

# SEIMA PROTECTION FOREST

## PROJECT DESIGN DOCUMENT FOR THE CLIMATE, COMMUNITY, BIODIVERSITY ALLIANCE 2<sup>ND</sup> EDITION - GOLD STANDARD

*IMAGE*

DATE

LOGOS & ADDRESSES

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## Acronyms

## Glossary of terms

## General Section

### **G1. Original Conditions in the Project Area.**

#### **G1.1 The location of the project and basic physical parameters.**

The project is situated within the Seima Protection Forest<sup>1</sup> (SPF), with credits being generated from the central zone of the reserve which is known as the Core Protection Area (Figure QQQ). SPF lies mainly in Mondulkiri Province with some sectors extending into Kratie Province. The site abuts the Vietnamese border and is bisected by Cambodian National Route 76. The SPF headquarters lie at the south-western entrance to the reserve in Keo Seima District.

The SPF and its surroundings form a topographically diverse landscape ranging from 60-750 m asl. The lower parts in the north and west form part of Cambodia's Eastern Plains. Further east the area rises to the Sen Monorom plateau, forming the south-western extremity of the Annamite mountain range, one of Asia's great centres of endemism [ref QQQEBA book, Centres of Pl Biodiversity, WWF ecoregions book, Corlett?]. Soils are of moderate to high potential fertility on the younger rocks associated with the plateau, while the lowlands are mostly of low to moderate fertility except for pockets of alluvial soil (SCW 2006). Two medium-sized tributaries of the Mekong drain most of the area whilst the southernmost valleys drain into the Dong Nai river system in Vietnam. Many of the rivers cease to flow during the prolonged dry season. The plains are characterised by hundreds of small seasonal grassy wetlands and pools ('trapeangs' in Khmer) dotted across the forest.

The climate is tropical monsoonal: the dry season from November to April with northeasterly winds and the wet season from May to October with south-westerly winds (SCW 2006). Total annual rainfall is 2200-2800 mm at the SPF headquarters, higher on the plateau and probably lower in the plains<sup>2</sup>. Over 85% of rain at the headquarters falls during May-October; December-April typically record less than 100 mm of rain per month and there are typically 5 'dry' months.

Maps - location in Cambodia, topo & rivers, soil/geology,

#### **G1.2 The types and condition of vegetation within the project area.**

In SPF studies have found a spectrum of forest types from fully deciduous to almost fully evergreen (e.g Walston *et al.* 2001, Zimmermann and Clements 2003), with the types forming a complex mosaic believed to reflect climate, altitude, edaphic factors and varying history of human disturbance. Different typologies can be imposed on this variation for different purposes (e.g Rundel 1999, Tani *et al.* 2007). Under one commonly used national system based on floristics, phenology and structure the Seima forests mostly fall within four broad classes : Deciduous, Semi-evergreen, Evergreen and Bamboo Forests (FA (2007); Figure QQQ). These broad types, and the rarer types also present, are described below. When the carbon stocks of these forests are analysed it is found efficient to use a two broader forest classes, dense and open, as described in Section G1.4.

*Denser forest types*

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<sup>1</sup> Its full legal name is the *Seima Protection Forest and Biodiversity Conservation Area*

<sup>2</sup> Combined results from WCS/FA and Nomad RSI (unpublished).

Overall, the Evergreen, Semi-evergreen and Bamboo forests in SPF each have high tree species diversity with a wide overlap in species lists and a generally similar range of tree forms, including many tall canopy and emergent species, often bearing buttresses. Trees heights of 35-55 m are common.

*Evergreen forest:* Evergreen forests are usually multi-storied forests where trees maintain their leaves during the whole year. They comprise the lowland tropical rain forests, the hill evergreen forests and the dry evergreen forest and along streams and rivers (gallery forests). Fires are very rare.

*Semi-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. In SPF this type is often dominated by the tall, pale-barked deciduous tree *Lagerstroemia calyculata* (Lythraceae). Another significant species is the massive evergreen emergent *Dipterocarpus alatus* (Dipterocarpaceae). Fires are very rare.

*Bamboo:* Areas dominated by tall tree bamboos, with or without trees. Bamboo areas taller than 5 m are included in the national definition of forest under the Marrakech Accords. In SPF the bamboo forests often contain a significant number of large trees and have quite high carbon stocks. Some bamboo stands in SPF are evidently signs of recent disturbance but others were already present on topographic maps from the 1960s and appear to represent long-term stable communities.

#### *More open forest types*

*Deciduous forest:* Deciduous forests comprise the Mixed Deciduous and Deciduous Dipterocarp forests. Deciduous forests drop their leaves more or less completely during the dry season and low-intensity understorey fires are frequent. Mixed Deciduous forest are floristically a depauperate version of semi-evergreen forest, often dominated by *Lagerstroemia calyculata*, with an understorey dominated by bamboo and some rattan but rarely much grass. Mixed Deciduous forests are sometimes of similar stature to semi-evergreen forest. Deciduous Dipterocarp forests naturally have an open character and are sometimes described as savanna forest. They have a small number of dominant species and tend to be of lower stature (typically 20-35 m). Individual stands usually have rather uniform structure dominated by just 2-3 species in any one location, but several different stand types can be found across the landscape. An undisturbed Deciduous Dipterocarp forests may have a crown cover of only 20-40%, an open understorey dominated by grass or herbaceous bamboos and no middle storey except along drainage lines.

*Other forests:* This includes regrowth and stunted forests plus, in parts of the Reference Area, forest plantations. Stunted forests grow very slowly because of poor site conditions on hydromorphic soils and rock outcrops. Heavily disturbed forest like mosaics of forest, regrowth, and cropping, corresponding to shifting agriculture in which the percentage of forest is more than 40%, and areas of old regrowth and young secondary forest in the process of regenerating after clear cutting, are also included in this category.

*Wood and shrub land evergreen/dry:* Wood and shrubland is a mixture of shrubs, grass and trees, the trees cover remaining below 20 percent. As the national forest definition includes land with a crown cover above 10%, some land in this category must be classed as forest for purposes of a REDD project. This class can be found mainly on shallow soils, on the top of mountains under climax conditions or as a result of non sustainable land use.



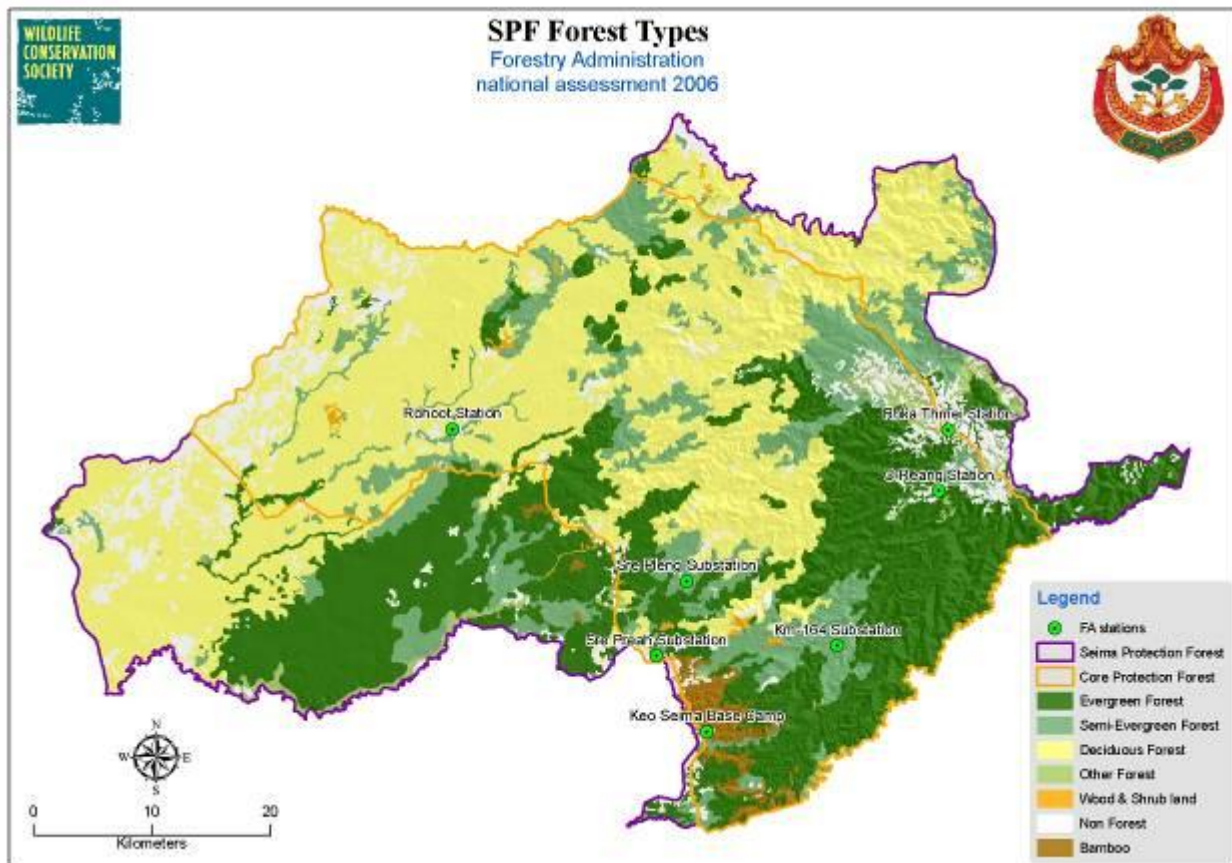
Most of the vegetation in the PA is in good or excellent condition, as shown by the assessment of carbon stocks (Section G1.4). However there have been some significant human impacts, as summarised here and discussed in more detail in Evans *et al.* (2011qqq degr report). The landscape has historically has rather low population densities (Evans *et al.* 2003), with near total depopulation during much of the 1970s and 1980s (Evans 2007) and poor road connections until the very recent past. There has thus been rather limited biomass harvesting by local communities, primarily for housing and firewood. This has only affected forest structure very close to villages, often in areas that have subsequently been deforested anyway.

Long rotation swidden cultivation has converted some mature forest to fallow, especially in and before the 1960s when tiny settlements were widely scattered across the denser forest parts of the landscape. Many of those pre Khmer Rouge fallows have now reverted to tall forest with >50 years of growth. Relatively few new fallows were created between the reoccupation of the upland villages through the 1990s, the opening up of new fields and the arrival of cashew (a cash crop that can be grown in place of fallowing) after about 2002.

The most significant drivers of degradation have been episodes of larger scale mechanised logging. Local reports indicate that there was scattered, locally heavy logging during the 1960s (by Khmer forces) and 1980s (by Vietnamese-backed teams), targeting clumps of valuable species including koki *Hopea odorata* and beng *Azelia xylocarpa* and leaving the landscape criss-crossed with old logging tracks that have facilitated subsequent illegal activity. In 1994 the area became part of the Samling International Chhlong logging concession. Operations took place in what is now the Project Area during only three dry seasons, 1997-1999, mainly in areas south of National Route 76, before the concession was mothballed as part of a national moratorium that has yet to be lifted. The scale of legal and illegal harvests during this period have not been well quantified, although Evans *et al.* (2003) made an estimate of losses for resin trees (mainly *Dipterocarpus alatus*) based on interviews with the traditional owners. Densities of desirable species were apparently relatively low as a proportion of the total stand in many areas and this has protected large areas of forest from excessive damage. Significant regeneration has also taken place in the subsequent decade. Nonetheless the evidence of these logging activities is still visible in patches of degraded forest, for example around the former logging road network south of the km 164 guard station. Since the end of the Samling operations the main form of logging has been the illegal selective harvest of Luxury grade beng, neanguon and thnong trees, all of which occur scattered at low density, usually as solitary trees. This logging has caused widespread slight degradation.

Understorey fires affect a high percentage of the deciduous forests each year. This is not believed to cause degradation of the vegetation, as it is a long-established feature practice and these forest types are considered highly fire-adapted (Rundel 1999, Stott QQQ).

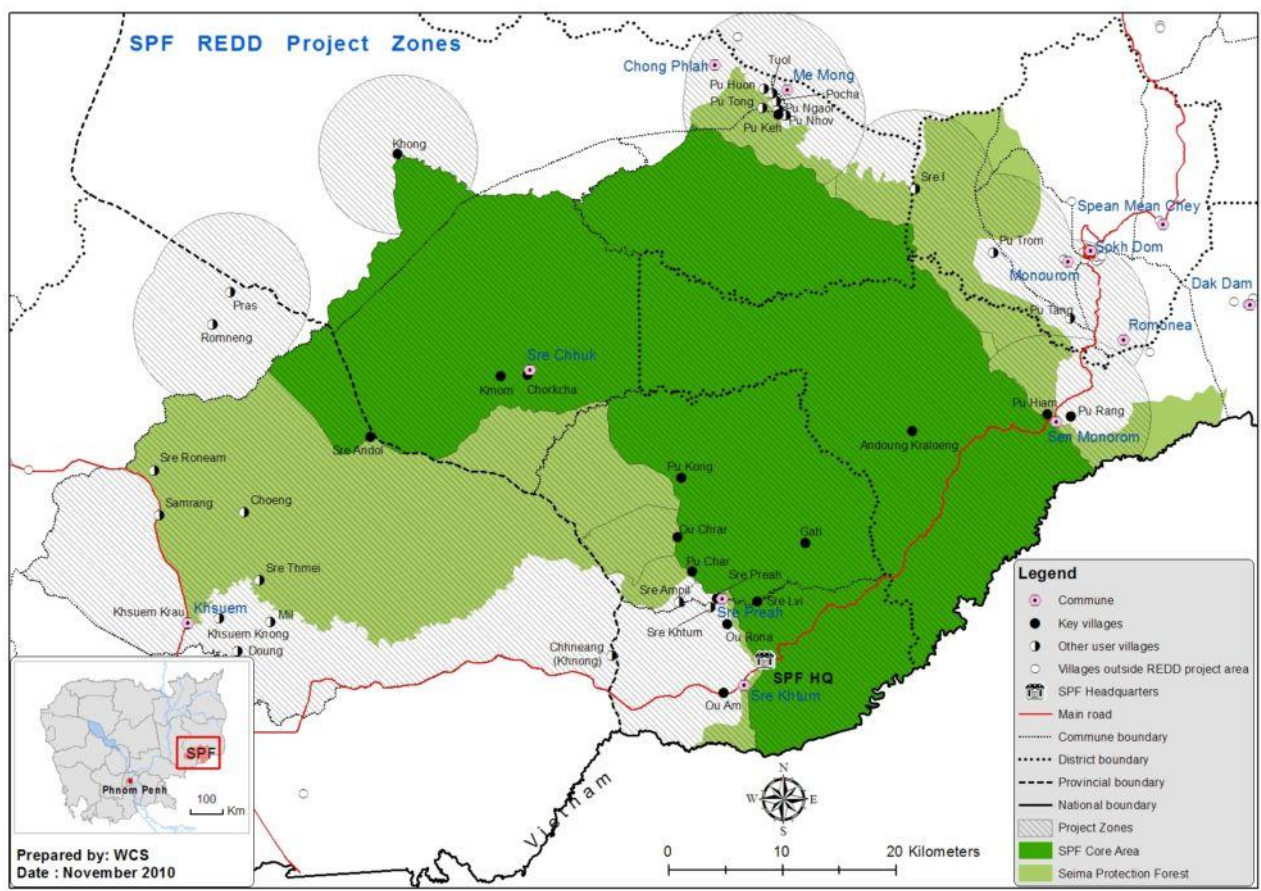
Figure QQQ Principal vegetation types of the SPF



### G1.3 The boundaries of the project area and the project zone.

The project zone as defined by CCBA is comprised of the *project area* (where avoided deforestation generates credits) and a broader area, here called the *outer project zone*, made up of other areas used by the communities using the project area. Together these comprise the overall *project zone* (Figure QQQ). The forested parts of the outer project zone in 2008 are considered equivalent to the *leakage belt* as defined by the project's chosen carbon accounting methodology (ref QQQ) and the anthropogenic non-forest parts are equivalent to the *leakage management area*.

Figure QQQ Project area and outer project zone



In accordance with VCS definitions, the *Project Area* is defined by the forest present in 2008 within the boundaries of the Seima Protection Forest Core Protection Area as set out by Prime Ministerial Subdecree # 143 (September 2009)<sup>3</sup>. Non-forest areas inside this boundary form part of the leakage management area.

The villages using this area are listed in Section G1.5.

Identification of areas used by these same villages outside the project area has taken a variety of approaches. The concept of use areas is not sharply defined in this landscape, as the intensity of use declines gradually with distance from a village and some uses overlap spatially with those of other villages. Therefore to define the project outer zone we seek to identify or predict areas where the great majority of a village's use take place, and use by other villages is minimal.

In some cases<sup>4</sup> **village administrative boundaries** have been mapped by participatory processes facilitated by line agencies, local authorities and NGOs, and are taken here to represent the main use areas, since this is one of the main criteria used to define them. In other cases (the villages of Khsim Commune, Sre Khtum Commune and the southern part of Sre Chhuk Commune) we have used the **commune boundary** as an approximation of the use area, without attempting to identify exact village use areas. For the remaining villages, administrative boundaries have yet to be

<sup>3</sup> [qqq assuming all village consent to include their communal land; otherwise these parts will be excised; this will be clear by end March 2011]

<sup>4</sup> Sre Lvi, Sre Khtum, Pu Char, Ou Chrar, Pu Kong

mapped and commune boundaries do not form a good guide for various reasons. For these other villages we have taken a **7 km radius** buffer around each of the known settlement centres, and assumed that these are an adequate guide for our purposes. This is consistent with known collection distances for many key resources.

#### G1.4 Carbon stocks within the project area.

insert relevant section from VCS PD

#### G1.5 A description of communities located in the project zone.

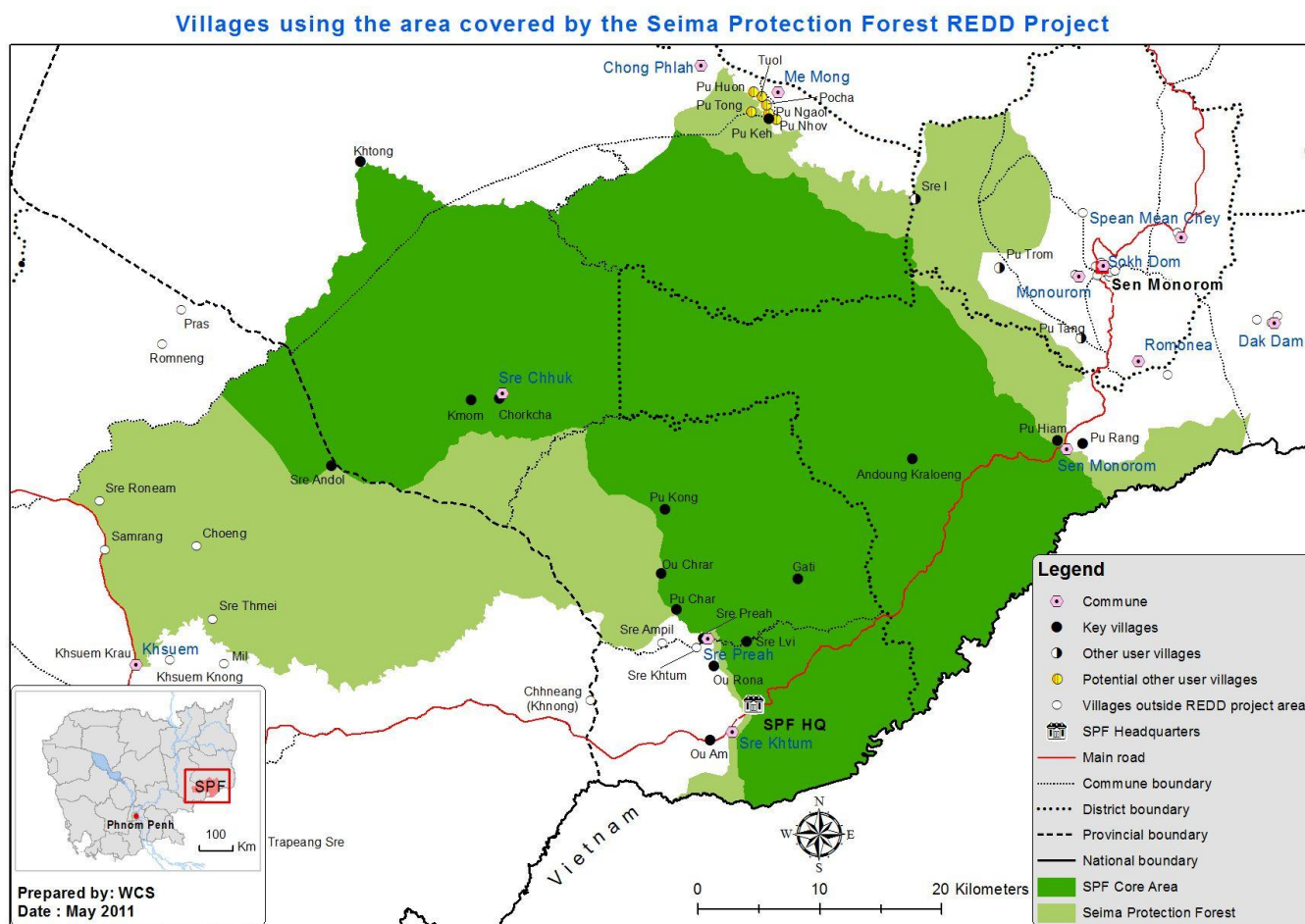
##### Administrative structures

Table QQQ and Figure QQQ summarise the administrative units relevant to the project. Commune Councils are the lowest elected level of government in Cambodia; village chiefs are appointed by the Ministry of Interior. In this PD, villages are divided into *key villages* (those with farmland or residential land in the project area) and *other user villages* (those documented to have regular, significant forest use in the project area but no agricultural or residential land inside). In the 16 key villages, the whole village is involved in most aspects of the project, since most or all families are users; in the 3 other user villages project activities are focused only on those families identified as being regular users of the project area (which may be a small minority of all families) plus relevant village officials.

Table QQQ Administrative units relevant to the project

Province	District	Commune	Key villages	Other user villages
Mondulhiri	Keo Seima	Sre Khtum	O Am, O Rona, Sre Lvi	
		Sre Preah	Sre Preah, Gati, Pu Char, O Char, Pu Kong	
		Sre Chhuk	Chakchar, Kmom, Sre Andaol, Sre Khtong	
		Memong	Pu Keh	
	O Rang	Sen Monorom	Andoung Kraloeng, Pu Haim, Pu Rang	
	Sen Monorom	Romonea		Sre I, Pu Trom, Pu Tang

Figure QQQ Villages affected by the SPF REDD project [low res version]



The words ‘village’ and ‘settlement’ are given precise, distinct meanings in this PD. A **village** is an administrative village – that is, a settlement or group of settlements overseen by a single official village chief (in Khmer, *phum*). In Mondulakiri the various settlements in one administrative village are often several km from one another. A **settlement** is a discrete cluster of houses - something that looks like ‘a village’ to the casual observer. Settlements often but not always correspond to administrative sub-villages (in Khmer, *krom*). Communes, villages and settlements are often given the same name. In this PD if we mean the commune or settlement we specify, and otherwise it can be assumed the whole administrative village is implied.

Village centres have been mapped by the Department of Geography in a nationally available dataset dated 1999. In the project zone individual settlement locations have also been mapped and changes monitored (Evans 2005, Evans *et al.* 2006, Pollard and Evans 2008, Pollard and Evans in prep.).

### Ethnicity

Cambodia has an ethnically Khmer majority population, around QQQ indigenous ethnic minority groups concentrated in the north and north-east and several non-indigenous ethnic groups, including Chinese, Vietnamese and Cham, who mostly live in the central lowlands and coastal areas [CAS 2009 and NGOFF 2006 - any more to add?]. Indigenous ethnic groups have typically been economically disadvantaged by their remoteness, language differences and various forms of social

discrimination. However, Cambodia has a number of socially progressive laws and policies regarding the rights of indigenous people.

The project zone is a traditional homeland for two indigenous ethnic groups and supports many ethnic Khmers. The main indigenous ethnic groups are the **Stieng** and **Bunong** (often spelt Phnong). These two groups are closely related members of the Mon-Khmer language group (White 1996/CAS?) and the people also have broadly similar appearance, customs, spiritual beliefs and traditional preferred livelihoods. There also appears to be a high degree of mixing and inter-marriage where the two groups meet. Since the practical differences are so slight in most contexts the less numerous Stieng are grouped with the dominant Bunong in this PD and most project activities as 'indigenous people'; however when differences important to the communities are detected during field activities these are taken into account by the project team.

The languages of these groups are not traditionally written but a Bunong alphabet has recently been developed and is being taught in Mondulkiri (ICC 2004). The Bunong are the largest ethnic group in Mondulkiri (although there are no reliable figures on their total population, ICC 2004) and also occur in small numbers in Ratanakiri and Kratie. The same group also occurs in larger numbers in neighbouring Vietnam, where they are called the Mnong. The Stieng are found mainly in Kratie and marginally in western Mondulkiri. They also occur in neighbouring southern Vietnam, where they are called the Xtieng. Many officials in local government are ethnically indigenous, including the incumbent Mondulkiri Provincial Governor and many Village Chiefs and Commune Councillors.

Ethnic lowland **Khmers** are primarily recent migrants to the province (since 1998), although a few have been resident for much longer. They have come especially from Kampong Cham, Takeo, Prey Veng and Svay Rieng Provinces.

Other groups present in much smaller numbers include Raong and Kraol (both indigenous peoples from the Mon-Khmer group), Lao, and Vietnamese (many of them of the Kampuchea Kraom group from the Mekong delta, who are ethnically Khmer). These are distinguished later in the PD only where necessary. The approximate number of people in each ethnic group is shown in Table QQQ.

aaa Table QQQ Populations according to ethnic group, 2008 [update data]

	Bunong or Stieng	Khmer	Other*	Total
Key villages				
Other user villages <sup>^</sup>				
Project Zone overall				

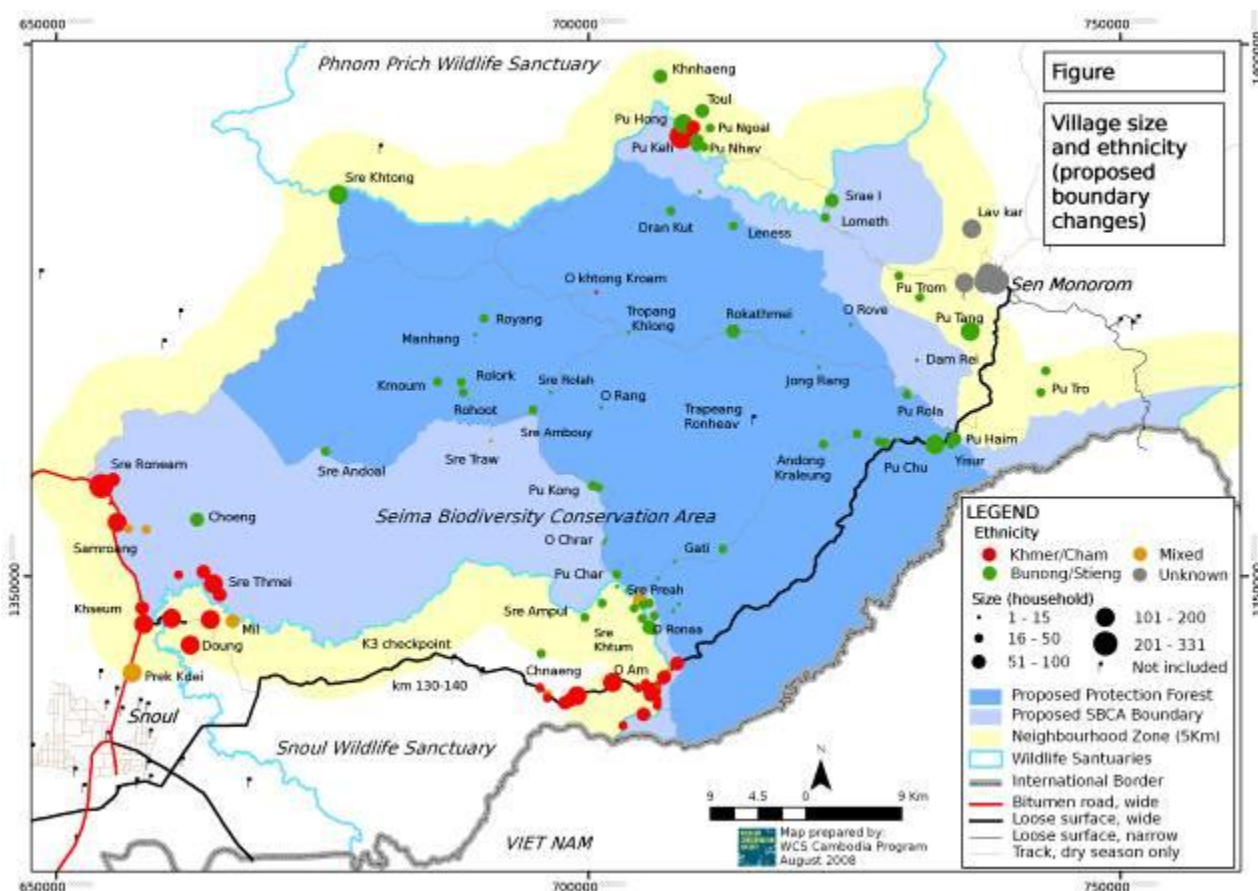
Source: reanalysis of data in Pollard and Evans (2008)

\*Lao, Vietnamese, Raong, Kraol etc

<sup>^</sup>Not all people in these villages use the project area

Figure QQQ shows the pattern of village sizes and dominant ethnic groups. In typical, remote Bunong villages (green spots) almost everyone is ethnically Bunong except perhaps for one or two Khmer trading families running small shops. In contrast, Khmer-dominated villages (red spots) tend to have grown up around existing Bunong settlements and so contain a minority of Bunong people intermixed.

Figure QQQ Village size and ethnicity [low res version]



Demography

Official figures for each village, cross-checked by other surveys, provide the best population estimates for the area (Evans 2005, Evans *et al.* 2006, Pollard and Evans 2008, Pollard and Evans in prep.). Table QQQ summarises the estimated population over recent years.

aaa Table QQQ Populations in the project area and outer project zone [to update]

	1998	2002	2003	2004	2005	2006	2007	2008
Key villages								
Other user villages*								
Project Zone overall								

\*Not all these people use the project area

In the early 1970s most of the population (then almost entirely made up of Bunong and Stiang families) was relocated out of the project zone during the Khmer Rouge regime, with survivors and their children returning progressively as security improved during 1979-1998 (Evans *et al.* 2006). People moved to their original homes settlements or others nearby, depending on local circumstances. Rokathmei and the settlements in Sre Chhuk commune were re-occupied around 1998, after which no other major settlements were re-established, although movements between established villages continued, as did inward migration to the landscape. Sre Ambouy (part of Chak Char village) was set up around 1998 by ethnically Bunong demobilised Khmer Rouge soldiers.

The Khmer population of O Am village is more recent, having grown up through in-migration, with the migrants illegally grabbing land inside Snoul Wildlife Sanctuary and SPF. A number of factors

were involved, including road improvements and employment opportunities stemming from logging concession activities, the demobilisation of around 200 ex-Khmer Rouge families here in 1998 (Degen *et al.* QQQ) and lax enforcement of forest protection laws by the local authorities.

Today settlements are mostly small, ranging in size from 12 to 1,598 people in 2006, median 161 or about 30 families (Evans *et al.* 2006). Most of the larger settlements are at the margins of the SPF, in the Khsim, O Am-Chneng, and Memong-Chong Plas areas, and in these three areas neighbouring settlements are close together or almost continuous. By contrast, most of the settlements in the interior of the project area have 50-250 people (10-50 families) and are scattered 5-15 km from each other.

In addition to the registered populations there are also some unregistered and hard-to-count populations of visiting people (mostly ethnic Khmers and Chams from Kampong Cham and beyond) who come to seek wage labour. These people come especially to the O Am-Chneng cash crop belt, the Chong Plas gold mine area and the new agro-industrial concession north of Pu Rola. Indigenous people rarely engage in labour migration out of the landscape.

#### Social features of Bunong villages<sup>5</sup>

Many Bunong in the area continue to live a mainly traditional lifestyle as outlined below. Others, especially those near main roads or in close contact with Khmer settlers (especially in O am village), have altered parts of their lifestyle to more closely match lowland Khmer people. Some have converted to Christianity which has also reduced their adherence to their traditional culture.

A traditional Bunong household is typically made up of a couple, their children (including those who have married but not yet moved out) and any surviving parents who are too frail to live alone. Household members jointly farm their land and mostly share food and income. Many of the other households in a typical settlement are closely related by blood or marriage. There are strong traditions of sharing and interest-free loans between family and close neighbours, providing a key livelihood coping strategy. Households tend to have two houses, a permanent one in the main settlement and a smaller one at the fields, which may be a few km from the village, where people often sleep and eat in the farming season. Nowadays people rarely dress in traditional costumes but in remote areas some still build their traditional style of low-walled house.

Bunong people are mostly animist, believing in powerful spirits that inhabit a wide range of natural objects or sites. This, and the economic dependence on natural resources, has built strong cultural ties to the land and forest. Many ceremonies are observed to ensure good relationships with these spirits, including sacrifices and libations, and it is believed that they communicate with humans through dreams. Each settlement has a small number of respected men who are considered elders, including one or more who have particular expertise in linking to the spirit world and performing ceremonies. These elders traditionally had a strong role in maintaining customs, adjudicating conflicts, deciding farming sites and leading the community in other ways. This role, though still important, has greatly declined in many villages, due to the dominance of the national government structures (village chief etc.) and the social turmoil of past decades.

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<sup>5</sup> This section is based mainly on studies by McAndrew *et al.* (2003), Evans *et al.* (2003), Khou Eanghourt (2004), Marschke (2003), Richardson (2003), Ironside (2004a), ICC (2004) and Degen *et al.* (2005) which together cover the great majority of villages in the project zone.



Formal, externally recognised community-based organisations have recently been set up in some villages, both indigenous and Khmer, sometimes building on traditional structures, and usually with the assistance of NGOs and/or government agencies (Pollard and Evans 2008, WCS 2008 [= MDLF prov strat.]). There is generally very little formal organisation or collective action at levels above the village, either traditional or modern, except for the government structures. However, some individuals are linked into national community forestry networks or human rights activist networks.

Even the most traditional village has many connections to the outside world. The history of displacement means that many adults have lived in other places, and some have travelled widely as members of the armed forces. There are generally friendly relationships between settlements, fostered by the extensive family connections and the low historical population densities leading to low resource competition. The market economy reached every settlement long ago, as evidenced by the high, prolonged involvement in resin-tapping for trade. Many villagers are in debt to traders.

Fluency in the spoken Khmer language is variable, being higher amongst adult men and lower among women, children and the elderly. Literacy and school attendance are very low, even if the settlement is lucky enough to have a school. Traditional doctors provide some herbal and spiritual healthcare but for serious problems a person might try to reach a government health centre or private clinic. Such treatment is poor and expensive and a serious illness can drive a family deeply into debt. Seasonal labour migration is rare among Bunong people in the project zone.

#### Social features of the Khmer communities

The Khmer communities in O Am, O Rona, Sre Preah villages are typical of recently established frontier settlements around Cambodia villages. Most people are Buddhist and there is a pagoda in O Am, with monks as community spiritual leaders. Most people live in nuclear families on or close to their farmland. The villages are larger and have lower levels of community cohesion or collective action than in traditional Bunong villages. Cultural ties to the land and to forest are naturally less than in long established Bunong villages. The Khmer population is better connected to distant parts of Cambodia, increasing linkages to markets and opening social channels for further migration.

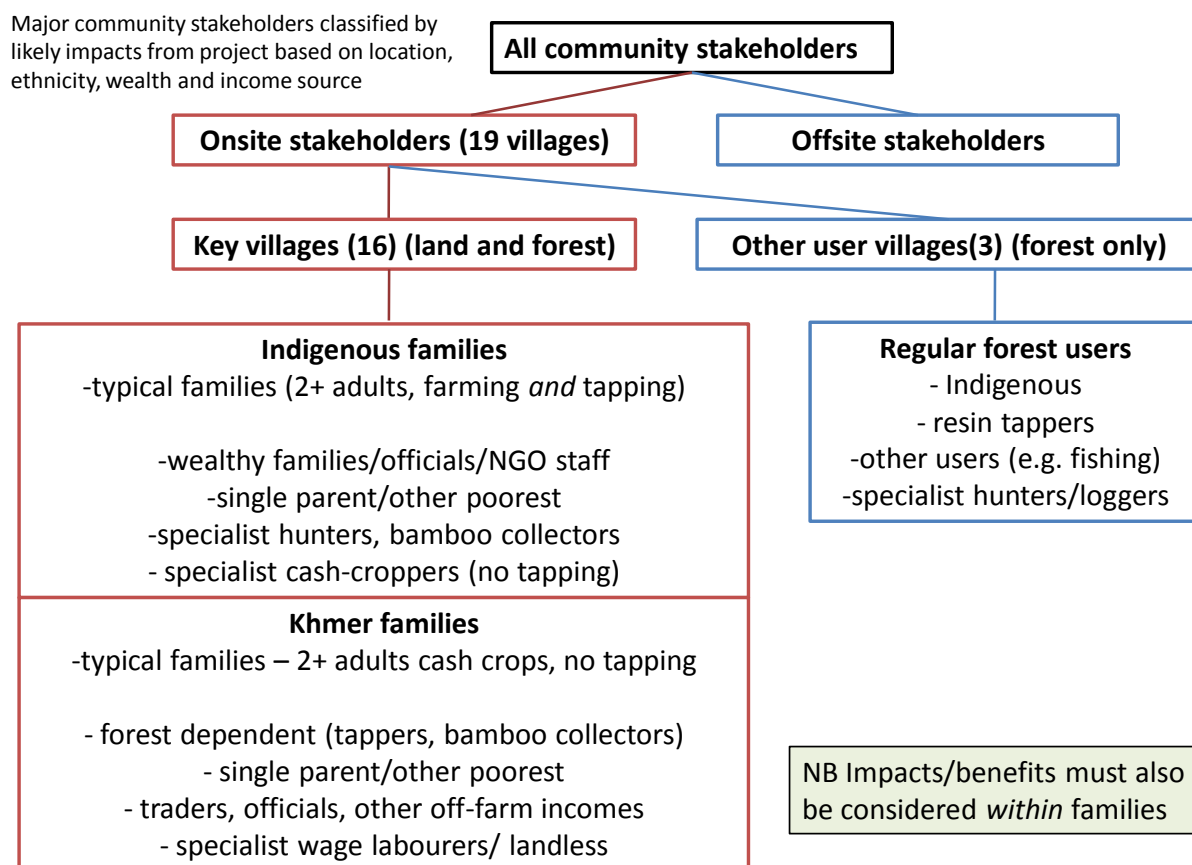
#### Development indicators

add data from social survey

#### Stakeholder analysis

Stakeholder can be separated into community members (on and off site) and non-community members (e.g. government agencies). A preliminary community stakeholder analysis (summarised in Figure QQQ) was developed by the project team based on their experience and the large number of past studies in the landscape. This was validated during workshop with community leaders from 15 of the 16 key villages (Sopha Sokhun Narong 2010c). The stakeholder analysis methodology is based on CCBA (2010b). This framework forms a basis for project planning, discussion of impacts and also for monitoring.

Figure QQQ Community stakeholder classification



The most important *community* stakeholders in terms of numbers and level of contact with the project are the people in the 16 key villages. They are classified by ethnic group and then by major livelihood indicators, which correlate both with wealth and with the type of benefits/negative impacts they are likely to experience from the project. The next most important group is the regular forest users in other user villages. These are also classified, but are likely to be a more homogenous subset of people since the great majority will be relatively poor resin-tappers.

The other community stakeholders are those living off-site, outside the project zone (Table QQQ).

Table QQQ Preliminary classification of off-site community stakeholders

Stakeholder group/sub-group	Examples
People dependent on the environmental services of SPF	Downstream water users, people catching migratory fish
People interested in settling in the area or selling land	Settlers, land speculators
People interested in harvesting resources in the area	Loggers, hunters, fishermen, harvesters of NTFPs

The preliminary *non-community* stakeholder classification is shown in Table QQQ. Since the project proponent is the FA on behalf of the Royal Government of Cambodia (RGC), in a sense other government agencies should not be considered distinct stakeholders, but rather as branches of the same organisation. Nonetheless, for effective project implementation it is important to understand and allow for the different mandates and agendas of these agencies, to ensure cooperation, so key government agencies are listed here.

Table QQQ Preliminary non-community stakeholder classification

Stakeholder group/sub-group	Examples
<b>Government</b>	
Technical line agencies	Provincial departments such as Land Management, Urban

	Planning and Construction; Environment; Tourism; Agriculture; and Rural Development, plus the relevant national ministries for major issues.
Provincial authorities	
District authorities	
Commune Councils	
Armed Forces	Military, Military Police, Police
<b>Non-government</b>	
Private companies	Economic Land Concessions (e.g. KCD), mining exploration concessions (e.g. Southern Gold)
NGOs	Development and Partnership in Action (integrated rural development), Nomad (health), World Education (literacy)

The next stage of a stakeholder analysis is to assess the legal interests<sup>6</sup> of each group, and their relationships with other stakeholders. This analysis is presented in Annex QQQ, with a fuller assessment of expected positive and negative impacts in Sections CM1&2. Based on these analyses, Table QQQ classifies stakeholders according to their *importance* (degree to which achievement of project goals depends upon the involvement of a given stakeholder; a function of population size and impacts from current activities) and *influence* (degree to which a stakeholder has power over the project and can therefore facilitate or hinder project interventions; a function of collective political power and special status accorded by CCBS) following CCBA *et al.* (2010b). Project design needs to focus on the stakeholders in the top left quadrant of the diagram, since they have the greatest power to move the project forward and also the greatest influence to prevent project success.

Table QQQ Analysis of relative influence and importance of stakeholders (non-community stakeholders in italic)

Influence of stakeholder	Importance to project achievement			
	Critical	Significant	Moderate	Low
<b>Highly significant</b>	Typical indig. families Offsite - settlers <i>Provincial authorities</i> <i>Armed Forces</i>	Elite indig. families	Khmer elite families	IP poorest <sup>^</sup>
<b>Significant</b>		Khmer typical families Offsite - loggers <i>District Authorities</i> <i>Commune Councils</i> <i>Line agencies</i>		Khmer poorest <sup>^</sup>
<b>Moderate</b>			Indig hunter/logger Indig cash-cropper Khmer forest specialist Other user - resin Other user - non-resin Other user - hunt/log NGO <i>Private company</i> *	Khmer landless <sup>^</sup>
<b>Low</b>				Indig. bamboo collector Offsite - environment service beneficiary

\*Private companies will rise to critical importance and highly significant influence if any major projects are approved (e.g. mineral exploitation).

<sup>^</sup>These groups have elevated influence because of the importance accorded to them in the CCBS Gold Standard.

<sup>6</sup> The incentives created by corruption do not have to be assessed in the calculation of net benefits under the CCBS (2009 standards, Section CM1 footnote 41). Nonetheless this is a significant practical issue which at times potentially affects the decisions made by officials, and project team members are fully aware of it.

## G1.6 Current land use in the project zone<sup>7</sup>

### Overview of economic uses

Qualitative surveys reveal only a few common major livelihood activities across the SPF: rainfed lowland rice farming, upland rice farming, cash crop farming and resin-tapping in mature forest. These currently occur in predictable combinations depending on the topography, accessibility and ethnicity of each settlement (Evans *et al.* 2006, Pollard and Evans 2008). In remote and hilly indigenous-dominated areas upland rice is combined with resin-tapping and a little cash cropping. In remote indigenous-dominated flat lowland areas lowland rice is combined with resin-tapping and a little cash cropping or upland rice. In more accessible lowland areas (especially those dominated by Khmers) cash crops tend to dominate, often in combination with lowland rice but little or no resin-tapping. Traditionally the lack of significant markets meant there was little interest in cash crop production before about 2002. As the road network improves, some previously remote settlements have shifted recently to the cash-crop dominated model (Pollard and Evans 2008).

A few settlements have reported other activities as being significant to many families in that location (Evans *et al.* 2006, Pollard and Evans 2008) such as trading (in the market town of O Am), the production of bamboo incense sticks (near the main bamboo forest area; Mann Mouy 2010), the collection of old military scrap metal (now ceased), and artisanal gold mining (in Memong Commune). Many other smaller scale activities (handicrafts, labouring, extraction/processing of other NTFPs, service industries) are also important at particular times or for particular families, but are not dominant in any one locality. Indigenous people in particular have a highly diversified range of smaller livelihood activities linked to collection of forest products for subsistence or sale and based on their detailed ecological knowledge of the area.

### Farming

The farming systems include many crops, with each farmer typically specialising in one or two but also growing a range of others. Of cash crops, cashew is planted most widely, with cassava, soy, rambutan and others only popular near to the main roads, due to transport constraints. At the time of writing cassava is clearly the dominant cash crop by area planted. Few productivity data are available but grower enthusiasm suggests that yields are attractive. Some plots of rubber have been planted in some areas since 2008. Various other crops are also grown as minority components of the cash-crop system.

Upland and lowland rice productivity is low (typically around 1-1.5t/ha) with little or no irrigation and high losses due to weather and insect pests. To cover annual rice shortfalls other starchy foods need to be bought, bartered or substituted by the collection of forest tubers. There are many other crops including cassava, yams, beans, corn, squashes and leaf vegetables, often inter-cropped with the upland rice or grown adjacent to lowland rice fields. Fruit trees are also increasingly grown.

Cash cropping can be very extensive or very small scale, depending on farmer preferences and population density. By contrast upland and lowland rice fields tend to be scattered in small patches in the forest, sometimes several km from the nearest settlement, depending on availability of

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<sup>7</sup> This section is based mainly on studies by McAndrew *et al.* (2003), Evans *et al.* (2003), Khou Eanghourt (2004 qqq), Marschke (2003), Richardson (2003), Ironside (2004a), ICC (2004) and Degen *et al.* (2005) which together cover the great majority of villages in the project zone.

suitable soils. Historically upland rice fields were abandoned after 2-6 years and left fallow for 10-20 years before being cleared again, often but not always by the same family. Fewer and fewer fields are now fallowed, with an increasing number being converted to permanent crops, especially cashew, once rice production declines.

Most households keep 5-20 chickens, 1-2 pigs and possibly some ducks [check figures]. If wealthy enough they may have a few cattle and 1-2 buffalos or even an elephant. Larger stock are rarely eaten or sold but are kept as a store of wealth for special occasions or emergencies (e.g. a wedding or a serious illness). Cattle, buffalo and elephants are also used as draught animals.

#### Forest use

A high proportion of total livelihood is drawn from the forest. Many products are used in the household (e.g. wood, vines, bamboo, vegetables, fish, wild meat and medicinal plants). Fish appears to be the main protein source, rather than wild or domestic animals as might be expected. People sometimes go on long dry season fishing trips to productive locations.

Some forest products can also be sold. By far the most important in this landscape is liquid resin tapped from forest trees. Almost all households own some trees (typically 10-100 or more) which they tap on a weekly cycle. The resin is sold to a middleman (often the Khmer shopkeeper from the settlement) who trades it to the Vietnamese border. In most of the landscape this trade appears to have begun only after 1979. The resin transport network to remote villages is used for trading other products both legal (basic consumer goods) and illegal (e.g. wildlife). Many people trade small amounts of small-bodied wildlife species (e.g. lizards and turtles) and a few are involved in trade in large, high value species. Trade in many forest products tend to be driven by middlemen making specific orders – when there is a demand for rattan, bamboo, live macaques, onkoit seeds (*Entada*) or some other product, people from the village will typically go to collect as much as they can with little regard for sustainability.

#### *NTFPs and timber*

The principal NTFP is resin collected from forest trees (mostly from mature *Dipterocarpus alatus*) the sale of which is a vital source of cash income, second only to rice farming in many settlements. A crude estimate is that [update data from social survey] Gross family incomes of QQQ are typical and the ownership of individual trees makes this a reliable and sustainable source of income. Prices have risen steadily in recent years [ref]. Resin trade networks cover the whole area with traders exporting large quantities of resin to Viet Nam or other parts of Cambodia.

Since 2006 the harvesting of large stemmed bamboos has become important in some villages (e.g. O Am and O Rona), particularly amongst in-migrants from other parts of Cambodia who lack resin income. The stems are split to form the core incense sticks, and are sold in large bundles to traders from Viet Nam.

Other plant NTFPs such as malva nuts (*Sterculia lychnophora*) and sleng fruit (*Stychnos* sp) are traded more sporadically, but sometimes in large quantities, in response to the arrival of a trader. Many NTFPs are also important for subsistence purposes.

Some timber harvesting in the landscape is illegal and trade-driven but some is permitted by law for house construction (ref degr study QQQ).

#### *Fisheries*

Fisheries in the SPF are small-scale by Cambodian standards but critically important for local livelihoods as they apparently supply a high proportion of protein needs. A 2003 study in the Core

Area of the SPF revealed that more than 50% of meals included fish, contrasting with less than 10% from other animal protein, most of that from domestic species. Most families in most settlements appear to fish regularly, usually catching small amounts in ponds and streams. Fisheries are open access and declining partly due to destructive methods used by outsiders and a minority of local residents for trade.

### *Hunting*

Wildlife hunting is common but much harder to quantify than fishing as hunting of rare species, and hunting for trade are both illegal. Various studies in SPF have estimated that at least 20-70% of households engage in some hunting. Most of the hunting is for smaller species (eg monitor lizards, mouse-deer, porcupines) and are caught for consumption or trade, apparently in quite small quantities per family. Hunting of larger and high-value species (Red Muntjac, Sambar, wild cattle, pangolin, turtles) also takes place. This typically is not for consumption, but to sell meat or parts. Commercial hunting is usually done by or in cooperation with those with access to weapons, typically members of the armed forces.

### Legal status of land and forest use

Land in the project zone has varying legal status depending on its history and current use (Table QQQ). The situation in the sectors of the outer project zone beyond the SPF border is especially complex and requires understanding of several laws. The reviews by EWMI (QQQ) and Oberndorf (2010) provide a useful starting point. The key division is between state land, private land and land communally owned by indigenous people. Within state land there are a number of divisions according to the responsible agency and the intended use. Changes in classification happen frequently, especially transferring parcels of State Public Land to other uses.

Table QQQ Summary of legal categories of land in the project zone

Category	Responsible	Legal basis*	Extent in Project Area	Extent in Outer Project Zone
<b>Protection Forest</b> (State Public Land, Permanent Forest Estate)	FA	Divided into <b>Core</b> and <b>Buffer Protection Forest</b> (see Note 1); both classes also include some areas potentially eligible for conversion to <b>ICT</b> (see below); <b>Community Protected Forests</b> can also be declared, and a part of this land is designated for piloting <b>Community-based Production Forestry</b> . Protection Forest and Core/Buffer Areas defined by FL Art. 10 and Subdecree 143 (2009); see Note 1 for detail.	The whole Project Area is classified as Core Protection Forest. Areas later identified for ICT will be reclassified.	Large part of the area is Buffer Protection Forest which includes one Community-based Production Forestry area and one Community Protected Forest; areas later identified for ICT will be reclassified
<b>Logging concessions - Production Forest</b> (State Public Land, Permanent Forest Reserve).	FA	Concessions should identify special community areas, and may also contain areas eligible for <b>ICT, Community Forestry</b> and <b>private titling</b> . See FL Arts. 13-19 & 40; relevant concession agreements	None.	Small areas of Samling International concession, suspended since approx 2000 and defunct, with very low probability of restarting check
<b>Other forest areas</b> (State Public Land, Permanent Forest Reserve, no specific management designation)	FA	Customary use rights are protected; potentially available for ICT, Community Forests, logging concessions, Protected Forests or transfer to other uses. See FL Art. 10 and in general	None	Limited areas to north west and east of SPF. check
<b>Wildlife Sanctuaries</b> (State Public Land)	MoE	Can be divided into <b>four zones</b> : Core, Conservation, Sustainable Use (SUZ), Community (Note 2); SUZ can include <b>Community Protected Areas (CPA)</b> and also <b>large-scale economic concessions</b> ] not clear if ICT can be issued but presumed yes. See PAL 2008 (notably Arts 7, 11-14 & 25-28).	None	Snoul WS and Phnom Prich WS; not fully zoned but some CPAs declared and several SUZs created to allow large-scale economic concessions.
<b>Economic Land Concessions</b> (State Private Land)	MAFF	Essentially a long-term lease, does not confer ownership; in theory requires conversion from State Public Land, Note 3. See Subdecree 146 (2005) modified 2008	One known (QQQ must clarify current status of this) maybe best to exclude from the PA	check maps
<b>Mine exploration concessions</b>	MIME + MAFF/MoE	Can co-exist with all other legal designations; confers limited research rights and option to negotiate if a resource is found. No ownership/management rights. See ML Art. 11.5	at least six known to overlap project area [see drivers section]	several others known in this zone [see drivers section]
<b>Tourism concessions</b>		law?	None known.	
<b>Indigenous Communal Title (ICT)</b> (Note 4)	Community	Eligible areas are mainly non-forest, but some forest is included. LL Arts. 23-28; Subdecree 83 (2009)	None at project start. Potentially includes areas near many indigenous villages.	None at project start. Potentially includes areas near many indigenous villages.
<b>Unclassified land</b> (outside all the above classes; status yet to be adjudicated, Note 5)	To be determined		None.	Some areas present including the section of O Am village just west of the SPF.

\* FL - Forestry Law 2002; LL Land Law 2001; ML - Law on Mineral Resource Management and Exploitation 2001; PAL - Protected Areas Law 2008

*Notes to Table QQQ*

Note 1. The main difference set out in Subdecree 143 (2009) between the two zones is that Buffer Protection Forest allows for a somewhat higher level of economic development and extractive use - for example the Community-based Production Forestry pilot area lies in this zone (Pollard *et al.* 2010). Other legal sources: rights to customary use set out in FL Art. 40; precise customary use rights and community zones will also be defined in the SPF Management Plan (FL Art. 23); ICT areas will be identified village by village following LL; Community Forests governed by FL Arts. 41-45; Community Protected Forests and Community-based Production Forestry are being piloted and so lack a settled legal framework at present

Note 2. Core Zones have essentially zero human use, Conservation Zones permit limited extractive use, Sustainable Use zones permit more intensive use including certain kinds of commercial concessions and Community Zones permit agricultural and residential uses by community members, including the issuance of restricted forms of land title. Community Protected Areas are special management arrangements for sections of the Sustainable Use Zone that allow increased levels of extractive use based on approved management plans. Authors of this PD could not identify the legal framework for large-scale concessions.

Note 3. Communities are often prevented from using land within ELCs, although they may be allocated zones within the ELC boundary, for example to give access to established fields or spiritual sites.

Note 4. ICT can include farmland, fallows, residential land, spirit and burial forests, according to the claims asserted by the community and the factual situation. This designation recognises the traditional management systems of these villages, whereby land is considered to be communally owned, although the products of the land are privately owned, and the concept of selling individual parcels, or of keeping ownership after leaving the village, is relatively new. It also recognises the vulnerability of this system to external pressures which can result in land alienation and serious livelihood impacts on weaker community members. These areas remain classified as PFR until community claims have been accepted by the MLMUPC, at which point they are reclassified to community ownership, with the restriction that the land cannot be sold. Parts of the titled land are designated as State Private land whilst others are designated as State Public Land. While the claims are being assessed, communities are permitted to continue with their traditional management systems in these areas. None of the eligible areas in SPF (or anywhere else in the country) have yet been registered, but the lands of one village in SPF are now very close to completing the process (the first village in the country to reach this stage), and others are likely to follow shortly.

Note 5. Land parcels that have been in uncontested use since before the passage of the 2001 Land Law are in most cases **eligible to receive ordinary private land titles** after adjudication by the MLMUPC, and this right may also seemingly be extended on a case-by-case basis to other parcels of land in use (e.g. those occupied after 2001, but uncontested).



### G1.7 Description of biodiversity in the project zone.

The first known biological surveys of the project zone took place in 2000 (Walston *et al* 2001) and covered the southern portions. At that time much of the project zone was managed as a logging concession by Samling International. The survey focussed on large mammals and birds and revealed the importance of the area.

Following the commencement of conservation activities in 2002 a more systematic survey of selected key species was carried out in order to develop a biodiversity monitoring plan (Clements 2002). Since 2004 systematic collection of data has taken place annually (see Section QQQ) which has yielded a great deal of information on the biodiversity of the project zone, and in particular the project area. In addition to the annual monitoring, many other records of species have been collected by project staff, and by visiting researchers. These data are stored in a dedicated biodiversity database administered by WCS. Several taxon-specific surveys have also taken place in the project zone which have revealed more detailed information on the biodiversity of the area (Annex qqq includes a list of surveys and key references; the most comprehensive review to date can be found in WCS/FA 2006a). As a result of these surveys the project zone is one of the best known areas in the country from a biological perspective.

The vegetation diversity of the project zone is outlined in Section G1.2. The SPF is unusual in south-east Asia in that it conserves large areas of both Annamitic evergreen forest and deciduous dipterocarp forests of the eastern plains, and the transition between the different forest types (Rundell 1999, Baltzer *et al* 2001). This mosaic of forest types probably contributes to the high species richness in the area. To date 334 bird species, 93 mammal species and over 60 reptile and amphibian species have been recorded in SPF (species lists are provided in Annex QQ) (WCS/FA 2006a, Gray *et al.* in prep, Stuart *et al.* 2005, WCS/FA unpublished data). There are likely to be many more reptiles, amphibians and small mammals that have not yet been recorded. A preliminary survey of fish, based on interviews, was conducted by Degen *et al.* 2004 and preliminary botanical studies were made by MacDonald (2004a & b). The flora and invertebrate life of the SPF have not been studied in detail and are very poorly known (Roland *et al* in press).

#### Species of global conservation concern

As of 2010 61 vertebrate species that are Globally Threatened, Near-threatened or Data Deficient had been recorded in SPF (IUCN 2010). (table qq and Annex qqq)

Table QQQ Number of species of global conservation concern present in SPF

Class	Number of species (number of species that are not yet confirmed, but suspected to occur, in brackets)					
	Critical	Endangered	Vulnerable	Near Threatened	Data Deficient	Total
<b>Mammals</b>		9 (2)	13	6	1	29 (2)
<b>Birds</b>	4 (1)	3	6	8 (1)		21 (2)
<b>Reptiles</b>	(1)	2	2 (2)	2		6 (3)
<b>Amphibians</b>			2	1	2	5
<b>Fish</b>		(1)			(2)	(3)
<b>Total</b>	4 (2)	14 (3)	23 (2)	17 (1)	3 (2)	61 (10)

The SPF is particularly notable for the conservation of several species groups

- **Carnivores:** The SPF has an extraordinary richness of mammalian carnivores. To date 23 species have been recorded and several more are thought to be present. The area is likely to

have at least six species of wild cat. In 2000 the first ever photo of a wild Cambodian Tiger was obtained from a camera-trap in the SPF.

- **Primates:** The semi-evergreen and evergreen forests of southern Mondulkiri are internationally important for the conservation of primates. In 2010 the population of the Endangered Black-shanked Douc in the project area is estimated to be 15,100-35,300 individuals, probably the majority of the total world population (Rawson 2009). In addition an estimated 350-1700 Yellow-cheeked Crested Gibbons are present, a significant proportion of the world's population of this Endangered ape (Pollard *et al.* 2007, Rawson *et al.* 2009, O'Kelly and Nut Meng Hor 2010). There are also notable populations of five other threatened primates including the Pygmy Loris and Germain's Silvered Langur.
- **Deer, wild cattle and Asian Elephants:** The diversity of forest types, permanent rivers and water sources, and large numbers of mineral licks provides a highly productive landscape which can support high numbers of large herbivores. A recent survey found the population of Asian Elephants in the SPF to be 101-139 animals (Pollard *et al.* 2008). Together with groups in neighbouring protected areas it is one of the most important Elephant populations in the Lower Mekong Region. Gaur, Banteng, Eld's Deer and Sambar are important in themselves, and are also a key prey species for large carnivores such as Dhole and Tiger. Good numbers of Banteng are found in SPF; photos of calves show that these are breeding successfully. Mondulkiri Province is thought to be home to one of the largest populations of Banteng in the world (IUCN 2010). Similarly it appears that Gaur numbers are stable and possibly recovering, and southern Mondulkiri may have one of the most important populations in Cambodia, and the region in general (IUCN 2010).
- **Galliforms:** SPF hosts globally significant numbers of three galliform birds. The Endangered Green Peafowl is seen regularly in most parts of the conservation area especially in open areas near to permanent water. The project area holds an estimated 150-700 individuals (O'Kelly and Nut Meng Hor 2010) and is part of what may be the last stronghold of this species in Cambodia (Goes 2010). The Orange-necked Partridge (Near threatened) was first recorded in the SPF in 2003 (Davidson *et al.* 2003). This Restricted-Range species was previously only known from a few locations in southern Viet Nam. Since then the bird has been seen and heard often. Although the size of the population is unknown it may be highly significant given the available area of its preferred habitat of bamboo-rich forest. The population of Germain's Peacock-pheasants in southern Mondulkiri is so large that in 2005 it contributed to a change in the status of the species from Endangered to Near-threatened (IUCN 2010).
- **Large waterbirds and Vultures:** Four Critically Endangered bird species have been recorded in the SPF: Giant Ibis, White-shouldered Ibis, Red-headed Vulture and White-backed Vulture (WCS/FA 2006a). These species have all been seen in recent years, mainly in the open forests in the west of the SPF (Bird *et al.* 2006). Although this sector has had relatively little survey effort, there have been multiple records of these species, and so it may prove to be of global importance for all them, in particular Giant Ibis. This area is also known to have breeding populations of Sarus Crane and Lesser Adjutant (both Vulnerable). White-winged Duck has been recorded on one river system and is reported to occur on several others.

There has been little botanical work carried out in SPF, but studies to date have shown that SPF has at least ten tree species that are listed on the IUCN Red List as Vulnerable, Endangered or Critically Endangered (table xx).

**Table xx: Globally Threatened and Near-threatened plant species confirmed in the project zone**

Species	Local name	Conservation Status (IUCN 2010)*
<i>Dipterocarpus turbinatus</i>		CR
<i>Dipterocarpus costatus</i>		EN

<i>Dipterocarpus alatus</i>	Choeteal tuk	EN
<i>Dipterocarpus costatus</i>	Choeteal bangkouy	EN
<i>Anisoptera costata</i>	Phdiek	EN
<i>Hopea odorata</i>	Koki masao	VU
<i>Dalbergia bariensis</i>	Neang Nuon	EN
<i>Dalbergia oliveri</i>	Neang noun	EN
<i>Dalbergia cochinchinensis</i>	Kranhung	VU
<i>Dialium cochinchinense</i>	Kran lanh	nt
<i>Afzelia xylocarpa</i>	Beng	EN
<i>Cycas siamensis</i>		VU

\*Cr = Critically Endangered En = Endangered Vu = Vulnerable nt = Low Risk/Near-threatened

### Global Assessment Criteria

In recent years many conservation organisations have carried out global assessments of biodiversity. These exercises are designed to highlight areas of high biological diversity or regions that are highly threatened with destruction. SPF overlaps several of these, reinforcing the conservation importance of the area.

The SPF overlaps with **two ‘Last of the Wild’** areas identified in the Indo-Malayan Tropical & Subtropical Dry Broadleaf Forests biome. The Last of the Wild were identified by WCS in a global exercise that mapped the extent and intensity of human influence and then selected the ten least affected areas within each biome (Sanderson *et al* 2002a).

The southern, evergreen parts of SPF lie within the **South Viet Nam / Cambodia Lowlands Endemic Bird Area** (Stattersfield *et al* 1998). EBAs are defined as areas that contain a concentration of endemic bird species. This means areas that contain the entire breeding ranges of two or more restricted-range bird species (those with a breeding range less than 50,000 km<sup>2</sup>). SPF has breeding populations of the 3 restricted-range bird species that characterise this EBA: Germain’s Peacock-pheasant, Orange-necked Partridge and Grey-faced Tit-babbler.

The area also includes parts of **two Important Bird Areas (IBA)** (Seng *et al* 2003). These are identified as being areas of high bird diversity, or with concentrations of endangered bird species, that are of high conservation importance. The southern parts of SPF are in IBA KH027 (Snoul / Keo Seima / O Reang) which is important for the conservation of Orange-necked Partridge, Siamese Fireback, Green Peafowl, White-winged Duck, and Great Hornbill, amongst other species. The northern deciduous dipterocarp sections of SPF are part of IBA KH026 (the Kratie / Mondulkiri lowlands) which is important for vultures, ibises, Sarus Crane and Green Peafowl.

The SPF includes parts of **two Global 200 Ecoregions: Annamite range moist forests, and Lower Mekong dry forests**. Ecoregions are large areas with relatively uniform climate that harbour a characteristic set of species and ecological communities. WWF identified about 200 of the most threatened of these globally which are defined as “outstanding representatives of the world’s terrestrial and marine ecosystems” (Olson & Dinnerstein 1998, Baltzer *et al* 2001). Selection has been based on parameters such as species richness, species endemism, higher taxonomic uniqueness, unusual ecological or evolutionary phenomena and keystone habitats.

The conservation area lies within the **Indo-Burma Hotspot** (Myers *et al* 2000, Tordoff *et al* 2007). This is an area identified by the NGO Conservation International as a *biodiversity hotspot* with high levels of biodiversity and endemism and under high threat of destruction.

Southern Mondulkiri, including the SPF has been highlighted in two species level priority setting exercises. The area is part of the **Southern-central Annamites Tiger Conservation Landscape**. This area is classified as a Global Priority landscape offering the highest probability of persistence of Tigers over the long term (Dinnerstein *et al* 2006). More recent assessments (Walston *et al.* 2010a, Lynam 2010) have however determined that Tigers are now in critically low numbers, or possibly extirpated from the landscape. The area is still considered of high importance for long-term Tiger conservation as it represents part of the largest remaining block of deciduous dipterocarp forest in the region and one of the largest protected areas networks in mainland south-east Asia. The landscape therefore has high potential as a possible reintroduction site and is identified by Walston *et al.* (2010b) as a Potential Source Site.

The IUCN Asian Elephant specialist group is identifying range-wide priorities for elephants. The project area overlaps with a proposed **Asian Elephant 'core population'**, one of the highest priority landscapes for the conservation of Asian Elephants globally (S Hedges *in litt* October 2010). The Asian Elephant population in the project area is one of only two in the lower Mekong for which there is a robust population estimate. In addition this population is thought to be part of a metapopulation with neighboring areas, and as such is of regionally very high importance.

The importance of the SPF for the conservation of plants can be inferred from studies of neighbouring areas. Nearby Cat Tien National Park in Viet Nam has been identified as a centre of plant diversity, with an estimated 2,500 species of vascular plants, and has semi-evergreen and evergreen forest that is similar to those in the south of SPF. Yok Don National Park in Viet Nam is dominated by deciduous dipterocarp forest, with semi evergreen forest along river banks. This area is very similar to the northern and western parts of SPF and has also been identified as a centre of plant diversity. Yok Don has an estimated 1,500 species of vascular plants, many of which are unique to deciduous dipterocarp forest. Considering that SPF has large areas of forest that are very similar to both Yok Don and Cat Tien it is likely that SPF would also qualify as a **Centre of Plant Diversity** (WWF/IUCN 1996).

### **G1.8 High Conservation Values in the project zone**

In the absence of a national interpretation the High Conservation Values of the project have been identified based on the Global HCV Toolkit (ProForest 2003). An assessment of which values are present in the project area was carried out by the project team (Pollard and Evans 2010). This assessment is based predominantly on existing studies and reports. In addition consultations with individual communities and multi-stakeholder discussions have been held to verify social values, and map their locations.

The assessment revealed that several values are present throughout the project zone (table xx). Project activities have been developed to maintain or enhance these values.

**Table xx: Summary of High Conservation Values identified in the Project Zone**

High Conservation Value	Details	References
<i>HCV1: Forest areas containing globally, regionally or nationally significant concentrations of biodiversity values</i>		
HCV 1.1: Protected Areas	<p>The SPF is classified as a Protection Forest, a protected area managed by the Forestry Administration. Amongst the aims of the SPF are</p> <ul style="list-style-type: none"> <li>• <i>To protect, conserve and rehabilitate genetic resources of fauna and flora species which are globally threatened species;</i></li> <li>• <i>To maintain and rehabilitate important ecosystems for habitats and breeding of all species and biodiversity resources.</i></li> </ul>	RGC 2009
HCV 1.2: Threatened and Endangered Species	41 Globally Threatened vertebrate and 10 Globally Threatened plant species have been confirmed from the project zone (see tables xx & xx).	IUCN 2010. WCS/FA 2006a. WCS data.
HCV 1.3: Endemic Species	<p>3 restricted-range bird species are found in the SPF (see section qqq above), consequently the area is part of the Southern Vietnam/Cambodia Lowlands Endemic Bird Area.</p> <p>Yellow-cheeked Crested Gibbon and Black-shanked Douc are restricted to southern Vietnam and eastern Cambodia. Both are found in large numbers in the SPF. One frog species is currently known from only one river system in the SPF. The rattan <i>Calamus lateralis</i> is known only from SPF and one other nearby site in Vietnam</p>	Stattersfield <i>et al</i> 1998 Pollard <i>et al</i> 2007 Stuart <i>et al</i> 2006 Henderson 2009
<i>HCV2: Forest areas containing globally, regionally or nationally significant large landscape level forests</i>	The SPF can itself be considered a large, landscape-level forest. The SPF overlaps with two 'Last of the Wild' areas. In addition the project zone is part of the Eastern Plains Landscape (16,800 Km <sup>2</sup> of contiguous forest)	Sanderson <i>et al</i> 2002a WWF/WCS 2008
<i>HCV3: Forest areas that are in or contain rare, threatened or endangered ecosystems.</i>	SPF conserves what is probably the largest remaining block of lowland southern Annamitic forest and large areas of deciduous dipterocarp forest. Both of these forest types have suffered globally from extremely high levels of deforestation and conversion. The SPF includes areas of the Sen Monorom plateau grasslands, it is one of only two protected areas in Cambodia to contain this nationally rare habitat.	Olson & Dinnerstein 1998, Baltzer <i>et al</i> 2001 Tordoff <i>et al</i> 2007

High Conservation Value	Details	References
<i>HCV5: Forest areas fundamental to meeting basic needs of local communities</i>	16 villages exist in the Project Zone and people from 3 more regularly use the area. A large proportion (including most of the households in the Project Area) are dependent on forest resources. Collection of liquid resin from forest trees, mainly <i>Dipterocarpus alatus</i> is the most important source of cash income for remote communities, providing income that is essential for purchasing rice and other basic needs. The fisheries of the rivers and pools of the project zone are of fundamental importance as the main protein source for most households. Other important resources include rattan, bamboo, honey and medicinal plants.	Evans <i>et al</i> 2003 Degen <i>et al</i> 2003 Richardson 2004 Mann Mouy 2010 WCS/FA 2006b
<i>HCV6: Forest areas critical to local communities' traditional cultural identity</i>	95% of residents of the Project Area are predominately ethnic Bunong who are animist with very strong cultural links to the forest. Culturally important areas ('spirit forests', 'spirit pools' and grave forests) have been mapped for 9 villages and are known to exist for most other communities.	Evans 2007 Degen <i>et al</i> 2003 WCS/FA unpubl. data

## **G2 Baseline Projections**

### **G2.1 Without Project baseline land-use projections**

insert relevant section from VCS PD

### **G2.2 Project additionality**

Project additionality is demonstrated below using the procedure set out in the chosen methodology. This procedure is essentially the same as that set out in Approved VCS Tool VT0001.

*Step 0. Preliminary screening based on the starting date of the AUFD project activity*

The project passes this screening as the project start date is after 1 January 2002.

*Step 1. Identification of alternative land use scenarios to the proposed AUFD project activity*

*Sub-step 1.a Identify credible alternative land use scenarios to the proposed AUFD project activity*

The following three land-use scenarios are considered credible alternatives to the with-project case. Scenarios 2 and 3 result in higher project additionality than the chosen BAU scenario, and are credible, but the available evidence is insufficient to document conclusively that they are more likely than the more conservative BAU scenario chosen.

1. *The chosen BAU scenario* (escalating threats from residents and migrants due to roads and other factors, continued partial conservation action without REDD funding). This is set out in Section G2.1.
2. *A declining/no conservation scenario* (escalating threats from migrants and residents due to roads etc, decline or eventual cessation of externally funded conservation action due to funding declines, loss of political support or low prospects of success). In this case the nature of the threats remains similar, but the levels of ongoing donor-funded conservation investment that are assumed in the BAU scenario become impossible to maintain. This could plausibly occur for many reasons - e.g. shifts in donor priorities away from biodiversity conservation, declines in the total amount of donor funding available due to the global economic downturn and/or declines in the ability of SPF to compete with other sites for available donor funding.
3. *The economic land concessions scenario* (threats and protection are generally as in the BAU scenario but in addition large areas of the project area are excised from the SPF and re-issued as agro-industrial or mineral exploitation concessions; conservation activities are excluded from these areas and deforestation rates rise greatly). This scenario affected the Mondulkiri Protected Forest during 2007, when about 650 km<sup>2</sup> was excised to facilitate the issuance of land concessions (ref subdecree and FA pers comm?), and is currently affecting large sections of nearby Wildlife Sanctuaries (ref Cam Daily article?).

All the relevant land-uses and agents exist commonly within the reference area and project area and hence can be deemed realistic and credible. The road improvements predicted to occur in the project area after the project start date have already taken place at the time of writing.

*Sub-step 1.b Consistency of alternative land use scenarios with applicable and enforced laws and regulations*

Part of each scenario is consistent with legal requirements, while remaining parts are consistent with local norms of non-compliance.

The construction of roads and the excision of areas from Protected Forests to permit their issuance as Economic Land Concessions or Mining Concessions is legal within certain constraints. The use of forest areas for shifting cultivation by members of indigenous ethnic minority villages is also legal within certain constraints.

The majority of forest loss in Scenarios 1 and 2 is technically illegal, but those legal requirements are systematically not enforced for a variety of reasons and non-compliance is the norm across the majority of the reference area and the broader region of north-east Cambodia. This is evident from an inspection of deforestation data for the historical baseline period and from PRAs conducted in many villages in the area.

#### *Step 2. Investment analysis*

Investment analysis is chosen as a stand-alone demonstration of additionality.

##### *Sub-step 2.a Determine appropriate analysis method*

Since the REDD project generates no financial or economic benefits to the project proponents other than carbon market-related income, Option I (Simple Cost Analysis) is appropriate.

##### *Sub-step 2.b Apply the selected analysis method*

The costs associated with the project activity are set out in Section QQQ G3.11. As can be seen they are very substantial, and there is no evidence that these costs will be possible to meet from other sources in the foreseeable future. Some of the alternative livelihood activities funded by the project (e.g. tourism and agricultural development support) produce revenue for local communities from sales of products, but this revenue is treated as a livelihood benefit and is not available to be reinvested on a significant scale in forest protection or project implementation.

Given this conclusion the analysis proceeds to Step 4.

#### *Step 4. Common practice analysis*

Many forest areas in Cambodia, including large parts of the reference area, receive little or no active protection. However, forest conservation activities do take place at some locations in the reference area and more widely in Cambodia. These are often associated with the presence of a large NGO working in partnership with government and are typically funded primarily by donor support. The BAU conservation project in SPF is a good example of this kind of project, as are the nearby projects conducted in Mondulkiri Protected Forest (FA/WWF) and Phnom Prich Wildlife Sanctuary (GDANCP/WWF).

However, there are essential differences between such activities and the SPF REDD project in scope - spatial, temporal and financial. It is very rare for any existing projects to achieve comprehensive spatial coverage or to address all key threats with sustainable funding over a period of decades; the norm is to achieve partial or insignificant spatial coverage with only partial effectiveness in addressing selected key threats, and for funding to be dependent on short-term (1-3 year) donor funding cycles. Furthermore, none of them offer the possibility of substituting for a part of the



national-level opportunity costs of forest conservation<sup>8</sup> and so all are vulnerable to declining political support and formal transfer of the forest to other designated land uses. Because no conservation project in the reference area, or anywhere in Cambodia, yet receives carbon finance, or any other kind of macro-scale payments for environmental services, none of them has achieved the four key forms of additionality that carbon finance will bring to the SPF project:

- i) increased, sustained financing, commensurate with the scale and duration of the threats facing the site
- ii) direct linkage of project success to further revenue, ensuring a sustained long term focus on achieving measurable emissions reductions
- iii) creation of a new conservation-based revenue stream for the RGC, increasing the level of long-term political support for protection of the reserve
- iv) resources available for large scale benefit-share arrangements structured to incentivise forest protection by local communities

### **G2.3 Estimated carbon stock changes associated with the ‘without project’ reference scenario.**

insert relevant section from VCS PD

### **G2.4 Without project scenario effects on project zone communities**

#### Approach

This section reviews key factors that will affect communities in the project zone without REDD project funding. Combined with the business-as-usual levels of conservation action and the expected trends in deforestation drivers (Section G2.1) a without project scenario can be developed for the communities. The widely used Sustainable Livelihoods Approach<sup>9</sup> (SLA) is used to organise the description, and trends are differentiated between the main stakeholder groups set out in Section G1.5. Since many factors cannot be modelled quantitatively with current data, especially over such a long period, the scenario is qualitative and focuses on those aspects which can confidently be predicted to improve or worsen significantly, and for which the project will attempt interventions. Most drivers overlap with those for deforestation (See Section G2.1) so those are not repeated here, but some additional drivers are highlighted where relevant.

The CCBS requires a prediction of changes *attributable to project activities*, whilst livelihood changes attributable to other factors are part of the baseline. The no-project scenario 'should therefore focus on the outcomes of processes or conditions that are most likely to be affected by the project - these are often linked to project-related land uses.' (CCBA *et al.* 2010 p21). This is a valuable distinction, as overall livelihood trends in the project zone will to a large extent mirror changes in the broader Cambodian and regional economy that are difficult to predict, such as population growth, employment, commodity markets and the effects of globalisation, levels of Foreign Direct Investment, the political and security situation, natural disasters, levels of corruption and so on. Expected future changes in the climate are also very hard to predict with enough accuracy to inform

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<sup>8</sup> With the possible exception of those with potential for catchment protection payments from hydro-developers. This option does not exist in Seima since no dams are planned.

<sup>9</sup> e.g. [poverty-wellbeing.net/en/Home/Livelihood\\_Approaches](http://poverty-wellbeing.net/en/Home/Livelihood_Approaches)

management decisions. Following the rationale above it can be assumed that most or all of these factors will be the same in the with- and without-project scenarios, and so they are not relevant to identifying net project impacts, except insofar as they may obscure the effects of the factors that are relevant.

### Changes in the vulnerability context

Under the SLA vulnerability is one of the over-arching factors that determines how families respond to other changes. Vulnerability is a key issue for the poorer communities in the project zone - here as in many parts of rural Cambodia families live close to the edge of economic viability and one severe financial shock (health crisis, crop failure, loss of land or resin trees) can push them into a downward spiral of indebtedness than can take years or even generations to escape from [ref QQQ]. The future potentially contains some economic opportunities for many families in the landscape, due to increasing market access, better public services and a likely continuation of recent improving trends in the overall Cambodian economy [refs QQQ]. However, in the without-project scenario many vulnerable stakeholders in this particular area may not see lasting improvements, and may face negative impacts or lower than possible net benefits from those trends.

To the extent that livelihoods improve and levels of capital increase in the communities, people will be more buffered against shocks and so less vulnerable, which is a positive trend. However, several competing factors may increase the vulnerability of many communities in the landscape:

- 1) The rapid arrival of modern Cambodian culture and economic forces in indigenous villages without safeguards is likely to lead to increased vulnerability due to pressures on social relationships, natural resources and existing economic systems.
- 2) The potential impacts of large economic concessions in the project zone, reducing the areas of forest available, potentially impacting on farmland and also bringing other threats such as pollution, social disruption and competition for remaining resources by migrant labourers.
- 3) Diversification of livelihoods tends to buffer against shocks; rural livelihoods in the landscape are currently highly diversified but may become less so if there is an increased dependence on a few cash crops or agricultural wage labour, or if some current resources (such as NTFPs and fish) decline without parallel increase in access to new opportunities.
- 4) Mondulkiri is predicted to be one of the most vulnerable provinces in South-east Asia to climate changes, due to a combination of QQQ (EEPSEA 2009).

### Changes in livelihood assets

Table QQQ lists selected key livelihood assets that are likely to change in the baseline scenario, arranged in the five categories of the SLA. It also notes changes in the factors that tend to increase or decrease these assets ('transforming structures and processes' in Sustainable Livelihoods Approach terminology). The list is based on the results of a workshop held in SPF in 2006 (WCS/FA 2006b). At the workshop, the rural development NGO CEDAC, together with WCS and FA, asked community representatives to help select indicators to monitor livelihood trends in the SPF in relation to the conceptual model then in place.

Table QQQ Projected trends in key livelihood assets

Asset class	Trend without project	Mainly affects	Changes in transforming structures and processes
<b>Natural Capital</b>			
Farmland/housing land	Alienation, forced sales	Indigenous	High levels of forest crime, weak enforcement, weak community control
	Uncertain tenure due to	Khmer, offsite settlers, some	High levels of forest crime, weak

	expansion outside agreed land-use plans	indigenous	enforcement, weak community control
	Loss to concessions	All communities	Concessions granted, mainly over land lacking clear title
Predictable climate for agriculture etc	Decline	All communities	Climate change, lack of adaptation support
Soil fertility	Decline	All onsite communities	Insufficient tech. support, lack of tenure to encourage investment, frontier (short-term) attitude, 'hungry' crops esp. cassava, possibly also climate change
Water	Declining quality and quantity	All communities, offsite env. service users	Poor management of catchments, pollution from intensive agriculture and possibly also mines, poison fishing
Forest resources (NTFP, timber, fish, wildlife)	Brief increases in harvest followed by steep declines in all resources	All forest dependent on-site communities, off-site env. service users (fisheries)	Market-driven harvests without effective management, high levels of forest crime, declining forest cover, possibly also climate change
<b>Social capital</b>			
Cultural identity	Seriously declined	Indigenous	Weakening of traditional structures; Khmer/Cham migration; loss of forest and land base
	Stable/improving?	Khmer	Stabilisation of transient/settler communities?
Social relationships	Seriously declined	Indigenous	Breakdown of communal systems, conflict over resources
	Unknown	Khmer	Too many factors to predict; one issue is conflict over resources with neighbours and concessions
Labour rights	Remain poor or improve	All on and off site communities	Unpredictable political/cultural factors
Gender equity	Remain poor or improve	All onsite communities	Unpredictable political/cultural factors
<b>Human capital</b>			
Education levels	Slowly improve for children, not improved for adults	All onsite communities (but vulnerable groups may decline)	Gradual increase in primary/secondary education, better road network, ?increasing purchasing power
Health levels	Slowly improve	All onsite communities (but vulnerable groups may decline)	Gradual increase in public services, better road network, ?increasing purchasing power
<b>Physical capital</b>			
Household level	Improve	Families that benefit from new development activities, illegal land-grabbing etc (mainly Khmer non forest-users)	
	Decline	Families that lose out from new development activities (mainly indigenous /Khmer forest users)	Loss of access to existing income sources, lack of replacements
Community level	Slowly improve	Mainly accessible communities	Gradual increase in public services, investments in better road network and water-sanitation projects
<b>Financial capital</b>			
Savings	Improve	Families that benefit from new development activities, land-grabbing etc (mainly Khmer?)	

	Decline	Families that lose out from new development activities (mainly indigenous?)	Loss of access to existing income sources, lack of replacements, competition
Low-cost community credit	Decline	Indigenous	Breakdown of social ties
Commercial credit	Improve	All communities (except vulnerable groups lacking collateral)	Arrival of banks, better roads

### Conclusion - Changes in livelihood outcomes

As a result of these various changes the following overall changes are expected in the major livelihood outcomes as defined by the SLA. **Income** may increase or decrease overall, depending on the macro-economic situation. We suspect that long-term it will tend to increase, on average, across many families, due to national trends. However, we note that **increasingly unsustainable use of the NR base** (rattan, timber, bamboo, sleng fruits, fish, wildlife, etc.) is likely to produce brief income peaks as each resource is over-harvested, followed by a decline until the next resource is targeted, with an overall **long-term decline in NR-based income**. Although resin harvests are thought to be sustainable (Evans *et al.* 2003), the trees themselves are at risk from logging and will also decline. This will be true for both Khmer and indigenous families, but more for the latter due to their higher dependence on NR.

Some farmers will benefit from the expansion of their land holdings, but many others, especially weaker indigenous families, may experience land alienation and lose income or subsistence products from this source, **increasing vulnerability** and **reducing food security**. Many Khmer families may experience high insecurity due to **insecure tenure on illegally grabbed land**, and all families face the potential risk of dispossession and conflict due to **problems with land concessions**, which have been widely documented in Cambodia. **Land fertility** is likely to decline in many areas due to unsustainable practices made worse by insecure tenure, lowering farm-based incomes after brief peaks due to the exploitation of freshly exposed forest soils.

Indigenous communities are also likely to suffer declines in **non-material aspects of well-being**, due to weakening of cultural institutions, loss of access to spiritually important forest and land, the shift from farming to labouring and so on. Trends in **labour rights and gender equality** are hard to predict, and could improve or decline depending on many factors. **Health and child education levels** seem likely to improve with increasing public investment, but again there will be losers who cannot afford to buy into these services, and there is little prospect of non-formal education to address the very low levels of adult literacy.

These various threats to livelihoods in the without-project scenario are represented in the project conceptual model (Section G3.1). The focus is on threats to land and natural resource capital, since this is the natural entry point for a project of this kind to have greatest impact. Threats to other kinds of capital, and the various transforming structures/processes are addressed through the design of the interventions (e.g. formation of community groups addresses social capital, while livelihood development activities address physical and financial capital).

### **G2.5 Without project scenario effects on project zone biodiversity**

This section describes the main known threats to biodiversity in the project zone. Combined with the business-as-usual levels of conservation action and the expected trends in drivers (Section G2.1).

a without project scenario can be developed for biodiversity. Since quantitative wildlife population trends are not yet known and cannot be modelled with current data, the scenario is qualitative. The drivers of threats to biodiversity overlap widely with those for deforestation so those are not repeated here; some additional drivers are highlighted where relevant.

### Threats to biodiversity

The main threats to biodiversity in the Project Zone are similar to those familiar to conservationists throughout tropical Asia (qqq Sodhi papers; also Corlett's book), most notably deforestation, illegal logging, unsustainable fishing and hunting. These threats were first documented for the site in 2000 (Walston *et al.* 2001) and have been systematically documented since 2005, providing an indication of historical baseline trends and informing predictions. The threats are grouped below into three major, widespread threats (hunting, habitat loss and selective logging/overharvest of NTFPs) which affect many species and are given full treatment in the project conceptual model (Section G3.1) plus several other threats which are less severe or affect only a subset of species. These smaller threats are addressed through specific actions in the workplan but not shown explicitly in the conceptual model, to improve clarity.

#### *Major, widespread threats affecting many species*

##### *i) Hunting*

The most significant threat to key wildlife populations is over-hunting. This has already probably long ago eliminated several species from the project zone (e.g. Kouprey *Bos sauveli* and Wild Water Buffalo *Bubalus arnee*<sup>10</sup>), and over recent decades has dramatically reduced populations of ungulates, Tigers, pangolins, turtles and other taxa. Tigers have also been reduced to critically low levels across Mondulkiri Province as a whole, due to hunting and loss of prey species. Hunting in SPF involves guns, snares, traps, dogs, poison baits and many other methods, targeting a wide range of species (Walston *et al.* 2001, Lynam and Men Soriyun QQQ, Drury QQQ, FA/WCS unpublished law enforcement patrol monitoring data). Most hunting with serious conservation impacts is driven by trade and supplies markets locally and internationally with bushmeat, traditional medicinal products and trophies (Lynam and Men Soriyun QQQ). Regional demand for wildlife products is rapidly increasing [ref].

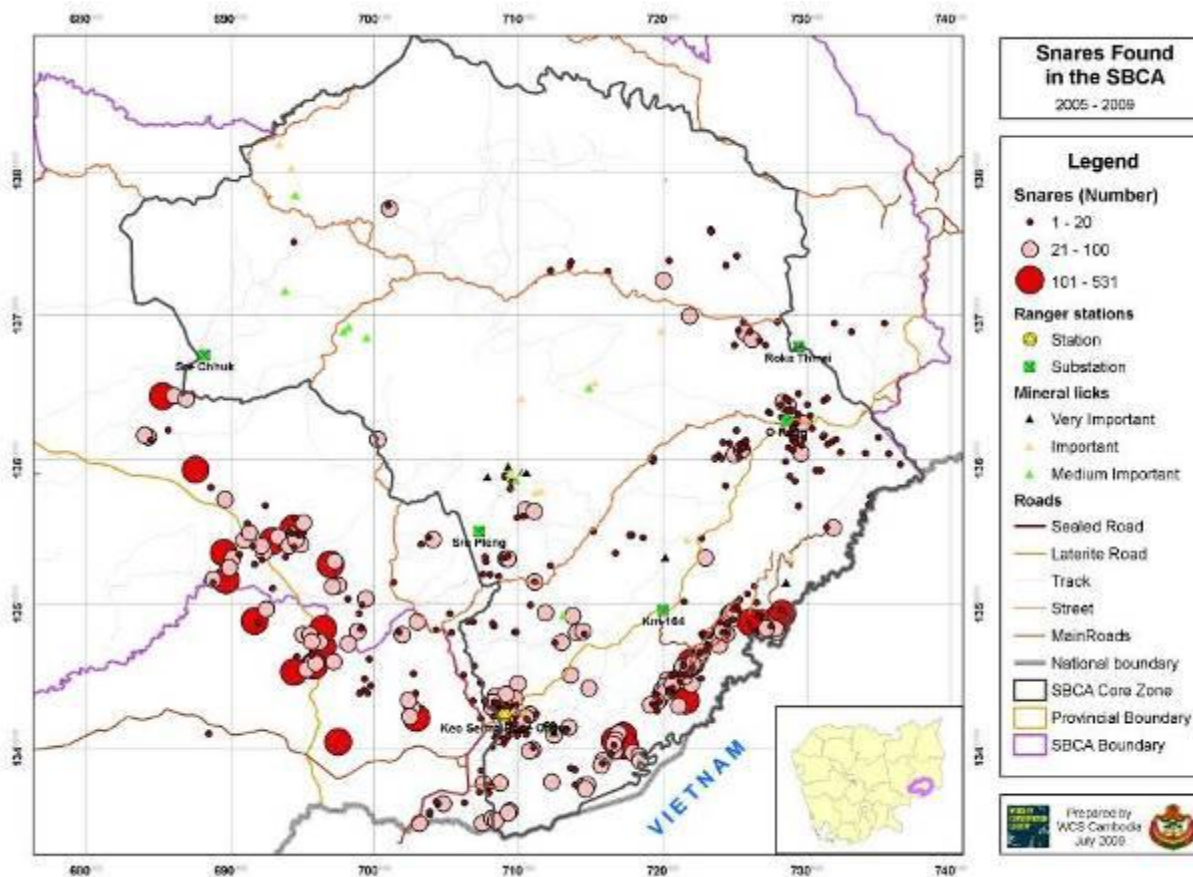
Most forms of hunting are difficult to detect, map or quantify. However, snares are more easily found and arguably provide a useful proxy for hunting pressure in general since they affect many key species and can be placed almost anywhere. Figure QQQ shows that the snaring pressure is very high. There are many records of snare lines of more than 100 snares, and during the period mapped almost 13,000 snares were removed, suspected to be a small proportion of the total in use. These snares capture large numbers of terrestrial mammals and birds from the size of mouse deer, civets and junglefowl up to Sambar, wild cattle, bears and big cats. When compared to maps of patrol effort (WCS/FA unpublished data) it is evident that:

- a) snaring (and hence other forms of hunting) are likely to be under-recorded in the north east and west of the SPF due to lower patrol effort
- b) the highest current levels of snaring (and hence presumably other forms of hunting too) appear to occur in those less heavily patrolled areas which are also more accessible from areas of dense human settlement.

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<sup>10</sup> There are no confirmed records of these species from the site but its habitat and location make it very likely they were once present.

Figure QQQ Distribution of snare lines found in and around SPF during recent years [low res]



Comparison with similar areas elsewhere shows that the level of enforcement effort achieved to date has partially reduced hunting compared to a 'no protection' scenario but has not brought it fully under control. Despite active enforcement, large numbers of snares continue to be found whenever systematic searches are made of vulnerable areas. Prices for the target species have increased dramatically in recent years, with increases ranging from 200-1000% over a recent six year period (Table QQQ), as demand for wildlife and wildlife parts has grown in Cambodia and more widely across Asia, especially in China.

Table QQQ Trends in prices of selected wildlife species in the project zone

Species	\$/kg	
	2003	2009
Banteng	\$0.75	\$3.75
Sambar	\$1.00	\$3.75
Gaur	\$1.00	\$3.75
Pangolin	\$16.25	\$50.00
Wild Pig	\$0.60	\$3.75
Muntjac	\$0.75	\$3.75
Small Turtle	\$0.50	\$1.25
Monitor Lizard	\$1.25	\$2.50
Soft-shelled Turtle	\$1.50	\$10.00
Frog	\$0.50	\$2.50
Porcupine	\$0.50	\$5.00

Source: FA/WCS unpublished surveys

Recent examples of the continuing high level of threat include reports of over-hunting of Pygmy Loris (Starr *et al.* 2011), the documented killing of at least one Elephant and several wild cattle during 2008-2011 and increasing reports of gunshots heard at night during wildlife monitoring surveys.

Given these data, the without-project scenario is that snaring and other forms of hunting would greatly increase over large parts of the reserve, gradually overwhelming current enforcement efforts, due to increase in human pressure, accessibility and other factors. The outcome will eventually be the elimination of most large-bodied vertebrate species except for a few highly resilient species of low conservation concern, as has happened in many other forests in Indochina (refs QQQ).

*ii) Habitat loss*

Deforestation and other forms of habitat conversion have severe impacts on biodiversity. This usually leads to the total destruction of natural habitats and their replacement with farmland or residential areas. These habitats typically support very few of the species present in the original forest, and almost none of those are currently of conservation significance in Indochina. Some of the SPF's threatened species (e.g. Eld's Deer, Asian Elephant, Green Peafowl) occasionally visit remote patches of agriculture in predominantly forest areas (Scally *et al.* 2007), but they do not occur regularly in areas dominated by such habitats (WCS/FA 2006).

Detailed data on deforestation trends are contained in Section G2.1. Deforestation is expected to affect all main forest types, in particular the evergreen and bamboo forests near to National Route 76. In addition to gross loss of habitat, fragmentation will result in smaller forest patches with a higher edge:core ratio. Such patches are typically less suitable for wide-ranging or forest interior species (refs QQQ), many of which are among the most threatened in the landscape, and smaller patches are also more vulnerable to pressures such as logging, hunting and invasive alien species, leading to synergistic impacts.

Non-forested habitats are also at risk. In particular, lowland grasslands/wetlands are being converted to agriculture, mainly rice paddy. Since 2000 the loss of several important wetlands in the reserve due to this cause has been documented (e.g. Trapeang Ronheav, Trapeang Khlong and Sre Traw). This is difficult to detect using remote sensing and is of course not represented in the deforestation models, but the rate of loss is believed to be higher than for deforestation since these rare alluvial soils are preferred for rice production and people will travel across many kilometres of forest to access wetland sites. The relative biodiversity impact may also be higher than for deforestation, since many Red-listed species are highly dependent on these rare habitats including Giant and White-shouldered Ibis, Eld's Deer, White-winged Duck, Sarus Crane and Lesser Adjutant. In the without-project scenario a high proportion of the lowland grasslands and wetlands in the SPF is likely to be converted in this way.

The distinctive upland grasslands of the Sen Monorom plateau are rapidly being converted to tree crops and cassava, both inside and outside the project zone. In the without-project scenario it is predicted that a very high proportion of this habitat will be converted, since it typically lacks even the weak protection afforded to forest and is seen as 'unused land' ripe for development. The direct biodiversity impacts of this are unknown. They may not be especially severe for threatened and endemic birds and mammals, since these habitats are relatively little used by such species (Walston *et al.* 2001, Bussey and Sok Ko 2004), but the value of these grasslands for other taxa such as amphibians, plants and invertebrates remains unstudied. Furthermore, the increased human activity in the grasslands will result in pressure from hunting, logging and fire in adjacent forest habitats.

An indirect impact of deforestation will be an increase in human-wildlife conflict, especially with elephants. Scally *et al.* (2007) found that although many human communities live in the forest, levels of human-wildlife conflict remained low compared to many other sites in tropical Asia. Since that time however there has been some increase in problems with human-elephant conflict near O Am village, linked to significant forest loss and planting of crops in former elephant range areas. This may lead to retaliatory killing of elephants, or increased exposure to poachers. The without project scenario predicts further encroachment leading to increased raiding of crops by elephants, and increased conflict with farmers, potentially leading to more elephant killings and declines in elephant numbers.

*iii) Selective logging and over-harvest of plant NTFPs*

Unsustainable illegal logging of rare Luxury class and Grade 1 timber species takes place in almost any dense forest area across the project zone, and indeed throughout Cambodia where such species persist. Several other plant resources are over-harvested as well, including the large bamboo species *russei thngor* (Mann Mouy 2010), several species of rattan and trees with valuable fruit such as *Strychnos nux-vomica* (sleng) and *Sterculia lychnophora* (samraong). This is both a direct threat to the species concerned (some are Red Listed e.g. *Azelia xylocarpa*, *Dalbergia bariensis* and *D. cochinchinensis*<sup>11</sup> are all IUCN Endangered) and an indirect threat through degradation of habitat (e.g. loss of nest sites, fruit sources and the undisturbed shady understorey required by certain forest species).

It is difficult to quantify this logging accurately without systematic scientific surveys. In the absence of these, records from law enforcement teams indicate the general scale and location of the problem. For example during the twelve months July 2008-June 2009 368 pieces of mostly Luxury grade timber were confiscated and 1667 other stumps and blocks of wood were seen in the forest. As with snaring records, this is believed to be only a fraction of the true number of cases. Figure QQQ shows results from the first systematic survey of logging evidence across the project area, conducted in 2009 as part of a broader survey of human threats. The area patrolled in 2009 is shown for comparison and it is evident that illegal logging is currently occurring at a significant level in all areas, but tends to be reduced somewhat in areas that are patrolled regularly. From this it can be concluded that project activities have some impact on the distribution of logging, but without an increase in patrol effort and coverage illegal logging will likely continue to be a serious threat in all parts of the reserve, even given current levels of the relevant drivers.

Figure QQQ Logging of high value species compared to patrol coverage [QQQ need to clip datasets to survey area to make it meaningful, or perhaps tint unsurveyed areas]

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<sup>11</sup> The Khmer names are beng, neang nuon and kranhoung respectively.



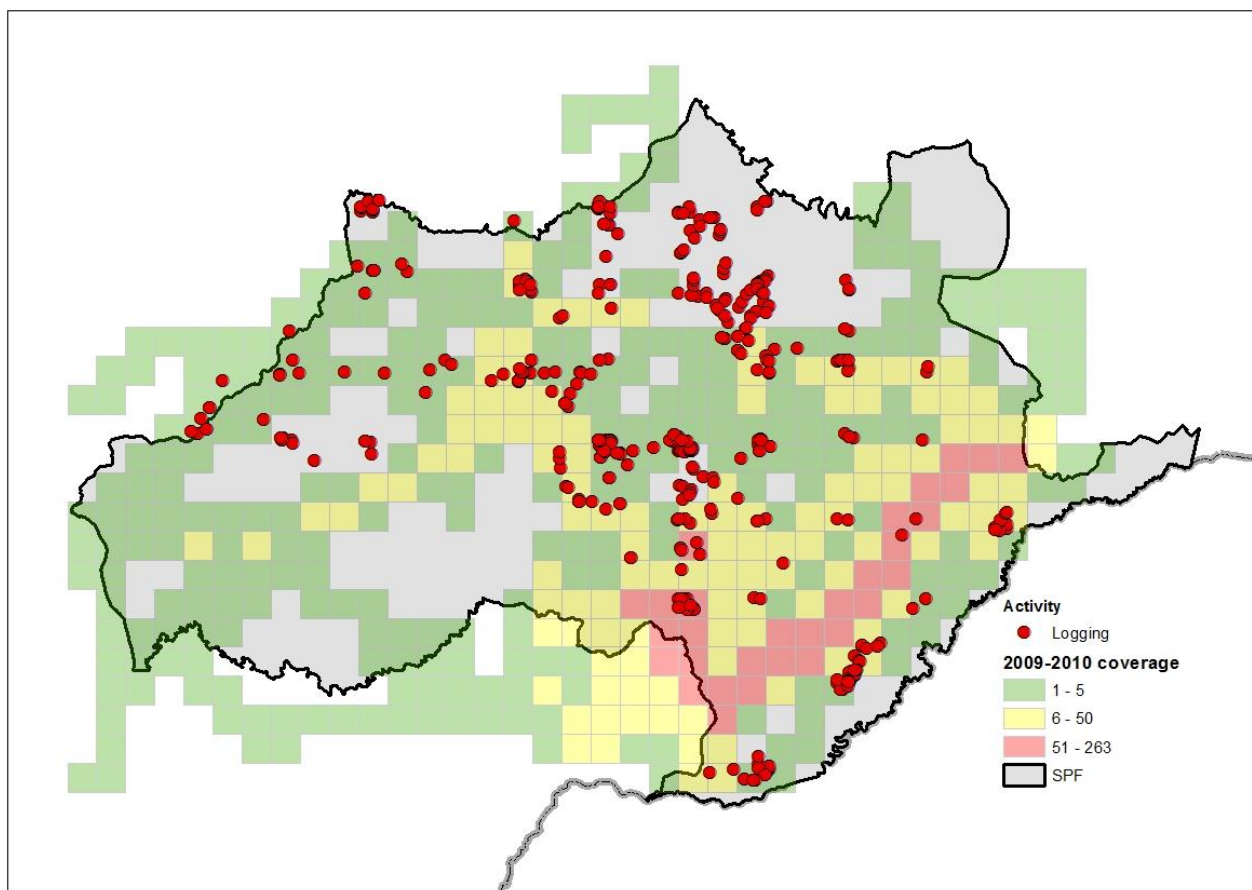
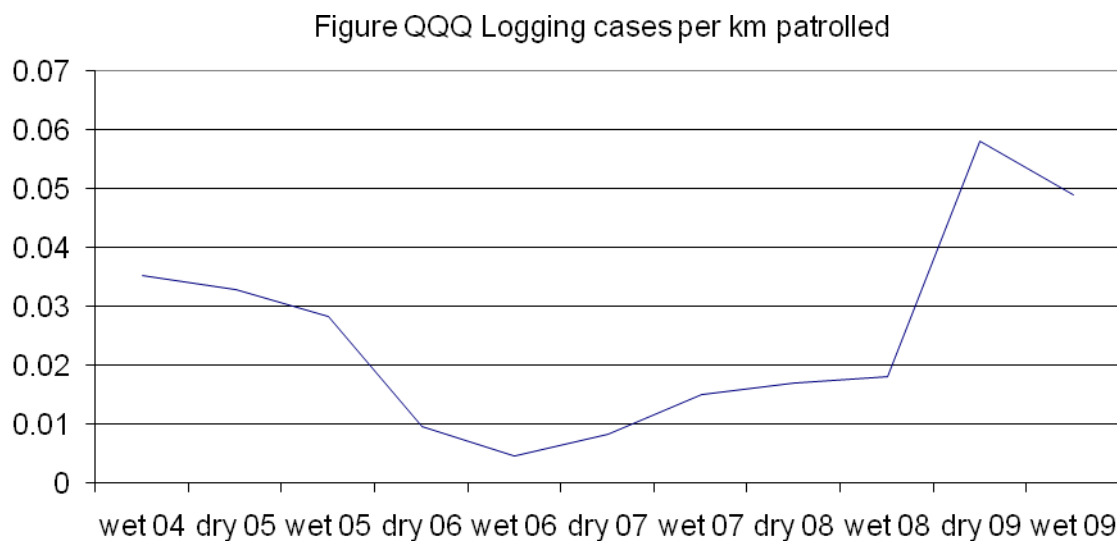


Figure QQQ Trend in detection of logging cases by law enforcement teams



The figure above (XXX) shows the increase in incidences of illegal logging as recorded by patrol teams. These suggest a decline during 2006-2007 followed by a more recent increase. Ranger-based evidence is prone to many confounding factors (Stokes 2010) but other evidence at the site points in the same direction, including the perceptions of law enforcement officers, observations by biological

monitoring staff and market information. Staff believe that logging intensity declined in the early years of the project due to better law enforcement, but rising pressures have caused the intensity to rise again. Prices for the target species have increased dramatically in recent years, with increases ranging from 200-600% over a recent four year period (Table QQQ), as demand has grown in Cambodia and Vietnam. The Cambodian economy continues to grow, and demand for furniture made from expensive wood is increasing, driving further increases in the levels of illegal logging. Hence the without-project scenario predicts that this increasing trend will continue.

Table QQQ Trends in timber prices in the project zone

Local Name	Scientific Name	2005	2009
		Price \$/m <sup>3</sup>	Price \$/m <sup>3</sup>
Beng	<i>Azelia cochinchinensis</i>	\$120.00	\$800.00
Neangnoun	<i>Dalbergia bariensis</i>	\$180.00	\$1,000.00
Koki	<i>Hopea odorata</i>	\$90.00	\$250.00
Choeutealtoeuk	<i>Dipterocarpus alatus</i>	\$80.00	\$250.00
Thnung	<i>Pterocarpus pedatus</i>	\$150.00	\$500.00
KraKah	<i>Sindora cochinchinensis</i>	\$90.00	\$250.00
SoKroam	<i>Xylia dolabriformis</i>	\$80.00	\$250.00
SroLao	<i>Lagerstroemia sp</i>	\$80.00	\$250.00
Doungcheam	<i>Tarrietia javanica</i>	\$100.00	\$250.00

Source: FA/WCS unpublished data

*Threats which are currently thought to be less severe or affect only a subset of species*

*i) Incidental disturbance*

Incidental disturbance is quite high in many sectors of the reserve, due to the large number of people in the forest (conducting both legal and illegal activities) and their tendency to concentrate at scarce water sources which are also critical limiting resources for many wildlife species. This is thought to reduce the suitability of the habitat for shy species such as large carnivores and wild cattle (e.g. U. Karanth pers. comm.). This threat is believed to be increasing due to rising human populations using the project zone.

*ii) Specific threats to vultures*

The two Critically Endangered vultures face several very specific threats across their Cambodian range (Clements *et al.* in prep.). As an indirect impact of over-hunting of wild ungulates they are threatened by scarcity of naturally occurring carrion. As a result of that, most surviving populations in Indochina are now dependent on dying or specially provided domestic animals, and so changes in animal husbandry practices are also significant potential indirect threats. Another indirect threat to vultures is that they often eat poisoned animal carcasses (e.g. poisoned stray dogs, or incidental casualties from fishing with poison; Clements *et al.* in prep.). In the non-project scenario all three of these threats will worsen and vultures will almost certainly be lost from the area.

*iii) Pollution*

Water pollution is not currently known to be a problem in most of the project zone, but data are lacking. It may emerge as a problem, now or in the future, in the intensively farmed areas within and adjacent to Snoul Wildlife Sanctuary. Existing economic land concessions upstream of the SPF may also be causing pollution unnoticed. In the without-project scenario it is predicted that levels of waterborne pollution will increase greatly, due to activities by small holders and concessionaires and upstream actors, and that this will have significant impacts on many aquatic species, most notably top predators such as otters, fish-eagles and predatory fish (ref Corlett possibly? QQQ), as well as terrestrial species that drink from affected sources.

*iv) Invasive species*

Invasive species have not been identified as a threat to date, presumably because the area is remote and habitats are largely intact. However, in the without project scenario increased infrastructure development, human access, habitat degradation, fragmentation and other factors will expose the site to potentially damaging invasives. For example, Giant Mimosa *Mimosa pigra* is a serious problem in the floodplains of the Tonle Sap Basin (van Zalinge 2006), has invaded remote areas of the Mondulkiri Protected Forest along river corridors (T. Evans pers. obs.), and requires expensive control operations in nearby Cat Tien National Park, Vietnam (G. Pollett, pers. comm.). The extent of this threat is hard to predict but it is likely to be significant, and to reduce habitat availability for riverine and static wetland species.

Conclusion - long term prospects for biodiversity in the without-project scenario

The above analysis indicates a worrying long-term future for biodiversity at the site. Threats are already severe and a worsening situation is predicted where threats continue to increase and current levels of conservation action cannot ultimately keep pace. This will lead to increased over-exploitation of forest products, wildlife and fish, increasing levels of deforestation, conversion of non-forest habitats, habitat degradation, and, over time also increasing pollution, human disturbance and competition with invasive species. Current levels of investment in law enforcement, infrastructure, demarcation and other key activities, can apparently prevent the declines of some species (e.g. some primates, Pollard *et al.* 2007, Rawson *et al.* 2009), at least over the area where activities can be funded, and can likely slow the declines of others, but in the without-project scenario eventually many of these species will be lost from the SPF or very severely depleted. An important negative feedback to consider is that, as a reserve loses charismatic flagship species it becomes harder to attract funding and this may lead to accelerated losses. The very low number of recent Tiger records from the reserve has already been linked to the withdrawal of two key donors, whose funding for this flagship species supported conservation efforts benefiting many others, and the carbon stocks in Tiger habitat.

Over the next 30 years, the without-project scenario predicts a QQQ% deforested landscape with the remaining forest fragmented, degraded, significantly disturbed by humans due to easier access and heavily over-hunted, leading to a depauperate fauna and flora lacking most of the species of conservation significance present today, with many of the other species surviving in severely reduced numbers. This results in the 'Empty Forest syndrome', with cascading effects on food webs, pollination, seed dispersal and many of the other ecological functions that maintain a healthy forest (Redford 1992, Corlett 2009). It cannot be predicted exactly which species will be lost or reduced, but it seems likely that all Critically Endangered and Endangered species (see Annex QQQ) will almost certainly be lost, along with many of the Vulnerable species. Some other Vulnerable and most Near-threatened species will probably survive in greatly reduced numbers. Some species will increase, but this will mainly be tolerant, open-country ('weedy') species of little conservation significance. These predictions are highly plausible since similar trends have been observed in many other forested landscapes with a longer history of high pressure across Indochina, including protected areas, especially in Thailand (ref QQQ) and Vietnam (Eleanor Stirling's book?), where threats became severe at an earlier date than in Cambodia. [qqq also cite Corlett, and Phil rounds Resident Forest Birds of Thailand]

## **G3 Project Design and Goals**

### **G3.1 Major Climate, Community and Biodiversity Objectives**

The objectives of the REDD project in the Core Area link directly to the over-arching management objectives of the SPF. These have been framed in varying ways during the evolution of the project, as described below.

Four key targets were set out in the original vision for the SPF, which was developed at a multi-stakeholder workshop in July 2006 (WCS/FA 2006b). This consultation included representatives from all the relevant government agencies, local government, village leaders and civil society. The agreed Vision for the site was: *A well-managed forest landscape that supports increasing wildlife populations and improving livelihoods for the people who currently live there.* At the same meeting a general conceptual model for the project was developed, linking the goal to targets, direct and indirect threats and a set of interventions. This was then used to develop the first three year strategic plan, 2008-2011, the annual workplans and the draft Subdecree. The final version of the Subdecree (passed in 2009) lists nine management objectives, which map closely to the original four targets.

Figure QQQ shows the current conceptual model, which was revised and updated slightly during the design of the REDD project (Figure QQQ) based on the analysis of threats set out in sections G2.3-2.5. The nine objectives of the SPF Subdecree and four high level Targets in the conceptual model (= Objectives) are listed below in relation to the three CCBA themes - climate, community and biodiversity. Section G3.2 discusses the rest of Figure QQQ in more detail. For ease of understanding Annex QQQ also breaks down the conceptual model into five sub models, one relating to each of the four main threats and one addressing climate change.

#### *Climate objectives*

The SPF Subdecree contains the following two relevant objectives.

- 3- To contribute to protection and conservation, to meet the goals of the National Millennium Development Plan of the Royal Government of Cambodia, and to maintain forest cover;
- 7- To maintain carbon stored in vegetation in order to reduce carbon dioxide (CO<sub>2</sub>) emissions into the atmosphere;

Hence the target in the revised conceptual model is: *'Maintain the variety, integrity and extent of all forest types'*

The implication of this is that the deforestation rate should be reduced to zero as soon as achievable in all the main vegetation types of the reserve, and that logging should be reduced to low and sustainable levels. This will cause net emissions from deforestation and forest degradation to drop to zero, which is a core goal of the Seima REDD project.

Increased carbon sequestration from reforestation or assisted natural regeneration is not a major objective of the project. Natural regeneration of deforested land is unlikely in most places since most recently deforested areas have become actively farmed and are likely to remain so. Hence assisted natural regeneration will only be a minor project objective, designed to restore areas that become temporarily unstocked during the project period due to attempted land-grabbing but are not converted to farmland. Some of the forest areas where deforestation is prevented will increase in carbon stock naturally due to recovery from past logging, and in theory this might be eligible for

additional credits, but to reduce project complexity no credits will be claimed for this during the first project period.

#### *Community objectives*

The SPF Subdecree contains the following four relevant objectives.

- 4- To conserve the culture and tradition of indigenous communities and local communities where they are living within the Protection Forest area;
- 5- To maintain the natural resources that these communities depend on for their livelihoods and to implement the program of poverty reduction of the Royal Government of Cambodia;
- 6- To contribute to sustainable socio-economic development through participation in the management of harvesting forest resources by the local communities, development of ecotourism and other similar activities which have very small impact to biological resources, forest and wildlife;
- 8- To prevent soil erosion, to protect soil fertility and to maintain the stability and quality of water sources;

Hence the targets in the revised conceptual model are : *Increase security and productivity of natural resources to support local livelihoods and Sufficient farmland to support the livelihoods of current residents.* Livelihoods are defined to include cultural aspects.

#### *Biodiversity objectives*

The SPF Subdecree contains the following two relevant objectives.

- 1- To protect, conserve and rehabilitate genetic resources of fauna and flora which are globally threatened;
- 2- To maintain and rehabilitate important ecosystems as habitat for all forms of biodiversity;

Hence the target in the revised conceptual model is: *Increase populations of wildlife of conservation concern.*

Based on this, in July 2009 the following statement for the biodiversity objectives of the SPF was drafted by the project team to provide a more specific guide for activity planning: *Threatened species from the Southern Annamites evergreen forests (such as elephants, big cats, Gaur and primates) and Eastern Plains deciduous forests (such as Giant Ibis, Green Peafowl, Banteng and Eld's Deer) will be present in healthy, growing populations in a landscape of great natural beauty.* The project has identified seven target Landscape Species (WCS/FA 2010) which together represent larger suites of biodiversity present in each of the main vegetation types, and also represent species vulnerable to each of the major classes of threat present in the project zone. It is therefore assumed that by ensuring the survival and recovery of these species most or all the other key biodiversity values will also be protected. The seven target species are: Asian Elephant, Banteng, Eld's Deer, Sambar Deer, Yellow-cheeked Crested Gibbon, Tiger and Smooth-coated Otter. Quantified goals have been developed for each of these seven species and these form the basis of the biodiversity monitoring program (Section B1.1 and 3.3).

#### *Other objectives*

The subdecree also contains the following general objective. In practice this will be largely covered by activities addressing the other objectives listed above. Many of the activities listed are included in Sub-objective 5 (see next section).

- 9- To support other activities including technical and scientific research, education, training, community development, and environmental studies which are related to sustainable development and conservation at local, national and international levels.

### *Overview of monitoring framework*

The conceptual model provides a natural hierarchical framework for monitoring. The highest level is the level of targets. If the four targets are met, it is presumed that the goal is also achieved. Indicators are also required for each of the nine major threats. The threats are expected to respond more quickly and more directly to the actions than the targets will, so monitoring threats gives information that is more directly informative for management planning. Table QQQ summarises the monitoring framework derived from the conceptual model.

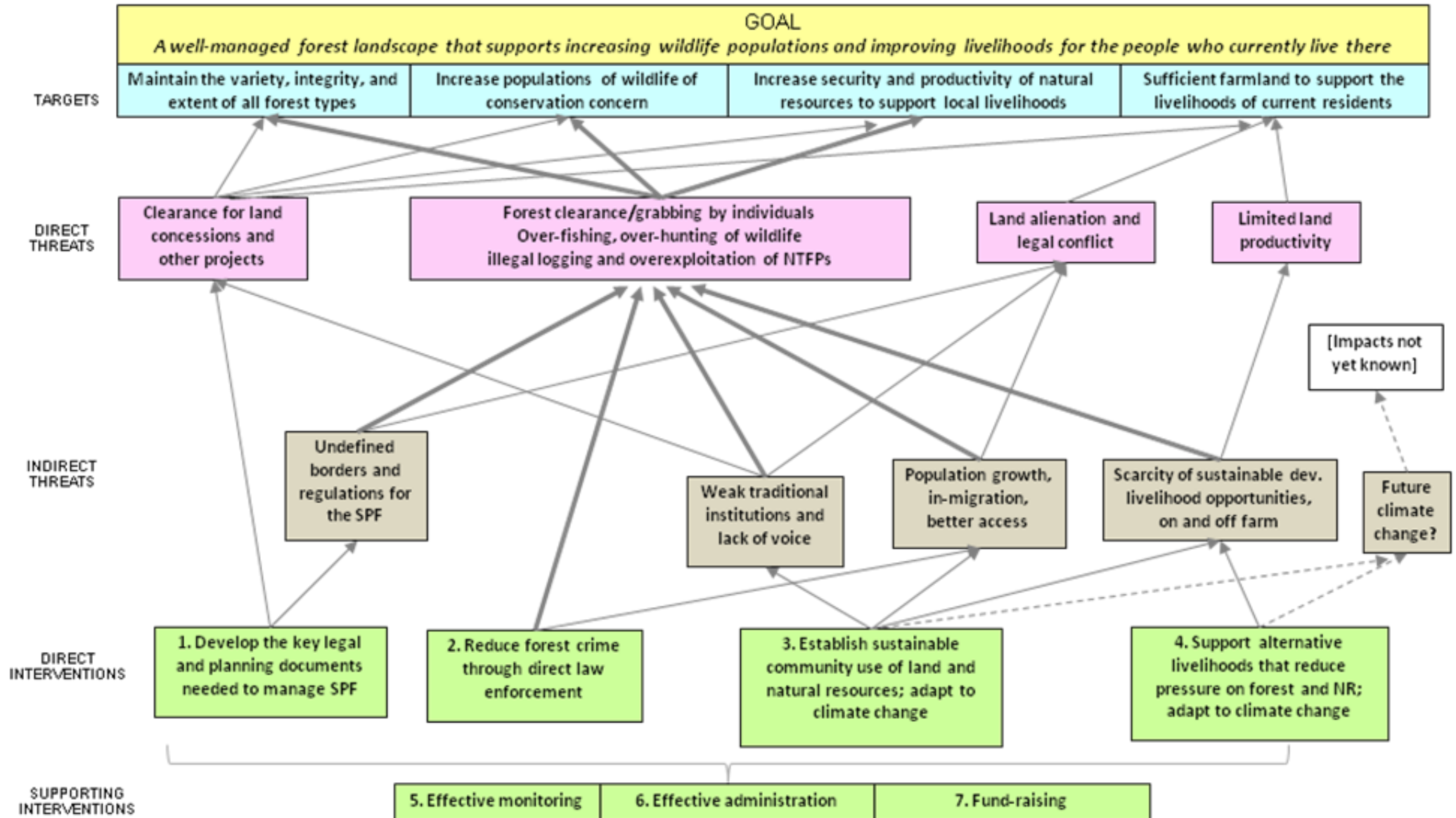
Table QQQ Overview of monitoring framework [add updates from social monitoring survey]

Level	Desired state	Monitoring approach [Section to refer to for further information]
<b>Target</b>		
<b>Maintain the variety, integrity, and extent of all forest types</b>	Zero net loss of any major forest type	Deforestation monitoring as per chosen VCS methodology [CL3]
<b>Increase populations of wildlife of conservation concern</b>	Desired populations for 7 target species	Trends for 7 targets and subsidiary species [B3.3]
<b>Increase security and productivity of natural resources to support local livelihoods</b>	to be defined	Selected NR indicators from overall periodic livelihood survey [CM3]
<b>Sufficient farmland to support the livelihoods of current residents</b>	to be defined	Selected agricultural indicators from periodic overall livelihood survey [CM3]
<b>Threat</b>		
<b>Clearance for land concessions and other projects</b>	No clearance from land concessions or other projects	Observed damage by concessions, mines etc [CL3]
<b>Undefined borders and regulations for the SPF</b>	Fully demarcated borders; agreed zones and regulations	Legal documentation [CL3]
<b>Population growth, in-migration, better access</b>	Population growth lower than in reference area; in-migration negligible; access to forest areas fully controlled	Demographic and road surveys, assessment of access controls [CL3]
<b>Forest clearance/grabbing by individuals; over-fishing, over-hunting of wildlife; illegal logging and overexploitation of NTFPs</b>	Illegal activities (clearance, hunting, over-fishing, hunting, logging, NTFP harvest) at very low levels	MIST LE database and other sources as available [CL3]
<b>Land alienation and legal conflict</b>	Tenure clear and no recent land alienation for all 16 key villages	Community committee situation assessments and legal documentation of tenure [CM3]
<b>Weak traditional institutions and lack of voice</b>	Effective community groups representing all 16 key villages	Community group capacity assessments and evidence of voice [follow MDLF model?] [CM3]
<b>Limited land productivity</b>	??? improving trend in land productivity	TBD - Community committee situation assessments??? periodic yield studies linked to the livelihood monitoring?? [CM3]
<b>Scarcity of sustainable dev. livelihood opportunities, on and off farm</b>	???	??? [CM3]

In addition, activity monitoring will be conducted using indicators set out in the annual workplan.

Figure QQQ Conceptual model for the project

Note: links to one of the key direct threat boxes have been emphasized, for clarity



### G3.2 Major project activities

As shown in Figure QQQ and Annex QQQ, the conceptual model links the four targets to seven groups of interventions, four of them (1-4) direct and three (5-7) supporting. These groups are called Sub-objectives in SPF workplans. They are described below. More detail can be found in Annex QQQ [workplan]

#### Direct interventions

##### **Sub-Objective #1: Key legal and planning documents for the Seima Protection Forest and surrounding landscape are approved and implemented**

- Action #1: Support for sub-decree maintained among senior government and general public
- Action #2: Management plan approved and implemented (including zonation and regulations)
- Action #3: Mondulkiri Provincial Corridors strategy implemented (maintain links to other forests)
- Action #4: Develop partnerships with the private sector (to reduce impacts by companies)
- Action #5: Develop international cross-border dialogue
- Action #6: Adaptive Management system (regular public reviews and workplans)

As shown in Figure QQQ, this group of actions addresses the indirect threat of *weak legal protection and undefined borders and regulations for the site*. Overall legal protection for the site was enhanced early in the project, a management plan with detailed zoning and clear regulations will be consulted upon and approved, provincial-level planning will help maintain connectivity to other forest blocks, and dialogue will be maintained with the private sector and cross-border authorities. Annual public stakeholder meetings and the results of monitoring programs will provide inputs to the production of an annual report and workplan. This will help greatly to reduce the direct threats that arise from *forest clearance/grabbing by individuals, over-fishing, over-hunting of wildlife, illegal logging and overexploitation of NTFPs*. It also addresses the direct threat from *issuance of large scale land concessions* within the project area. By addressing these threats, deforestation will be reduced as will pressure on wildlife populations and other natural resources, bringing benefits to climate, biodiversity and people with forest-dependent livelihoods.

##### **Sub-Objective #2: To reduce forest and wildlife crime by direct law enforcement**

- Action #1: Enforce wildlife, forest and protected area laws and sub-decree through patrols
- Action #2: Establish and implement law enforcement monitoring framework
- Action #3: Ensure sufficient patrol buildings, equipment and staffing
- Action #4: Ensure sufficient patrol personnel capacity
- Action #5: Liaise with Provincial, National and other authorities
- Action #6: Establish Community-based Patrolling and/or monitoring system

This group of actions centres on support to government-led law enforcement teams who conduct direct patrols, legal extension, stakeholder liaison and intelligence-gathering activities. Patrol activity and results are monitored with an advanced but user-friendly computerised system called MIST. Communities are also assisted to conduct some patrols themselves, although this can be challenging given the scale of the threats. As shown in Figure QQQ this group of activities addresses the direct threats that arise from *forest clearance/grabbing by individuals, over-fishing, over-hunting of wildlife, illegal logging and overexploitation of NTFPs* as well as the indirect threat of *illegal immigration*, which in turn will reduce the direct threat of *land alienation and legal conflicts over land*. Addressing these threats will bring benefits for all four of the project's targets.

##### **Sub-Objective #3: Land and resource use by all core zone communities is sustainable**



- Action #1: Form and maintain land-use agreements with communities
- Action #2: Legally register communities and users
- Action #3: Indigenous communal land titling in appropriate communities
- Action #4: Demarcation of the Forest Estate; reforestation of recent clearance
- Action #5: Conduct extension and communication activities
- Action #6: Liaise with Commune Council and other agencies
- Action #7: Engage with civil society organisations operating in the Project area
- Action #8: Ensure the capacity of Project staff is sufficient

This group of actions harnesses the motivation and capacity of community members to address three important indirect threats - *weak traditional institutions and lack of voice; population growth, in-migration and better access; and scarcity of sustainable development livelihood opportunities, on and off farm.* The activities centre on the formation of community groups who are then assisted to develop systems for protection and sustainable use of the resources they depend upon, both forest and land. Some community groups, and some areas of land, can be legally registered to increase their level of protection. Communities are also encouraged to participate in government-led forest boundary demarcation activities. Outreach activities are necessary to ensure the understanding and support of all community, local government and NGO stakeholders. Addressing these indirect threats will significantly reduce the four direct threats - *forest clearance/grabbing by individuals, over-fishing, over-hunting of wildlife, illegal logging and overexploitation of NTFPs; land alienation and legal conflicts over land; issuance of large scale land concessions; and limited land productivity,* supporting efforts to achieve all four of the project targets. The activities will also include climate change adaptation measures, in anticipation of a worsening climate over the longer-term.

#### **Sub-Objective #4: Support for alternative livelihoods that reduce deforestation**

- Action #1: Establish sustainable timber harvests in buffer zone areas
- Action #2: Establish community-based ecotourism
- Action #3: Support agricultural extension activities
- Action #4: Provide infrastructure support linked to conservation activities
- Action #5: Develop NTFP-based livelihood projects
- Action #6: Develop and manage a system to share carbon benefits
- Action #7: Improve literacy and numeracy

This group of actions addresses the indirect threat of *scarcity of sustainable development livelihood opportunities, on and off farm.* Doing so will develop alternative livelihoods that are less dependent on deforestation and NR harvests, reduce two of the key direct threats, *limited land productivity and forest clearance/grabbing by individuals, over-fishing, over-hunting of wildlife, illegal logging and overexploitation of NTFPs* and hence provide benefits for all four of the project targets. The exact alternative livelihoods will vary from village to village depending on opportunities and on the preferences of the local people determined through participatory methods. Agricultural support (including savings groups/micro-credit), small infrastructure projects, literacy/numeracy and the development of benefit-share systems for carbon benefits will be relevant in most villages whereas ecotourism, sustainable timber harvests (in the outer project zone) and NTFP-based projects will be more localised. The activities will also include climate change adaptation measures, in anticipation of a worsening climate over the longer-term. As new options for livelihood development are identified these will be added to the list of actions.

#### Supporting interventions

The remaining groups of actions do not relate directly to specific threats but rather create the enabling conditions for implementation of the four previous groups of actions. The importance of effective administration is self evident. Effective fund-raising includes financial administration of the REDD project and is also important as the baseline scenario for the project assumes that donors will continue to support a certain level of activities through non-carbon funds. The monitoring programs are essential to enable project management to track success, identify weaknesses, take corrective action and communicate with stakeholders in-country; many are also necessary to ensure full reporting in accordance with VCS and CCB requirements.

**Sub-Objective #5: Collect information on long-term ecological and social trends**

Action #1: Monitoring of trends in forest cover

Action #2: Monitoring of key wildlife species

Action #3: Socio-economic and demography monitoring

Action #4: Facilitate research that will benefit the management of the SPF

Action #5: Ensure sufficient staff capacity is available

**Sub-Objective #6: Effective administrative, accounting and logistical procedures are in place**

Action #1: Evaluation and feedback on staff capacity, effectiveness and training needs

Action #2: Develop and maintain effective management, administrative and accounting systems

**Sub-Objective #7: Long-term financial security**

Action #1: Develop and Implement REDD project

Action #2: Continued support of a wide range of donor partners

Action #3: Increase use of commune development funds for project activities

### **G3.3 Location of project activities**

Annex QQQ [workplan] specifies where the individual activities will take place. Essentially the four direct interventions will aim to expand to cover the whole project area and relevant parts of the outer project zone, starting from the current areas of best coverage in the south of the project area. The precise mix of law enforcement, community land-use management and alternative livelihood development will be carefully adjusted to meet the needs of each village.

### **G3.4 Project life time, accounting period and implementation schedule**

The project crediting period began on 1 July 2008 and is planned to continue for 30 years [to be confirmed by RGC - 50 years may be preferable]<sup>12</sup>. The first fixed baseline period will be ten years from 1 July 2008-30 June 2018<sup>13</sup>. Monitoring and verification will be conducted on a 2-3-yearly cycle, at years 3, 5, 7 and 10 (ie 2011, 2013, 2015, 2018). Year 10 will coincide with revision of the baseline and revalidation of the PD.

The project implementation schedule is set out in Annex QQQ [workplan].

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<sup>12</sup> This is consistent with VCS 2007.1 (Section 1 Definitions and Section 5.2.1 Project start date).

<sup>13</sup> This is consistent with the chosen methodology (Section 1.2.3 Starting date and end date of the first fixed baseline period).

### G3.5 Natural and human-induced risks

insert risk tool from VCS

### G3.6 Measures to maintain or enhance High Conservation Values

The project activities outlined in Section G3.2 will all contribute to maintaining or enhancing the HCVs of the project zone. As described above interventions are designed to mitigate both the direct and indirect threats to the project targets. These targets correspond closely to the identified HCVs and no additional activities are planned that manage HCVs alone. A summary of the HCVs and interventions is provided in Table xx below. Greater detail on activities and interventions to manage HCVs are included in the full HCV report (Annex qqq).

**Table qqq: Management interventions to maintain or enhance HCVs in the project zone**

High Conservation Value	Corresponding project targets	Interventions
<i>HCV1: Forest areas containing globally, regionally or nationally significant concentrations of biodiversity values.</i>	Increase populations of wildlife of conservation concern	<ul style="list-style-type: none"> <li>○ Law enforcement activities to reduce hunting &amp; trapping of Globally Threatened and endemic Species</li> <li>○ Law enforcement to reduce conversion of forest and wetland habitats</li> <li>○ Livelihood support activities to improve management for forest resources and reduce hunting pressure</li> </ul>
<i>HCV2: Forest areas containing globally, regionally or nationally significant large landscape level forests.</i>	Maintain the variety, integrity, and extent of all forest types	<ul style="list-style-type: none"> <li>○ Law enforcement to reduce conversion of forest and wetland habitats</li> <li>○ Land-use planning at village, Provincial and National level to reduce conversion and fragmentation of SPF and wider landscape</li> </ul>
<i>HCV3: Forest areas that are in or contain rare, threatened or endangered ecosystems.</i>	Maintain the variety, integrity, and extent of all forest types	<ul style="list-style-type: none"> <li>○ Law enforcement to reduce conversion of forest and wetland habitats</li> <li>○ Land-use planning at village, Provincial and National level to reduce conversion and fragmentation of SPF and wider landscape</li> </ul>

<b>High Conservation Value</b>	<b>Corresponding project targets</b>	<b>Interventions</b>
<i>HCV5: Forest areas fundamental to meeting basic needs of local communities</i>	<p>Increase security and productivity of natural resources to support local livelihoods</p> <p>Maintain the variety, integrity, and extent of all forest types</p>	<ul style="list-style-type: none"> <li>○ Land-use planning at a village level to protect forest resources</li> <li>○ Development of community natural resources management rules to encourage more sustainable use of resources</li> <li>○ Livelihood support activities to reduce the pressure to harvest resources unsustainably.</li> <li>○ Law enforcement to protect forest and aquatic resources from external pressures</li> <li>○ Appropriate zoning of the SPF that recognises NTFP collection and compensates any unreasonable reductions in access</li> </ul>
<i>HCV6: Forest areas critical to local communities' traditional cultural identity</i>	<p>Increase security and productivity of natural resources to support local livelihoods</p> <p>Maintain the variety, integrity, and extent of all forest types</p>	<ul style="list-style-type: none"> <li>○ Village level land-use planning to map and protect spiritual sites</li> <li>○ Law enforcement to protect spiritual sites from outside threats</li> <li>○ Appropriate zoning of the SPF that recognises spiritual sites</li> </ul>

### **G3.7 Measures to maintain and enhance the benefits beyond the project lifetime**

[this section to be finalised. Likely elements:

- establish a trust fund or endowment to capitalise during project lifetime
- ensure robust legal status at project close
- ensure completion of alternative livelihood work to minimise pressures
- develop alternative benefit streams (e.g. tourism, watershed protection etc)
- build social recognition of non-financial values of the reserve (heritage, biodiversity etc)]

### **G3.8 Stakeholder consultation**

[update with results of JICA-sponsored FPIC process]

Consultation with local government and NGO stakeholders has long been a regular part of project activities, with frequent meetings held on a wide variety of issues. In addition to site-level meetings, FA and WCS have also cooperated with WWF and MoE to establish a Provincial Conservation Planning (PCP) Working Group, supported by a full time PCP advisor, which ensures effective communication with Provincial authorities and line agencies (activity reports available upon request /webref?qqq) and allows discussion of issues that affect the whole Eastern Plains landscape. The PCP Working Group and PCP Advisor facilitated a major provincial level awareness raising and consultation event in September 2010 to discuss the REDD aspects of work in SPF (Sopha Sokhun Narong 2010a). WCS also participates in meetings of the provincial NRM NGO Network.

Community consultations take a different approach. The following is a summary of the detailed description of methods given in FA/WCS (2010, 2011) [i.e. consultation framework docs]. The documents describe community consultations methods for the project zone and how they relate to previous consultations and the extensive community program that already exists at the site. The methodology is designed to follow international best practice. The central issue is the need for documentation of Free, Prior and Informed Consent (see Section G5.3), but this must be seen as just one step, building on past project activities, and linked to plans for regular consultations during future project implementation. The planned consultations also provide an opportunity to consult on community views regarding potential project impacts (see Section CM1), improvements to project design (see e.g. Section G3.2), options for a grievance procedure (Section G 3.10), and an assessment of the existence of High Conservation Values in the project area (section G1.8 etc). The consultations will involve a large element of awareness-raising, since the concept of REDD is new to the communities. However, most of the planned project activities are already familiar to villagers, as the REDD project builds on a smaller conservation project already active at the site. Most of the elements of the proposed REDD project have already been the subject of extensive consultations in most of the target villages.

Section 1 of FA/WCS (2010) describes the main parts of the project, in particular the way activities already involve communities and protect their rights. The principles of benefit-sharing in the Seima REDD project are also discussed. Section 2 analyses the main global legal and voluntary standards that the project needs to meet, especially the UN Declaration on the Rights of Indigenous Peoples and the CCBS. Past consultations in Seima since 2002 are briefly described and an analysis is given of the key issues that need to be specifically covered by community consent. The social impact assessment process is described.

Section 3 describes and maps the villages that need to be consulted and reviews the various options for these villages to select representatives that will take part in the consultations. Many villages already have potentially suitable community-based organisations whilst others will have to form new groups. The main capacity constraints for the various stakeholders are outlined.

Section 4 gives a detailed account of the consultation procedures. Teams have been selected, preparatory meetings and training held and communication materials (posters, a project description in booklet form and short video<sup>14</sup>) have been created and tested (Sopha Sokhun Narong 2010a, b, c). The main consultation consists of 3 phases in each village or settlements, one to raise awareness and to review potential project impacts, one to present and discuss the proposed community agreement and one to finalise and sign the agreements. An outline timetable is presented, as well as a checklist list of the key issues that communities need to be aware of before they give their consent, for use by facilitation teams and evaluators. The community agreement is discussed in more detail in Section G5.3. The Phase 1 meetings have been completed in most villages (Sopha Sokhun Narong 2011b) and Phase 2 meetings are now underway.

As part of Phase 2 independent legal advice will be provided by a specialist Cambodian NGO. This will help the villages to decide whether to sign the agreements, and to generate feedback on the levels of awareness and understanding amongst community representatives.

After this major round of consultations, a regular cycle of communication is planned through the life of the project, continuing past practices. This will include liaison meetings with community committees every 1-3 months and an annual gathering of community leaders to review progress

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<sup>14</sup> All available on request.

and workplans. There will also be further specific consultations on landscape wide issues such as zonation, forest use regulations and village-specific issues such as the choice of development support or mapping of village lands.

### **G3.9 CCBA public comment period**

The public comment period will be held after the PD has been submitted to CCB for validation. Public hearings will be hosted by the project proponent to collect feedback from the affected communities, following the model developed in the Oddar Meanchey REDD project<sup>15</sup>.

### **G3.10 Conflict resolution procedures**

A grievance procedure managed by a third-party is required by CCBS. One legally mandated role of the existing Commune Councils in the project zone is to receive complaints from their constituents on issues of any kind and either direct them to the appropriate place or seek to resolve them directly, often by mediating between the affected parties. Hence the Commune Councils in the project zone function as a third party grievance mechanism, and have done so since the beginning of conservation activities in 2002. The project is providing capacity-building to the Commune Councils and logistical support to increase their understanding of the REDD project and their role in performing this function. The FA has committed to this as one element of the formal Community Agreements.

The adequacy of this mechanism will be assessed annually during consultations with community representatives. As the project grows in size and scope, it may be found necessary to develop a project-specific grievance procedure contracted out to another third party (e.g. a local NGO). A framework for this has been drafted, and is available to the project auditors on request.

### **G3.11 Project financing**

[insert summary of project financing spreadsheets]

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[https://s3.amazonaws.com/CCBA/Projects%2FOddar\\_Meanchey\\_REDD\\_Project%2FComments\\_received\\_on\\_Oddar\\_Meanchey\\_REDD\\_Project.pdf](https://s3.amazonaws.com/CCBA/Projects%2FOddar_Meanchey_REDD_Project%2FComments_received_on_Oddar_Meanchey_REDD_Project.pdf)

## G4 Management Capacity and Best Practices

### G4.1 Project Proponents

The primary project proponent is the Royal Government of Cambodia (RGC), represented by Forestry Administration of the Ministry of Agriculture, Forestry and Fisheries (MAFF). The FA is responsible for management of the site including, but not limited to, the following:

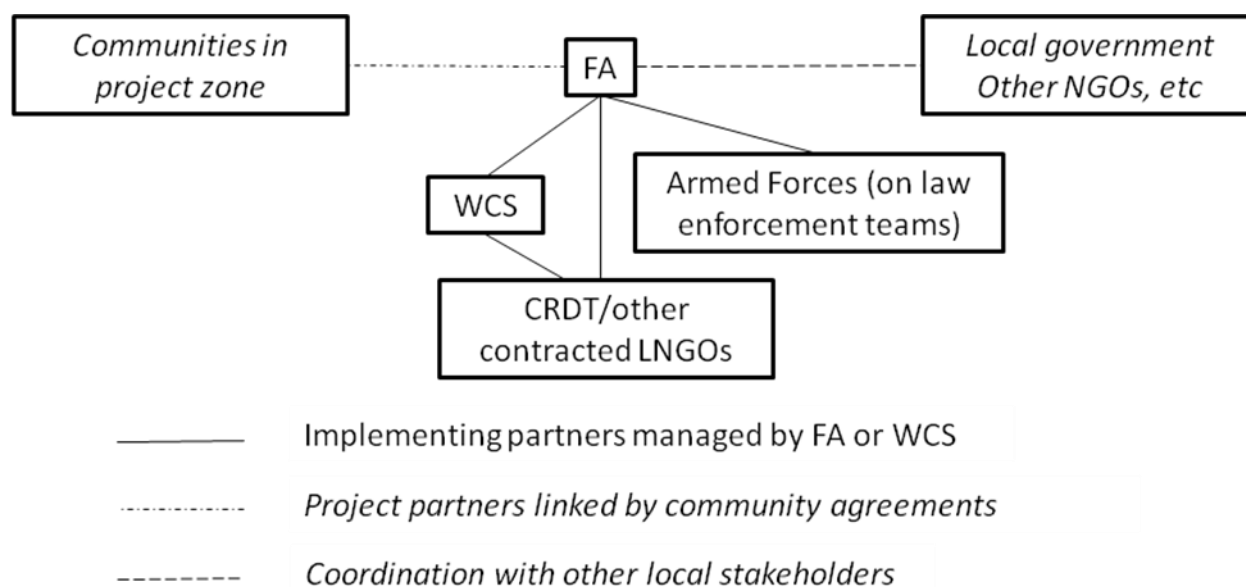
- assignment of staff, including a Protected Forest director, or equivalent
- developing workplans and budgets
- implementation of activities such as law enforcement, community work and demarcation
- oversight of participation by other government agencies such as the armed forces
- coordination with other branches of government
- oversight of involvement of non-governmental organisations

With regard to the REDD project, FA is responsible for

- overall oversight and management (including benefit-sharing frameworks and coordination of partners),
- assignment of key staff including team leaders and managers,
- approval of the PD, workplans and monitoring reports
- implementation of activities in the workplan for which FA is responsible
- coordination of the REDD work with other aspects of PF management

Figure QQQ summarises the relationship of the project proponent to other actors.

Figure QQQ Organogram for the SPF REDD project



The Wildlife Conservation Society Cambodia Program is the lead non-governmental partner. WCS has cooperated with FA at the site since the first wildlife surveys in 2000. WCS works on the REDD project under the terms of a 3-year Project Agreement with MAFF (current term 1/1/2009-31/12/2011; Annex QQQ). Successive three year agreements have been in place since 1999 and are

likely to continue being renewed into the foreseeable future, by mutual consent. Over time it is envisaged that the WCS role will evolve, and the project will come to depend less and less on WCS participation with more and more technical functions being covered by FA staff. Should this agreement be terminated, at the discretion of either party, FA will be responsible for making other arrangements to fill the role played by WCS in the REDD activities.

To the extent possible by available funding and other resources, WCS is responsible for:

- provision of technical advice on all aspects of conservation at the site
- drafting of certain project documents such as the PD, annual reports and REDD verification reports
- management of non-governmental staff associated with the project
- coordination of the inputs of livelihood/development NGOs
- seeking non-REDD funding sources required for business as usual activities

The other principal project participants are local development NGOs (LNGOs) and village-level community-based organisations. The exact LNGO partners will depend on levels of funding and technical requirements of the project, and will vary over the course of the project on the basis of negotiated contracts for service provision. The key partner in the early years of the project will be Cambodia Rural Development Team (CRDT). CRDT has cooperated with FA and WCS at the site since 2005 and during 2008-2010 worked there in part under direct contract to WCS.

CRDT, and other similar LNGO partners, will be responsible for implementing specific alternative livelihood activities, for example the development of sustainable agriculture projects and off-farm livelihood improvement projects. This mainly relates to actions under Sub-objective 4 of the workplan, although CRDT is also involved in some extension (Sub-objective 3, Action 5).

#### G4.2 Technical skills of management team

The project activities listed in section G3.2 require a broad range of skills as set out in Table QQQ.

Table QQQ Key skills required to implement the project

Sub-objective	Key skills required	Main partners
#1: Key legal and planning documents for the Seima Protection Forest and surrounding landscape are approved and implemented	Protected area management planning, coordination with senior government officials, understanding of private sector	FA, WCS
#2: To reduce forest and wildlife crime by direct law enforcement	Implementation of enforcement patrols, monitoring outcomes	FA, WCS
#3: Land and resource use by all core zone communities is sustainable	Participatory land-use planning, implementation of Land Law and Forestry Law, design of natural resource management systems	FA, WCS
#4: Support for alternative livelihoods that reduce deforestation	Promotion of alternative livelihoods (forestry, tourism, agriculture, savings groups, adult education etc)	FA, WCS, CRDT other NGOs
#5: Collect information on long-term ecological and social trends	Scientific monitoring (remote sensing, wildlife and plant species, socio-economics)	FA, WCS,
#6: Effective administrative,	Administration and accounting	FA, WCS



accounting and logistical procedures are in place	systems	
#7: Long-term financial security	Fund-raising from traditional donors, management of REDD activities	FA, WCS, CRDT other NGOs

The implementing organisation and implementing partners had been active in conservation at the site for six years prior to the project start date and already had a well-established core team which is being expanded through an active program of recruitment to achieve the additional activities required for the REDD project. The team draws on the combined strengths of a government agency (FA), an international conservation NGO (WCS) and a number of local development NGOs.

The FA has the legal mandate to manage forest and forest resources in Cambodia, including Protected Forests. It has over 1500 staff, including senior managers and core technical offices in Phnom Penh and a network of local offices extending out to every district.

Senior FA management staff assigned to the SPF REDD project are mainly drawn from the Department of Wildlife and Biodiversity and the Department of Forestry and Community Forestry, with involvement of other technical offices as required. These managers have extensive experience in protected area management, implementation of forestry law enforcement, design of community engagement programs, wildlife monitoring, coordination with other stakeholders and management of large budgets. They also provide training to and coordinate the involvement of officers from the provincial and district branches of the FA, who have skills in matters such as forest estate demarcation, law enforcement, oversight of community forestry and forest tree nurseries, and members of the Royal Cambodian Armed Forces who participate in law enforcement patrols.

WCS has strong institutional capacity to support the work of the project proponent. The Wildlife Conservation Society (WCS), founded in 1895, is an internationally recognized organization dedicated to preserving the Earth's wildlife and wild places. WCS currently oversees a portfolio of more than 500 conservation projects in 60 countries in Asia, Africa, Latin America, and North America. WCS works with national governments, universities, non-governmental organizations (NGOs) and dedicated individuals to increase understanding and awareness of the importance of wildlife through the establishment and strengthening of protected areas.

More recently, WCS has engaged in the development of its carbon for conservation initiative. Currently, WCS is working with communities and governments in 18 landscapes and 14 countries to develop sub-national REDD+ demonstration projects and support the development of national REDD strategies. WCS believes that work at sub-national and national levels should be linked in such a way that national REDD strategies are informed by on-the-ground experience obtained through demonstration projects. WCS only works on sub-national REDD+ demonstration projects in landscapes where we have or plan to have a long-term presence. This long-term presence is a prerequisite to success in order to understand the drivers of deforestation and implement activities that reduce deforestation effectively and ensure permanence with community's consent and participation.

WCS employs various non-government national project staff including expatriate or national technical advisors, field team members, volunteers, and Phnom Penh based technical and administrative personnel. The technical advisors are often resident long term on-site and over the past few years have included at various times Senior Natural Resources Management advisor, a Community and Civil Society Development advisor, a Wildlife and Threats Monitoring advisor and

a Law Enforcement advisor. WCS also has a conservation support team based regionally and at the New York headquarters that provides technical assistance, analysis, training and capacity building to WCS global conservation programs. The conservation support program, established 10 years ago, provides direct technical support in the areas of conservation strategic development, status and impact monitoring, landscape and ecological modelling, education outreach and capacity building.

The mission of CRDT is to improve food security, incomes, and living standards of poor rural communities in support of environmental conservation in Cambodia. CRDT has been active in SPF since 2005 through a small team of community extension workers supported by a core team of highly experienced development practitioners at their head office in adjacent Kratie Province. The team has experience implementing a range of projects in SPF including water/sanitation, agriculture/livestock, savings groups, environmental education and adult literacy.

### G4.3 Capacity building

The core FA/WCS staff team is organised in four main groups, each with distinct training needs and provision, as shown in Table QQQ. In addition to the provision shown, all partner organisations also encourage staff with special potential to pursue further education through day-release or sabbatical arrangements. As shown, most training activities occur on an annual basis, or more frequently, so that new staff can rapidly be inducted. The project has a generally low level of staff turnover, reducing the need for retraining.

Table QQQ Training provision for the main staff groups

Staff group	Training needs	Planned provision
Senior management and technical advisors	Conservation project design, project management and administration	External mentoring through existing WCS and FA systems; short professional training courses, exchange visits, attendance at conferences
Law enforcement team	Patrol techniques, equipment and weapons handling Outcome monitoring methods (e.g. MIST) Human rights and related issues	Annual intensive FA/MoE/WCS joint training courses, including exchange with other sites; on-the-job mentoring from technical advisors, routine MIST refresher trainings, formal training courses provided through existing government systems
Community engagement team	Legal systems, effective communication techniques, technical forestry, forest zoning and indigenous land titling, agricultural development skills	Short-term issues-based professional training courses, provided by technical advisors, senior project staff or external trainers (e.g. other NGOs, government departments)
Monitoring team	Technical and reporting skills relating to measurement of biodiversity, remote sensing and social factors	Annual intensive FA/WCS joint wildlife monitoring training course; personally tailored training for GIS/RS officers; as-needed short term training courses on social measurement techniques

Community members and local authorities also have training needs. Training and awareness raising regarding project goals and procedures is conducted through periodic workshops, usually

connected to a particular activity. This will also be an element of the annual project planning meeting. Technical trainings for community members are also conducted on specific village-level activities, most notably those under Sub-Objective 4 (development of alternative livelihoods). These are conducted on an as-needed basis by the community engagement team or the officers of local NGO partners, and may range on length from an hour to several days depending on the topic being covered. Selected key government officials and community leaders will also benefit from participation in conferences and other training courses.

#### **G4.4 Community employment opportunities**

Most jobs in the project are advertised, either in writing or verbally through our networks at national and local level. The project operates an equal opportunities policy and aims to increase the proportion of locally-recruited staff, female staff and staff from indigenous ethnic minorities wherever possible. An exception is currently made for law enforcement officers due to an observation that there can be increased risks of corruption among officers with strong local family connections; this policy is regularly reviewed. Retention of female staff can be especially difficult given the remote and difficult field conditions.

It is difficult to fill the more senior positions by local recruitment as there are very few local residents who have attained even a basic level of formal education, and almost none who have joined the relevant government technical agencies. However, there is a high proportion of local staff in the more junior levels of the community team, wildlife monitoring team and ancillary staff (administration, cooks, drivers etc). We are committed to identifying junior staff with potential and investing in their professional development, as outlined in Section G4.3. These staff will be promoted to more senior positions as their capacity grows. We often take on promising and motivated but poorly qualified people as interns or volunteers for an initial period, and those who show strong commitment to the work are hired and provided with training.

#### **G4.5 Laws and regulations concerning workers' rights**

FA employees and such are covered by the employment conditions of their host Ministries. These can be assumed to adhere to government law and policies. The government staff are also covered by supplementary contracts with WCS, which gives them additional protections. Most remaining staff are under contract solely with WCS and have the same protections. Therefore this analysis focuses on WCS staffing policies.

WCS Cambodia aims to provide working conditions and a range of benefits to ensure that employees are well provided for and are appropriately supported on matters of health and general welfare. Employer-employee rights and responsibilities are governed by a collection of legal authorities, including:

- the Constitution of the Kingdom of Cambodia;
- the Cambodian Labor Law, 1997;
- Regulations enacted by the Royal Government (Sub-Decrees) and the Ministry of Labor (Ministerial orders, Circulars, and Notices);
- Employment Contracts; and
- WCS's Internal Regulations.

The project meets all and exceeds many of the requirements covering workers’ rights, and conditions and is comparable with the standards of other international conservation NGOs working in Cambodia.

Information regarding workers’ rights and responsibilities is communicated to staff in various formats and on several occasions including:

- During the recruitment process;
- The WCS, Cambodia Personnel Policy which is available to all employees;
- in Individual Employment Contracts;
- at staff meetings; and
- Relevant laws and regulations are available to all staff in the local language.

The following websites provide further detailed information regarding Cambodian laws and regulations covering worker rights:

<http://www.constitution.org/cons/cambodia.htm>

<http://www.bnglegal.com/uploads/reports/Labor%20Law%20Guide%20for%20NGOs.pdf>

<http://www.arbitrationcouncil.org/InformationforParties/LegalDocuments/tabid/72/language/en-US/Default.aspx>

#### **G4.6 Occupational risk, and worker health and safety**

All project staff and counterparts enjoy the protection of WCS Health and Safety policies. Health and safety in the workplace is both an individual and shared responsibility of staff and the employer. WCS is committed to providing a safe working environment for all employees, contractors, volunteers and visitors. Whilst every effort is made to minimize work-related risks, there are inherent risks associated with any fieldwork. Table QQQ lists the risks identified as currently having the highest threat and likelihood at the project site.

Project staff and counterparts receive orientation to identify risks associated with fieldwork, and training is given to minimise the risk of injuries and illness, and to deal with an incident, should it occur. Project staff are expected to exercise due care at all times, to adhere to safe work practices and to follow site-specific safety guidelines (the Health and Safety Standard Operating Procedures, H&S SOPs), including the use of personal protection equipment provided by the project.

Project supervisors are required to continually conduct workplace risk assessments and to address issues regarding risk and risk avoidance at staff briefings. Similarly, as workplace health and safety is a shared responsibility, staff are required to inform project management of unsafe conditions or equipment, illness or injury, for prompt remedial action or treatment.

The project site is equipped with comprehensively stocked first aid kits and project staff have received first aid training, which will be refreshed every 12 months. In the unlikely event of a work-related incident or illness, the project provides health and accident insurance to staff and all expenses will be covered.

Table QQQ Summary risk assessment for project staff to complete

<b>Risk</b>	<b>Who is at risk?</b>	<b>Existing mitigation strategy (please refer to H&amp;S SOPs for more detail)</b>
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Malaria and other mosquito borne diseases	All field staff	Staff are given regular training in the prevention of mosquito borne diseases and to recognise symptoms of malaria and other diseases. Staff are provided with treated mosquito nets and any cost related to testing and treatment is provided by the project.
Vehicle Accidents	All field staff	summarise H&S SOPs
Encounters with potentially dangerous animals, eg. elephants, snakes	All field teams	summarise H&S SOPs
Forest Fires	All field teams	summarise H&S SOPs
Heat stress (Closest non-emergency care is in SenMonorom, 1hr from HQ)	All field teams	summarise H&S SOPs
Tree fall/branch fall	All field teams	Chainsaws available for clearing fallen timber [is this relevant?]
Chainsaw	Driver of mobile teams, monitoring teams	summarise H&S SOPs Experience in use of chainsaw[ training?]
Confrontation with illegal loggers or poachers, or with powerful people	Patrol staff	summarise H&S SOPs Training in safe arrest techniques, weapons handling, avoidance/safe resolution of confrontations with powerful people; decision-making procedures [is other equipment needed?]
Weapons/ammunition used for security by patrol staff	Military police	Training in safe weapons handling

#### G4.7 Financial health of implementing organization

The FA is a legally constituted branch of the Royal Government of Cambodia and as such receives annual allocations from the national budget. Hence its basic financial health and long-term stability are good. The FA lacks adequate operating budget for the maintenance of SPF, and other protected forests under its mandate, and this is one of the key reasons that the SPF REDD project has been developed.

The Wildlife Conservation Society (WCS) was founded in 1895 as the New York Zoological Society. WCS is an internationally recognized not-for profit conservation organization dedicated to preserving the Earth's wildlife and wild landscapes and seascapes. WCS currently oversees a portfolio of more than 500 conservation projects in 60 countries in Asia, Africa, Latin America, and North America. The WCS financial report ending fiscal year 2009 (WCS Annual Report, 2009) demonstrates the financial stability of the organization with operating revenue of USD\$205.4 million. These operating revenue and support exceeded expenditures by USD\$1.5 million, the sixth consecutive year of operating surpluses. The WCS Cambodia program has been operational since 1999 and has a good record of financial health.

## G5 Legal Status and Property Rights

### **G5.1 Relevant national laws and international treaties**

insert relevant section from VCS PD

### **G5.2 Documentation of project approvals**

insert relevant section from VCS PD

### **G5.3 Property rights and Free Prior and Informed Consent**

The key issues relating to property rights and FPIC are analysed in FA/WCS (2010) and summarised here. The legal categories of land ownership are described in Section G1.6.

#### *Property rights*

In the SPF community zones are being mapped around each village. These include residential land, farmland, fallow swiddens, spirit and burial forest but not other types of mature forest. All villages will have their community zones recognised in the SPF management plan, and initially all are classified as State Public Land, since they remain a part of the SPF. The community zones of some ethnic Bunong villages are eligible for special protection in the form of Communal Land Titles<sup>16</sup>. Titled lands and community zones are mostly non-forest but contain some forest carbon, and they often border areas at high risk of deforestation, so they are a natural focus for some activities.

Outside these community zones, local residents also have rights to continue using forest resources in the Permanent Forest Estate (e.g. under Forestry Law Article 40). These rights will also be clarified and confirmed, and eligible users are already in the process of being issued with ID cards on a village by village basis. This will confirm their rights of use and make it easier to exclude illegitimate users, whose activities are often destructive.

These community zones, communal titles and traditional forest use rights provide an excellent framework for forest protection activities and for structuring REDD project activities, including benefit-sharing. Furthermore, REDD funds can be used to strengthen protection of community lands and forest resources from outside threats and develop improved/alternative livelihoods.

A recent national legal analysis found that the ownership of carbon rights under Communal Land Titles 'is a "gray" area of the law that can be clarified in the future after exploring possible options for implementation'<sup>17</sup>. Therefore it was necessary for Seima, as a national pilot project, to propose and test an interpretation of the law that fits local conditions and may be applicable at other sites. The legal review also noted that usually 'Forest resources (and the carbon stored in them) growing on private property are the property of the entity that legally owns the land that the forest resources are growing on' and furthermore that Communal Land Titles give rights almost identical to private

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<sup>16</sup> Issued under Articles 23-28 of the Land Law (2001) and Subdecree 83 (June 2009) Procedures for the registration of land of indigenous communities.

<sup>17</sup> Oberndorf, R. B. (2010, in draft) *REDD+ in the Cambodian Context. An Overview of the Policy, Legal and Governance Frameworks Impacting Implementation*. UNDP Cambodia Office.

ownership<sup>18</sup>. This does not confirm that the carbon in Communal Land title areas is owned by the communities, but it provided the basis for the pilot project to make a proposal regarding the legal rights to carbon in different zones of Seima as follows [FA have confirmed verbally that this interpretation is accepted; final confirmation is pending]:

- 1) On Communal titled land a community owns the carbon rights and could in theory generate and trade carbon credits themselves from this land if they chose (and if they had the relevant permissions). Equally, they can choose whether or not to incorporate the land into the area of the Seima REDD project, or to exclude the land from any REDD project. Land in the process of consideration for title should be given similar status as fully titled land for the purposes of REDD project design<sup>19</sup>.
- 2) Land in SPF used by villages of any ethnicity who do not want or are not eligible for communal title is also not eligible for private title and so will be placed in Community Zones. These remain state land, so the FA can in principle decide whether to include them in a REDD project. However, we propose that community zones should be treated as functionally identical to communally titled land for the purposes of REDD project design. This will ensure equity between villages and simplify project management. Other approaches are likely to cause conflict.
- 3) Forested land outside the community zones is Permanent Forest Estate (State Public Land) and is not owned by any community. However, it is still recommended to hold detailed consultations, obtain relevant consent and to share benefits, so as to ensure social acceptance, project success and use of forest to support poverty alleviation policies. Communities also have traditional use rights to these areas that must be considered in REDD project design.

This analysis results in two easily understood categories of land for REDD - community land and non-community land, with different levels of community rights and different requirements for consultation.

### *Free, Prior and Informed Consent*

In addition to the CCBS, many international policy documents focus on the need to obtain Free, Prior and Informed Consent for a project from affected communities<sup>20</sup>. This includes the UNDRIP, to which Cambodia is a signatory<sup>21</sup>. A useful operation definition of FPIC is provided by UNESCO (2005; quoted in full in FA/WCS 2010). The broadest level of consent covers the decision as to whether the project should proceed in any form. The spirit of the UNDRIP and CCBS implies that consent is required not only from landowners in the project area but also from other traditional users of the area. These villages are identified in Section G1.5. An inclusive definition is used and in the Seima case results in the inclusion of some villages living over 15 km away from the project area itself.

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<sup>18</sup> Land Law 2001 Article 26: '...This collective ownership includes all of the rights and protections of ownership as are enjoyed by private owners. But the community does not have the right to dispose of any collective ownership that is State public property to any person or group...'

<sup>19</sup> Land Law Article 23: '...Prior to their legal status being determined under a law on communities, the groups actually existing at present shall continue to manage their community and immovable property according to their traditional customs and shall be subject to the provisions of this law.'

<sup>20</sup> e.g. UN-REDD (2010) *Operational Guidance: Engagement of Indigenous Peoples and Other Forest Dependent Communities*. FAO/UNDP/UNEP and UNDG (2008) *Guidelines on indigenous peoples' issues*. United Nations Development Group.

<sup>21</sup> [www.un.org/esa/socdev/unpfii/en/declaration.html](http://www.un.org/esa/socdev/unpfii/en/declaration.html)

Specific consent is also required for the main elements of the project. A rights-based analysis of the need for FPIC in different elements of the project is presented in FA/WCS (2010). It shows that there are three fundamental questions that need to be discussed with communities during the PD consultations:

- 1) Each community needs to decide whether or not their communal titled lands or community zones should be included in the REDD project crediting area.
- 2) Each community needs to decide if they want to participate in expanded collaborative conservation activities for forest outside the communally titled areas.
- 3) Each community needs to decide if they agree to the principles of the benefit-sharing arrangements and the process for future negotiations to finalise the system

A detailed consultation process will be followed (Section G3.2). Consultations will result in signed agreements with each community, confirming their consent, specifying what the project entails, (including the principles of benefit-sharing) and setting out the terms of their collaboration with the FA. Great care will be taken to ensure that communities are providing consent in a manner that they are comfortable with, and through representatives that they trust and have chosen themselves.

The current round of consultations and consent agreements is taking place after the formal project start date, July 2008. At that early stage the project team judged that it would have been premature to hold highly formalised consultation leading to signed agreements. This may seem to conflict with the requirement in Version 2 of the CCBS that consent should be prior to project commencement, but starting a project in this gradual way was consistent with the first version of the CCBS, which was then in force, and which had no requirement for FPIC. Furthermore, none of the project activities undertaken in the start-up period of the REDD work prior to the current consent process materially affected any of the rights of the communities involved, and in many cases these activities were highly beneficial. Many of the key activities and achievements during this period (for example the improvements in land-titling, the increased attempts to address illegal logging, the registration of traditional family rights to harvest products and the efforts to prevent parts of the site being issued as Economic Land Concessions or sold to illegal in-migrants) were identified by communities as priorities in the consultation processes mentioned in the previous paragraphs. Such activities often involved village-level consent processes. Crucially, no credits will be issued nor contracts signed with any potential buyers until the framework community agreements that document the level of consent have been signed. In sum this approach, and the commitment to regular consultations through the life of the project, is fully consistent with the intent of FPIC requirements.

#### **G5.4 Involuntary relocations**

The project anticipates no involuntary relocations of legitimate occupants of the area from either residential land or farmland. However, illegal settlers or land grabbers attempting to occupy state or community land will be arrested by the relevant authorities and removed without compensation, and possibly prosecuted, in accordance with the law.

In general the project will impose no restrictions on customary use of forest resources beyond the basic legal requirements for sustainable practices, and in many cases will improve security of access and the status of these resources. However, the project is expected to propose some restrictions on customary use rights in areas to be designated as Strict Protection Zones, SPZs, (provisional title) which will be areas of zero or near zero human use, designed to improve the survival prospects of



the most vulnerable wildlife species (part of Action 1.2, Section G3.2). The size and location of the proposed SPZs has yet to be decided, but they will be placed to minimise the number of forest users affected. Restriction of use falls within the CCBS definition of 'relocation', but this will not be an involuntary process. Designation of such zones will be preceded by detailed consultations and consent process with potentially affected villages, identification of affected individuals/families and the negotiation of mutually acceptable compensation packages, which might include, but would not be limited to, employment opportunities, in-kind compensation (e.g. alternative livelihoods) or financial compensation (e.g. substituting the value of any resin tree income foregone).

### **G 5.5 Impact of illegal activities**

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### **G5.6 Clear, uncontested title to the carbon rights**

An analysis of the ownership of carbon rights is set out in Section G5.3, based on Oberndorf (2010). There are two categories:

- 1) Over the great majority of the project area carbon ownership rests with the FA on behalf of the RGC. [insert supporting references]
- 2) In Community Zones and potential Community Zone areas the ownership of the carbon rights is best assigned to the relevant community, and this is particularly so in areas titled, or eligible to be titled, as Indigenous Communal land. In these cases, the FA will sign carbon agreements with each village. These will entrust any carbon credits generated on community land within the project area to the FA for aggregation and sale. The agreement will also outline the process for benefit-sharing on the proceeds from these sales.

No land will be included in the project area that is not covered by one of these two categories.

***Climate Section***

***CL1 Net Positive Climate Impacts***

insert relevant section from VCS PD

***CL2 Offsite Climate Impact ('leakage')***

insert relevant section from VCS PD

***CL3 Climate Impact Monitoring***

insert relevant section from VCS PD

## Community Section

### ***CM1 Net Positive Community Impacts***

#### **CM1.1 Impact of project activities on communities**

The project has been designed so as to maximise the positive impacts on communities and minimise the negative ones, seeking to ensure a net positive impact for all stakeholder groups. Two main sources of guidance have been adopted for this process - the Akwé:Kon guidelines (CBD 2004) and the Manual for Social Impact Assessment of Land-based Carbon Projects Version 1.0 (CCBA *et al.* 2010). The latter source in particular provides a structured way to assess both positive and negative impacts in a format consistent with the CCB approach.

The expected positive impacts of the project are set out in sections G3.1 and G3.2, using a conceptual model ('theory of change') to make the links and assumptions clear, as recommended by CCBA *et al.* (2010).

A theory of change approach is not recommended for assessing negative impacts. Rather it is recommended to conduct multi-stakeholder assessments, reviewing each element of the project in turn and assessing its likely impacts on each stakeholder group. In the Seima REDD Project we developed a preliminary impact assessment within the project team, and then consulted widely on this with local stakeholders, incorporating most of these discussions into the awareness raising stage for the consultation described in this document. Table QQQ shows the preliminary impact assessment as it stood after consultation with a large group of community leaders at a workshop on 8 November 2011 (Sopha Sokhun Narong 2010c). It takes account of the expected baseline (no-project) trends in community well-being (Section G2.4).

Table QQQ Preliminary assessment of impacts on onsite community stakeholders

	Expected positive impacts	Potential negative impacts	Most vulnerable stakeholders	Assessment and mitigation of threats
<b>Sub-Objective #1: Key legal and planning documents for the Seima Protection Forest and surrounding landscape are approved and implemented</b>				
Action #1: Support for sub-decree maintained among senior levels of government and general public	recognition and protection of traditional/existing livelihoods, reduced risk from concessions, infrastructure, migration etc, improved status of key natural resources, REDD finance for livelihood improvement	<b>restriction of development options</b>	poorest, women, IP	in fact there is no significant restriction on options for community development beyond those in national law  mitigation of any possible restriction of options comes from increased investment in alternative and improved livelihoods
Action #2: Management plan approved and implemented (including zonation and regulations)	clearer definition of existing rights and responsibilities, strengthen capacity of FA to implement activities/manage threats, improved status of key natural resources	<b>zonation will exclude traditional harvest activities in certain areas (to be defined through consultation)</b>	IP, forest-dependent Kh users	this is best considered voluntary displacement of customary uses,; further FPIC will be sought for this step, risks will be countered by careful design and piloting, compensation for resin tree users, targeted provision of alternative livelihoods
Action #3: Mondulkiri Provincial Corridors strategy implemented (maintaining links to other forests)	increased involvement of provincial authorities in supporting SPF management and controlling threats	none	-	
Action #4: Develop partnerships with the private sector (to reduce impacts by companies)	reduced negative impacts from company activities	none	-	
Action #5: Develop international cross-border dialogue	reduced cross-border impacts (esp logging, illegal hunting)	none	-	
Action #6: Adaptive Management system (regular public reviews and workplans)	SPF management responds to changes in community needs/attitudes	undue representation of certain groups	-	structured, balanced forum for participation
<b>Sub-Objective #2: To reduce forest and wildlife crime by direct law enforcement</b>				

Action #1: Enforce wildlife, forest and protected area laws and sub-decree through patrols	effective control and deterrence of illegal activities by outsiders and community members; improved security of land and forest resources; improved general law and order situation	<b>inappropriate prevention of legal uses, selective enforcement, over-harsh punishment, unclear rules</b>	IP, poor Kh users	legal awareness, monitoring, training, enforcement strategies, demarcation/regulations, grievance system, regular staff reviews, strong responses to any corruption found
Action #2: Establish and implement law enforcement monitoring framework	increased effectiveness of Action#1	<b>physical risks to informants from criminals</b>	non-powerful people	voluntary participation, incentives not enough to motivate undue personal risk taking, confidentiality rules, adaptive management, grievance system
Action #3: Ensure sufficient patrol buildings, equipment and staffing	increased effectiveness of Action#1	buildings on community land		obtain community approval before building or seek other locations
Action #4: Ensure sufficient patrol personnel capacity	increased effectiveness of Action#1	none	-	
Action #5: Liaise with Provincial, National and other authorities	increased effectiveness of Action#1	none	-	
Action #6: Establish Community-based Patrolling and/or monitoring system	additional control and deterrence of illegal activities by outsiders and community members; improved security of land and forest resources; improved general law and order situation; jobs for community members	<b>risk from offenders; conflict within community; legal liability</b>	IP, poor Kh users	manage through community groups; voluntary participation, participatory approaches; coordinate with local government; adaptive management; develop cautiously to resolve legal issues
<b>Sub-Objective #3: Land and resource use by all core zone communities is sustainable</b>				
Action #1: Form and maintain land-use agreements with communities	increase tenure security, improve management of threats, build community cooperation/strengthen traditional systems and cultural norms	<b>communities allocated too little land; process causes/revives conflicts or changes social dynamics; marginalised groups not accounted for</b>	IP, poor Kh users	participatory process, safeguards for all village members; grievance process; local gov. oversight
Action #2: Legally register communities and users	increase tenure security, improve management of threats, build community cooperation/strengthen traditional systems and cultural norms	<b>CBO formation gives too much power to some groups; individual registration excludes some users unfairly</b>	IP, poor Kh users	participatory process (= national process for ICC, local process for user cards), safeguards for all village members; grievance process; local gov oversight

Action #3: Indigenous land titling in appropriate communities	further increase tenure security and define boundaries of carbon ownership	<b>communities allocated too little land; process causes/revives conflicts or changes social dynamics; marginalised groups not accounted for</b>	IP, poor Kh users	participatory process, safeguards for all village members; grievance process; local gov oversight
Action #4: Demarcation of the Forest Estate; reforestation of recent clearance	improve management of threats, clarify extent of rights (reduce risk of conflict with the law); reforestation sequesters carbon, increases supply of forest products/biodiversity and	<b>communities allocated too little land; process causes/revives conflicts or changes social dynamics; marginalised groups not accounted for; reforestation in wrong areas</b>	IP, poor Kh users	participatory process (see WCS/FA/MoE 2009), safeguards for all village members; grievance process; local gov oversight
Action #5: Conduct extension and communication activities	support all other activities	none	-	
Action #6: Liaise with Commune Council and other agencies	support all other activities	none	-	
Action #7: Engage with civil society organisations operating in the Project area	support all other activities	none	-	
Action #8: Ensure the capacity of Project staff is sufficient	support all other activities	none	-	
<b>Sub-Objective #4: Support for alternative livelihoods that reduce deforestation</b>				
Action #1: Establish sustainable timber harvests in buffer zone areas	bring forest under sustainable management, control threats, alternative and improved livelihoods	<b>damage from logging, corruption/social conflict, inequitable benefit-sharing; business liabilities</b>	IP, women, elderly	FA approval of management plan/ESIA; financial safeguards; participatory approach, oversight by local authorities
Action #2: Establish community-based ecotourism	alternative and improved livelihoods; incentives to change behaviour and control threats	<b>environmental and social impacts from tourists, corruption/social conflict, inequitable benefit-sharing; business liabilities</b>	IP, women, elderly	environmental screening/monitoring; code of conduct for tourists and agents; participatory approach, oversight by local authorities

Action #3: Support agricultural extension activities	alternative and improved livelihoods, incentives to change behaviour and control threats	<b>inequitable benefit-sharing, corruption</b>	IP, women, elderly	participatory approach, oversight by local authorities
Action #4: Provide infrastructure support linked to conservation activities	alternative and improved livelihoods, incentives to change behaviour and control threats	<b>inequitable benefit-sharing, corruption</b>	IP, women, elderly	participatory approach, oversight by local authorities
Action #5: Develop NTFP-based livelihood projects	bring forest under sustainable management, control threats, alternative and improved livelihoods	<b>over-harvest, corruption/social conflict, inequitable benefit-sharing; business liabilities</b>	IP, women, elderly	FA approval of management plan/ESIA; participatory approach, oversight by local authorities
Action #6: Develop and manage a system to share carbon benefits	alternative and improved livelihoods, incentives to change behaviour	<b>corruption/social conflict, inequitable benefit-sharing</b>	IP, women, elderly	participatory approach, oversight by local and national authorities
Action #7: Improve literacy and numeracy	increase capacity to participate in other activities; increase off-farm livelihood opportunities	inequitable benefit-sharing	IP, women, elderly	participatory approach, oversight by local authorities
<b>Sub-Objective #5: Collect information on long-term ecological and social trends</b>				
Action #1: Monitoring of trends in forest cover	assess threats, measure success	none		
Action #2: Monitoring of key wildlife species	assess threats, measure success	none		
Action #3: Socio-economic and demography monitoring	assess threats, measure success/negative impacts	none		
Action #4: Facilitate research that will benefit the management of the SPF	inform adaptive management	unethical research		ensure ethical review by source institution
Action #5: Ensure sufficient staff capacity is available	support other activities	none		
<b>Sub-Objective #6: Effective administrative, accounting and logistical procedures are in place</b>				
Action #1: Evaluation and feedback on staff capacity, effectiveness and training needs	support other activities	none		
Action #2: Develop and maintain effective management, administrative and accounting systems	support other activities	none		

<b>Sub-Objective #7: Long-term financial security</b>				
Action #1: Develop and Implement REDD project	ensure documentation, consent and approvals to allow sale of carbon credits	covered elsewhere		
Action #2: Establish Eastern Plains Trust Fund	ensure transparent long-term sustainable management of funds	none		
Action #3: Continued support of a wide range of donor partners	maintain funding for baseline levels of protection	none		
Action #4: Increase use of commune development funds for project activities	reduce need for external funding	none		system already has many safeguards



### CM1.2 Impact on social High Conservation Values (HCVs 5 & 6)

As described above (section xx) the identified HCVs correspond closely to the overall project targets. The interventions outlined in sections XX, xx and xx are designed to have a net positive impact on local communities (see section xx). The positive impacts of project activities are described in full in the HCV assessment report (annex qq) and are summarised in table x below.

**Table xx: Positive impacts of project activities on social HCVs**

<b>High Conservation Value</b>	<b>Corresponding project targets</b>	<b>Positive impacts</b>
<i>HCV5: Forest areas fundamental to meeting basic needs of local communities</i>	<p>Increase security and productivity of natural resources to support local livelihoods</p> <p>Maintain the variety, integrity, and extent of all forest types</p>	<ul style="list-style-type: none"> <li>○ Productivity of critically important NTFPs (including fisheries) is maintained</li> <li>○ Security of resources and access to resources increased.</li> <li>○ Extent of productive forest maintained.</li> </ul>
<i>HCV6: Forest areas critical to local communities' traditional cultural identity</i>	<p>Increase security and productivity of natural resources to support local livelihoods</p> <p>Maintain the variety, integrity, and extent of all forest types</p>	<ul style="list-style-type: none"> <li>○ All spiritual sites protected.</li> </ul>

## ***CM2 Offsite Stakeholder Impacts***

### **CM2.1 Potential negative offsite stakeholder impacts of project activities**

### **CM2.2 Project plans to mitigate negative offsite social and economic impacts**

### **CM2.3 Impact on other stakeholder groups**

Relatively easy section. To complete.

### CM3 Community Impact Monitoring

#### CM3.1 Preliminary community impact monitoring plan

Section G3.1 gives an overview of the project monitoring framework. Table QQQ repeats and expands those elements most relevant to positive community impacts. Negative community impacts from project activities are discussed below. Monitoring of some other relevant threats such as forest crime is described in Section CL3.

Table QQQ Major monitoring indicators relevant to positive community impacts

Level	Desired state	Monitoring approach
<b>Target</b>		
<b>Increase security and productivity of natural resources to support local livelihoods</b>	To be defined	Selected NR indicators from overall periodic livelihood survey
<b>Sufficient farmland to support the livelihoods of current residents</b>	To be defined	Selected agricultural indicators from periodic overall livelihood survey
<b>Threat</b>		
<b>Land alienation and legal conflict</b>	No recent land alienation and tenure clear for all 16 key villages	Community committee situation assessments and legal documentation of tenure
<b>Weak traditional institutions and lack of voice</b>	Effective community groups representing all 16 key villages	Community group capacity assessments and evidence of voice [follow MDLF model]
<b>Limited land productivity</b>	To be defined	To be defined. Potentially includes participatory situation assessments and quantitative yield studies linked to the agricultural assistance program
<b>Scarcity of sustainable dev. livelihood opportunities, on and off farm</b>	To be defined	To be defined. Potentially includes participatory situation assessments and quantitative yield studies linked to the alternative livelihoods program

The indicators in Table QQQ will be monitored using two main systems with different levels of investment and different periodicity. Other systems may also be added as needed following elaboration of the full monitoring plan (see Section CM3.3).

*Annual participatory situation assessments* will be conducted with each key community and a selection of the other user villages, working mainly with the committees but also the community members. These assessments will mainly be qualitative, and will provide information on the four threats listed, as well as perceptions of progress towards the two broader targets. Simple PRA tools will be developed to allow these data to be collected objectively and efficiently by project staff or partner LNGOs.

*Periodic quantitative livelihood surveys.* At appropriate intervals a statistically robust survey will be conducted of livelihoods in the 16 key villages, modelled on the first baseline survey conducted in 2006-7 (which covered 15 of the villages) but refined and updated to take account of changes in project design and possibly also new analytical tools such as the Basic Needs Survey approach (CCBA *et al.* 2010). This will provide information on trends in a wide range of indicators, many of them selected with inputs from community members, including the levels of income from various sources and the levels of capital under the five headings of the Sustainable Livelihoods Framework. These will be compared with other quantitative sources (such as the Department of Planning's Commune Database and ad hoc surveys by other organisations) to build up a multi-dimensional

picture of the status of livelihoods in the area. If the project decides to seek certification under the CCB Gold standard for community benefits then this survey will provide useful disaggregated information on the livelihoods of the poorest members of the communities.

These two monitoring systems will be supplemented by monitoring of the impacts of specific livelihood interventions, which will also provide disaggregated information on the socio-economic status of the beneficiaries.

### *Monitoring negative community impacts*

Potential negative impacts of project activities have been identified using a participatory process as set out in Section CM1.1. The best way to monitor whether or not these have been effectively mitigated will be through the annual participatory situation assessments mentioned above. These will be structured to allow an activity-by-activity review of issues. Supplementary information will be obtained from issues raised and documented during the many other meetings between project staff and local stakeholders each year, and through cases handled by the grievance procedure.

### **CM3.2 Monitoring of social High Conservation Values**

Monitoring of social HCVs is described in more detail in the full HCV assessment report (annex x).

The identified social HCVs will be monitored as part of the overall socio-economic monitoring program (see Section CM3.1). In addition to this however other aspects of the project monitoring and evaluation framework will be used to monitor some of the social values, as set out in Section CL3.

Remote sensing systems used to monitor general land use change will be used to monitor disturbance to spirit forest areas (HCV6). This information will be supplemented with data gathered by law enforcement teams, and managed by the MIST database. This system will provide information on disturbance to spiritual sites (HCV6), for example illegal fishing methods used in spirit pools, or logging of spirit forest (HCV6). Data from MIST will also be used to monitor illegal logging of resin trees, illegal fishing methods and unsustainable harvesting of bamboo (HCV5).

Annual meetings will be held with key community representatives to review project activities, impact and progress. The meetings will include consultation on the communities' perception of the condition of HCVs, and potentially the identification of new HCVs or HCV areas.

### **CM3.3 Community impact monitoring plan**

Within 12 months of validation a full monitoring program will be put in place, using the framework set out in Section CM3.1 and building on existing systems. Three principal activities are required:

- a participatory reassessment of the indicators chosen in the 2006/7 baseline survey, and other existing frameworks such as the database of community based organisations put in place during the 2007-2010<sup>22</sup>

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<sup>22</sup> As part of the Civil Society and Pro-Poor Marketing project.

- expert input on the options to apply newly developed tools such as the Basic Needs Assessment
- a comprehensive resurvey using the updated methods, and analysis of trends to data

It is feasible to conduct these three activities during the 2011/12 dry season, before, during or shortly after the validation of this PD.

## Biodiversity Section

### B1 Net Positive Biodiversity Impacts

#### B1.1 Impact of project activities on biodiversity

South-east Asia has seen major losses of biodiversity in the last 40 years (Schipper *et al* 2008, Sodhi *et al* 2010) and this project aims to reverse that trend for a site of acknowledged international importance. As described in the project objectives (Section G3.2) the project aims to secure stable or increasing populations of all species of conservation concern (species listed in table qqq). This will be achieved by reducing the threats outlined in Section G2.5.

No negative effect on biodiversity in the project area is anticipated from any project activities.

The key threats that need to be addressed to bring net benefits for biodiversity are habitat loss (forest and lowland wetlands/grasslands), hunting in all its forms, and selective logging and over-harvest of plant NTFPs (Section G2.5). These main threats, along with others listed in Section G2.5, will be addressed by a suite of activities set out in Section G3.2. Table xx below outlines which activities mitigate these threats, and the positive impacts that will result from the successful implementation of each intervention, whilst the following text summarises efforts in relation to each threat.

**Table xxx: Positive biodiversity impacts of project activities**

Project action	Threats addressed (major threats underlined)	Positive impacts
<b>Sub-Objective #1: Key legal and planning documents for the Seima Protection Forest and surrounding landscape are approved and implemented</b>		
Action #1: Support for sub-decree maintained among senior government and general public	All. Especially important in controlling <u>habitat loss</u>	<ul style="list-style-type: none"> <li>o Recognition of the importance of the SPF.</li> <li>o Maintenance of natural habitats</li> <li>o Deterrence of large-scale external threats</li> </ul>
Action #2: Management plan approved and implemented (including zonation and regulations)	All.	<ul style="list-style-type: none"> <li>o Stabilised land-use by residents will protect natural habitats</li> <li>o Clarified regulations for forest use will reduce damaging activities</li> <li>o Areas of strict protection identified and managed appropriately, leading to reduced disturbance to wildlife populations and optimal hunting controls. These will create source areas for the entire landscape.</li> </ul>
Action #3: Mondulkiri Provincial Corridors strategy implemented (maintain links to other forests)	<u>Habitat loss</u> and fragmentation in the wider landscape	<ul style="list-style-type: none"> <li>o Protection of the wider landscape will help conserve species that range widely through the area, for example Asian Elephants, Tigers and vultures</li> </ul>
Action #4: Develop partnerships with the private sector (to reduce impacts by companies)	<u>Hunting, habitat loss, illegal logging, incidental disturbance, pollution</u>	<ul style="list-style-type: none"> <li>o Reduced impact from industrial activities in the landscape will minimise disturbance to the SPF. Key aspects that will be controlled are hunting and trapping by company staff, illegal logging, and pollution</li> </ul>

Project action	Threats addressed (major threats underlined)	Positive impacts
<b>Sub-Objective #2: To reduce forest and wildlife crime by direct law enforcement</b>		
Action #1: Enforce wildlife, forest and protected area laws and sub-decree through patrols	<u>Hunting, habitat loss, illegal logging and over-harvest of NTFPs</u>	<ul style="list-style-type: none"> <li>○ The key strategy to protect biodiversity.</li> <li>○ Will protect biodiversity from direct exploitation and disturbance leading to increasing or stable populations of species and protection of threatened ecosystems</li> </ul>
Action #2: Establish and implement law enforcement monitoring framework	<u>Hunting, habitat loss, illegal logging and over-harvest of NTFPs</u>	<ul style="list-style-type: none"> <li>○ Monitoring of law enforcement impacts will enable the project to track effectiveness and improve practices if necessary. This will ensure that efforts adapt to changing threats, and protection of species and habitat is maintained</li> </ul>
Action #3: Ensure sufficient patrol buildings, equipment and staffing and Action #4: Ensure sufficient patrol personnel capacity	<u>All</u>	<ul style="list-style-type: none"> <li>○ Sufficient staff and resources are available leading to improved effectiveness of enforcement efforts and increased protection of species and habitat against all threats</li> </ul>
Action #5: Liaise with Provincial, National and other authorities	<u>All</u>	<ul style="list-style-type: none"> <li>○ Coordination will improve effectiveness, for example in processing criminal cases and for addressing threats such as wildlife trade that extent beyond the borders of the project zone</li> </ul>
Action #6: Establish Community-based Patrolling and/or monitoring system	<u>Hunting, habitat loss, illegal logging and over-harvest of NTFPs, incidental disturbance</u>	<ul style="list-style-type: none"> <li>○ Community-based patrolling will increase community support for activities and increase protection efforts further, ensuring continued protection of species and habitat</li> </ul>
<b>Sub-Objective #3: Land and resource use by all core zone communities is sustainable</b>		
Action #1: Form and maintain land-use agreements with communities	<u>Habitat loss, illegal logging, over harvesting of NTFPs, incidental disturbance</u>	<ul style="list-style-type: none"> <li>○ Agreements will stabilise land-use and reduce conversion of natural habitats, especially critical areas such as grasslands and wetlands important to large waterbirds, and Eld's Deer, bamboo groves used by elephants and salt-licks used by ungulates.</li> <li>○ Agreements allow for the improved management of forest resources thus controlling over-harvesting and minimising habitat disturbance.</li> </ul>
Action #4: Demarcation of the Forest Estate; reforestation of recent clearance	<u>Habitat loss</u>	<ul style="list-style-type: none"> <li>○ Clarification of the forest boundary will reduce forest conversion thus protecting natural habitats</li> </ul>
Action #5: Conduct extension and communication activities	All	<ul style="list-style-type: none"> <li>○ Increased awareness of forest laws, and the impact of activities on the forest and wildlife will lead to changes in attitude and behaviour. Increased compliance with the laws will reduce pressures on species and ecosystems</li> </ul>

Project action	Threats addressed (major threats underlined)	Positive impacts
<b>Sub-Objective #4: Support for alternative livelihoods that reduce deforestation</b>		
Action #1: Establish sustainable timber harvests in buffer zone areas	<u>Illegal logging, over harvesting of NTFPs, incidental disturbance</u>	<ul style="list-style-type: none"> <li>○ A sustainable, small-scale logging enterprise will provide a legal source of timber, thus reducing illegal logging.</li> <li>○ Income generation from the legal activities will reduce the need for local communities to engage in destructive activities such as hunting, illegal logging and the conversion of forest to cash crops.</li> </ul>
Action #2: Establish community-based ecotourism	<u>Habitat loss, illegal logging, over harvesting of NTFPs</u>	<ul style="list-style-type: none"> <li>○ Income generation from the legal activities will reduce the need for local communities to engage in destructive activities such as hunting, illegal logging and the conversion of forest to cash crops</li> <li>○ Tourism links income to forest and species conservation, providing a direct incentive for local residents to protect species and habitats</li> </ul>
Action #3: Support agricultural extension activities	<u>Habitat loss</u>	<ul style="list-style-type: none"> <li>○ Improved agricultural productivity and diversity will stabilise land-use, thus reducing habitat conversion.</li> <li>○ Cash income from farming will reduce the need for local communities to engage in destructive activities such as hunting, illegal logging</li> </ul>
Action #5: Develop NTFP-based livelihood projects	<u>Over harvesting of NTFPs</u>	<ul style="list-style-type: none"> <li>○ Improved NTFP management will lead to more sustainable harvesting and reduced habitat disturbance.</li> </ul>

The key activities that will address deforestation are: the development of key legal and policy documents for the project zone, including a comprehensive management plan and zonation and; and active enforcement of Cambodia's forestry, fisheries and land laws. Forest habitats will be protected from illegal logging by law enforcement. Wetland habitats are especially threatened throughout Asia (Bezuijen *et al* 2008) and particular effort will be made to protect rivers and forest pools throughout the Project Area. Protecting such wetlands for conversion is vitally important for several highly threatened species including Giant and White-shouldered Ibis, White-winged Duck, and freshwater turtle species. Permanent pools also serve as vital dry season water sources for large mammals and their protection is essential for the recovery of a number of ungulates such as Banteng, Elephant and Eld's Deer. The enabling environment to support the application of these activities will be improved through community engagement to enhance land-use patterns and reduce pressures on forest resources.

Control of hunting will primarily be by patrolling of key habitats and areas known to be under threat from hunting and trapping. This will act as a deterrent to hunters who fear arrest or loss of equipment, and the confiscation and removal of snares, weapons and other hunting equipment will directly reduce pressures on all species.

Illegal and unsustainable collection of wildlife and fish will be controlled through enforcement of laws and SPF regulations. Plant resources (timber and NTFPs) will be harvested sustainably and in accordance to Cambodian law and agreements between the SPF management and local



communities. Enforcement of these agreements will be by law enforcement teams and self-regulation by community institutions.

Several more minor threats have been identified (section G2.5). These threats are currently having a relatively low impact on the biodiversity of the area, or only affect a few species.

*Incidental disturbance* will be reduced as a secondary effect of other management activities. Livelihood support and law enforcement efforts will reduce the total number of people accessing the forest by excluding illegal users and increasing the amount of time people spend on non-forest livelihoods. In addition zonation will create strict protection areas where human disturbance will be minimised. This will reduce disturbance a key sites such as dry season water sources and mineral licks enabling key species such as ungulates to survive through seasonal stresses.

*Specific threats to vultures* from reduced food sources will be addressed through the use of 'vulture restaurants'. These provide supplementary food in the form of slaughtered domestic cattle and have proved to be a successful strategy in other parts of Cambodia (WCS *et al* 2004). Accidental poisonings will be mitigated as part of a nationwide program to raise awareness on the appropriate use of agro-chemicals. These methods will increase the suitability of the project zone for vultures and should see their return to the area, and aid the recovery of the species globally.

The main project strategy to address the threat of *increasing pollution*, especially of freshwater ecosystems, is engaging with private sector developments as they arise in the landscape. Project staff and partners will engage with the private sector and relevant government line agencies to encourage leading-edge and best practices in plantation development and mining. Key strategies that will be encouraged are the maintenance of riparian corridors of natural habitats and reduced use of agro-chemicals in plantations, and the application of the recommendations of the International Council on Mining and Metals and the Australian Enduring Values framework (ICMM 2006, MCA 2004). Agricultural assistance with local communities will also promote the minimisation of pesticide use and adherence to good practices where use is unavoidable.

*Invasive species* are dealt with in section B1.3 below.

The main net benefits for biodiversity from these activities will be the protection of globally threatened ecosystems and the recovery of populations of species of conservation concern. The outcomes for the seven target species to be attained by 2020 are included in QQQ in the supporting materials and summarised (with slight modifications to take account of new information) in Table QQQ. Since these are umbrella species, achieving the target states should result in benefits for a great many other threatened species and habitats, as listed QQQ in the supporting materials. Most of these species are predicted to be lost or severely reduced in the project zone without project activities (Section G2.5).

**Table xx: Proposed species targets\***

Species	Measure	Species target (to 2020)
Asian Elephant	Population size	Increase to 180 individuals
Banteng	Population density	Increase to 475 individuals
Sambar	Population density	Increase to 1000 individuals [unfeasible by 2020?]
Eld's Deer	Population density	Growing population
Yellow-cheeked Crested Gibbon	Population density	Increase to 1 group/km <sup>2</sup> in suitable habitat [unfeasible by 2020?]
Tiger	Population size	Growing population [unfeasible by 2020]

Species	Measure	Species target (to 2020)
Smooth-coated Otter	Extent of occurrence	Stable or expanding extent of occurrence

\* the targets represent preliminary proposed targets. The final targets are being developed in consultation with relevant species experts

### B1.2 Impact of project activities on ecological High Conservation Values (HCV1-4)

As described above (section G1.7) the identified HCVs correspond closely to the overall project targets. The interventions outlined in sections XX, xx and xx are designed to have a net positive impact on biodiversity (see section xx). The positive impacts of project activities are described in full in the HCV assessment report (annex qqj) and are summarised in table x below.

**Table xx: Positive impacts of project activities on ecological HCVs**

High Conservation Value	Corresponding project targets	Positive impacts
HCV 1: Significant concentrations of biodiversity values	Increase populations of wildlife of conservation concern	<ul style="list-style-type: none"> <li>o Increasing or stable populations of all Globally Threatened, and endemic species</li> </ul>
HCV 2: Landscape level forests	Maintain the variety, integrity, and extent of all forest types	<ul style="list-style-type: none"> <li>o Maintenance of large intact forest areas.</li> <li>o Maintained connectivity with wider forest landscape</li> </ul>
HCV 3: Threatened ecosystems	Maintain the variety, integrity, and extent of all forest types	<ul style="list-style-type: none"> <li>o Deforestation rates reduced to 0%.</li> <li>o Conversion of wetlands and natural grasslands halted</li> </ul>

### B1.3 Project activities and invasive species

The project does not envisage any problems with invasive species if habitat protection measures are successful. No project activities are planned that might increase the potential for problem invasive species.

Some potentially invasive species are present in the project area but none appear to impacting severely on natural ecosystems, and probably will not unless habitats become highly fragmented and degraded as in the without-project scenario. For example, various *Mimosa* species occur in anthropogenically disturbed sites such as farm and road edges, but have not spread into natural forest. *Chromolaena odorata* is found on road edges and in regenerating vegetation along old logging roads, however it also does not appear to be spreading into natural forest. Qualitative monitoring of the regeneration of abandoned roads will track the recovery of these areas to check that non-natives do not impede natural regeneration.

### B1.4 Project activities and non-native species

The project will not involve the use of non-native species except possibly on a very small scale, for ornamental purposes. Some non-native tree species (notably *Accacia mangium*) were planted as ornamentals prior to the start of project activities, but none have been planted in the project area since 2006. Any assisted regeneration or re-forestation activities in the project area will use native species which are readily available from local FA nurseries (for example *Dipterocarpus alatus* and *Hopea odorata*) or from seeds collected in the project area.

### B1.5 Project activities and GMOs

No Genetically Modified Organisms are currently used in the Project Zone, as far as is known. GMOs will not be used in any project activities. The use of GMOs on farms in the Project Zone will

be strongly discouraged, and will not be supported by REDD-funded agricultural assistance projects.

## **B2 Offsite Biodiversity Impacts**

### **B2.1 Potential negative offsite biodiversity impacts**

The project has identified potential negative offsite biodiversity impacts by reviewing the threats to biodiversity in Cambodia, and predicting how project activities may affect these outside the project zone. These issues have been discussed with stakeholders working in other parts of eastern Cambodia, including those working in areas that may potentially be affected.

Various offsite impacts could potentially occur. The most severe threat to the site is deforestation for small-holder farms or plantation development. Control of deforestation in the project zone could lead to deforestation elsewhere leading to negative impacts on forest biodiversity elsewhere. The issues of deforestation leakage are covered in section XXX, and will not be dealt with further in this section.

The control of the other threats to biodiversity listed in section G2.5 could potentially lead to them being displaced to other parts of the project zone, or elsewhere in the country. Hunting and trapping of high value species, for example trophy species such as Banteng, Sambar and Eld's Deer, species for traditional medicine (eg Pygmy Loris) or bushmeat could all theoretically be displaced. Similarly illegal collection of forest resources (NTFPs, and fish) may be displaced. Finally, it is possible that illegal logging of high-value species, and for domestic use, could be displaced to other forest areas in Cambodia.

### **B2.2 Mitigation of negative offsite biodiversity impacts**

Most of the potential negative offsite impacts will be avoided or mitigated through several approaches at different scales. These are part of overall project activities as listed in section G3.2.

Some offsite impacts of hunting and logging will be managed by working with government and non-government partners across the landscape to support conservation activities beyond the project zone (Sub-objective #1: Actions #3, #4, #5; and Sub-objective #2: Action #5). Phnom Prich Wildlife Sanctuary (PPWS) and Mondulkiri Protection Forest (MPF) are the sites of long-running conservation programs by the World Wildlife Fund Cambodia program (WWF), in collaboration with Ministry of Environment and FA. WCS has collaborated with WWF in forming a Mondulkiri Provincial Conservation Planning Unit. This unit (and a similar one planned for Kratie) works with Provincial departments and Governors offices to improve land planning decisions and to support the management of protected areas. A coordinated approach at the provincial level will minimise the possibility that improved protection of the project area will simply displace pressures to neighbouring protected areas. The SPF project team also works closely with MoE, FA and WWF staff to share information on threats, and methods to mitigate them.

The project will work with local residents to improve natural-resource management patterns and alternative income sources (Sub-objectives #3 and #4). Therefore many practices that have negative impacts on biodiversity will not be displaced, but rather they will be replaced with alternative options. For example, in the bamboo-rich areas of Sre Khtum commune the project will work with village groups to develop bamboo management strategies to enhance the sustainability of harvesting and minimise the pressure to over-harvest, or harvest bamboo in neighbouring areas (Sub-objective #4: Action #5). Similar resource-use plans will be developed for all villages in the project area where key resources are being over-harvested. These will enhance the sustainability of vital subsistence activities such as collection of forest foods, and fishing and reduce the need to collect these commodities beyond the project zone. Similarly livelihood support work (Sub-objective #4: Action #1, 2, 3) will provide alternative sources of income and reduce levels of hunting

for food or income, or the over-exploitation of other forest resources. Livelihood development is supported by a program in literacy and numeracy (Sub-objective #4: Action #7). Acquisition of functional literacy is a crucial step in the process of improved livelihoods and alleviation of poverty for the residents of the project zone. Without these basic, foundational skills, making any sustainable improvements in livelihood skills or attendant knowledge is far more difficult.

The project is not committing to achieve net conservation benefits for Luxury grade timber species at risk from illegal logging, other than protecting habitat in which future regeneration may be possible from the stock of immature trees. The with-project emissions scenario conservatively assumes that most stocks of these highly sought-after species in SPF will eventually be cut, despite the best efforts of the project, because the level of pressure is so intense in relation to the law enforcement effort that is feasible. If some success is achieved in preventing cutting of these species, net benefits will probably occur since these species are now economically extirpated from many, perhaps most other areas in North-east Cambodia and there is little scope for leakage.

### **B2.3 Demonstration of net positive biodiversity impacts**

The predicted positive biodiversity impacts of the project will far outweigh any potential unmitigated negative offsite impacts.

It may not be possible to control all offsite negative impacts. Within Cambodia and neighboring countries there continues to be high demand for wildlife products including meat, trophies and parts thought to have medicinal properties (Ashwell & Walston 2008). Control of hunting in the project zone cannot be accompanied by a nationwide reduction in demand given the resources of the proposed REDD project. It is also beyond the scope of the project to improve management and protection of conservation areas throughout Cambodia. Hence it is possible that cessation of hunting of high-value species in the project zone will lead to some increased pressure on other, less well protected populations.

Any unmitigated negative offsite impacts are however likely to be more than compensated for by the positive biodiversity benefits within the project zone. Most forest areas beyond the SPF and neighboring protected areas have been heavily hunted and logged during the last few decades (Loucks et al 2009). The biodiversity values of these areas are now severely degraded. Most of the threatened wildlife species (such as elephants, Sambar, large carnivores, large waterbirds) have been extirpated from these forests. Many of the high-value species (eg Sambar, Banteng, Gaur, Serow) are now restricted to a few highly reduced populations in the most remote or well protected areas.

Any displacement of subsistence hunting and trapping activities from the SPF will therefore largely be to areas of less value for biodiversity. The populations of key species, such as Banteng, Gaur, and Elephant in the project zone are amongst the largest in the country, and are of regional or global importance. The complete protection of globally important populations of endangered species within the project zone will lead to the recovery of these populations to much higher population levels, approaching carrying capacity for the habitat (Table QQQ). These population recoveries, and their ability to seed the repopulation of neighboring areas (should management improve there) form a very significant positive biodiversity impact of the project. These benefits will offset any possible marginal increase in the hunting of already very small (and probably doomed) populations of these species beyond the project zone.

The same general argument can be made for the protection of the rare non-forest habitats in the project area, and over-harvested NTFPs.

### **B3 Biodiversity Impact Monitoring**

#### **B3.1 and B 3.2 Initial biodiversity monitoring plans**

Initial monitoring plans are not required as a full monitoring plan has been developed (Section B3.3).

#### **B3.3 Comprehensive biodiversity monitoring plan**

A comprehensive biodiversity monitoring plan is already in place in the project zone. Development of this program began in 2002 (Clements 2003) and is now one of the largest and most robust in south-east Asia (O'Kelly and Nut Menghor 2010). It is based around the concept of landscape species (Sanderson *et al.* 2002b), which then become the conservation target species whose status indicates overall ecosystem health. Seven target species have been selected for SPF (WCS/FA 2010 and Section B1.1 of this document). Regular monitoring is conducted of the target species and the principal threats that they face (as set out in Section G3.1). Monitoring of the target species is set out below, and threat monitoring in section QQQ.

The monitoring of target species where possible employs absolute measures rather than relative indices, to ensure accurate and precise data. These data are used to assess the effectiveness of project activities and whether the project is meeting its overall conservation objectives. In addition some qualitative data are collected to provide supplementary information. A summary of the main measures and methods used is provided in table QQ. Full documentation of the monitoring of target species is supplied in annex XXX.

**Table QQ: Summary of target species monitoring methods used in the Seima Protection Forest**

Species	Measure	Quantitative method	Qualitative method	Frequency	Note
Asian Elephant	Population size	Fecal DNA capture-recapture	Camera-trapping, presence of signs; threat data	Fecal DNA: every c.5 years. Others: ongoing	
Banteng	Population Density	Distance sampling on line transects	Camera-trapping, presence of signs, threat data	Distance sampling: every 1-2 years. Others: ongoing.	
Sambar	Population Density	Distance sampling on line transects	Camera-trapping, presence of signs, threat data	Distance sampling: every 1-2 years. Others: ongoing.	

Species	Measure	Quantitative method	Qualitative method	Frequency	Note
Eld's Deer	Population Density	Distance sampling on line transects	Camera-trapping, presence of signs, opportunistic observations, threat data	Distance sampling: every 1-2 years. Others: ongoing.	As of 2010 densities are very low. Insufficient encounters are currently obtained for distance sampling. Qualitative methods are currently the main source of information
Yellow-cheeked Crested Gibbon	Population Density	Distance sampling. Line transects	Opportunistic observations incl. calls, threat data	Distance sampling: every 1-2 years. Others: ongoing.	
Tiger	Population size	Fecal DNA & camera trapping	Camera-trapping, presence of signs, threat data	Fecal DNA: periodic. Others: ongoing, based on reports	As of 2010 densities are very low; when numbers recover a measure of population size will be used
Smooth-coated Otter	Presence	To be determined	Camera-trapping, presence of signs, threat data	Periodic. Full protocol to be determined	Quantitative methods for monitoring the otter population have not yet been formulated. When suitable methods have been developed they will be used

Four main methods are used to monitor the conservation targets and other species of conservation concern: Line transects, fecal DNA capture-recapture, camera-trapping, and opportunistic observations/studies.

#### Line transects

Distance sampling on line transects is recognised internationally as one of the most robust and appropriate methods for measuring the absolute density of wildlife populations (Thomas *et al* 2010). The method is based on standardised repeat walks along a network of transects. All observations with target species are recorded, noting the distance to the individual, and the bearing from the observer. These data are used by the program DISTANCE to calculate absolute densities.

A network of 40, 4km transects has been placed systematically (with a random start) across the whole of the project area (map xx). Each dry season, every transect is walked ten times, five times in the morning, starting at first light, and five times in the hours before dusk. Thus the total annual survey effort is 1,600km. This survey effort is a compromise between obtaining enough encounters with low density species, and the logistical constraints imposed by access to remote transects, and the relatively small number of skilled staff.

Line transects are used to monitor the population densities of several target species: Banteng, Sambar, Yellow-cheeked Crested Gibbon and potentially Eld's Deer. In addition to these species however data are also collected on several other species. This has two main purposes:

1. it enables the project to monitor the populations of other species of conservation concern as they are either Globally Threatened, or they are key large carnivore prey; and
2. it allows the project to assess the assumptions of the choice of *landscape species*, ie whether the target species are representative of other species.

The additional species monitored using line transects are:

- Gaur
- Red Muntjac
- Wild Pig
- Black-shanked Douc
- Germain's Silvered-langur
- Long-tailed Macaque
- Stump-tailed Macaque
- Pig-tailed Macaque
- Green Peafowl

#### Fecal DNA capture-recapture

Fecal DNA is currently used to monitor the population of Asian Elephants in the project area. When numbers recover, this method will also be used to monitor the population of Tigers. This method uses DNA extracted from small samples of fecal matter to identify individual animals. A survey design involving repeat collection of samples throughout a season enables a population estimate to be calculated based on standard capture-recapture methods. This is an approved method under the CITES MIKE monitoring protocols (Hedges and Lawson 2007) and was used to estimate the elephant population of the SPF in 2006 (Pollard *et al* 2008). Due to the slow rate of population growth of Asian Elephants it has not been deemed necessary to carry out this survey annually. After consultation with the WCS Global Species Coordinator for Asian Elephant (S Hedges *in litt*) it was decided to apply this technique approximately every five years. Routine monitoring of illegal killings provides an early warning system for potential population declines. SPF is a designated site under the CITES Monitoring of Illegal Killing of Elephants (MIKE) program and follows the MIKE protocols.

DNA samples extracted from scat will be used to determine a minimum population size for Tigers in the project area. If sufficient samples can be collected then capture-recapture methods can also be used to estimate total population size. The same technique may potentially be applicable for otters.

#### Camera-trapping

Camera-traps are used to confirm the continued presence of target species, and to gain information on the presence of other species of conservation concern. Camera-traps are set at points of interest, for example mineral licks, water sources or areas with animal signs. All photos are examined to identify the species present, number of individuals, and if possible sex and age of the animal. This



qualitative method is used to understand more about the distribution of target species (particularly Asian Elephant, Banteng, Sambar, Smooth-coated Otter and Tiger) and their use of key sites. The presence of calves in photos is evidence that breeding is successful. This method also provides information on other species, most notably carnivores and ungulates. Generally camera-traps are set:

- at mineral licks to monitor their use by ungulates (Bussey *et al* 2005);
- if signs of large cats are located camera-traps are set to confirm what species is present;
- at otter spraint sites to confirm the species, and understand more about their distribution.

Camera-trapping can be used systematically to obtain density estimates of species for which individual identification is possible. When numbers have recovered sufficiently such a capture-recapture methodology will be used to monitor the population density of Tigers.

#### Opportunistic records and studies

Notable records of all species encountered in the project zone are documented, whether or not they were collected during formal structured surveys such as transects. Records of observations, signs (tracks and dung), and calls are collated from monitoring team members, project staff and visiting researchers and bird tour groups. For highly vocal species, such as Yellow-cheeked Crested Gibbons, Green Peafowl and Germain's Peacock Pheasant call records are a particularly important source of information (Evans and Clements 2004, UEA 2006).

For the target species these records and studies can be used to supplement the routine quantitative methods and enhance understanding of species presence and distribution. They can help to alert project managers to possible changes in population size, ranging behaviour, altered group sizes and other factors that may indicate changed threat levels and call for more detailed study. For some species which occur at low density, or in specific habitats (eg Eld's Deer and Smooth-coated Otter) these data, together with camera-trap records, are the best form of monitoring available at present. Although they do not provide absolute measures of varying population size over time, they do confirm the continued presence of target species in each sector and also help to identify areas of critical importance. For example records of tracks, and occasional observations of Eld's Deer reveal that they are currently to be found only in the west of the project zone, in areas of very open deciduous dipterocarp forest with large natural grasslands.

From time to time selected species will also be the subject of focused studies by visiting researchers facilitated by the project (e.g. two PhD students are currently seeking funds for in-depth work on Green Peafowl and Germain's Silvered Langur). These are clearly very valuable in clarifying threats and establishing baselines and methodologies for additional species monitoring programs in the future.

#### Monitoring impacts outside the project area

Impacts of project activities outside the project area are monitored through regular communication with villages using the outer project zone and collaboration with government agencies and NGOs working in neighboring areas (MoE, FA and WWF in Cambodia, Bu Gia Map NP in Vietnam). These agencies carry out biodiversity and threats monitoring activities. Data and results of biodiversity monitoring are shared by all of these partners. This information will indicate whether there is reason to suspect displaced negative impacts on the most significant concentrations of biodiversity adjacent to the project zone (primarily the buffer zones of SPF itself, and Phnom Prich WS).

### Timing and logistics

The biodiversity monitoring team is led by staff from the Department of Wildlife and Biodiversity of the FA. The team leader has many years experience and training in the field methods employed. The field team consists of team leaders employed by WCS how have been recruited from Cambodia's leading universities, and local high schools. The teams are assisted by local residents employed by WCS who are intimately familiar with the forest and its wildlife. The whole biodiversity monitoring program is assisted by a technical advisor from WCS and also draws on assistance from other highly experienced WCS scientists.

Refresher training courses on all monitoring methods are held annually before any field data collecting is carried out (e.g. cite some training reports QQQ). All staff participate in the training, regardless of previous experience.

Monitoring cycles are shown in Table QQQ. Quantitative monitoring methods are carried out in the dry season (December to May) when access to all areas of the forest is possible. Qualitative data are collected on an ad hoc basis. Camera-trapping efforts are highest in the dry season but also take place in the wet season. Incidental records of species are collated year-round and reviewed annually during production of the SPF annual report.

### Reporting and dissemination of results

All biodiversity data are stored in a dedicated MS Access database maintained by WCS. Data extracted from the database are used for Distance sampling, capture-recapture modeling, and mapping species presence.

Results of the biodiversity monitoring activities are presented in annual biodiversity reports (eg O'Kelly and Nut Menghor 2010). These present the quantitative results for targets species where possible, including population trends, as well as any qualitative results obtained that year. Results of qualitative methods for selected species are also presented, including maps of records. These results are included in the SPF annual reports where they are reviewed against annual and longer-term project targets (FA/WCS 2010, FA/WCS in prep.). The annual biodiversity monitoring and project reports are shared with all project partners, and posted on the WCS Cambodia website ([www.wcscambodia.org](http://www.wcscambodia.org)). In addition the annual results are presented to project staff and partners (local government, line agencies, and civil society) at annual planning meetings.

The results are also prepared for presentation at conferences, gray-literature reports, and peer-review journals (eg Clements et al 2008, Pollard et al 2007, O'Kelly et al in prep)

### Monitoring of HCVs 1-3

The monitoring of HCVs is outlined in more detail in the HCV assessment report (annex xxx).

Monitoring of biodiversity HCVs is carried out as part of the overall project monitoring framework as outlined in this document (see above, and sections XX and XX). These methods are suitable for assessing whether the project activities maintain or enhance the HCVs. A summary of the methods used to monitor the values is provided in table xx.

**Table xx: Methods used for monitoring High Conservation Values 1-3 in the Seima Protection Forest**

High Conservation Value	Indicators	Monitoring Method
HCV 1: Significant concentrations of biodiversity values	Target species; Other threatened, and/or endemic species (eg Black-shanked Douc, Green Peafowl, Germain's Peacock	Line transects, fecal DNA capture-recapture, camera-trapping, and incidental observations (see above).

	Pheasant)	
HCV 2: Landscape level forests	Forest cover	Remote sensing forest cover assessments (see section XX)
HCV 3: Threatened ecosystems	Forest cover & condition	Remote sensing (see section XX), threats monitoring using MIST software (see section xx)

## Gold Level Section

### GL 3 Exceptional Biodiversity Benefits

The project zone qualifies for Gold Level as it will have globally exceptional biodiversity benefits. The area meets both of the main criteria for gold level:

1. Vulnerability – many Globally Threatened species occur in the project zone
2. Irreplacibility – the project zone holds significant populations of at least three restricted-range species and large proportions of the world’s population of at least five other species

In recognition of this the site overlaps extensively with two Key Biodiversity Areas: Mondulkiri-Kratie Lowlands, and Snoul-Keo Seima-O Reang (Tordoff et al 2007, Seng Kim Hout et al 2003)

#### GL 3.1 Vulnerability

The project area is home to at least 41 Globally Threatened vertebrate species, as listed in the table below. This includes 18 that are listed as either Critically Endangered or Endangered. See the supporting documents (eg Walston et al 2001, FA/WCS 2006, Bird et al 2006, Pollard et al 2007, Pollard et al 2008, O’Kelly et al 2010) for more information on these records.

**Table XX: Globally threatened species recorded in the SPF (z indicates species that have been recorded in the project zone, but not yet in the project area)**

English Name	Scientific Name	Status	Population estimate [year of estimate]
<b>MAMMALS</b>			
Malayan Pangolin	<i>Manis javanica</i>	EN	n/a
Pygmy Loris	<i>Nycticebus pygmaeus</i>	VU	n/a
Northern Pig-Tailed Macaque	<i>Macaca leonina</i>	VU	Pending analysis
Stump-Tailed Macaque	<i>Macaca arctoides</i>	VU	Pending analysis
Germain’s Silvered Langur	<i>Trachypithecus germaini</i>	EN	Pending analysis
Black-Shanked Douc	<i>Pygathrix nigripes</i>	EN	23,145 (15,161-35,331) [2010]
Yellow-Cheeked Crested Gibbon	<i>Nomascus gabriellae</i>	EN	779 (355-1,711) [2010]
Dhole	<i>Cuon alpinus</i>	EN	n/a
Asiatic Black Bear	<i>Ursus thibetanus</i>	VU	n/a
Sun Bear	<i>Helarctos malayanus</i>	VU	n/a
Smooth-Coated Otter	<i>Lutrogale perspicillata</i>	VU	n/a
Asian Small-Clawed Otter	<i>Aonyx cinereus</i>	VU	n/a
Binturong	<i>Arctictis binturong</i>	VU	n/a
Large-spotted Civet	<i>Viverra megaspila</i>	VU	n/a
Asiatic Golden Cat	<i>Catopuma temminckii</i>	NT	n/a
Marbled Cat	<i>Pardofelis marmorata</i>	VU	n/a
Clouded Leopard	<i>Neofelis nebulosa</i>	VU	n/a
Tiger	<i>Panthera tigris</i>	EN	n/a
Asian Elephant	<i>Elephas maximus</i>	EN	116 (101 - 139) [2006]
Sambar Deer	<i>Rusa unicolor</i>	VU	167 (67-420) [2010]
Eld's Deer	<i>Rucerosus eldii</i>	EN	n/a
Banteng	<i>Bos javanicus</i>	EN	533 (204-1,392 [2010 estimate for Banteng and Gaur combined])
Gaur	<i>Bos gaurus</i>	VU	see above

English Name	Scientific Name	Status	Population estimate [year of estimate]
<b>BIRDS</b>			
Green Peafowl	<i>Pavo muticus</i>	EN	333 (158-701) [2010]
White-Winged Duck	<i>Cairina scutulata</i>	EN	n/a
Pale-Capped Pigeon	<i>Columba punicea</i>	VU	n/a
Sarus Crane <sup>z</sup>	<i>Grus antigone</i>	VU	n/a
Masked Finfoot	<i>Heliopais personata</i>	EN	n/a
White-Rumped Vulture	<i>Gyps bengalensis</i>	CR	n/a
Red-Headed Vulture	<i>Sarcogyps calvus</i>	CR	n/a
White-Shouldered Ibis <sup>z</sup>	<i>Pseudibis davisoni</i>	CR	n/a
Giant Ibis	<i>Pseudibis gigantea</i>	CR	n/a
Lesser Adjutant	<i>Leptoptilos javanicus</i>	VU	n/a
Manchurian Reed Warbler <sup>z</sup>	<i>Acrocephalus tangorum</i>	VU	n/a
Yellow-breasted Bunting <sup>z</sup>	<i>Emberiza aureola</i>	VU	n/a
Great Slaty Woodpecker	<i>Mulleripicus pulverulentus</i>	VU	n/a
<b>REPTILES</b>			
Giant Asian Pond Turtle	<i>Heosemys grandis</i>	VU	n/a
Yellow-Headed Temple Turtle	<i>Hieremys annandali</i>	EN	n/a
Elongated Tortoise	<i>Indotestudo elongata</i>	EN	n/a
Asiatic Softshell Turtle	<i>Amyda cartilaginea</i>	VU	n/a
<b>AMPHIBIANS</b>			
Marten's Floating Frog	<i>Occidozyga martensii</i>	VU	n/a
Annam Tree Frog	<i>Rhacophorus annamensis</i>	VU	n/a

### GL 3.2 Irreplaceability

#### Endemic species

The southern part of the project zone which is dominated by evergreen and semi-evergreen forest formations is part of the Southern-Vietnam / Cambodia Endemic Bird Area (Stattersfield *et al* 1998). This is in recognition of the presence of three restricted-range bird species: Germain's Peacock-pheasant, Orange-necked Partridge and Grey-faced Tit-babbler. It is not yet known whether the project zone support more than 5% of the global population of these species. The Orange-necked Partridge is known from only 17 disjunct forest patches in southern Vietnam, and the SPF in Cambodia (IUCN 2010). Given that the potential area of the species' preferred habitat of bamboo forest is relatively large, it seems likely that more than 5% of the global population of the species is found in the project zone. Further research is required to confirm this.

Two frog species new to science have been described from the project area (Stuart 2005), the O'Reang Horned Frog (*Ophryophryne synoria*) and Mouhot's Litter Frog (*Leptobrachium mouhoti*). The horned frog is still known globally from only one river system in the south of the SPF, and Mouhot's Litter Frog is known from only a few locations (J Rowley *pers comm*). The project area therefore contains the entire world's known population of O'Reang Horned Frog, and most likely has more than 5% of the world's population of Mouhot's Litter Frog.

#### Globally significant populations

Globally significant populations of several other species occur in the project zone. Lack of robust data on global population sizes or species ranges for these species makes assessment of whether they qualify under the *irreplaceability* criterion hard to judge but on current evidence it is reasonable to presume that some or all of the species listed below have globally significant populations (>1% of global population) in the project zone.

Black-shanked Douc This monkey is restricted to southern Vietnam and eastern Cambodia. It is currently known from a few fragmented forest patches but the total area species' range is yet to be estimated. The population of the species in the project area has been estimated from density estimates (O'Kelly and Nut Meng Hor 2010) at 15,161-35,331 individuals. This is the largest known population in the world, and significantly larger than the next largest recorded population of 500-700 in Nui Chau National Park, Vietnam (Nader *et al* 2003, Rawson 2009).

Yellow-cheeked Crested Gibbon This species is restricted to southern Vietnam and eastern Cambodia but the total range of the species is yet to be estimated. The population of the species in the project area has been estimated (O'Kelly Nut Meng Hor 2010) at around 400 groups, 780 individuals. This is the largest known population in the world. The next largest recorded populations are around 150 groups in Phnom Prich Wildlife Sanctuary (Phan Channa and Gray 2009), and around 150 groups in Cat Tien National Park, Vietnam (Hao et al 2005 in IUCN 2010)

Banteng This was historically a wide ranging species found in Java and Borneo, through peninsular Malaysia, Thailand, Myanmar, Cambodia, Vietnam and Laos. It is now restricted to a few scattered populations, none thought to be larger than 400-500 animals. The global wild populations is not known, but could be between 5,000 and 8,000 (IUCN 2010). The population of both wild cattle species in the project zone has been estimated at around 500 (O'Kelly and Nut Meng Hor 2010, of which perhaps half are Banteng. If so this represents over 3% of the maximum estimated global population of 8,000 (IUCN 2010). The population in the SPF is part of a larger meta-population in neighboring protected areas. Such significant populations make SPF and Mondulkiri as a whole of global importance for the species.

Green Peafowl The range of this formerly widespread and abundant species covered parts of Java and peninsular Malaysia, Thailand, Myanmar, north-east India, Indochina and southern China. It is now restricted to a few small fragmented populations, with a global population estimated at 10,000-20,000 (IUCN 2010). The population in the project zone is estimated as 330 (range 158-701) [ie >1.5%]. Birdlife International (2001), Brickle et al (2008) and Goes (2010) suggested that Mondulkiri was a global stronghold of this Endangered species, with the SPF forming a core part of the population.

Giant Ibis. The largest ibis species in the world is restricted to the deciduous dipterocarp forests of the lower Mekong. It lives at low densities (IUCN 2010) and is dependent on areas of forest with very low levels of human disturbance. As a consequence of habitat loss and disturbance the global population of the species was estimated as a minimum of only 100 pairs (IUCN 2010), and is now found almost exclusively in northern and eastern Cambodia. Giant Ibis have been recorded in the project zone on several occasions (Bird et al 2006, Claasson et al 2007, WCS data), and although no nest have yet been found it is highly likely that the species breeds there. Given the area of potential habitat, and the number and dispersal of records obtained, it seems likely that the population easily represents more than 1% of the estimated global population.

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## Annexes

### ***Ai High Conservation Value Assessment***

[see separate Annex]

### ***Aii list of supporting documents***

to be completed

### ***Aiii Scientific surveys in the Project Zone***

to be updated

<b>Date</b>	<b>Study</b>	<b>Institution</b>	<b>Key reference</b>

### ***Aiv species lists***

to be pasted in

### ***Av basic demographic data***

to be pasted in

**Annex QQQ Stakeholder interests**

Table QQQ Interests of on-site community stakeholders

Stakeholder group/sub-group	Interests in the project	Effect of the project on their interests*	Capacity and motivation to participate	Relationship w other stakeholders
<b>Key village</b>				
<b>Indigenous families</b>				
typical families (2+ adults, usually both farming and tapping)	land and forest protection, continued access, freedom to develop, better governance, development assistance, jobs	generally positive.	usually moderate capacity; motivation depends on perceived project benefits	some conflict/distrust with Khmer settlers, some mutual support to poorest indigenous families
wealthy families / officials/NGO staff	land and forest protection, continued access, freedom to develop, better governance, development assistance, jobs	generally positive.	usually high capacity; motivation depends on perceived project benefits	
single parent/other poorest	land and forest protection, continued access, freedom to develop, better governance, development assistance, jobs	generally positive, elevated risk of negative impacts due to high intrinsic vulnerability	low capacity; motivation depends on perceived project benefits	some dependence on other families
bamboo collectors	forest protection, freedom to develop, continued access, better governance, development assistance, jobs	positive in long term, could be negative in short term	variable capacity; motivation depends on perceived project benefits	
specialist hunters, loggers	alternative livelihoods or transition to legal harvest, better governance, development assistance, jobs	mixed negative and positive, but impacted activities largely/wholly illegal	variable capacity; motivation likely to be low unless alternative livelihoods attractive	corrupt relationships with some armed forces/other officials
specialist cash-croppers (no tapping)	land protection, freedom to develop, better governance, development assistance, jobs	neutral or positive.	higher capacity?; motivation depends on perceived project benefits	
<b>Key villages</b>				
<b>Khmer families</b>				
typical families – 2+ adults cash crops, no tapping	land protection, freedom to develop, better governance, development assistance, jobs	reduced scope for illegal land clearance	variable capacity; motivation depends on perceived project benefits	
forest dependent (tappers, bamboo collectors)	land and forest protection, continued access, freedom to develop,	generally positive.	usually moderate capacity; motivation depends on perceived project	

	better governance, development assistance, jobs		benefits	
single parent/other poorest (forest or farm dependent)	land and forest protection, continued access, freedom to develop, better governance, development assistance, jobs	generally positive, elevated risk of negative impacts	low capacity; motivation depends on perceived project benefits	
traders, officials, other off-farm incomes	better governance, development assistance, jobs	generally positive?; reduced scope for illegal land sales	high capacity, motivation to work on nat. resources often limited	
specialist wage labourers/ landless	better governance, development assistance, jobs, possibly allocation of land	?	variable capacity; motivation depends on perceived project benefits	
<b>Other user villages</b>				
Resin tappers	land and forest protection, continued access, freedom to develop, better governance, development assistance, jobs	generally positive.	usually moderate capacity; motivation depends on perceived project benefits	links with local traders (resin, other products, credit/debt)
Non-resin tappers (fishing, other NTFPs)	land and forest protection, continued access, freedom to develop, better governance, development assistance, jobs	generally positive.	usually moderate capacity; motivation depends on perceived project benefits	
Specialist hunters, loggers	alternative livelihoods or transition to legal harvest, better governance, development assistance, jobs	mixed negative and positive, but impacted activities largely/wholly illegal	variable capacity; motivation likely to be low unless alternative livelihoods attractive	corrupt relationships with some armed forces/other officials

Table QQQ Interests of off-site community stakeholders

Stakeholder group	Interests in the project	Effect of the project on their interests*	Capacity and motivation to participate	Relationship w other stakeholders
People dependent on the environmental services of the area	Continued maintenance of services (climate, watershed, fisheries)	positive.	Capacity limited as mostly distant and poor -e.g. few business/urban users	Little relationship - population diffuse, distant, no mechanisms for expressing concerns
People interested in settling in the area or selling land	Limited. Migration to existing villages where space exists for outsiders in the land-use plans	largely negative, through preventing illegal activities (land grabbing, deforestation etc)	Not applicable, as cannot be identified in advance; limited motivation.	Conflict with existing forest/land users; cooperation with relatives in some cases
People interested in harvesting resources in the area	Limited. Benefit from improved status of resources but likely to have reduced access.	largely negative, through preventing illegal activities (most occasional visitors harvest using unsustainable methods)	Not applicable, as cannot be identified in advance; limited motivation.	Conflict with existing forest/land users; cooperation with relatives in some cases

\* A detailed assessment of positive and negative impacts for each stakeholder can be found in Sections CM1&2.

Table QQQ Interests of government and NGO stakeholders

Stakeholder group	Interests in the project	Effect of the project on their interests*	Capacity and motivation to participate	Relationship w other stakeholders
<b>Government</b>				
Provincial authorities	Improved governance, livelihoods, environmental services	potential conflicts with desire for rapid economic development projects	High capacity and high motivation	Position of high authority
District authorities	Improved governance, livelihoods, environmental services	potential conflicts with desire for rapid economic development projects	High capacity and high motivation	Position of high authority
Commune Councils	Improved governance, livelihoods, environmental services	potential conflicts with desire for rapid economic development projects	Low to moderate capacity, motivation depends on perceived benefits to themselves and constituents	Position of authority; also responsible for resolving disputes
Technical line agencies	Depends on specific technical mandate	Depends on specific technical mandate	Typically moderate to high capacity, esp at provincial level	Position of authority
Armed Forces	Cooperation to reach shared goals	Overlapping jurisdictions, challenges to informal business activities	Highly variable capacity and motivation	Position of authority; often in conflict with FA over enforcement of forestry laws
<b>Non-government</b>				
Private companies	Improved Corporate	May hinder their	High capacity,	Variable -



	Social Responsibility, information sharing	access to land and resources	motivation depends on policies of each company	cooperation in some cases, conflict in others
NGOs	Cooperation, funding ensuring human rights	Largely or wholly positive.	High and high	Broadly cooperative; varying positions on illegal acts by community members

## Annex QQQ: Globally Threatened and other important Species of the SPF

([ ] = not yet confirmed in the SPF)

English Name	Scientific Name	Status*	SPF importance^
<b>MAMMALS</b>			
Malayan Pangolin	<i>Manis javanica</i>	EN	Regional
Pygmy Lorisee	<i>Nycticebus pygmaeus</i>	VU	Global
Northern Pig-Tailed Macaque	<i>Macaca leonina</i>	VU	National
Stump-Tailed Macaque	<i>Macaca arctoides</i>	VU	Possibly regional
Long-Tailed Macaque	<i>Macaca fascicularis</i>	lc	National
Germain's Silvered Langur	<i>Trachypithecus germaini</i>	EN	Possibly global
Black-Shanked Douc	<i>Pygathrix nigripes</i>	EN	Global
Yellow-Cheeked Crested Gibbon	<i>Nomascus gabriellae</i>	EN	Global
Dhole	<i>Cuon alpinus</i>	EN	Possibly regional
Asiatic Black Bear	<i>Ursus thibetanus</i>	VU	Possibly regional
Sun Bear	<i>Helarctos malayanus</i>	VU	National
Smooth-Coated Otter	<i>Lutrogale perspicillata</i>	VU	Unknown
Asian Small-Clawed Otter	<i>Aonyx cinereus</i>	VU	Unknown
Binturong	<i>Arctictis binturong</i>	VU	Unknown
Large-spotted Civet	<i>Viverra megaspila</i>	VU	Unknown
[Fishing Cat]	<i>Prionailurus viverrinus</i>	EN	Unknown
Asiatic Golden Cat	<i>Catopuma temminckii</i>	NT	Unknown
Marbled Cat	<i>Pardofelis marmorata</i>	VU	Unknown
Clouded Leopard	<i>Neofelis nebulosa</i>	VU	Possibly regional
Leopard	<i>Panthera pardus</i>	NT	Possibly regional
Tiger	<i>Panthera tigris</i>	EN	Regional
Asian Elephant	<i>Elephas maximus</i>	EN	Regional
[Large-Antlered Muntjac]	<i>Muntiacus vuquangensis</i>	EN	Unknown
Sambar Deer	<i>Rusa unicorn</i>	VU	Possibly regional
Eld's Deer	<i>Rucervus eldii</i>	EN	Regional
Banteng	<i>Bos javanicus</i>	EN	Global
Gaur	<i>Bos gaurus</i>	VU	Regional
<b>BIRDS</b>			
Orange-Necked Partridge	<i>Arborophila davidi</i>	NT	Global
Green Peafowl	<i>Pavo muticus</i>	EN	Global
White-Winged Duck	<i>Cairina scutulata</i>	EN	Regional
Pale-Capped Pigeon	<i>Columba punicea</i>	VU	Unknown
Sarus Crane	<i>Grus antigone</i>	VU	Unknown
Masked Finfoot	<i>Heliopais personata</i>	EN	Unknown
[Slender-Billed Vulture]	<i>Gyps tenuirostris</i>	CR	Possibly Global
White-Rumped Vulture	<i>Gyps bengalensis</i>	CR	Possibly Global
Red-Headed Vulture	<i>Sarcogyps calvus</i>	CR	Possibly Global
White-Shouldered Ibis	<i>Pseudibis davisoni</i>	CR	Possibly Global
Giant Ibis	<i>Pseudibis gigantea</i>	CR	Possibly Global
Lesser Adjutant	<i>Leptoptilos javanicus</i>	VU	National
Manchurian Reed Warbler	<i>Acrocephalus tangorum</i>	VU	Unknown
Yellow-breasted Bunting	<i>Emberiza aureola</i>	VU	Unknown
Germain's Peacock-Pheasant	<i>Polyplectron germaini</i>	NT	Global
Oriental Darter	<i>Anhinga melanogaster</i>	NT	Unknown
Siamese Fireback	<i>Lophura dairdi</i>	NT	Regional
Great Slaty Woodpecker	<i>Mulleripicus pulverulentus</i>	VU	Unknown
White-Rumped Falcon	<i>Polihierax insignis</i>	NT	Unknown
<b>REPTILES</b>			
Burmese Python	<i>Python molurus</i>	nt	Unknown

English Name	Scientific Name	Status*	SPF importance^
[Siamese Crocodile]	<i>Crocodylus siamensis</i>	CR	Unknown
[South Asian Box Turtle]	<i>Cuora amboinensis</i>	VU	Unknown
Giant Asian Pond Turtle	<i>Heosemys grandis</i>	VU	Regional
Yellow-Headed Temple Turtle	<i>Hieremys annandali</i>	EN	Global
Elongated Tortoise	<i>Indotestudo elongata</i>	EN	Global
[Impressed Tortoise]	<i>Manouria impressa</i>	VU	Unknown
Asiatic Softshell Turtle	<i>Amyda cartilaginea</i>	VU	Unknown
<b>AMPHIBIANS</b>			
Mouhot's Litter Frog	<i>Leptobrachium mouhoti</i>	DD	Described from SPF
O'Reang Horned Frog	<i>Ophryophryne synoria</i>	DD	Described from SPF
Marten's Floating Frog	<i>Occidozyga martensii</i>	VU	Unknown
Annam Tree Frog	<i>Rhacophorus annamensis</i>	VU	Unknown
Spotted Warty Tree Frog	<i>Theloderma stellatum</i>	NT	Unknown

\* = Status from the 2010 IUCN Red List of Globally Threatened Species

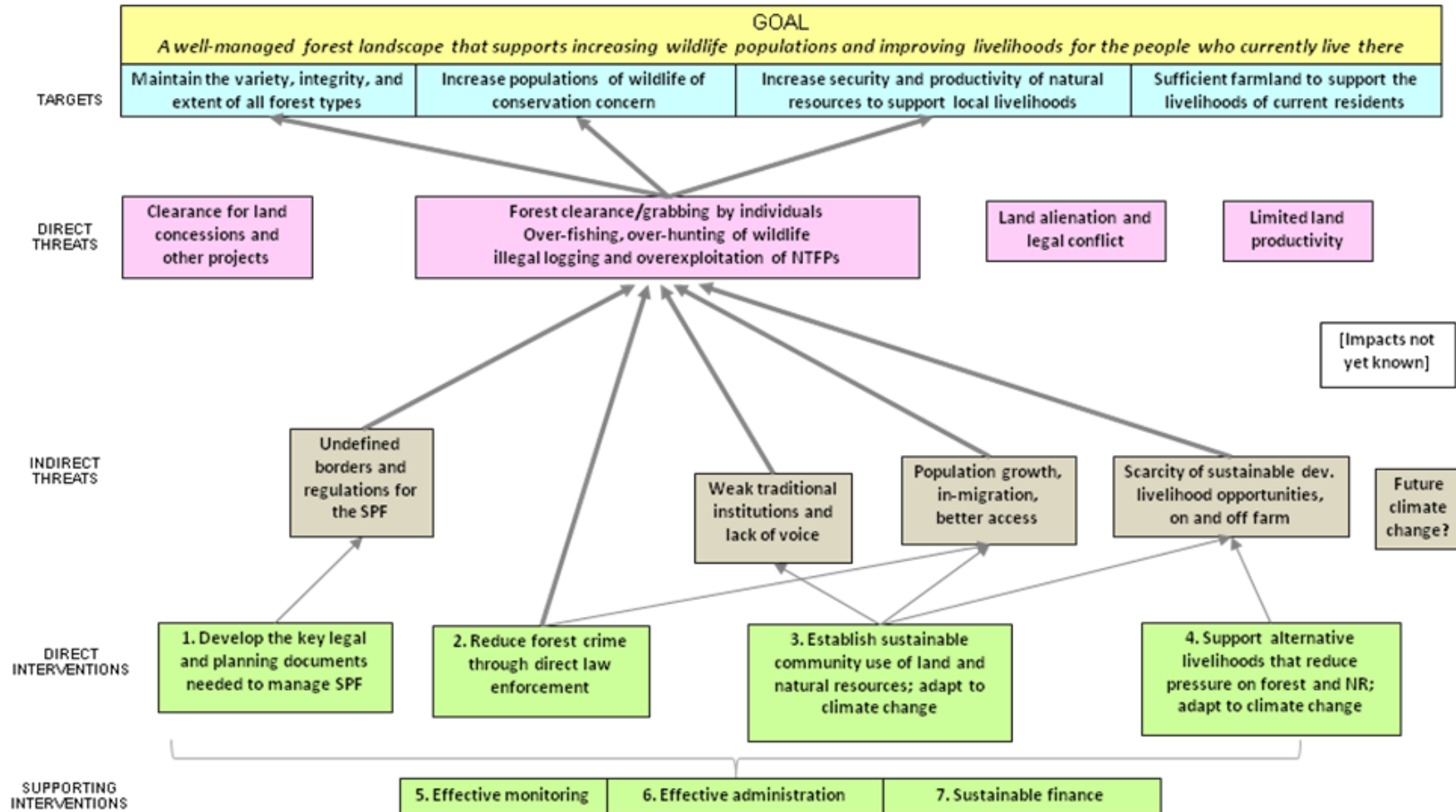
Cr = Critically Endangered    En = Endangered    Vu = Vulnerable

nt = Low Risk/Near-threatened    lc = Least Concern.

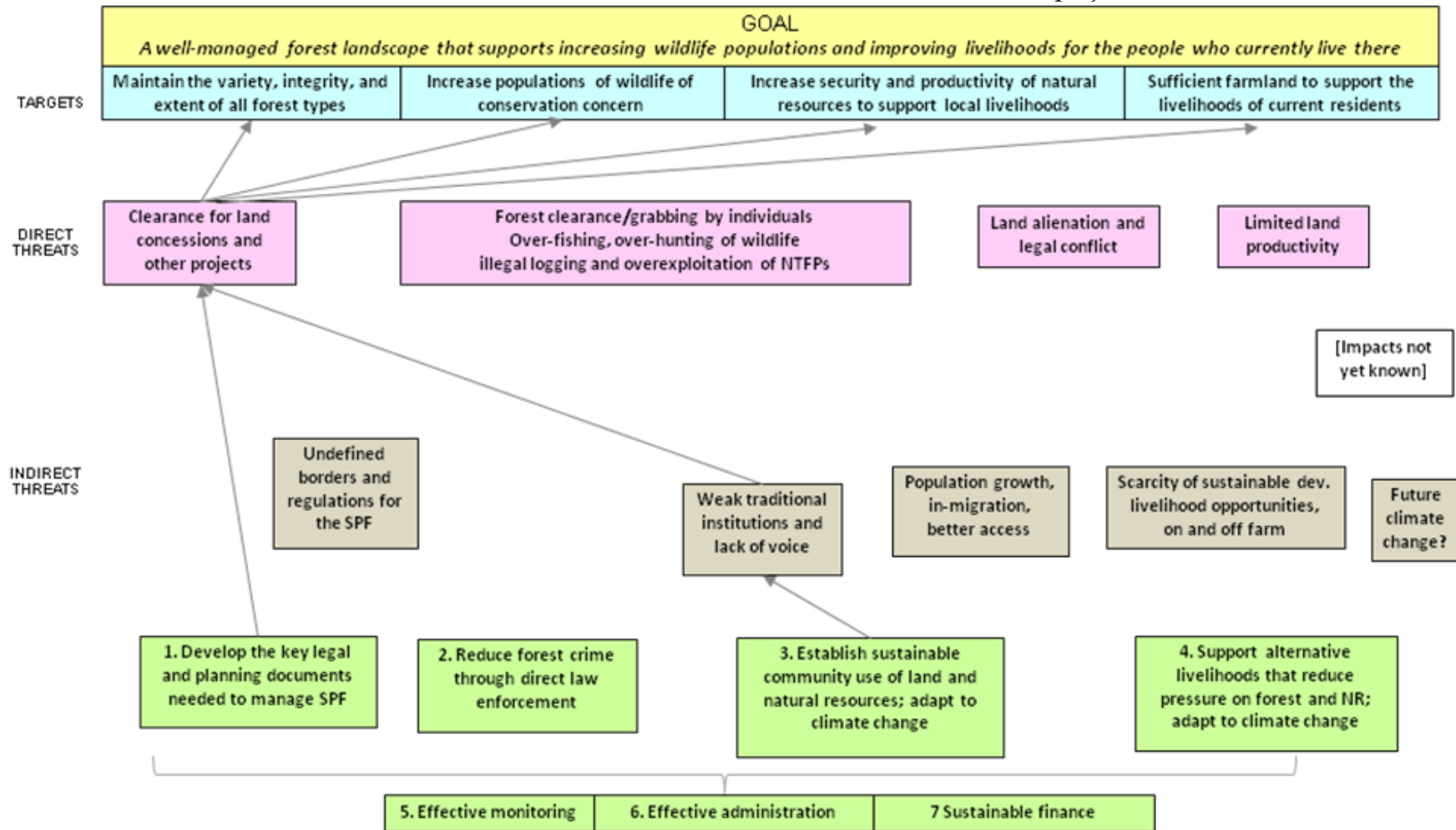
^ Subjective assessment based on likely contribution of SPF to maintaining global population size and ancestral range

Annex QQQ Sub-models within the project conceptual model:

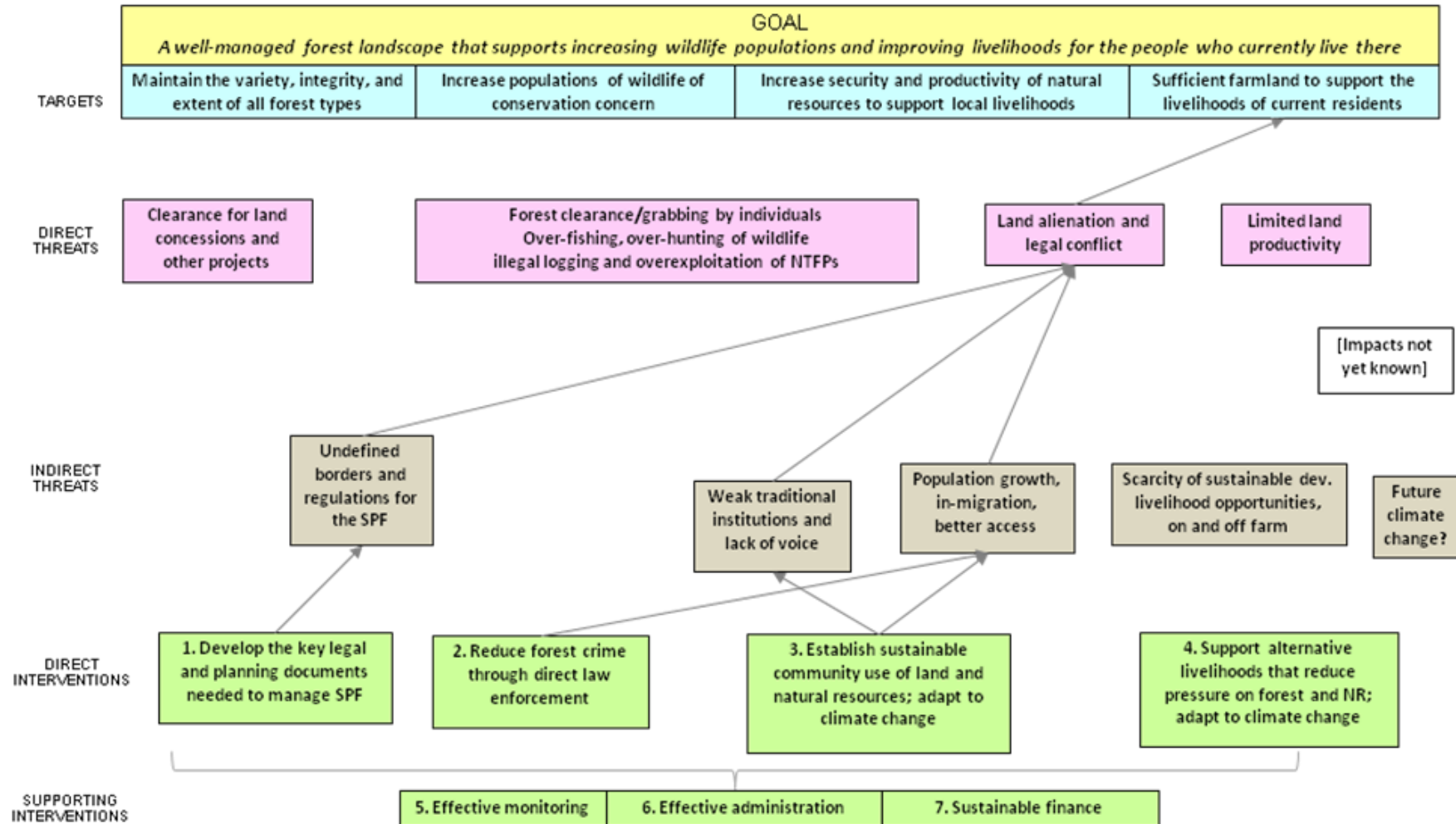
1 - Causal chain for the direct threat from illegal activities



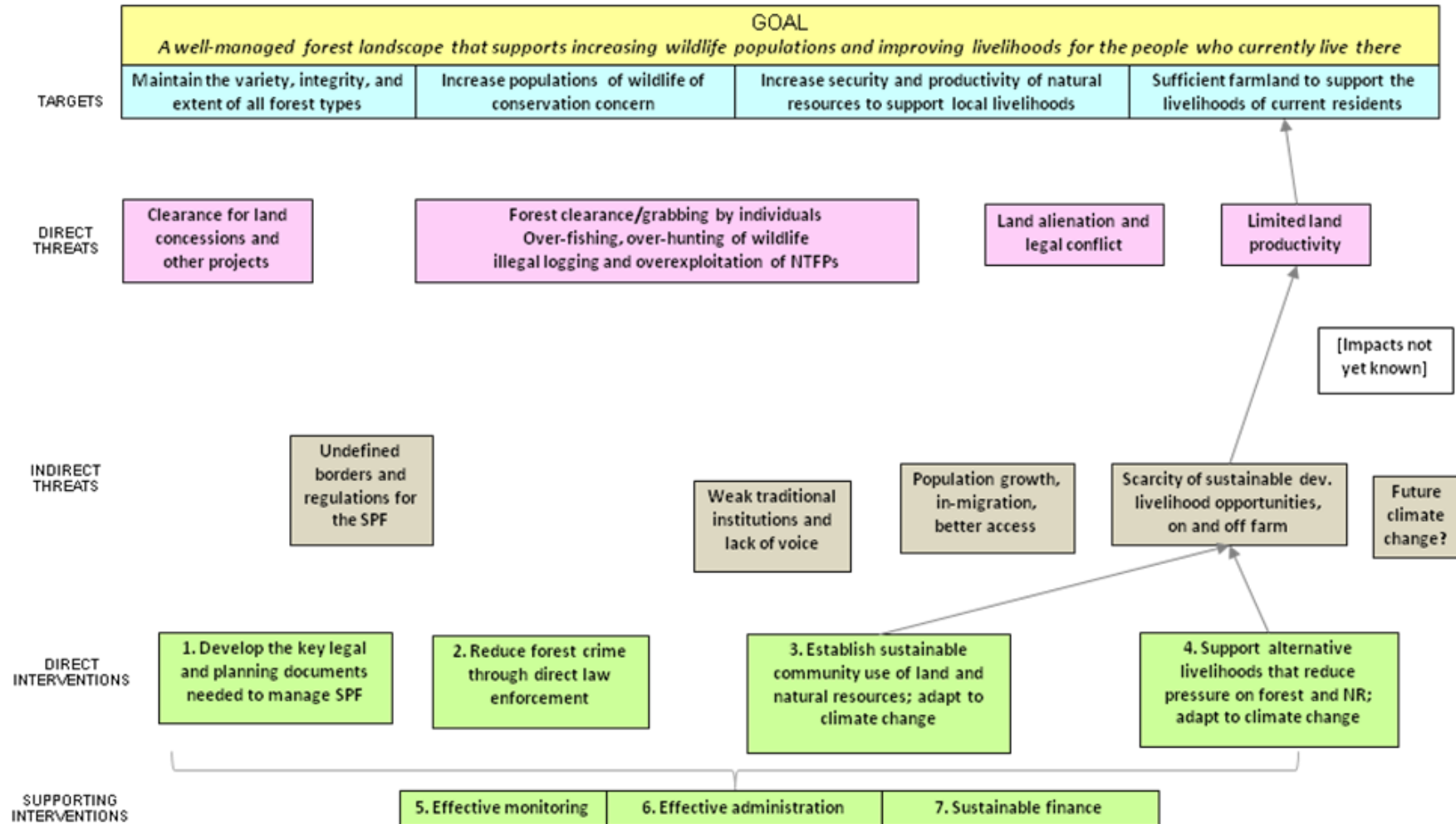
2- Causal chain for the direct threat from land concessions and other projects



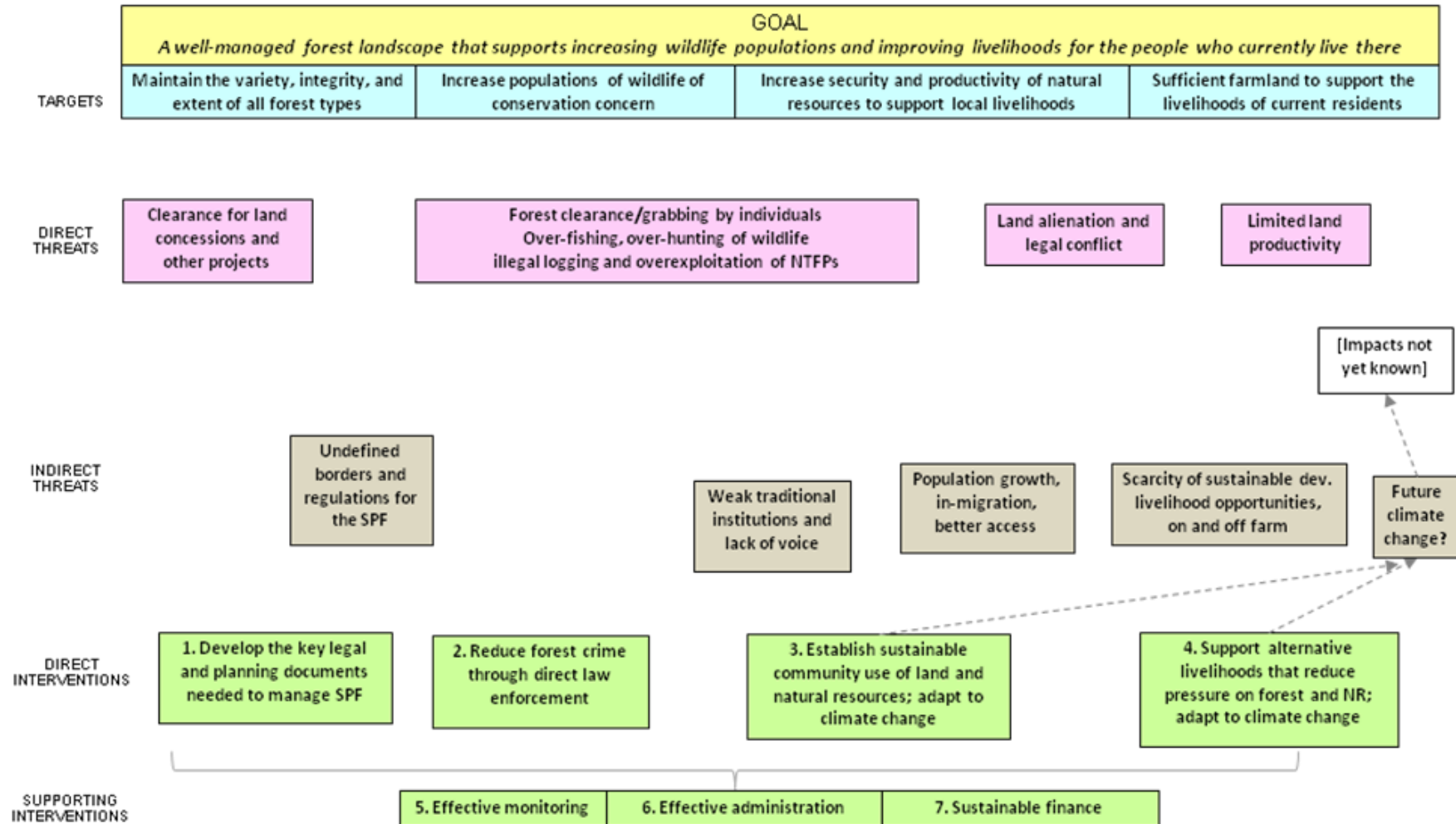
3 - Causal chain for the direct threat from land alienation and legal conflict



4 - Causal chain for the direct threat from land alienation and legal conflict



5 - Provisional location of climate change in the causal diagram





**Annex QQQ 30-year workplan**

#	Sub-Objectives and Actions	Activities	Indicators	Timing	Location	Explanatory notes
1.1	Sub-Objective #1: Key legal and planning documents for the SPF and surrounding landscape are approved and implemented					
1.1.1	Action #1: Support for sub-decree maintained among senior levels of government and general public	Maintain national level support and awareness	High level visits, annual reporting, national media visibility	as needed throughout project period	off-site	
		Maintain physical markers	Signboards etc	as needed throughout project period	main access points and junctions	
		Maintain provincial level support/awareness	Meetings held at Prov & Dist and comm & village level. Documents shared. MDK and KRT	as needed throughout project period	provincial/district capitals	
1.1.2	Action #2: Management plan approved and implemented (including zonation and regulations)	Provincial Deika on regulations	Community consent, provincial signature	2012	all villages, provincial capital	Regulations will specify permitted activities for each zone in more detail than national law
		Agreement of Strictly Protected Zones	Community consent; physical demarcation	2012	all villages, provincial capital	Acceptable zones will be identified through consultation; any displaced regular users will give consent and be compensated
		Management plan approved and implemented	Community consent, signed by minister, renewed as needed	2013; renewed periodically	all villages, provincial capital	Specifies management objectives, zonation, regulations, staffing levels, workplan and monitoring
1.1.3	Action #3: Mondulkiri Provincial Corridors strategy implemented	Agreed strategy	Signed by MDK Gov'nor	2011	provincial capital	Defines high priority areas for ecosystem protection and connectivity across whole province
		Implement and monitor strategy	Implementor id'd. Evidence of problems mitigated/avoided	as needed throughout period of strategy	whole site	
		Coordinate with WWF on Kratie PCPU	PCPU formed, and providing assistance for SPF	2011 onwards	Kratie town	
1.1.4	Action #4: Develop partnerships with the private sector in Mondulkiri (to reduce impacts by companies)	Coordinate with other NGOs working on mining and plantations	Effective joint NGO strategies	as needed throughout project period	as needed	
		Code of conduct for companies operating in SPF	Code agreed by FA and adherence monitored	to be determined	as needed	
1.1.5	Action #5: Develop international cross-border dialogue	Effective system in place to manage cross border issues	Reduced levels of cross-border threat	to be determined	as needed	System likely to include regular coordination meetings with 'opposite numbers' on Vietnamese side of border
1.1.6	Action #6: Adaptive Management (regular public reviews and workplans)	Miradi model in use and regularly updated	Conceptual model understood and used by all senior staff.	2011	HQ	Miradi is a software package for managing the conceptual model and monitoring information
		Regular review of strategic	Plan remains relevant to	review every 3-5 years	HQ	

		plan	current threats and opportunities			
		Annual planning/reporting cycle with community involvement	Annual reporting by components and planning on time, widely shared; preparatory annual community workshop	annual	HQ	The process may eventually also lead to a formally recognised consultation committee made up of community reps
		Grievance procedures	Understood and used	basic system functional; upgraded during 2011	all villages/communes	3rd- party system required - may be run by independent NGO or by Commune Councils
1.2	Sub-Objective #2: To reduce forest and wildlife crime by direct law enforcement					
1.2.1	Action #1: Enforce wildlife, forest and protected area laws and sub-decree through patrols	Regular Foot and vehicle patrols	Full spatial coverage. Highly targeted information-driven patrolling. Key threats reduced to near zero.	routine	whole project zone, mainly in project area	
		Ranger Stations Manned	All stations fully manned	routine	all stations in project area	
		Verify and respond to informant information	Most villages regularly sharing information	routine	all villages	
		Snare collection team	Snaring reduced to zero in all zones where forbidden	routine	whole project zone, mainly in project area	
1.2.2	Action #2: Establish and implement law enforcement monitoring framework	Monthly Patrol review and planning meetings	MIST report + summary report + snare team report + MIKE carcass reports	monthly	HQ	
		Quarterly evaluations against targets; annual reporting	Summary reports with recommendations + MIKE annual report	quarterly	HQ	
		Independent assessment of human activities from land-use mapping, monitoring team etc	Deforestation reports. MIST data from monitoring teams. Targeted monitoring of hotspot villages.	annual	as needed	
1.2.3	Action #3: Ensure sufficient patrol buildings, equipment and staffing	New stations built, HQ rebuilt, all stations maintained and full fleet of vehicles	All necessary stations built, vehicles not limiting activities	building program complete by 2015; routine maintenance	whole site	
		Field teams fully equipped	Field teams able to patrol safely in all seasons	routine	whole site	
		Field teams fully staffed		routine	whole site	
1.2.4	Action #4: Ensure sufficient patrol personnel capacity	Patrol strategy, techniques and legal training	Training sessions, skill levels	annual or more as needed	whole site	
		MIST training	Training sessions, skill levels	two per year or as needed	whole site	MIST is the software used to handle patrol data, providing summary tables and maps of effort/results
		First Aid and health and	Training sessions, skill	annual	HQ	

		safety	levels			
1.2.5	Action #5: Liaise with Provincial, National and other authorities	Work more closely with judiciary and use outside legal assistance	# of successful prosecutions; training on wildlife laws	recurrent, as needed	off-site	
		Continue good collaboration with MDK FA Cantonment; expand to Kratie	Quarterly reports from SPF to Cantonment; case reports; share work plans; [cooperation on technical issues see below]	routine	off-site	
1.2.6	Action #6: Establish Community-based Patrolling and/or monitoring system	Put mechanism in place	All 16 key communities engaged; regular reviews of effectiveness	Pilot 2011 or 2012, roll out behind land use agreements; all key villages by 2020	all villages	
		Bird's nest protection scheme	All known nests protected each year, breeding success high	initiate in 2013	all relevant villages	Based on model developed in Northern Plains landscape.
1.3	Sub-Objective #3: Land and resource use by all core zone communities is sustainable					
1.3.1	Action #1: Form and maintain land-use agreements with communities	Monthly liaison with all villages	Regular meetings and follow-up	routine	all villages	
		Agreed land zonation for all villages	Approved by commune, included in management plan, physically demarcated, included in CLUPs (Commune Land-use Plans)	All 16 key villages by 2018	all villages	Participatory mapping process; focus on near-village uses (residential, agriculture, fallow, spirit and burial sites)
		Zone management plans or resource management plans	Agreed in all villages where required to maximise carbon benefits or ensure sustainable harvests	All 16 key villages by 2018	all villages	
		Participatory monitoring of agreements	All villages actively monitoring	routine monitoring, annual review	all villages	
1.3.2	Action #2: Legally registering communities and users	All eligible Indigenous Community Commissions (ICCs) registered		All 16 key villages by 2018	all eligible and interested villages	Registration of the ICC is the first step to communal land registration
		All non ICC Community Based Organisations established		All 16 key villages by 2018	all other villages wishing to form groups	
		Implement card system for forest users		All 16 key villages by 2018	all villages	Formalises Article 40 of the Forestry Law and helps to control non-legal users
1.3.3	Action #3: Indigenous land titling in appropriate communities	All ICT demarcated	Registered with MLMUPC	All 16 key villages by 2018	all indigenous villages that choose communal land	
1.3.4	Action #4: Demarcation of the Forest Estate; recovery of unstocked areas	Demarcation of forest estate completed	Stakeholder agreement. Concrete posts in ground	All high priority boundaries by 2018	all forest boundaries, including indigenous land	
		Recovery of forest in key areas	Assisted natural regeneration in all	routine, as needed	selected areas of recent deforestation	

			appropriate areas		vulnerable to land-grabbing	
1.3.5	Action #5: Conduct extension and communication activities	Awareness raised and maintained among local authorities and NGOs	Sub-decree and REDD project understood by key stakeholders	routine, with major campaigns as needed	all villages	
		Manage Human-WilldifeConflict	Conflicts minimised, local attitudes acceptable	system to deal with all significant conflicts set up 2013	all villages with significant HWC	
1.3.6	Action #6: Liaise with Commune Council and other agencies	Make inputs to Commune Development Plan/ Commune Investment Plan to include SPF priorities and prevent damaging activities	CDP/CIPs reflect SPF priorities	annual	All relevant villages and communes	
		Regular meetings with Commune Councils to discuss issues arising	Meetings held and reported. Issues solved	routine	all communes	
		Regular meetings with PSDD advisors & Prov Govnr office	Meetings held and reported	routine	provincial capital	
1.3.7	Action #7: Engage with civil society organisations operating in the Project area	Attend regular network meetings	NGOs have coordinated response to key issues	Routine	as needed	
		Direct contracts or MoUs with key partners		as needed	as needed	
		Engage all other local NGOs in annual planning cycle	NGOs give input to SPF annual and strategic plans	annual	HQ or other locations	
1.3.8	Action #8: Ensure the capacity of Project staff is sufficient	Training for staff and local NGO partners on land management issues	Increased understanding of training in law, conservation, NRM, facilitation skills, health and safety	annual or as needed	as needed	
		Increase proportion of locally hired staff	Majority of staff are residents of the provinces; more than 25% are native Bunong speakers	routine	as needed	
1.4	Sub-Objective #4: Support for alternative livelihoods that reduce deforestation					
1.4.1	Action #1: Establish sustainable timber harvests in buffer zone areas	CBPF project established	Functional, fully self supporting CFEs in 3 communes	[Commune 1 by 2014], others by 2017	Sre Preah and possibly two other communes (Sre Preah activities pre-date REDD and are part of business-as-usual)	
		CBPF-like activities in other parts of the buffer areas	Functional, fully self supporting Community Forestry Enterprises	By 2018	to be determined (after feasibility studies including	

					carbon assessments)	
1.4.2	Action #2: Establish tourism activities that benefit conservation	Wildlife-based tourism underway in all suitable villages	Financially and environmentally sustainable; target species stable/increasing	By 2018	to be determined (after feasibility studies)	
		ELIE project ongoing	Project self-sustaining, contributing to SPF protection	By 2013	Pu Trom (2) village	
		Other forms of ecotourism active and well managed (e.g. waterfalls, resorts, trekking)	number of visitors, level of income to village and SPF	By 2018	to be determined (after feasibility studies)	
1.4.3	Action #3: Support agricultural extension activities	Relevant NGO partners active in all villages	Reduced demand for fresh land, increased compliance with REDD targets due to incentives	All 16 key villages by 2018	all key villages, possibly some other user villages	
1.4.4	Action #4: Provide infrastructure support linked to conservation activities	infrastructure support as requested by target communities.	Increased compliance with REDD targets due to incentives	All 16 key villages by 2018	all key villages, possibly some other user villages	
1.4.5	Action #5: Develop NTFP-based livelihood projects	NTFP-linked livelihoods sustainable and profitable in all relevant villages	No NTFPs being over-harvested; improved incomes reduce pressure for deforestation	All 16 key villages by 2018	to be determined (after feasibility studies)	
1.4.6	Action #6: Develop and manage a system to share carbon benefits	Create model for benefit sharing (direct and indirect)	model created and implemented	All 16 key villages within 2 years of first carbon sale	all villages	
		Identify suitable forms of assistance		All 16 key villages within 2 years of first carbon sale	all villages	
1.4.7	Action #7: Improve literacy and numeracy	Literacy campaign covers whole landscape.	high levels of functional literacy and numeracy in all villages; increased opportunities for off-farm employment	All 16 key villages by 2018	all key villages, possibly some other user villages	
1.5	Sub-Objective #5: Collect information on long-term ecological and social trends					
1.5.1	Action #1: Monitoring of trends in forest cover	Regular deforestation monitoring reports, SPF and surroundings	reports distributed	2 year cycle	whole site	
1.5.2	Action #2: Monitoring of key wildlife species	Regular line transect surveys of ungulates, primates etc	reliable densities and trend data for all target key species	2 year cycle, or more if feasible	core area	
		Periodic systematic surveys of elephant, otter, Eld's Deer and other target species	reliable trend data for all key species in conceptual model	2-5 year cycles as appropriate	as needed	
		Informant system for key species and for human-animal conflict	Regular community reporting of elephant, tiger, [other species?]. Regular community	systems in place by 2012	as needed	

			based-monitoring of human-animal conflict			
		Camera-trapping for other target species; exploratory surveys to find new key species populations; vulture restaurants		as needed	as needed	
1.5.3	Action #3: Socio-economic and demography monitoring	Regular demographic surveys	demographic trends clearly understood; new threats detected	2 year cycle	all villages	
		Social benefit/impact monitoring consistent with CCBA	System designed and outlined in PDD; overall wellbeing indicators and results of specific interventions	to be determined in design process	all villages	
1.5.4	Action #4: Facilitate research that will benefit the management of the SPF	Maintain list of priority research topics	Researchers attracted to do research on SPF priority list	routine	HQ	
		Regular production of papers and reports in khmer and English	Published research relevant to SPF profile or management planning	as needed	as needed	
		Oversee visiting researchers	Published research relevant to SPF profile or management planning	as needed	as needed	
		Construction of a research and training centre	Centre built, often used	date to be determined	to be determined, probably near HQ	
1.5.5	Action #5: Ensure sufficient staff capacity is available	Training courses in social and biological monitoring techniques	number of people capable of carrying out social and biological monitoring	as needed	as needed	
		Recruit staff, where possible locally resident	# staff recruited	routine	as needed	
1.6	Sub-Objective #6: Effective administrative, accounting and logistical procedures are in place					
1.6.1	Action #1: Organise evaluation and feedback on staff capacity, effectiveness and training requirements	Senior staff complete the annual self-evaluation forms		annual	as needed	
		Staff reviews	Managers informally review team member performance	annual or as needed	as needed	
1.6.2	Action #2: Develop and maintain effective management, administrative and accounting systems	Hire and retain on-site admin staff		routine	as needed	
		Management team meet regularly	Weekly progress meetings; quarterly budget meetings	weekly and quarterly	as needed	
1.7	Sub-Objective #7: Long-term financial security					
1.7.1	Action #1: Develop and Implement REDD project	Gain and maintain community consent; impact assessments and	Agreements made and regularly renewed	2011, plus reviews before 10-yearly revalidation	all villages	

		HCV assessment				
		Initial validations and revalidation	Vallidations achieved and renewed	10 yearly	as needed	
		Reporting, verification, registration	Reports submitted, verified	2-3 yearly	as needed	
		Marketing and sales		as needed	as needed	
1.7.2	Action #2: Establish Eastern Plains Trust Fund	Finalise Business plan	finished and written up	2012	as needed	
		Prepare scoping paper on Trust Fund structure	Completed and distributed	2011	as needed	
		Consultations with legal & financial experts, and stakeholders	Agreed design for Trust Fund & launch	2011-12	as needed	
		Consultatins with potential donors	Donor interest	routine	as needed	
1.7.3	Action #3: Obtain continued support of a wide range of donor partners	Continued fund raising from usual and new sources	\$ raised	routine	as needed	
		Facilitation of site visits	# visits	routine	as needed	
1.7.4	Action #4: Increase use of commune development funds for project activities	Proportion of locally administered investment funds spent on SPF priorities		annual	all communes	