវ័ណ្ណទ្រូងខ្មៅ	Lesser NecklacedLaughingthrush	*Garrulax monileger*	LC		
Babblers (Sylviidae: Sylviinae: Timaliini)						
229	ចាបដូនតាចំពុះធំ	Abbott's Babbler	*Malacocincla abbotti*	LC		
230	ចាបដូនតាបំពង់កប៉ោង	Puff-throated Babbler	*Pellorneum ruficeps*	LC		
231	ចាបដូនតាបន្ទូលក្បាលស្រកា	Scaly-crowned Babbler	*Malacopteron cinereum*	LC		
232	ចាបដូនតាទូរសព្ទ៍	Striped Tit Babbler	*Macronous gularis*	LC		
233	ចាបដូនតាបន្ទូលក្បាលស្នោតទុំ	Chestnut-capped Babbler	*Timalia pileata*	LC		
234	ចាបដូនតាក្បាលខ្មៅ	White-browed Shrike Babbler	*Pteruthius flaviscapis*	LC	II	
235	ចាបដូនតាកំប៉ោយគូថលឿង	White-bellied Yuhina	*Yuhina zantholeuca*	LC		
Larks (Alaudidae)						
236	ក្រួចអិន	Indochinese Bushlark	*Mirafra marionae*	LC		
Flowerpeckers (Nectariniidae: Nectariniinae: Dicaeini)						
237	ចាបកន្លង់ចំពុះធំ	Thick-billed Flowerpecker	*Dicaeum agile*	LC		
238	ចាបកន្លង់គូថលឿង	Yellow-vented Flowerpecker	*Dicaeum chrysorrheum*	LC		
239	ចាបកន្លង់ភក់	Plain Flowerpecker	*Dicaeum concolor*	LC		
240	ចាបកន្លង់ខ្នងក្រហម	Scarlet-backed Flowerpecker	*Dicaeum cruentatum*	LC		
Sunbirds (Nectariniidae: Nectariniinae: Nectariniini)						
241	ចាបកន្លង់បំពង់កស្នោតចាស់	Brown-throated Sunbird	*Anthreptes malacensis*	LC		
242	ចាបកន្លង់	Olive-backed Sunbird	*Nectarinia jugularis*	LC		
243	ចាបកន្លង់ខៀវ	Purple Sunbird	*Nectarinia asiatica*	LC		
244	ចាបកន្លង់ក្រហម	Crimson Sunbird	*Aethopyga siparaja*	LC		
Sparrows (Passeridae: Passerinae)						
245	ចាបស្រុក	Plain-backed Sparrow	*Passer flaveolus*	LC		
246	ចាបឆ្ទះ	Eurasian Tree Sparrow	*Passer montanus*	LC		
Wagtails and Pipits (Passeridae: Motacillinae)						
247	ខ្ចប់ដីខ្នងប្រផេះ	Grey Wagtail	*Motacilla cinerea*	LC		

No	Khmer Name	English name	Scientific name	IUCN	CITES	Cambodia Classification
248	ក្រួចអិនជើងវែង	Richard's Pipit	*Anthus richardi*	LC		
249	ក្រួចអិនវាលស្រែ	Paddy field Pipit	*Anthus rufulus*	LC		
250	ក្រួចអិនទ្រូងឆ្នូតខ្មៅ	Olive-backed Pipit	*Anthus hodgsoni*	LC		
Weavers (Passeridae: Ploceinae)						
251	ចាបពូកទ្រូងឆ្នូត	Streaked Weaver	*Ploceus manyar*	LC		
252	ចាបពូកទ្រូងត្នោត	Baya Weaver	*Ploceus philippinus*	LC		
253	ចាបពូកទ្រូងលឿង	Asian Golden Weaver	*Ploceus hypoxanthus*	**NT**		
Munias (Passeridae: Estrildinae)						
254	ចាបចង្កែងចុងខ្នងស	White-rumped Munia	*Lonchura striata*	LC		
255	ចាបចង្កែង	Scaly-breasted Munia	*Lonchura punctulata*	LC		

Critically Endangered	CR
Endangered	EN
Vulnerable	VU
Near-threatened	NT
Data Deficient	DD
Least Concern	LC

Appendix 1.6a: Key Reptiles Species

Siamese Crocodile *Crocodylus Siamensis* (CITES App. I, IUCN-CR)

The most impressive reptile living in the PVPF is the Siamese crocodile. Siamese crocodiles are globally endangered and were assumed to be extinct from the planet (Ross, 1998; Bembrick& Cannon, 1999) until surviving and breeding populations were identified in the Central and Southern Cardamoms in 2000 (IUCN/SSC, CSG, Jenny D. &Dany C. 2000). Once used to be abundant and widespread in rivers and marshes of freshwater system of mainland and island Southeast Asia. Though, this relatively small and harmless crocodile had been hunted to near-extinction. Siamese Crocodiles have historically been collected for farming, and hatchlings were collected for trophies. However, these threats have been mitigated by the protection and conservation measures implemented by Forestry Administration in collaboration with development partners. The main threat to Siamese Crocodiles in the PVPF is now accidental by-catch in fishing nets. During the 1980's, 1990's and early 2000's most of the wild Siamese Crocodiles were hunted during that period and few remain in it natural habitat. The hunted crocodiles were sold to neighbouring country (live caught crocodiles) and to domestic crocodile traders. The crocodile is most likely to persist, was very handful within and around PVPF.

Elongated tortoise *Indotestudoelongata* (IUCN-VU, CITES App. II)

This species is widespread throughout dry deciduous/open forests in mainland tropical Asia of Cambodia, Vietnam, Laos, Thailand, Northern Peninsular Malaysia, and from China to India. Elongated tortoises feature heavily in the international pet trade and in the Far East trade for medicine, ornaments and food (Daltry & Momberg, 2000). A few carapaces/shells of this species were found at abundance hunting camp in the surveyed areas as well as in abandon NTFP collectors' camps site in the forest, though some were spotted in the village settlement near by the PVPF in Chunh.

Bengal monitor *Varanusbengalensis* (CITES App. I)

Bengal monitor or clouded monitor lizards are widespread, but heavily hunted throughout Asia. International trade in Bengal monitor skins is estimated about 1 million skins per year. These spotted lizards are likely presented in the area through difference habitats at lower and medium elevations ranging from dense evergreen logged forest, open forest, bamboo forest and farmlands (Chheang at al. 2002). This species has been commonly harvested by the local villager from forested areas, especially within the PVPF, for subsistence and for sale.

Water monitor *Varanussalvator* (CITES App II)

This is the world's second largest lizard, reaching a maximum length in excess 2.5 m (Daltry & Momberg, 2000). This species is highly adaptable and still widespread across tropical Asia, millions are killed annually for their meats and skins and populations have plummeted in many areas (Bennett, 1998). Water monitor is the most heavily exploited monitor and international trade in water monitor skins in Southeast Asia is estimated 1-1.5 million skins (Sen, 1999). Water monitors are frequently encountered near rivers in the PVPF and several were seen trapped by fishing nets and snared for bush-meat. This species have been commonly harvested by the local villager from forest area, especially within the PVPF, for subsistence and for sale.

Reticulated python *Python reticulatus* (CITES App. II, IUCN-LR/nt) and Burmese python*Python molurusbivittatus* (CITES App. II, IUCN-LR/nt)

With weight more than 100 kg and its girth about 60 centimeter, the Reticulated python is known to be the world's longest snake, reportedly reaching lengths of about 10 m (Cox, 1991),. This species of python distributed throughout most of Southeast Asia. This python is

well known to local people who hunt it for meat and its skin. The reticulated python is a major target of both the international pet trade and skin trade, and populations have been depleted locally in many countries (Daltry & Momberg, 2000). As Groombridge & Luxmoore (1991) reported many of the python skins exported from Thailand are said to originate from Cambodia, for prices of US$ 13-17/m.Local villagers and field guides confirmed that the survey area is home for both Reticulated python*Python reticulatus* and Burmese python *Python molurusbivittatus*, but the field team did not encounter significant evidence of both species during this survey, but only part of the skins of both species keeping in houses of local villager in Choam Ksant, and Chheb districts.. These species been harvested by the local villager from forest area, especially within the PVPF, for subsistence and for sale.

Appendix 1.6b: List of Reptiles of PreahVihear Protected Forest

No.	ឈ្មោះជាភាសាខ្មែរ	English Name (Robson)	Scientific Name	IUCN	CITES
1	ក្រពើភ្នំ	Siamese Crocodile	*Crocodylus siamensis*	CR	I
2	អណ្តើកក្បាលធំ	Big-headed Turtle	*Platystemon megacephalum*	EN	I
3	អណ្តើកបិទមុខឥណ្ឌូចិន	Indochinese Box Turtle	*Cuora galbinifrons*	CR	II
4	អណ្តើកព្រិច	Elongated Tortoise	*Indotestudo elongata*	EN	II
5	អណ្តើកបិទមុខស្នូកខ្មៅ	Asian Box Turtle	*Cuora amboinensis*	VU	II
6	អណ្តើកសកល	Malayan Snail-eating Turtle	*Malayemys subtrijuga*	VU	II
7	អណ្តើកភ្នែកខ្មៅ	Black Marsh Turtle	*Siebenrockiella crassicollis*	VU	II
8	អណ្តើកក្របីក្បាលលឿង	Yellow-headed Temple Turtle	*Hieremys annandalii*	EN	II
9	កន្ធាយអាស៊ី	Asian Softshell Turtle	*Amyda cartilaginea*	VU	II
10	កន្ធាយក្បាលកន្ទែប	Asian Giant Softshell Turtle	*Pelochelys cantorii*	EN	II
11	ពស់ថ្លាន់តូច	Burmese Python	*Python molurus bivittatus*	VU	II
12	អន្សង	Water Monitor	*Varanus salvator*	LC	II
13	ត្រកួត	Bengal Monitor	*Varanus bengalensis*	LC	I
14	ពស់ថ្លាន់ធំ	Reticulated Python	*Python reticulatus*		II
15	ពស់ព្រៃកណ្តុរ	Common Rat Snake	*Ptyas mucosus*		II
16	ពស់វែករនាម	King Cobra	*Ophiophagus hannah*	VU	II
17	ពស់វែកក្របី	Monocled Cobra	*Naja kaouthia*	LC	II
18	ពស់វែកដំបូក	Indochinese Spitting Cobra	*Naja siamensis*	VU	II
19	ពស់ក្រាយខ្លួនជ្រុងវែង	Banded Krait	*Bungarus fasciatus*	LC	
20	ពស់ពញ្ចក់ខ្លួនជ្រុងខ្លី	Malayan Krait	*Bungarus candidus*	LC	
21	ពស់ព្រៃ	Indochinese Ratsnake	*Pytas korros*		
22	ពស់ព្រៃកន្ទុយក្រហម	Red-tailed Green Ratsnake	*Gonyosoma oxycephalum*	LC	
23	ពស់ចាន់ល្មម	Bocourt's Water Snake	*Enhydris bocourti*	LC	
24	ពស់កាចាន់	TayNinh Water Snake	*Enhydris innominata*	DD	
25	ពស់ដែក	File Snake	*Acrochordus granulatus*	LC	
26	ពស់ដែកអង្រែស	Elephant-trunk Snake	*Acrochordus javanicus*	LC	
27	ពស់ប្រែងតូច	Common Blind Snake	*Ramphotyphlops braminus*	LC	
28	ពស់ប្រែងធំ	Diards's Blind Snake	*Typhlops diardi*		
29	ពស់ដីខ្លួនឆ្នូតក្រហម	Red-tailed Pipe Snake	*Cylindrophis ruffus*	LC	
30	ពស់ដីខ្លួនរលោងភ្លឺ	Sunbeam Snake	*Xenopeltis unicolor*	LC	
31	ពស់ក្រាយឫស្សី	Bamboo Pit-viper	*Trimeresurus stejnegeri*		
32	ពស់ស្រែកាចាស់	Russell's Pit-viper	*Daboia russelli*		
33	ពស់ព្រៃភ្នែកភ្លឺមុត	Modest Keelback	*Amphiesma modesta*		
34	ពស់ខ្សែគោ	Striped Keelback	*Amphiesma stolata*		
35	ពស់ឈើ	Tentacled Snake	*Erpeton tentaculatum*	LC	
36	ពស់ព្រៃក្បាលវ៉ឺណាស	Speckel-bellied keelback	*Rhabdophis chrysargus*		
37	ពស់ព្រៃខ្លួនក្រហម-បៃតង	Green keelback	*Rhabdophis nigrocinctus*	LC	
38	ពស់ព្រៃកក្រហម	Red-necked keelback	*Rhabdophis subminiatus*	LC	

No.	ឈ្មោះជាភាសាខ្មែរ	English Name (Robson)	Scientific Name	IUCN	CITES
39	ពស់ខ្សែគោឆ្នូតបួន	Indo-Chinese Sand Snake	*Psammophis condanarus*	LC	
40	ពស់ពង្កាត់ត្នោតក្បាលអុច	Barron's Kukri Snake	*Oligodon barroni*	LC	
41	ពស់ពង្កាត់ត្នោតអុចប្រផេះ	Banded Kukri Snake	*Oligodon fasciolatus*	LC	
42	ពស់ពង្កាត់ក្បាលខ្មៅ	Cambodian Kukri Snake	*Oligodon mouhoti*	LC	
43	ពស់ពង្កាត់ព្រៃ	Inornate Kukri Snake	*Oligodon inomatus*		
44	ពស់អង្កាច់មាស	Striped Kukri Snake	*Oligodon taeniatus*	LC	
45	ពស់តឹកកែ	Common Wolf Snake	*Lycodon capucinus*	LC	
46	ពស់ខ្សែគោលឿង-បៃតង	Golden Tree Snake	*Chrysopelea omata*		
47	ពស់ខ្សែគោក្បាលឆ្នូតស	Mountain Bronzeback	*Dendrelaphis subocularis*		
48	ពស់ហនុមានបៃតង	Green Cat Snake	*Boiga cyanea*		
49	ពស់ភ្លីថ្នាំកែវ	Marbled Cat Snake	*Boiga multomaculata*		
50	ពស់ខ្យងអុច ស ខ្មៅ	White-spotted Slug Snake	*Pareas margaritophorus*	LC	
51	ពស់ស្លាប់កង្កែប	ChequeredKeelback	*Xenochrophis piscator*		
52	ពស់ត្រីស្រែកាធំ	Dog-faced Water Snake	*Cerberus rynchops*	LC	III
53	តុកកែ	Tockay	*Gekko gecko*		
54	បង្គួយព្រៃត្រចៀកតូច	Scale-bellied Tree lizard	*Acanthosaura lepidogaster*	LC	
55	បង្គួយមានពុកមាត់	Moustached Lizard	*calotes mystaceus*		
56	ថ្លែនកន្ទុយក្រហម	Common Butterfly Lizard	*Leiolepis belliana*		
57	ថ្លែនឆ្នូតខ្នងកន្ទុយវែង	Long-tailed Sun Skink	*Mabuya longicaudata*		
58	កន្ត្រែង	Water Dragon	*Physignathus cocincinus*		

Critically Endangered	CR
Endangered	EN
Vulnerable	VU
Near-threatened	NT
Data Deficient	DD
Least Concern	LC

Appendix 2.1: Socio-economic Data of Choam Ksant and Chheb Districts of Preah Vihea Province

No.	Kind of Statistics	District/Khan Considered as a Rural		Total
		Chheb	Choam Ksant	
1	Total number of families	4178	14238	18416
2	Total number of females	10105	26787	36892
3	Total number of males	11511	28779	40290
4	Number of girls 0-5 years old (under 6's)	1682	4092	5774
5	Number of boys 0-5 years old (under 6's)	1764	4165	5929
6	Number of girls 6 to 14 years old	2284	5801	8085
7	Number of boys 6 to 14 years old	2271	5961	8232
8	Number of girls 6 to 14 who go to school	1927	3477	5404
9	Number of boys 6 to 14 who go to school	1900	3985	5885
10	Number of women 15 to17 years old	819	1712	2531
11	Number of men 15 to17 years old	735	1682	2417
12	Number of women 18 to 60 years old	4415	12679	17094
13	Number of men 18 to 60 years old	4233	11880	16113
14	Number of women over 61 years of age	672	965	1637
15	Number of men over 61 years of age	584	1003	1587
16	Number of llliterate women over 15 years old	1597	1996	3593
17	Number of Illiterate men over 15 years old	1392	1790	3182
18	Number of houses with thatched roof	1074	3448	4522
19	Number of houses with tiled roof	13	1484	1497
20	Number of houses with zinc roof	2425	7255	9680
21	Number of houses with concrete roof	2	11	13
22	Number of latrines	752	2636	3388
23	Number of families with piped water, private pump well or private ring well, usable year round, at their house, less then150m.	1981	9572	11553
24	Number of families with a communal tap, pump well or ring well, usable year round, within 150m of their house.	242	583	825
25	Most common source of water for other families: pond, river, rain water, other.	1148	1094	2242
26	Number of families with cattle and buffalo in village	3414	2918	6332
27	Number of families with pigs in the village	2275	2737	5012
28	Average farm gate price of paddy in Riel for this month, December	930	856	1786
29	Number of motorcycles	1650	4609	6259
30	Number of tractors/koyons/cars	1496	3190	4686
31	Number of horse carts and ox carts	198	53	251
32	Number of bicycles	1544	1618	3162
33	Number of row boats	142	26	168
34	Number of boats with motor	111	0	111
35	Number of TVs	555	3307	3862
36	Number of families who used a traditional birth attendant in the past year	225	239	464
37	Number of families who used a trained midwife in the past year	142	844	986
38	Number of traditional birth attendants in the village	41	23	64
39	Number of government trained midwives in the village	20	31	51
40	Number of family who have some irrigated rice land	0	0	0

No.	Kind of Statistics	District/Khan Considered as a Rural		Total
		Chheb	Choam Ksant	
41	Number of family using chemical fertilizer in the past year	114	45	159
42	Number of family using pesticide in the past year	43	751	794
43	Number of murder, robbery, theft cases in the past year	29	28	57
44	Number of land conflict case in the past year	44	29	73
45	Number of female headed household/families, where the head is a mother with one or more children with under 5 yrs old	218	56	274
46	Number of families having problems with violence in home	110	146	256
47	Location of the nearest market villager frequently go to buy goods	145	74	219
48	Distance in Km to nearest year-round road (4 wheel motor vehicles)	6.5	8	15
49	Time taken to get from village to this nearest market by motor or motorboat	534	34	568
50	Number of primary school classrooms in the commune	89	228	317
51	Number of secondary school classrooms in the commune	21	39	60
52	Number of high school classrooms in the commune	6	7	13
53	Number of primary school teachers in the commune	98	121	219
54	Number of secondary school teachers in the commune	32	42	74
55	Number of high school teachers in the commune	6	13	19
56	Area wet season rain fed rice land in Ha	5087	27274	32361
57	Rice production in wet season, MT	2	2	4
58	Area of recession dry season rice land in Ha	2	0	2
59	Rice production in dry season, MT	2	0	2

Appendix 3.1: Conceptualized Management Zones

UNECO, the United Nations Educational, Scientific, and Cultural Organization, has established a number of Biosphere Reserves in different parts of the world in an attempt to consolidate human activities, research, and protection of the natural environment. The focal point of a Biosphere Reserve is a core area in which a selected ecosystem's biological communities are strictly protected. The core zone is surrounded by a buffer zone in which traditional human activities such as the collection of non-timber forest products are allowed. The buffer zone then extends into a transitional zone in which some forms of sustainable development such as small scale-farming and selective logging, as well as some forms of research, are allowed (Primack 1995).

Miller and Hamilton (1999) modified the zoning configuration of a Biosphere Reserve in order to maintain biological diversity across an entire landscape while still meeting the requirements of local people. Their bioregional approach proposes four broad zones in a human-induced landscape: a core area, a buffer or transitional zone, a corridor, and a human-dominant matrix. The purpose of the corridor is to connect critical ecosystems to encourage and facilitate animal migration and dispersal patterns.

The premise of the proposed zoning configuration of the PVPF was developed by integrating the Biosphere Reserve concept with elements of a landscape ecology theory (Turner et al. 2001) in order to recognize that the PVPF are not contiguous.

1. Zoning Criteria and Methods

The guiding principles for determining the ecological management zones of the PVPFlandscape are to maintain wildlife habitats, protect ecosystems, and provide opportunities for sustainable uses of resources. In incorporating those principles into the management plan, the zoning arrangement for the PVPF is linked to the following spatial ecological quality factors:

- Critical Habitat;
- Environmental Services;
- Naturalness; and
- Remoteness.

1.1. Critical Habitat: Critical habitat is reflected in the level of wildlife concentration in an area. Concentrations, or hot spots, of wildlife are subdivided into three classes. These include critical (high to relatively high concentration), moderately critical (moderate to relatively low concentration), and not critical (low concentration).

1.2. Environmental Services: The most recognized environmental service provided by the PVPF is its watershed. This system supplies water to low land communities as well as to the Tonle Sap flood plain. Several small reservoirs have also been constructed in this watershed to store water for irrigation. The integrity, or quality, of a watershed is commonly represented by its erosion sensitivity index. This is developed using two physical factors, elevation and slope.

1.3. Naturalness: Naturalness reflects the degree to which a site is free from disturbances caused by modern technology and human interference, or remains in a natural state. Within the PVPF, several areas that have been converted to farmlands and settlements, or allocated to development uses, no longer exhibit significant degrees of naturalness.

1.4. Remoteness: Remoteness is a measure of the distance of a site from established settlements. In the PVPF, it is determined by distance from human settlements, main roads, and boundaries.

2. Characteristics of Ecological Management Zones:

2.1. A **Core Area** is a natural zone with a high degree of ecological integrity that is remote from human disturbances and settlements. It is primarily managed for the conservation and maintenance of biological diversity and the provision of a wide range of ecosystem services. The area must be of sufficient size to support a viable population of target species (Orsdof 1987). The management team proposes that core areas in the PVPF are developed with reference to the following criteria:

- Relatively high to high species richness, or critical wildlife habitat ;
- A high erosion sensitivity index ;
- Inclusion of a physical portion of each protected area that is at least 3 km from human settlements and park peripheries, at least 1 km from all main roads, and at least 1 km from large agricultural activities (25 ha) ; and
- A minimum area of 100 ha of undisturbed vegetation.

The primary purpose of a **Buffer Zone** that surrounds a core zone is to manage unfavourable impacts that extend into the core area and its surrounding landscape. Buffer zones in the PVPF should be developed on the basis of the following factors:

- Moderate wildlife concentration;
- Moderate erosion sensitivity;
- Inclusion of some remaining forest and agricultural areas inside the protected area boundaries; and
- Lack of overlap with other zones.

For practical implementation on the ground, the buffer zone may be subdivided into two subzones, a primary buffer zone and a secondary buffer zone.

2.2. A **Primary Buffer Zone** is a natural area situated around the core area. The entire primary buffer zone is located inside the protected area boundaries. The management of this zone is directed to research, training, education, and ecotourism activities. These non-consumptive uses support conservation within the core area. Limited use of plants and wood from fallen trees, and seasonal grazing of domestic animals, are allowed in certain places and under certain conditions. In the PVPF there are some activities that may not be consistent with strict protection, but it must be recognized that these activities have been conducted in this complex for a long period of time.

2.3. A **Secondary Buffer Zone**, or transition zone, encircles the primary buffer zone. It is located outside of the protected area. Within this zone, sustainable use of resources by local communities is permitted. The primary objective of this buffer zone is to ensure that local residents have access to resources without having to enter the core area. Activities in this zone might include agro-forestry, collection of mushrooms, bamboo shoots, and resins, use of plants and wood from fallen trees, and seasonal grazing of domestic animals.

2.4. A **Corridor** is a linear assemblage of mainly continuous vegetation that connects critical ecosystems to encourage and facilitate animal migration and the dispersal of plant and animal species in fragmented landscapes. The land in a conservation corridor usually overlaps parts of the buffer zones and the matrix. Potential areas for inclusion in this zone include the following:

- Remnants of significant ecological value to improve connectivity between protected areas or fragmented landscapes; and
- Lands that are extensive enough to reduce edge effects and do not overlap with other zones.

The designation of a conservation corridor is not as exact as that of the inner two zones. Its delineation is based on consultations with the Wildlife Ecology Specialist, as well as with field experts.

2.5. A **Matrix** contains extensive cover and connectivity in a landscape where human settlements and intensive development activities are conducted. Agricultural areas and human settlements form the matrix in the PVPF landscape.

3. Spatial analysis

The spatial analysis of GIS ArcView 3.2 is employed to perform all spatial analysis functions. The analysis involves three steps, the preparation of spatial criteria and map overlays, map queries and reclassification, and generalization.

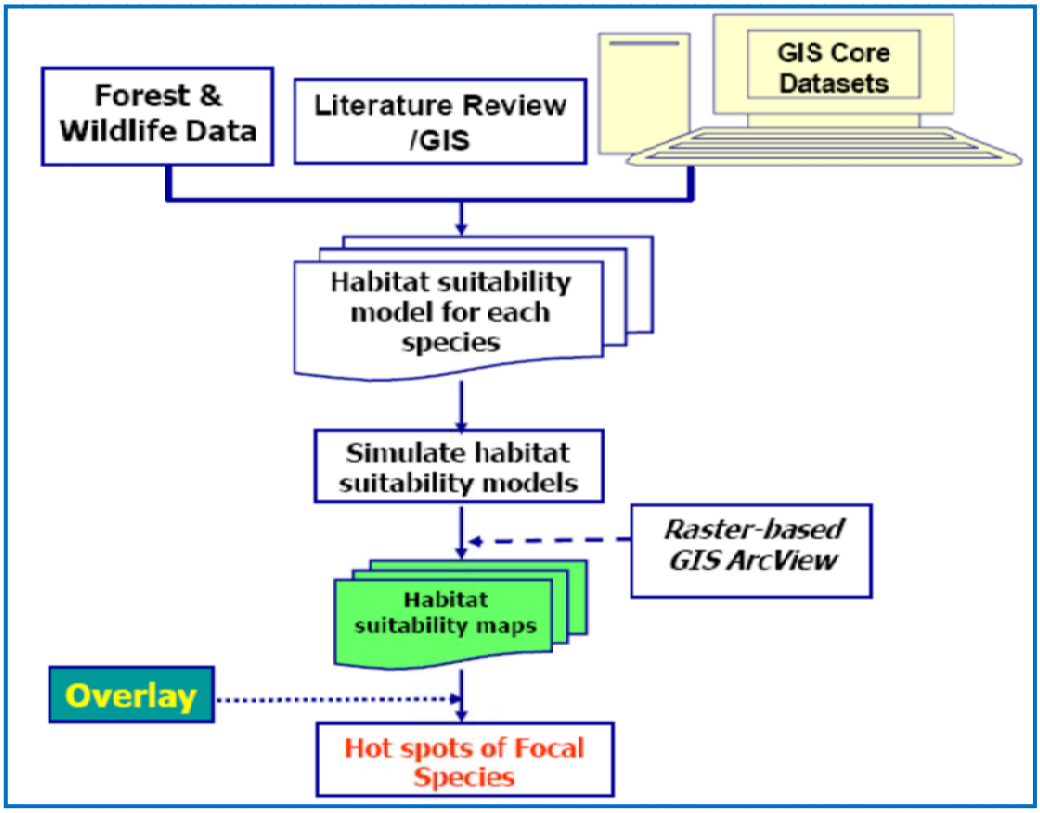
Biophysical factors, including land-use or land-cover type, village location, and main roads, are converted from vector format to raster format, and grid values assigned to land-cover attributes. Slope, elevation, and wildlife concentration are initially in grid format. The FIND DISTANCE command generates distances to human settlements, roads, and large agriculture grids. The MAP QUERY function selects and reclassifies grids that contain values according to designated characteristics of each ecological zone. It is used to query grid locations that represent critical habitat, sensitivity to erosion, or the physical condition of each zone.
The results of each preliminary ecological zone are superimposed and reclassified as priorities. Values of zones that are smaller than 100 ha (approximately 110 pixels) are replaced by those of their nearest neighbours. This process simplifies the ecological zonation map for practical implementation.

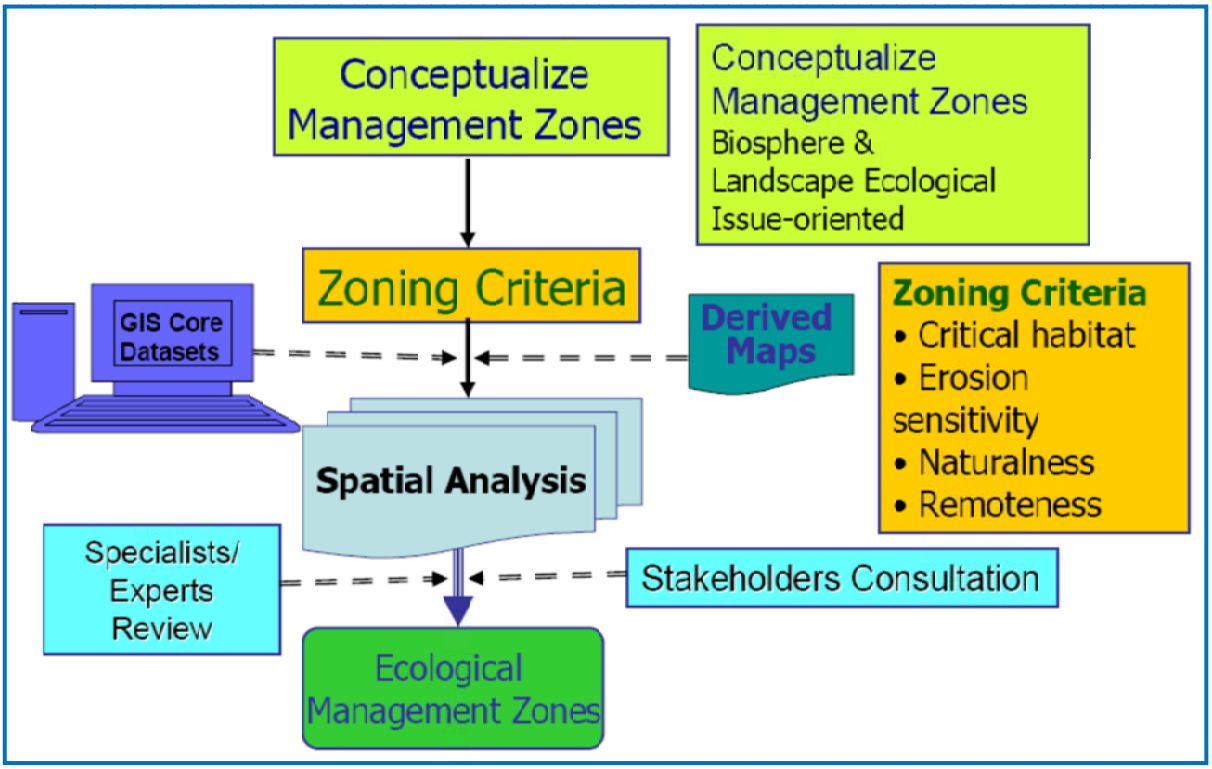
4. Consultation and Ground Validation

Consultation occurs as part of a two-step process. The first step is public consultation on the zoning plan for the PVPF during a district and provincial consultation workshop to be organized. At this workshop, the zoning concept is presented by the GIS Specialist to participants, the zoning framework approved, and the zoning configuration for biodiversity conservation at the landscape level recommended by UNESCO discussed and Permanent Forest Estate Classification (PFEC) in Cambodia.

Meanwhile, the preliminary ecological management PFEC of PVPF zone map is sent for comment to the Forestry Administration and all technical staff involved in the PVPF Management. The GIS Specialist presents the draft map to the Director of Wildlife Protection Office and FA's official and relevant stakeholders during a GIS Training Workshop to be organized. Subsequently, the GIS specialist and designated staff from the PVPF conduct a field survey to assess the merits of the draft map, especially the proposed zones for practical implementation on the ground. The draft map is revised according to comments received from stakeholders and field validation. Conservation corridors in potential areas are then delineated after consultation with the Wildlife Ecology Consultant and local experts. The final zoning map is prepared at an appropriate scale and recorded in CD-Rom for printing and distribution to concerned parties.

Diagram 3.1.1: Zoning Concept





5. Mapping of Agriculture and Residential land in PVPF

Prepared by FA-WCS team
January 2009

These steps are to help the facilitator plan for activities in the village. The steps are not intended to provide a rigid process that the facilitator is required to follow exactly. The facilitator may change sequence of some activities as he/she sees fit depending on the situation in the village.

Step	Sub Step	Details
Step 1. Mapping in Office	a. Using aerial photos and satellite images paddy areas or agricultural areas (that are identifiable) are demarcated and mapped.	
	b. Aerial Photos and Topographic maps are prepared A^0 size and wrapped in plastic sheets.	• Put the maps in big plastic sheets then flatten the sheets over the map and clip edges with stapler. Ensure there are no wrinkles or folds in the plastic sheet or map.
	c. Discuss with Protect Forest and Khan officials on cooperation and membership in Mapping team.	• Clarify working relationship or identify members from Khan or Protected Forest who will work with Mapping team.
	d. Mapping team looks at the maps and familiarizes themselves with the maps.	• Mapping teams are formed and team leaders identified. • Training to Mapping team on approach and working with community. • Discussion on laws and conservation issues regarding the particular village.
	e. Collect existing information of the target village	• Existing reports • Seila program data
Step 2. Introduction to village	a. Introduce project to district and Commune Councils and request them to arrange and introductory meeting for team in the target village.	• Present district & Commune Council with map showing protected forest. • Discuss importance of zoning within protected forest • Present relevant legal instruments highlighting relevant articles emphasize the role of CC in all these procedures. • Explain project plans and objectives • Discuss importance of protecting wildlife and important conservation areas in their commune. • Discuss plan for meeting with community and fix time and date with Commune Council.
	b. Present the project and its activities to the target community and obtain agreement for cooperation.	• Commune Council introduces team to village • Present maps showing boundary of protected forest and location of village and if relevant areas community use for agriculture and residential land based on aerial photos. • Present and explain relevant legal instruments and how this would impact on village land use. • Explain the aims and objectives of Mapping exercise and help community understand why this is important for them • Explain conservation and conservation

		needs in the area (Cardamom Video) • Present the procedure of how mapping will be done and then request for cooperation from community. • Ask community members if they are interested in mapping activities and if they are, help community write a thumb-printed request to Commune Council to form a user community. • Discuss schedule for next visit and explain how committee members will be selected
	c. Discussion with Neighboring villages	• Ask Commune Council to arrange meeting with neighboring villages • Present conservation map and discuss importance of conservation activities in their neighborhood. • Present overview of activities that will be implemented in target village. • Discuss activities and relevance to existing laws. • Obtain agreement for cooperation.
Step 3. Selection of Committee	a. Selection of Forest Demarcation committee	• Review main points of last village discussion. • Discuss roles and responsibilities of Committee. • Discuss selection procedure for committee members (voting or selection by community) • Select Committee members
	b. Provide training to Committee Members	• The concept of Zoning or Land Use Planning • GPS, map and compass • Present maps to Committee members and help them locate themselves on the map. • Discuss their roles and responsibilities and help committee review and change as necessary. Help them understand that the maps, discussions, decisions need to be presented to village for their agreement and approval. • Study Tour/Exchange visit • Discuss relevant legal instruments/procedures and help committee's understand this in detail so that they can discuss with the community. • Discuss conservation issues and important wildlife and wildlife habitat areas with committee.
	c. Commune Endorsement	• Discuss structure for committee and finalize agreement from village. • Discuss roles and responsibilities of each post in structure, selection process and terms of office of committee. Develop rules and regulations for committee. • Committee members and village/commune chief identifies

		persons in selected committee members to fill different posts in the structure. • The names of committee members and their posts are endorsed through a Commune Deika. • The rules and regulations regarding selection of Committee, Roles and Responsibilities and Structure are also endorsed by Commune Council, village representatives and community.
	d. Present the **Mapping of Community Protected Forest Steps** to committee members and make work plan with them to discuss what will happen when.	• Discuss mapping steps with committee and help them understand each step of mapping process. • Present the current land use maps to the Committee and help them understand the maps. • Discuss residential boundary and agriculture boundary. • Discuss important wildlife habitats with committee. • Make workplan with committee based on mapping steps. In other words develop a timeframe for implementing the mapping steps with the committee. • Explain the need to verify maps and correct if necessary. • Make plan for next visit.
4. Mapping	a. Conduct Livelihood study	• With committee take a census of the village. • Identify ownership/use of agricultural and residential plots. • Using livelihood framework understand livelihood strategies and its dependence on resources around community i.e. collect information on production, population, village history, sources of income and NTFP use. Important to link rice production to agriculture areas. • Understand production and resource issues faced by community. • Understand existing management systems for resources in community. • Understand decision making hierarchy in community. • PRA Tools that can be used i. Social and natural resources map, Analyst the past and present use of land and natural resources ii. Institution analysis iii. Conflict map iv. Transect walk v. Seasonal calendar
	d. Identify boundary of village residential land	• Present A^0 size aerial photos and identify present village residential land boundary. • Take GPS points of current village boundary and draw on map (on plastic

		sheet). • Discuss reserve Village Residential Area with committee • Present maps showing areas important for wildlife and wildlife habitats. • Discuss and modify if necessary boundaries of reserve residential area and if necessary present village residential area boundary. • Take GPS points of new modified boundary and put on the map. • Ask Committee to present this map to community and explain the boundaries and if necessary take the community around the boundaries. • Obtain agreement from village on boundary. • Discuss management structure and rules and regulations for managing existing village residential land and reserve village residential land. • Committee presents the structure and rules and regulations to community and obtains agreement from community.
	e. Map Agriculture land	• Identify user area boundaries of the village • Map current agriculture land based on existing crops and ownership agreements within village user area. • Present existing data on agriculture land on a A^0 size map to committee(Satellite or aerial photo or ground survey) • Discuss Land Law, and other relevant laws with committee emphasizing expansion of agriculture land without agreement from relevant authorities is illegal. • Discuss future expansion for agriculture land with committee and take GPS point. • Identify areas with potential to convert to paddy within village user area. • Identify areas reserved for cash crop • Identify swidden areas* • Present maps showing important wildlife areas and habitats • Discuss boundary for agriculture land. (boundary beyond which paddy cultivation/cash cropping is not allowed even land is available) • Present to villagers for modification and/or agreement. • Present Maps to Khan and Protected Forest Authorities discuss and make modifications if necessary. • Present modifications to village and finalize agreements. • Present to villagers for modification and/or agreement.

	f. Map of natural resources use	• Identify Resin tapping areas • Identify areas where other NTFP or timber products are collect from (timber products: eg. Poles for fences around paddies, wood and other material for houses, farming equipment and handicrafts, NTFP for food or sale, wood for ox-carts, etc. • Discuss areas and identify zone around these user areas and discuss broad rules and regulations and criteria of this zone. • Discuss important fishing areas • Present boundary and results of discussion to Khan and Protected Forest Authorities • Present results of discussion to community and obtain agreement on decisions.
	g. Map of village user area boundary	• Based on maps and discussions above discuss village user area boundaries with community and committee. • Discuss with committee, village and commune chief and villagers on the village boundary • Committee go to discuss this boundary with neighboring villages
	h. Endorsement of Map	• Finalize maps with different boundaries and obtain agreement from villagers, other relevant stakeholders. • 8 key stakeholders: – Community – Commune, District, Province – FA Division and Cantonment – Head of DWB – Provincial DLMUPC Sign on the finalized maps. • Single sheet with named zones
	i. Develop Broad regulations to manage each zone. *Sometimes authorities may ask for rules and regulations before the boundary has been made.*	• Review structure to manage the areas. • Review procedures for installing these structures. • Review roles & responsibilities of structure • Discuss rules, regulations for allocation of land and criteria of beneficiaries who will receive residential land, paddy land and land for cash crop cultivation. • Discuss rules, regulations for allocation swidden plots in demarcated swidden areas. • Divide NTFP Collection areas based on use and discuss rules and regulations to manage use of each NTFP or zone. • Present to community for modification and/or agreement.
	j. Agreement of Zone Regulations.	• Community, Village Chief, Commune, District PF Director, possibly also Khan if necessary sign on these rules and regulations.

		• 5-20 page set of written regulations, zone-by-zone including UTMs of zone corners
5. Demarcating boundaries	a. Painting of boundaries	• Paint different boundaries after agreement or • Put cement posts to demarcate boundaries on ground or • Plant live fences on boundaries
5. Detailed Management Plans	a. Develop Detailed Management plans for each Zone	• If community Forestry will have to follow Community Forestry Guidelines. • If Land Registration will have to follow proper procedures allowed in the Land Law • Management plans developed in accordance to legal requirements.

*Swidden areas: Swidden areas are defined as areas where upland (Chamkar) rice is grown.

Based on this definition we can classify swidden agriculture into two categories:

a) Many indigenous communities grow rice only or mostly in swidden plots . Paddy farming is not the main source of rice and but maybe practiced by some members in the community. This system has a specific traditional management regime and such land is eligible for communal land registration. The community maintains an ownership right to the land while individuals have usurfruct rights. The rights depend on community. These communities have specifically designated swidden areas which they use for agriculture. In these communities the team will have to identify these areas and include them in the map as agriculture areas for swidden agriculture. Ownership patterns follow traditional systems.

b)Most Khmer and other ethnic minority/indigenous communities conduct swidden agriculture as part of their food production. Paddy rice is the main source of rice however, families that do not have draft animals, labor or land to conduct paddy conduct swidden agriculture as a temporary practice till they are able to grow paddy rice. The community may have specifically designated areas, however ownership of these swidden areas is complex, some villages provide usufruct rights as long as rice is being grown on plot while in others it is a precursor for claiming ownership to grow other crops. In these communities it is important to identify specific areas as 'land reserved for swidden agriculture' where community members with no draft animals, labor or paddy land can grow upland rice on a temporary basis. The ownership in these areas is temporary for growing rice only and ownership rights end once individual members stop growing rice in these areas.

Neark Bous Temple

Preah Vihear Protected Forest
contains many sites with cultural significance,
such as ancient temples and sacred forests.

Giant Ibis

Preah Vihear Protected Forest is a global stronghold of
endangered species of Giant Ibis Pseudibis gigantea-
national bird symbol of Cambodia

The Preah Vihear Protected Forest of Cambodia is a part of the Indo-Burma Biodiversity Hotspot, one of the 25 Global Hotspots on our planet and part of the Indochinese Dry Forest. This Management Plan describes the overall objectives, zoning classifications and main program activities for conserving the resources and maintaining the biodiversity of the Preah Vihear Protected Forest and intended to provide a road map of interrelated strategies and management activities designed to ensure the sustainable development of the natural resources in the area. *Conserve the forest and biological resources and promote sustainable management initiatives in Phreah Vihear Protected Forest in order to maximize contributions to the socio-economic development and healthy ecosystem of the region.*

Forestry Administration (FA)

#40, Preah Norodom Blvd. Phnom Penh, Cambodia

Tel: (855-23) 214-651; Fax: (855-23) 212-201
Email: wpo@online.com.kh; Website: http://www.forestry.gov.kh/