



# Baseline Report

Beung Kiat Ngong Wetlands, Pathoumphone District, Champassak Province, Lao PDR



**MEKONG WATER DIALOGUES**



June 2011



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This publication has been made possible in part by the generous support of The Ministry for Foreign Affairs of Finland.

**Published by:** IUCN, Gland, Switzerland, and Vientiane, Lao PDR.

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**Citation:** IUCN (2011). *Baseline Report: Beung Kiat Ngong Wetlands, Pathoumphone District, Champassak Province, Lao PDR*, Mekong Water Dialogues Project. Gland, Switzerland: IUCN. 42pp.

**Cover Photo:** Beung Kiat Ngong Wetland, IUCN Lao PDR

**Layout by:** Charlotte Hicks

**Produced by:** IUCN Lao PDR Country Office

**Funded by:** The Ministry for Foreign Affairs of Finland and IUCN

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## Abbreviations

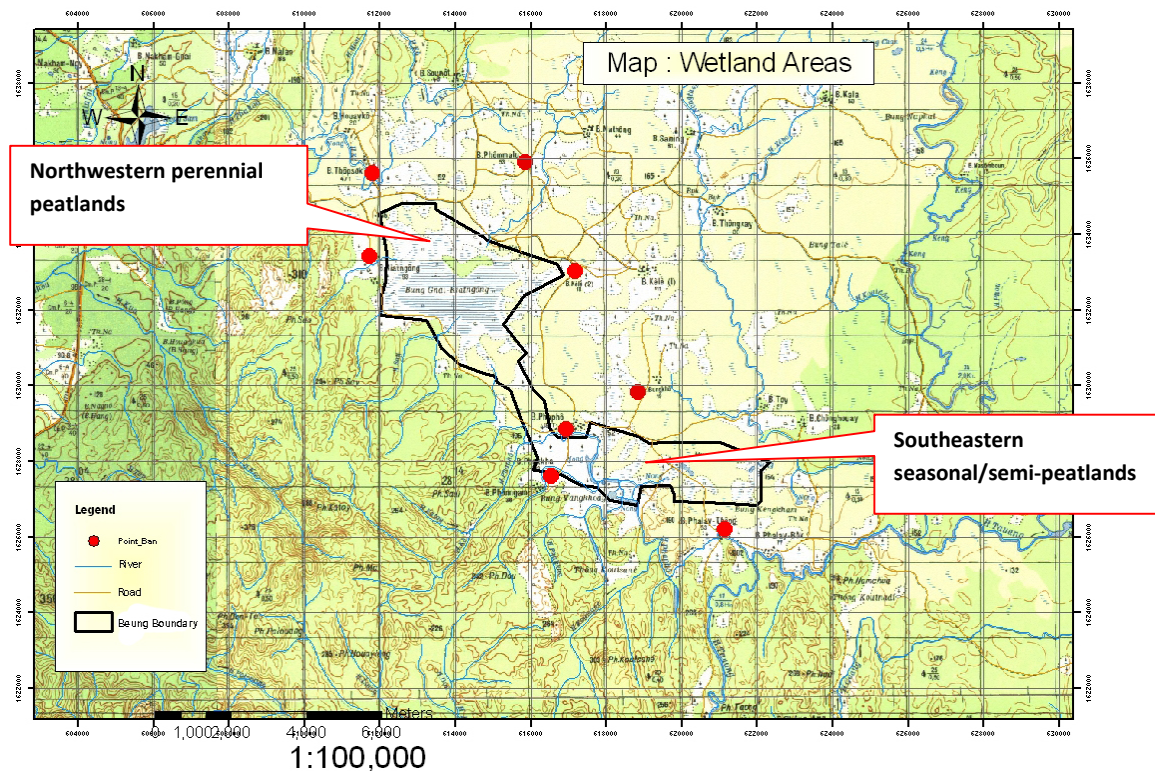
<b>ADB</b>	Asian Development Bank
<b>BCI</b>	Biodiversity Corridors Initiative
<b>DAFO</b>	District Agriculture and Forestry Office
<b>DFRC</b>	Division of Forest Resources Conservation
<b>GAPE</b>	Global Association for People and the Environment
<b>GoL</b>	Government of Lao PDR
<b>Ha</b>	Hectare
<b>IUCN</b>	International Union for Conservation of Nature
<b>Lao PDR</b>	Lao People's Democratic Republic
<b>LFA</b>	Land and forest allocation
<b>LLS</b>	Livelihoods and Landscapes Strategy
<b>LNTA</b>	Lao National Tourism Administration
<b>MAF</b>	Ministry of Agriculture and Forestry
<b>MRC</b>	Mekong River Commission
<b>NLMA</b>	National Land Management Authority
<b>NPA</b>	National Protected Area
<b>NTFPs</b>	Non-timber forest products
<b>PAFO</b>	Provincial Agriculture & Forestry Office
<b>PFA</b>	Production Forest Area
<b>PWREO</b>	Provincial Water Resources and Environment Office
<b>RIS</b>	Ramsar Information Sheet
<b>SUFORD</b>	Sustainable Forestry for Rural Development
<b>WREA</b>	Water Resources and Environment Administration
<b>WWF</b>	Worldwide Fund for Nature

## 1. Overview

The Beung Kiat Ngong Wetlands complex is made up of a number of important wetland types, including swamps, lakes, peatlands and marshes. The edge of the wetland is forested, and is surrounded by large trees, including species typically found in the south and east of Lao PDR. The forest is rich due to the quality soil and abundance of water, and seasonal and perennial flooded grasses are found here. The Beung Kiat Ngong Wetlands is also the only place in Lao PDR where peatland areas can be found.

The wetlands are shaped somewhat like a bat with outstretched wings: the perennial-peatland wetlands are found in one wing, the northwestern part of Beung Kiat Ngong, which includes high quality peatland accounting for about 400 hectares (ha); the seasonal semi-peatland wetlands with a low quality of peatland are found in the other wing, the southeastern part of the site, and cover about 1000 ha (see Map 1 below).

**Map1: Beung Kiat Ngong Wetlands**



Source: WREA, 2011

Detailed studies on biodiversity have not yet been undertaken in the Beung Kiat Ngong Wetlands; although exact numbers of species are not always known, the existing data shows that it hosts an important array of aquatic and terrestrial biodiversity. During wet season the wetlands provide a passage for a variety of fishes to move upstream along these rivers and streams, as well as providing spawning grounds. The wetlands also form an especially important habitat for fish during the low water dry season. Forty-three

fish species have been reported in wet season, while during the dry season only about 20 fish species remain in the area (IUCN, 2009a).

The Beung Kiat Ngong Wetlands provide small and medium nesting sites for water birds, as well as a source of food, such as plants, insects, fish and other small animals, for birds, wild and domestic animals, and humans. In 1996 a survey of the wetlands found 33 wetland-associated bird species (Claridge, 1996). In 2009, surveys conducted in six main villages around the wetlands showed similar number of bird species including: Cattle egrets (*Bubulcus ibis*), Intermediate egret (*Mesophoyx intermedia*), Lesser tree duck (*Dendrocygna javanica*), Painted snipe (*Rostratula benghalensis*) and Chinese pond heron (*Ardeola bacchus*) (IUCN, 2009a). More detailed bird surveys would undoubtedly reveal a much larger number of wetland-associated bird species.

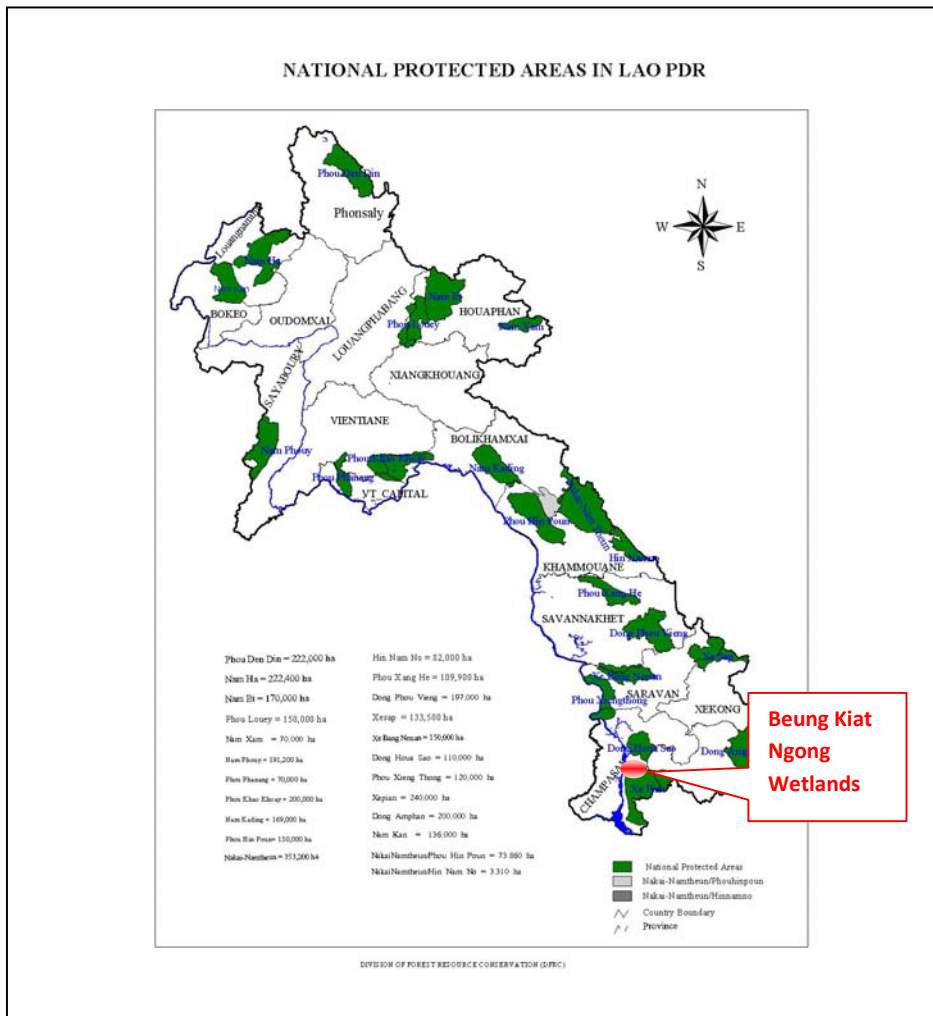
The wetlands also support a human population of around 11,500 people from eight core villages and another five surrounding villages. These villages are primarily reliant on subsistence agriculture, wild-capture fisheries, wild vegetables and non-timber forest products (NTFPs) for their livelihoods, food and income. Some income is also earned from tourism businesses, particularly in Ban Kiat Ngong. Paddy fields are found around the edge of the wetlands, especially in the seasonal wetlands in the east of the site. In addition, about 4,300 cattle and water buffalo and 27 elephants are living in the wetland area (IUCN, 2008b). The economic value of all agricultural, fishery and NTFP products coming from the Beung Kiat Ngong Wetlands is estimated to be about USD 850,000 per year (IUCN, 2009b).

This report provides an overview of existing data about the wetlands, including its ecology, biodiversity, socio-economic values, management and threats. The bulk of the information presented in this report was gathered from project reports from key organizations working in the wetlands and surrounding areas over the past decade or so, as well as from documents prepared for the site's nomination when Lao PDR joined the Ramsar Convention on Wetlands of International Importance in 2010. A stakeholder analysis of management and other concerned actors is also provided at Annex 1.

## **2. Location**

The Bung Kiat Ngong wetlands cover 2,360 hectares and are located in Pathoumphone District, Champassak Province in the southern Lao PDR, approximately 56 km south of the provincial capital, Pakse. The elevation of the site is 120 to 200 meters above sea level. The southern parts of the wetlands, as well as most of the village of Ban Kiat Ngong, are located within the Xe Pian National Protected Area (NPA) (Duckworth, 2008). At the broadest regional scale, the Beung Kiat Ngong Wetlands are included the Indo-Burma Biodiversity Hotspot or the Central Indochina area (tropical lowland plain) (see Conservation International, 2006). Map 2 shows the wetlands' location between the two NPAs.

**Map 2: Location of Beung Kiat Ngong Wetlands in relation to NPAs**



The northern boundary (14°47'06" - 106°02'10" to 14°46' 18" - 106°05'12") is along Route 18A (the road connecting Ban Thangbeng at Km 48 of Pathoumphone District, Champasak Province, to Sanamxay District of Attapeu Province). The boundary follows from Ban Topsok to the junction with the road to Ban Phapho. The boundary curves along this access road running through Ban Kelae Noi then connects to Ban Phapho at the eastern boundary. The southern boundary is between 14°43'02"/106°04'37" and 14°42'19"/106°08'26" and runs along the forest of Xe Pian NPA from Ban Phapho to Ban Kiat Ngong, and the western boundary is from Bam Kiat Ngong to approximately 500 m before Ban Topsok (14°46'16"/106°02'16"). Map 3 below shows the wetlands and main villages.

**Coordinates (from WREA, 2011):**

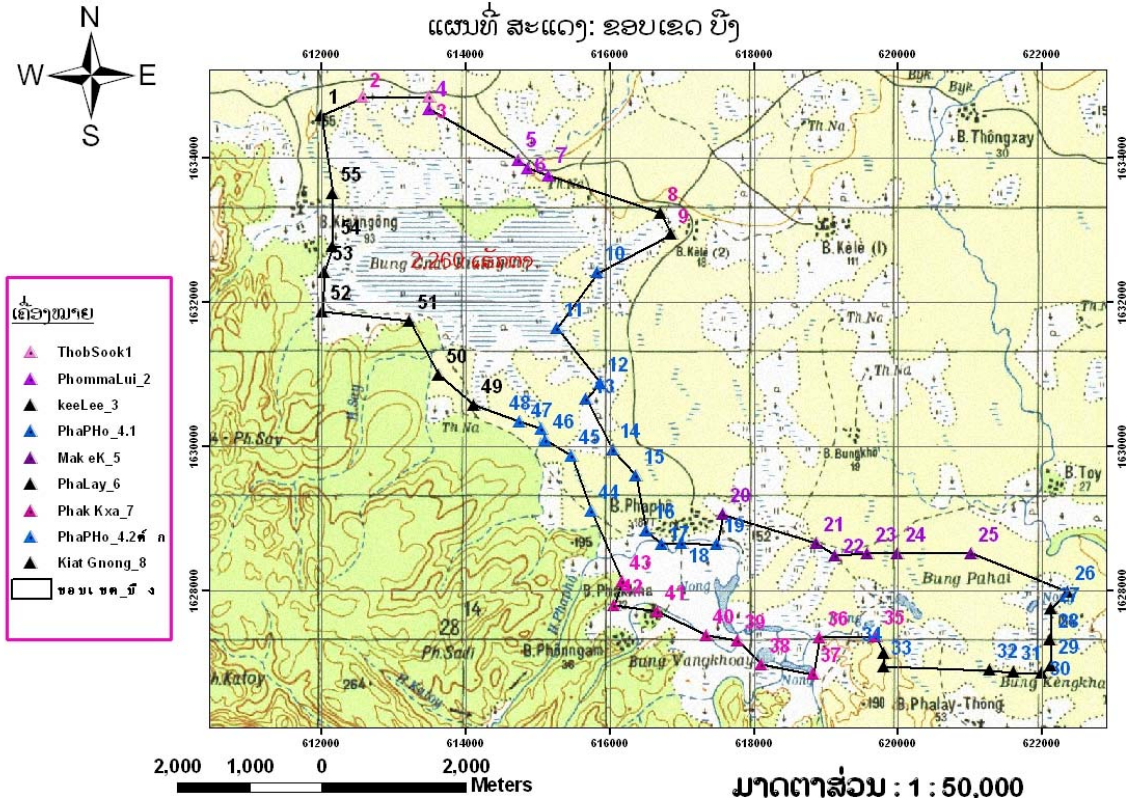
Most northerly point: 14°47'29" N, 106°02'21" E (Ban Topsok, Route 18 A)

Most southerly point: 14°42'01" N, 106°08'30" E (Phalaybok, marginal forest of Xe Pian)

Most easterly point: 14°43'53" N, 106°08'42" E (Chong Houay)

Most westerly point: 14°46'16" N, 106°02'16" E (Ban Kiat Ngong)

**Map 3: Beung Kiat Ngong wetlands and main villages**



Source: IUCN LLS Project records

### 3. Catchment area

The catchment area of the Beung Kiat Ngong Wetlands, including the streams that flow into the wetlands, is estimated be at least 10,000 ha in size (Khamlibounthavi, 2008). There are two main water sources for the wetlands, one from the Xe Pian NPA (Xe Khampho Basin) and another from Dong Hua Sao NPA (Tamo Stream Basin). Thus the wetlands are linked to a number of rivers and streams, including the Xe Khampho, Tamo, Xe Pian and Xekong rivers and the Takuan and Ta Euang streams. During wet season, all these waterways are ecologically connected. The Xe Khampho is believed to support well over 150, and possibly up to 200-300 fish species. The main forest types in the catchment area include lowland dry evergreen forest, mixed deciduous forest, and shrubs.

## 4. Landscape and Ecology

The Beung Kiat Ngong Wetlands are one of the most important and unique wetland areas in Lao PDR. Much of this wetland is peatland or peatmarsh and swamps. Both perennial and seasonal ponds are also found in the wetlands complex, including landscapes composed of fresh water marshes, lakes, ponds, rice paddy fields, seasonally flooded grassland, shrubland and forest (Claridge, 1996). Found in the area are water birds, a variety of fish, vegetation, livestock grazing areas, fish ponds, settlements and traditional rice cultivation. According to the Ramsar Information Sheet (RIS, WREA 2011) for the wetlands, four types of wetlands have been identified within the overall Beung Kiat Ngong site:

- The Mekong River, with braided and main channels, deep pools, rapids and waterfalls;
- Rice fields (rain-fed & irrigated);
- Emergent and flooded shrubs, and riparian, seasonally flooded forest;
- Marshes with small pools (known as *nong* in Lao language), which are reduced significantly in area in the dry season, plus farm ponds.

The Beung Kiat Ngong wetlands are the only area in Lao PDR where peatland areas can be found. The area also includes rich semi-evergreen forest areas within the broader wetland mosaic. More detail on the features of the wetlands area is provided below.

### 4.1 Water

The main part of the Beung Kiat Ngong Wetlands is not an open surface wetland. Many different islands with large trees and piles of rocks can be found in the wetlands. Above the water surface, there is also a thick layer of decayed grasses with new shooting grasses and emergent weeds as well as bushes growing on top of this layer. The thick layer of grasses is found mainly in the northwestern wing, where it floats over still water. Most parts of the wetlands are shallow, although some areas are as deep as 2-3 m in the dry season. Water permanence during the dry season is about 300-400 ha for the main part of the wetland. Apart from this area, there are some other scattered small marshes and swamps that retain water throughout the year. During the wet season water levels go up, peaking from August to early October, with peaks close to 2 m above the dry season water levels. This occurs throughout the area. The thick layer of floating grasses can be observed in the dry season, particularly in April and May, when the layer becomes harder. Where there is shallow water, the layer is likely a mixture of both grass and soil. However, in the deep water area there is still water underneath. It is possible for people to walk on top of the soggy thick layers during the dry season.

Water quality in the wetlands is still quite good as it has not been heavily disturbed, and because there is a relatively low level of agricultural chemical use around the wetlands (although there are concerns that this is increasing). Rice paddy fields are found around the edge of the wetlands and mainly in the southeastern part of the wetlands. Dry crop cultivation is also practiced but only on a small scale. Because the soil in the area is very highly fertilized by natural sediments distributed during flood periods, local villagers tend to cultivate without using large inputs of chemical fertilizers.



## **4.2 Geology**

The Beung Kiat Ngong Wetlands are located in a large plain that descends from the Bolaven Plateau, which is an old volcanic (presently inactive) mountain. Large numbers of different sized rocks are scattered throughout the area, many of which originated from volcanic events in the past, such as volcanic explosions and lava flows. Some very rocky areas exist here and are called 'lang' in Lao language.

## **4.3 Soil**

Most parts of the catchment area is arable land with naturally fertile soil (fine texture/basalt, alluvia deposits), suitable for cultivation. Most of soil color in the wetland is blackish, while the area outside of the wetland has reddish soils. The forest in the wetlands area is rich due to the good quality soil and abundance of water.

## **4.4 Climate**

The Beung Kiat Ngong Wetlands are situated in a monsoonal zone with one distinct dry season (late October-early May) and one distinct wet season (late May-October). Temperatures range from a minimum low of 14.5°C in January (humidity 32-95%) to a maximum high of 38.3°C in April (humidity 39-96%), with humidity approaching 99% throughout the wet season (according to Pakse Meteorological Station records). Average annual rainfall at the site is around 2,000 mm with up to one third of the rainfall recorded during the month of August.

Although there are limitations to the availability of country-specific data and projections on the potential impacts of climate change, average daily temperatures across Southeast Asia have already increased by 0.5 to 1.5°C between 1951 and 2000, and mean temperatures across the Mekong River Basin will most likely increase by another 0.79°C over the next 20 years (IPCC 2007 and Eastham 2008, cited in WWF 2009). The Mekong River Commission (MRC, 2009) notes that climate change is expected to modify temperatures, rainfall and wind in the Lower Mekong Basin, affecting natural ecosystems as well as agriculture and food production, of serious concern in countries that rely strongly on natural resources.

## **4.5 Ecosystem services**

The Beung Kiat Ngong Wetlands provide a number of important ecosystem services, including:

- Flood mitigation.
- Sediment trapping (due to the slow water flow).
- Storing and maintaining ground water.
- Fish spawning ground, plus habitat for other aquatic species such as frogs, tortoises and snails.
- Habitat for other wild animals, including a number of threatened species.
- Contribution to securing local livelihoods, with villagers earning about US\$850,000 directly per year from wetlands resources, particularly collecting fish, frogs and wetland vegetables. In addition, thousands of livestock, including

buffalo, cattle and elephants, also use the wetlands and the site provides tourism earnings.

## 5. Biodiversity

The Beung Kiat Ngong Wetlands support high biodiversity values. Although there is a lack of detailed biodiversity data for Beung Kiat Ngong, this is consistent with other parts of Lao PDR. In fact, it has been claimed that Pathoumphone District is among the best surveyed areas of Lao PDR for birds and large mammals (Duckworth, 2008). However, preceding surveys have prioritized forests, while wetlands have been less well covered (although Duckworth, 2008, notes that Timmins *et al.* (1993) highlighted numerous wetland management needs).

Relevant surveys include:

- Survey of Xe Pian NPA in November 1992–March 1993 and May 1993 (Timmins *et al.* 1993, Thewlis *et al.* 1996) in the ‘northern zone’, which constitutes the area north of Xe Pian NPA’s main block of semi-evergreen forest, dominated by functionally deciduous woodland with many wetlands, cultivation and villages.
- Survey of Dong Hua Sao NPA in May–July 1993 and in February 1996 (Thewlis *et al.*, 1996, Evans *et al.*, 2000), both surveys concentrating on the NPA’s lowlands, overlapping with the northern part of the Asian development Bank’s (ADB) Biodiversity Corridors Initiative (BCI) pilot area.
- Pathoumphone production forest area survey by Poulsen *et al.* (2005).
- Unpublished bird records from M. K. Poulsen, from Xe Pian NPA and adjacent Pathoumphone District.
- Biodiversity survey focused on wetlands and bird species in ten villages of the BCI project area, as well as several adjacent areas, including Beung Nyai-Kiatngong as the biggest and best-known wetland in the BCI area (Duckworth, 2008).
- Interviews and surveys conducted for the IUCN Livelihoods and Landscapes Strategy (LLS) project in 2009 (IUCN, 2009a).

### 5.1 Flora

There is a paucity of information available regarding the flora of the Beung Kiat Ngong Wetlands. A general description is provided by Claridge (1996) and some work was done during the “Rapid and Participatory Biodiversity Assessments” (BIORAP) survey in the main part of Xe Pian National Protected Area (Mather *et al.*, 1997). Recent work has been carried out on the economic value of the wetlands (Khamlibounthavi, 2008). However, these surveys did not focus on specific plant species. At present it is not known if any rare or endangered flora species are present in the area. More broadly, the wetlands are surrounded by valuable tree species such as Malva nut trees (*Mak chong*). Although harvests vary from year to year, Malva nuts often provide an important source of income for local people. Other NTFPs such as berberine and wild honey are also harvested from the area.

A study (Elkington *et al.*, 2009) conducted in 2009 focused on surveying and identifying medicinal plants growing in the wetlands and surrounding forested areas. The survey

focused on five villages near the wetlands including Kiet Ngong, Topsok, Phapho, Kelae, and Phalai. More than 320 plants representing more than 240 species of plants, belonging to 180 genera in 80 families of vascular plants, are used by traditional healers in medical therapy in the area, including *Tinospora crispa*, *Desmodium lanceolatum*, *Orthosiphon stamineas*, and *Vitex trifolia*, among others. At least 15 of these species have not been previously reported for medicinal properties, suggesting that their uses may be unique to Lao PDR. More than 300 unidentified plants were also noted by the study, and specimens of 116 plants were collected and have been deposited at the Traditional Medicine Research Center herbarium in Vientiane and the John G. Searle Herbarium at the Field Museum of Natural History in Chicago, USA.

## **5.2 Fauna**

The Beung Kiat Ngong Wetlands have not been adequately studied and surveyed, and therefore, there is a lack of detailed information on the fauna of the area. Historically, the wetlands have supported key species such as Siamese crocodiles (*Crocodylus siamensis*), Sarus cranes (*Grus antigone*), Great adjutants (*Liptoptilos dubius*) and Oriental darters (*Anhinga melanogaster*). These species were reported in the area 15 years ago (Claridge, 1996), but have not been confirmed recently, although there are still some occasional reports of Siamese crocodiles. Numerous bird species are found in the area including Cattle egrets (*Bubulcus ibis*), Lesser tree ducks (*Dendrocygna javanica*), Greater painted snipes (*Rostratula benghalensis*), and Chinese pond herons (*Ardeola bacchus*) (Claridge, 1996). In 2009, interviews and field surveys conducted in the six main villages surrounding the wetlands showed similar number of bird species and more detailed surveys would undoubtedly reveal a much larger number of wetland-associated bird species (IUCN, 2009a). There are also many fish species in the Beung Kiat Ngong Wetlands but a complete study on this has not yet been undertaken (see Section 5.2.3 below).

### **5.2.1 Birds**

As part of Xe Pian National Protected Area, this wetland area is considered an important site for bird feeding and occasionally for nesting. The Beung Kiat Ngong Wetlands are suitable for small and medium nesting sites for water birds, and provide a source of food, such as plants, insects, fish and other small animals, for birds, wild and domestic animals, and humans.

However, there is evidence that the area has suffered a decline of bird species. A 2008 survey (Duckworth, 2008) of biodiversity in the corridor between Xe Pian and Dong Hua Sao NPAs, which includes Bueng Kiat Ngong, found that many non-forest species that should live in the survey area are now effectively absent, such as Sarus Crane, Black Kite, Grey Heron, Spot-billed Pelican and Greater Adjutant. Further, a number of species are at “real risk of local extinction”, including: Green Peafowl; Red-wattled Lapwing; all species of vulture resident in Lao PDR; Vinous-breasted Starling; White-vented Myna; and, among forest and -edge species, Oriental Pied and Wreathed Hornbills, Alexandrine, Blossomheaded and Red-breasted Parakeets, and Green Imperial Pigeon. As Duckworth notes, these trends are typical of Lao PDR, and although it has lost much, the survey area remains very important for wetlands and grasslands birds.

Highlights of the 2008 survey included: a foraging Brahminy Kite; Cotton Pygmy-goose; Pheasant-tailed Jacana and Greyheaded Lapwing; the first White-browed Crake sighting

for South Lao PDR; thousands of mid-winter egrets; and a fly-over Spot-billed Pelican. Within Beung Kiat Ngong specifically, nearly all wetland bird species recorded during the survey were found here. These included: several large roosts of harriers, mixed Yellow Wagtails and Red-throated Pipits (by far the largest known in Lao PDR); Yellow-breasted Bunting (a globally near-threatened species); Streaked Weavers (the only Lao record); many Purple Herons (with the only breeding site reported); many egrets; Storkbilled Kingfisher; and several species of rallid, including the first record of White-browed Crake for South Lao PDR. However, as the composition and numbers of water birds varies significantly with season, further surveys are required to fully assess the status of bird species at the wetlands. A full list of the results of the 2008 survey is provided at Annex 2.

### 5.2.2 Mammals

Some mammals are present in the area such as Barking deer (*Muntiacus muntjak*), rabbits, Civet (*Viverra sp.*), as well as reptiles, amphibians, and fishes (WREA, 2011). Guar (*Bos gaurus*) has been recently reported in the area close to Kiat Ngong village (IUCN, 2009a).

The 2008 BCI survey report notes that the corridor habitat, a patchwork of forest types with many glades, wetlands, grasslands and all-year water sources, is perfect for large ungulates and associated big predators. Species probably extinct in Lao PDR such as Lesser One-horned Rhinoceros (*Rhinoceros sondaicus*), Hog Deer (*Axis porcinus*) and Wild Water Buffalo (*Bubalus arnee*) probably occurred in large numbers. Dhole (*Cuon alpinus*), Leopard (*Panthera pardus*), Tiger (*P. tigris*), Asian Elephant (*Elephas maximus*), Sambar (*Cervus unicolor*), Gaur (*Bos gaurus*) and probably bears (*Ursus* spp.) would also have been present, along with smaller numbers of Eld's Deer (*Cervus eldii*), Banteng (*Bos javanicus*) and perhaps even Kouprey (*Bos sauveli*). This community of fauna is now gone (Duckworth, 2008).

Although individuals may occur occasionally, Duckworth notes that up to four species of otter (*Lutra* sp(p).) should occur; locally caught captive otters were seen in the northern zone of Xe Pian NPA in 1992–1993 (Duckworth *et al.* 1994, cited in Duckworth 2008). The lack of signs found suggests that otters are rare at best, no doubt reflecting the trade in otters and their parts in South-east Asia. Other mammal species of which the corridor might still support populations are Jungle Cat (*Felis chaus*) and Fishing Cat (*Prionailurus viverrinus*), the latter of which is classified as Endangered on the IUCN Redlist of Threatened Species.

In the 2008 survey, Duckworth found relatively few signs of ungulates, with only wild pigs, muntjacs (most likely the common Red Muntjac (*M. muntjak*), although Khounboline & Baird (2008) found Sambar signs around Ban Nabon. The following common mammals were seen directly: the squirrels (*Callosciurus finlaysonii williamsoni* and *Tamiops* sp(p).); Northern Treeshrew (*Tupaia belangeri*); Small Asian Mongoose (*Herpestes javanicus*); and Siamese Hare (*Lepus peguensis*). The sole record of a mammal of wider conservation significance was of a single Large-spotted Civet (*Viverra megaspila*) by the Ban Thangbeng–Attapu road, close to the turn to Ban Kiat Ngong. Duckworth (2008) notes that this species is now rare and the Xe Pian NPA area may be a global stronghold (citing Austain 1999, Khounboline 2005, Lynam *et al.* 2005). Village interviews in December 2007 (Khounboline & Baird 2008) confirmed that large mammal populations are greatly reduced and many species are effectively locally extinct.

According to the 2011 RIS, Beung Kiat Ngong specifically supports a number of threatened species, as shown in Table 1 below.

**Table 1: Key Threatened Species in Beung Kiat Ngong**

Common name	Scientific name	IUCN	CITES
Malayan snail-eating turtle	<i>Malayemys subtrijuga</i>	Vulnerable	Appendix II
Sambar	<i>Cervus unicolor</i>	Vulnerable	-
Leopard cat	<i>Prionailurus bengalensis</i>	Least concern	Appendix II (App. I in Thailand, Bangladesh & India)
Fishing cat	<i>Prionailurus viverrinus</i>	Endangered	Appendix II

Source: WREA, 2011

### 5.2.3 Fish, Amphibians and Reptiles

There are many fish species in the Beung Kiat Ngong Wetlands but a complete study on this has not yet been undertaken. Compared to wetlands in the surrounding areas, water remains throughout the year in Beung Kiat Ngong, and thus it is an especially important area for fish to live during the low water dry season. Forty-three species have been reported here in wet season, with additional species migrating to the site to spawn, while 20 fish species remain in the area during the dry season (IUCN, 2009a). Fish species found in the wetlands include Walking catfish (*Clarias* spp.), Snakehead fish (*Channa striata*), and Swamp eel (*Monopterus albus*). The aquatic habitats are also thought to be home to freshwater tortoises such as the vulnerable Malayan snail-eating turtle (*Malayemys subtrijuga*), the endangered Elongated tortoise (*Indotestudo elongate*), and the endangered Yellow-headed temple turtle (*Hieremys annandalii*). Reptiles include snakes, such as the Striped water snake (*Enhydris jagorii*), Gerard's water snake (*Gerarda prevostiana*), White-lipped pit viper (*Tremeresurus albolabris*), and the Cobra (*Naja* sp). (WREA, 2011). Tables 2 and 3 below show key fish species in the wetlands according to season.

**Table 2: Key fish species in the dry season**

Scientific name	Common name	Local name
<i>Channa striata</i>	Snakehead murrel	Pa kho
<i>Channa gachua</i>	Dwarf Snakehead	Pa kang
<i>Clarias batrachus</i>	Walking catfish	Pa douk
<i>Clarias macrocephalus</i>	Bighead Catfish	Pa douk oui
<i>Esomus metallicus</i>	Striped flying barb	Pa cheo
<i>Monopterus albus</i>	Swamp eel	Pa ein
<i>Oreochromis niloticus</i>	Nile Tilapia	Pa nin
<i>Rasbora aurotaenia</i>	Pale rasbora	Pa cheo oa
<i>Trichogaster trichopterus</i>	Blue Gourami	Pa kadeut

**Table 3: Key fish species that migrate into the wetlands for breeding in wet season**

Scientific name	Common name/family	Local name
<i>Channa sp.</i>	Channidae	Pa kuane
<i>Channa sp.</i>	Channidae	Pa do
<i>Cirrhinus sp.</i>	Cyprinidae	Pa keng
<i>Cirrhinus sp.</i>	Cyprinidae	Pa kha yang
<i>Danio sp.</i>	Cyprinidae	Pa vienphai
<i>Notopterus notopterus</i>	Asian Knifefish	Pa tong
<i>Tetraodon sp.</i>	Tetraodontidae	Pa pao

Source: WREA, 2011

## 6. Economic, social and cultural values

### 6.1 Population

Beung Kiat Ngong is home to approximately 11,500 from eight core villages and several outer villages<sup>1</sup> who are heavily reliant on the wetlands and nearby river resources. The majority of the population is made up of farmers who mainly engage in paddy rice cultivation and earn extra income from collecting wetland and other forest products for food, household use and for sale. More information about the economic uses of the wetlands is provided in Section 6.2 below.

Pathoumphone District, where the wetlands are located, is one of 72 districts in Lao PDR identified as poor (also known as “poverty districts”) (*Socio-Economic Atlas of Lao PDR*). Data gathered in the 11 villages of the wetlands by the IUCN LLS project (of which four are considered core/outer wetlands villages) between 2008 and 2010 shows that in 2010, of 1128 households, 208 households are considered “poor” or “extremely poor”, representing a poverty rate of 18%. Slightly more households are considered “wealthy”, with 234 (20%) out of 1128. Among the four that are core or outer villages on the wetlands, of 39 out of 375 households are considered poor or extremely poor, a relatively low poverty rate of 10.4% (please see Table 5 below for more detail).

According to a report from the BCI project (ADB, 2009), the average household size in this area is around six people, which is higher than the district average. The population density in the BCI villages was estimated to be around 40 people/square km, similar to that for Pathoumphone District, but much higher than the national average of 24.8. The population growth rate in the BCI villages was also found to be higher than the national average; higher population density combined with higher population growth implies a higher pressure on natural resources, especially given the villages reliance on these resources for their livelihoods.

<sup>1</sup> A note on the villages of the Beung Kiat Ngong area: data on villages shown in this report is taken from a number of reports produced for several projects in the area, including the ADB’s BCI project, IUCN’s LLS project and work for the site’s Ramsar nomination. Each project focused on slightly different pilot villages although with considerable overlap. For the purposes of this report, we consider the eight core villages, as referred to in the Beung Kiat Ngong Regulation (2010) and several surrounding villages. Please see Annex 3 for a list of all villages involved in various studies in the area.

IUCN Lao PDR (2008a) reports that most of the BCI villages are similar in terms of road access and the distance from the district town of Pathoumphone, although access becomes more difficult in wet season. However, only two villages have access to the main electricity supply grid, whereas one village has mini-hydro electricity supply.

The people of the Beung Kiat Ngong area are predominantly Lao Loum, the largest ethnic group in Lao PDR. According to the ADB (2009), the Xe Pian - Dong Hua Sao corridor, located within Pathoumphone District, is home to three ethnic groups: Lao Loum, Youane and Brao. Most of the wetlands villages are considered Lao Loum, with only Ban Houayko, an outer village of the wetlands, as Brao. The report notes that most of the villages that claim to be Lao recognize that in the past there has been mixing with the indigenous Mon-Khmer groups in the region, but they have now become Lao. Some of these villages have been there for centuries, while others were established recently as people moved into new areas.

## 6.2 Economic uses

As mentioned above, more than 11,500 people in 13 villages rely on the wetlands for their livelihoods, which are mainly derived from fishing and collecting wild vegetables. With an area of only about 3,000 ha, the Beung Kiat Ngong Wetlands provide enormous direct and indirect benefits for local communities. It was estimated in 2008 that the wetlands provide US\$ 897,607 (Khamlibounthavi, 2008) of annual direct economic value. Economic research conducted by LLS team and research students in the wetlands and with the communities living in and around the area in 2009 (IUCN, 2009b) reached a revised figure of US \$849,682 of economic benefits annually (see Table 4). The findings of this research are largely consistent with the previous estimate although different data sets were used.

**Table 4. Annual economic value derived from Kiat Ngong Wetlands in 2009**

Item	Harvest/ year (tons)	US\$	Percentage of total value
Fish	227.4	519,355	61
Eels	37.00	82,235	9.7
Frogs	137.1	112,600	13
Snails	13.00	3,058	0.3
Vegetables	5.70	1,411	0.17
Rice	724.4	131,011	15.4
<b>Total</b>	<b>1,144.6</b>	<b>849,682</b>	<b>100</b>

This figure of US\$849,682 can be supplemented with the economic benefits derived from livestock grazing and tourism. According to IUCN (2008a), the wetlands supports grazing for 4350 elephants, buffalo and cattle, amounting to 5430 “grazing units” which consume almost 40,000 tons of wetland vegetation. At an estimated cost of 3 baht per 15 kilograms, the equivalent in purchased feed for animals would amount to about US\$263,000 per year (please see Section 6.2.1 on agriculture below for more detail). Tourism earnings from elephant trekking alone has been placed at more than US\$20,000 per year, bring thing combined economic value of the wetlands closer to US\$1,132,000 annually.

According to ADB (2009), people in some villages in the corridor area, such as Ban Houayko, where there is less land available, have begun working as wage labor to earn extra income. Some seek employment in coffee plantations in Pak Xong or other nearby locations; some also migrate to Thailand in search of better opportunities. Better-off households also engage in small business, such as running shops, transportation, and handicrafts.



**Table 5: Socio-economic census data for 11 LLS villages, 2008-2010**

Village	Households (LLS/2008)					Households (LLS/2010)					Persons						
	Extreme poor	Poor	Fair	Wealthy	Total	Extreme poor	Poor	Fair	Wealthy	Total	Children <14 yrs		Elderly people			Women	
											Total	F	Total	M>60	F>55	Total	Widows
Somsouk	0	6	61	10	<b>77</b>	0	6	58	13	<b>77</b>	229	110	53	33	20	107	6
Nabone	1	13	73	0	<b>87</b>	0	0	60	28	<b>88</b>	217	107	53	26	27	145	11
Laonga	12	47	41	2	<b>102</b>	5	26	70	5	<b>106</b>	316	220	32	16	16	244	8
Sanot (W*)	0	17	70	31	<b>118</b>	0	7	58	53	<b>118</b>	233	121	71	38	33	154	11
Topsok (W)	3	1	71	12	<b>87</b>	3	1	70	13	<b>87</b>	165	45	47	16	31	180	20
Thahou (W)	0	10	41	34	<b>85</b>	0	10	41	34	<b>85</b>	165	89	59	28	31	135	15
Nakok	0	14	70	31	<b>115</b>	0	11	67	37	<b>115</b>	243	126	37	21	16	106	33
Nam Om	19	61	65	6	<b>151</b>	19	59	67	6	<b>151</b>	274	131	97	66	31	183	14
Thongpa	3	33	49	12	<b>97</b>	3	33	49	13	<b>98</b>	155	76	92	41	51	144	17
Huai Ko (W)	0	19	12	0	<b>31</b>	0	19	12	0	<b>31</b>	67	34	8	3	5	32	4
Kiat Ngong (W)	0	30	101	26	<b>157</b>	0	6	134	32	<b>172</b>	341	121	90	40	50	186	25
<i>Total</i>	<b>38</b>	<b>251</b>	<b>654</b>	<b>164</b>	<b>1107</b>	<b>30</b>	<b>178</b>	<b>686</b>	<b>234</b>	<b>1128</b>	<b>2405</b>	<b>1180</b>	<b>639</b>	<b>328</b>	<b>311</b>	<b>1128</b>	<b>164</b>

Source: IUCN Lao PDR LLS project records

\*W = wetlands core/outer village

### 6.2.1 Agriculture

As noted above, local people rely primarily on subsistence agriculture, NTFPs and fishing for their income and food supply in and around the Beung Kiat Ngong Wetlands. Local villagers grow paddy rice in the wet season, and water from the wetlands also supports gardens. Villagers also harvest fish and vegetables through the year from the wetlands and use boats both for fishing and farming. As shown in Table 8 below, IUCN field measurements in the wetlands area in 2009 found that there were 322 ha of rice paddies and about 4.5 ha of gardens. The rice grown in and around the wetlands is worth about \$130,000 each year (IUCN, 2009b). There are special varieties of rice in the area that are adapted to local conditions, such as floating rice.

The wetland is also grazing land for more than 4000 head of livestock, including cattle, buffalo and elephants, which feed on the wetland grasses. Provincial government officers from Xe Pian NPA produced a list of livestock numbers for each of 19 villages which might be expected to be grazing their animals in or around the wetlands. This shows that almost 80% of the animals grazing in the wetland belong to nine villages, with only 22% of the animals coming from the outer villages. Three villages alone, Kiet Ngong, Phapho and Phalai Bok, account for 50% of all animals grazing. Five villages, Khon Thout, Chong Houay, Toi, Houay Ko and Houay Mak, were not grazing their animals in the wetland, so the total number of villages grazing their animals in the Beung Kiet Ngong Wetlands is 14 (IUCN, 2008b).

**Table 6: Summary Livestock Statistics of 19 villages around the Kiet Ngong Wetlands**

Village	All animals				Animals grazing in wetlands				% of stock using wetlands	Share in wetland
	Eleph-ants	Buff-aloes	Cattle	Graz-ing units	Eleph-ants	Buff-aloes	Cattle	Graz-ing units		
Kiet Ngong	15	437	347	1153	15	437	347	1153	100	21
Phalai Bok	0	424	315	951	0	424	315	951	100	18
Pha Bo	3	197	436	762	3	197	436	762	100	14
Na Thong	3	86	267	426	3	86	267	426	100	8
Phom Ma Leu	1	81	327	459	1	40	327	397	87	7
Kae Lae Nyai	0	46	312	381	0	25	310	348	91	6
Pha Ka	1	169	301	565	1	32	101	159	28	3
Kae Lae Noi	0	8	50	62	0	8	50	62	100	1
<b>Total core villages</b>	<b>23</b>	<b>1448</b>	<b>2355</b>	<b>4757</b>	<b>23</b>	<b>1249</b>	<b>2153</b>	<b>4257</b>	<b>89</b>	<b>78</b>
Sa Ming	3	175	85	378	3	175	85	378	100	7
Ta Hou	0	133	105	305	0	133	105	305	100	6
Thop Sok	1	83	96	231	1	70	82	197	85	4
Bung Kok	0	47	117	188	0	47	117	188	100	3
Sa Node	1	85	141	279	0	0	70	70	25	1
Thong Sai	0	47	125	196	0	0	37	37	19	1
Khon Tou	0	100	118	268	0	0	0	0	0	0
Chong Houay	0	93	40	180	0	0	0	0	0	0
Toi	0	36	520	574	0	0	0	0	0	0
Houay Ko	0	45	34	102	0	0	0	0	0	0
Houay Mak	0	18	18	45	0	0	0	0	0	0
<b>Total outer villages</b>	<b>5</b>	<b>862</b>	<b>1399</b>	<b>2742</b>	<b>4</b>	<b>425</b>	<b>496</b>	<b>1174</b>	<b>43</b>	<b>22</b>
<b>Total all villages</b>	<b>28</b>	<b>2310</b>	<b>3754</b>	<b>7499</b>	<b>27</b>	<b>1674</b>	<b>2649</b>	<b>5430</b>	<b>72</b>	<b>100</b>

The economic value of grazing is thus high. If an average cow consumes 20 kg of fresh roughage per day, all year round, the total count of 5,430 grazing units would consume 39,439,000 kg, or almost 40,000 tons of wetland vegetation (IUCN, 2008b).

### 6.2.2 Fishing & other non-timber wetlands products

Due to a wide variety of habitats and abundance of fish, local villagers from the main villages around the wetlands annually harvest about 227 tons of fish, 187 tons of other aquatic resources, and 5-6 tons of vegetables; fish and eels account for a combined 70.7% of the total economic value derived from the wetlands (IUCN, 2009a).

Fishing techniques have not changed much in recent years, but now there are more people living in the area and thus more competition for natural resources. Of particular importance are a large number of semi-natural fish trap ponds (*loum pa*) owned by villagers in the area. These trap ponds are located in areas that dry out during the dry season. They are filled with vegetation by fishers. As the wetlands dry out fish concentrate in these holes. Then, when surrounding wetland areas are dry, usually in March and April, villagers remove the vegetation from the holes, scoop out the water, and harvest the fish (including swamp eels). Some families have a number of these trap ponds. Some destructive fishing practices have been reported, such as the use of electric shocks and draining water from their ponds for harvesting fish during dry season (see Baird and Shoemaker 2008; Claridge et al. 1997).

Significant analysis of the role of NTFPs in the local economy has been carried out by IUCN Lao PDR for the BCI and then the LLS projects. The table below shows the 11 most important NTFPs in the BCI villages. According to this data, the five top NTFPs harvested by the villagers are: Malva nut or Mak Chong (323 scores), berberine vine or Kheuahem (197 scores), honey (153 scores), cardamom or Mak Naeng (143 scores), and Damar resin (54 scores). While bamboo shoot and Kha (*Alpinia* spp. used in mat making) also ranked high these resources are largely for domestic use and have less market value.

**Table 7: Important NTFPs contributing to family cash income, ranked according to importance by villagers in 11 villages of the BCI site.**

Product	Lao Name	Na Bon	Som Souk	Lao Nya	Nam Om	Thong Pha	Sa Not	Thop Sok	Kiet Ngong	Houay Ko	Tha Hou	Na Kok	Total	%
Malva nuts	Mak chong	35	37	37	35	26	24	26	27	22	24	30	323	29%
Berberine	Kheua Haem	15	16	16	15	19	20	20	20	16	22	19	197	18%
Honey	Nam Pheung	20	21	21	20	24	22	0	0	24	0	0	153	14%
Cardamom	Mak Naeng	20	16	16	20	0	18	0	0	18	20	16	143	13%
Bamboo	Nor Mai	0	0	0	0	17	0	23	0	20	18	22	99	9%
Damar Resin	Ki Si	10	11	11	10	0	0	0	13	0	0	0	54	5%
Galangal	Kha	0	0	0	0	14	16	17	0	0	0	0	47	4%
Tinospora	Khao Ho	0	0	0	0	0	0	14	0	0	16	0	30	3%
Rattans	Wai	0	0	0	0	0	0	0	24	0	0	0	24	2%
Oleoresin	Nam Man Yang	0	0	0	0	0	0	0	16	0	0	0	16	1%
Mushrooms	Hed	0	0	0	0	0	0	0	0	0	0	14	14	1%
Average No of counters*		100	100	100	100	100	100	100	100	100	100	100	1100	100%
Actual No of counters		20	19	19	20	42	45	35	45	45	45	37	372	

\*It was difficult to compare actual scores as different villages used a different number of counters. Actual scores were made comparable by multiplying scores for each village to add up to a total of 100 counters.

Source: IUCN 2009c

IUCN Lao PDR's subsequent work through the LLS project found that around 89% of families in the area are engaged in harvesting NTFPs. IUCN's efforts to promote the sustainable harvesting of Malva nuts has resulted in better management of the Malva nut stands and increases in local income from the NTFP (IUCN, 2009d).

### 6.2.3 Other uses

The wetlands also have economic value in terms of other natural resources, such as peat and timber. Between 2006 and 2009, a Vietnamese company was involved in peat extraction in the Beung Kiat Ngong wetlands. According to the Ban Kiat Ngong council, the company worked 2-3 months per year, extraction about 650 cubic meters of peat each day worked. This left more than 20 holes of about 10 x 10 x 5 m in size in the northern part of the wetlands (IUCN, 2008a). After complaints by local villagers and intervention by the District Governor, the peat extraction was halted in 2009.

Beung Kiat Ngong, as a forested wetland and close to the Xe Pian and Dong Hua Sao NPAs, is also a source of timber and fuelwood. According to Article 21 of the *Regulation on Natural Resource Management for the Kiat Ngong Wetlands*, timber from the wetlands can be harvested for household use from customary managed zones, in accordance with the Forestry Law. However, only hand saws may be used, and timber cannot be transferred to other locations or mills. Duckworth (2008) observes that large amounts of charcoal are sold along Route 13 in Champassak Province; further, people in the area claim that it is becoming harder to find quality wood and now use sub-standard branches, etc, for charcoal making. ADB (2009) also notes that encroachment by outsiders illegally cutting timber is an emerging problem for local people in Ban Laonga (BCI/LLS village, located close to Dong Hua Sao NPA).

## 6.3 Tourism and recreation

Beung Kiat Ngong Wetlands and Phou Asa are among the most well-known tourism sites in Champassak Province, after the Khone Falls and Wat Phou Temple. Phou Asa Mountain provides a view of the green wetlands and forest, as well as the archaeological site on the mountain. The number of domestic and foreign tourists visiting Champassak Province has increased steadily over recent years, as it has in Lao PDR more generally. In 2009, just over 2 million people visited Lao PDR, bringing in revenues of more than US\$267 million. Of these, 278,054 people visited Champassak Province. This is a significant increase from 63,963 visitors to the province in 2004 (LNTA, 2010). Transport and access to the province has improved, with daily flights to Pakse, and a road bridge crossing the Mekong to Thailand along with an improved road to the international border crossing at nearby Chong Mek. The province also has road links to Vietnam and Cambodia. The number of visitors to the area is expected to increase in the future.

Approximately 10,000 tourists per year come to Pathoumphone District to stop at Kiat Ngong Village and visit Phou Asa and surrounding areas (WREA, 2011). According to the Pathoumphone District Tourism office, visitor numbers to the district increased by 46% between 2007 and 2008, with 4896 people visiting in 2007 and 7171 in 2008. Elephant trekking is a significant revenue generator for local mahouts, with revenue from

this activity alone believed to have earned them over USD\$23,000 from March 2006 – February 2007 (Maurer, 2009).

Since tourism has expanded in Kiat Ngong village, villagers have had the opportunity to expand their elephant riding service, as well as participate in guiding tours, operate a guesthouse and home-stay services, and sell handicrafts and other local products to tourists. In the wetlands, tourism is ostensibly organized by the local community – tourists can travel directly to Ban Kiat Ngong and book activities and accommodation through the “village information office” which also has a restaurant and a souvenir shop. The village has a community guesthouse, and the Kingfisher Ecolodge, an Italian-Lao family business, also offers accommodation and tours.

There are a number of ecotourism activities also taking place in the NPAs to the north and south of the site, Dong Hua Sao and Xe Pian. In Dong Hua Sao, some trekking is offered, where waterfalls and wild orchids are among the attractions, and more recently, an ecotourism company, Green Discovery Laos, has established a zipline and treehouse project to bring tourists into the NPA. In Xe Pian NPA, WWF has also supported the development of community-based ecotourism, and a website promoting the NPA ([www.xepian.org](http://www.xepian.org)).

With increases in visitor numbers and activities on offer likely to increase, careful management will be needed to ensure that any negative impacts on the wetlands and nearby protected areas and villages are minimized and that the benefits are shared fairly.

#### **6.4 Social and cultural values**

The Beung Kiat Ngong Wetlands also host important social and cultural values. The area is characterized by rural Lao Loum culture, including a continuing traditional elephant mahout culture. As noted in Maurer (2009), the tradition of domesticated elephant ownership is viewed by government officials and villagers alike as an important element of the Pathoumphone District’s cultural heritage. Ban Kiat Ngong is home to around half of Champassak Province’s remaining domestic elephant population of 33 elephants (Maurer, 2009), with 15 in 2009 and 14 reported by DAFO in 2010 (Elefant Asia, 2010). A local elephant festival is also held each year in February at Beung Kiat Ngong.

Elephant domestication has been practiced in Champassak Province for centuries, but these populations are now in decline. Taking calves from the wild was customary until banned by the Government of Lao PDR (GoL) in the late 1980s, complying with international conventions. In Champassak, as in other parts of Lao PDR, breeding of domestic elephants is uncommon and the elephant population is not being renewed. Conversations with local mahouts indicate that Pathoumphone District was home to an approximate 90 domesticated elephants ten years ago; only 14 or 15 remain today (Maurer, 2009; Elefant Asia, 2010). Maurer (2009) comments that, without intervention, the domesticated elephant population of Champassak Province will be close to zero within 20 years.

Beung Kiat Ngong Wetlands and its surrounds also host cultural sites, including Phou Asa and carved figures in the river bed rock at Ban Kasee (Xe Pian NPA website). Phou Asa, a hill adjoining the wetlands, is marked by many piles of flat stones where a ‘temple’ is located. Each pile is about 3 m high and stands like a pillar. This temple was built

under the direction of the Buddhist monk, Phra, at the beginning of the 19<sup>th</sup> century. He gathered up an army of ethnic minorities to fight against the oppressive slave trade. They sacked and burnt Champassak, forcing the then King of Champassak, Chao Manoi, to flee. Later, King Anouvongsa's son, Chao Nyo, eventually captured him in Attapeu (Baird 2007, cited in WREA 2011).

## **7. Land use, tenure and planning**

As discussed above, agricultural production, including paddy rice, gardens and livestock grazing, and utilization of wetlands and forest resources are the most common land use practices in and around the Beung Kiat Ngong Wetlands. A land and forest allocation (LFA) program has been conducted in the area to allocate land and to establish agreements on land use responsibility from village to village, as well as allocating land to each household (e.g. for paddy, gardens) (WREA, 2011). Within the site boundaries, lands and wetlands are common/state land owned by the government but local villagers have the right to use it. Individual or household, customarily "owned" areas include house settlement areas, paddies, gardens, sites for fishing traps and fish trap ponds (natural and man-made or influenced). A traditional tenure system exists that allows for private ownership of these trap ponds (Baird and Shoemaker 2008), with some families owning several. Table 8 below details the areas of land in the eight core villages used for rice growing and gardens.

Common land includes deep-water pools, forest areas (including village production forest and the two NPAs) and river channel areas outside of those with fishing agreements. The inland fisheries are generally managed as a common resource. The catchment area also includes areas designated as Dong Hua Sao NPA to the north and Xe Pian NPA to the south. There is almost no industrial or commercial development in the area. However, industrial monoculture plantations are increasing in the catchment area, replacing forest areas. These plantations, and others planned, may pose a significant threat to the area in the long-term. A study of plantation development in Pathoumphone District by WWF Laos and the National Land Management Authority (NLMA) in 2008 showed that the total area of issued concessions was 10,431.8 ha (although only 1,672.6 ha. was actually planted as of 2008), with rubber as the primary crop. Thirty-two plantation companies were active in the district, planting rubber, cashew, oil palm, eaglewood, jatropha, and fruit trees (cited in Barney, 2010). In addition, 650 cubic meters of peat was being extracted each day worked from the wetlands during 2006-2009 to make natural fertilizer (IUCN, 2008a), although this has now ceased. The Kingfisher Lodge, a tourism venture, also has a small concession of 7 ha for a guesthouse and recreation space, granted by the district government for a period of 50 years.

Some wetland areas have been converted into rice fields. Research has clearly shown that people have tended to lose more fish than they have gained rice when this conversion process occurs. In some years, the water level is too high in some plots of rice paddy located around the wetlands, so they could not be harvested and productivity suffers. It has also been shown that many 'food security' projects have funded this conversion, even if it actually decreases food security (Baird and Shoemaker 2008; WREA, 2011).

**Table 8: Land use in Kiat Ngong Wetlands' eight core villages**

Village Name	Info. on field areas in 1998 (ha)	Village interviews 2009			Landowner interviews 2009			Field Measurement 2009					
		House-holds	No. of plots	Total area (ha)	House-holds	No. of plots	Total area (ha)	Rice Paddy			Gardens		
								House-holds	No. of plots	Area (ha)	House-holds	No. of plots	Area (ha)
Topsok	15.98	14	14	14.46	12	16	14.790	12	16	24.760	3	4	0.457
Phom-maleu	6.11	14	14	18.1	16	16	18.270	16	16	31.869		0	0
Kele	20.55	9	9	15.23	15	15	29.300	15	15	20.278		0	0
Phapho	46.06	41	41	42.25	34	36	33.460	34	36	50.157	5	6	4.526
Nong-mang Ek	1	14	14	12.1	18	21	18.200	18	21	19.517		0	0
Phalai	30	10	10	10.79	10	11	12.870	10	11	17.5		0	0
Phakha	10	30	30	32.09	68	72	77.230	68	72	75.776		0	0
Kiat Ngong	124.65	97	155	144.64	92	98	125.317	92	98	159.597		0	0
<b>Total</b>	<b>211.71</b>	<b>192</b>	<b>250</b>	<b>241.87</b>	<b>222</b>	<b>238</b>	<b>267.077</b>	<b>222</b>	<b>238</b>	<b>322.547</b>	<b>5</b>	<b>6</b>	<b>4.526</b>

Source: interviews and field measurements conducted under the IUCN LLS project in 2009.

Under the *Regulation on Natural Resource Management for the Kiat Ngong Wetlands*, dated 2010, which applies to 12 villages in and around the wetlands<sup>2</sup>, the basic principles governing the wetlands are:

- Participation and customary rights of local villagers and authorities;
- Contribution by local villagers in conserving and managing the wetlands (Article 2).

Article 8 sets out zoning of the wetlands, including protected areas, seasonally protected areas and customary managed zones, referring to areas where customary rights allow the villagers to continue to fish, practice agriculture and gather NTFPs. These zones are described in greater detail in Section 8 on management below.

## **8. Management and conservation of the site**

Different types of formal and informal management arrangements have characterized how the Beung Kiat Ngong Wetlands have been managed, exploited and conserved. Government policies, villager practices and exploitation of resources in the wetlands are intermingled, including individual village established and enforced regulations for managing living aquatic resources, traditional family based arrangements, and government enforced regulations. This section will describe the evolution of management of the wetlands.

### **8.1 Past and present management**

All the villages were affected by the land and forest allocation process (LFA) in the 1990s, and some villages formed protected wetland areas, especially deep-water pools and forest areas within the broader wetland area. For example, a number of deep-water pools have recently been protected by villagers for fish breeding with the support of the Global Association for People and the Environment (GAPE), which started working in the area in 2001. These villages have also prepared other fisheries-based rules.

The Beung Kiat Ngong Wetlands lies partly within Xe Pian and the Dong Hua Sao NPAs, both established in 1993. The Forestry Law and related regulations have been developed as legal tools to support the management and conservation of biodiversity. Therefore, based on the legislation, the area is protected from natural resources exploitation. However, protection of NPAs can be overridden with express permission of the Ministry of Agriculture and Forestry (MAF). Another part of the larger Beung Kiat Ngong Wetlands complex is Beung Phapho, which is not legally protected because it lies outside of both of the NPAs.

Education and raising awareness activities on the importance of biodiversity and wise use of the wetlands have been conducted in the past with the support of a number of organizations, including: Swedish International Development Agency (SIDA); IUCN; Danida; ADB; Worldwide Fund for Nature (WWF) and GAPE. However, these activities have always been reliant on project funding from external donors. Due to a lack of long-term funding, these activities have therefore had limited success, although it should be

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<sup>2</sup> The eight core villages are Kiat Ngong, Topsok, Phommaleu, Kele, Phapho, Phalai, Nongmang Ek and Phakha, with four additional villages including Sanot and Saming.



noted that GAPE has been working in the area for more than 8 years, and plans to continue working there (WREA, 2011).

In 2006, the ADB started work in the area between the two NPA's, covering parts of Champassak and Attapeu Provinces and including Beung Kiat Ngong, for a Biodiversity Corridors Initiative (BCI), a substantial part of its Greater Mekong Subregion Core Environment Program. The BCI project started implementation in six pilot sites in Cambodia, China, Lao PDR, Thailand, and Vietnam in the period 2006 – 2009. BCI has been carried out by a partnership of government agencies, non-governmental organizations and the ADB. Its purpose is to rebuild connectivity of fragmented natural ecosystems through corridor approaches, establishing by 2015 a number of priority biodiversity conservation landscapes and corridors in the region for maintaining the quality of ecosystems and ensuring sustainable use of shared natural resources (ADB, 2009). Work for the BCI project in Lao PDR was coordinated by the national Water Resources and Environment Administration (WREA), together with PAFOs and WWF. The project included biodiversity surveying, NTFPs market analysis, land use planning and small-scale infrastructure improvements. Financing for phase one of the project ended in 2009, although up-scaling of the BCI pilot activities has been requested by Cambodia, Lao PDR and Vietnam (ADB, 2009). Work for BCI in Lao PDR is ongoing, with phase two now being implemented.

The WWF project “Improve the Management of the Xe Pian NPA” was implemented between April 2009 and June 2011. This project supported conservation activities throughout the NPA, including the wetlands, with a focus on law enforcement, including training and equipping Xe Pian staff to respond to illegal activities.

Also in the BCI area between the two protected areas, the IUCN Lao PDR Livelihoods and Landscapes Strategy (LLS) began in 2008. The LLS started activities with education and awareness-raising for key decision-makers from the province, in order to address the lack of recognition of the wetlands' importance. This was followed by a series of formal and informal consultations in Pathoumphone District to develop a 'road map' for improving management of Beung Kiat Ngong. A District Committee for the Wetlands was established in January 2009, and field surveys on the wetlands' boundaries, land use, biodiversity, economic values and zoning were carried out. IUCN Lao PDR facilitated further consultations in the 13 villages in and around the wetlands to identify and solve wetlands issues. Growing exploitation of the wetlands for peat, fish and NTFPs were among the concerns raised. Zoning and the development of a regulation in 2010 to govern the wetlands were completed under the LLS project. NTFPs have been another focus for LLS, which has helped local villages to carry out NTFPs planning and harvesting improvements in the Beung Kiat Ngong area. Working with the villages, the District Government and PAFO, IUCN developed and established a sustainable management and trading system for the most important non-timber forest NTFP in the Province, Malva Nut, to address unsustainable use of the resource and promote local ownership.

During this period, work also intensified to prepare Lao PDR to join the international Ramsar Convention on Wetlands of International Significance. Beung Kiat Ngong was one of two sites nominated by Lao PDR acceding to the Convention. Lao PDR officially joined Ramsar in September 2010; work is now focused on implementing the

requirements of the convention for the “wise use” of wetlands, including the development of management plans.

An officially approved management plan does not yet exist for Beung Kiat Ngong, although a ‘co-management plan’ is under preparation with assistance from IUCN Lao PDR. However, a *Regulation on Natural Resource Management for the Kiat Ngong Wetlands* was approved in 2010 by the District Government. The Regulation sets out the boundaries, as endorsed by the eight core wetlands villages: Kiat Ngong, Topsok, Phommaleu, Kele, Phapho, Phalai, Nongmak Ek and Phakha (Article 7). It also describes the protected zones, seasonally protected zones and managed zones, where activities such as fishing, grazing and farming continue, provided they do not harm the wetlands. Conversion of the wetlands or forests of Beung Kiat Ngong is now banned (Article 6). Table 9 provides more detail on the various zones recognized in the Regulation. In addition, the Regulation sets out the rights and responsibilities of the local villages in managing the wetlands, including shared patrolling duties (Article 10; see Map 4 below).

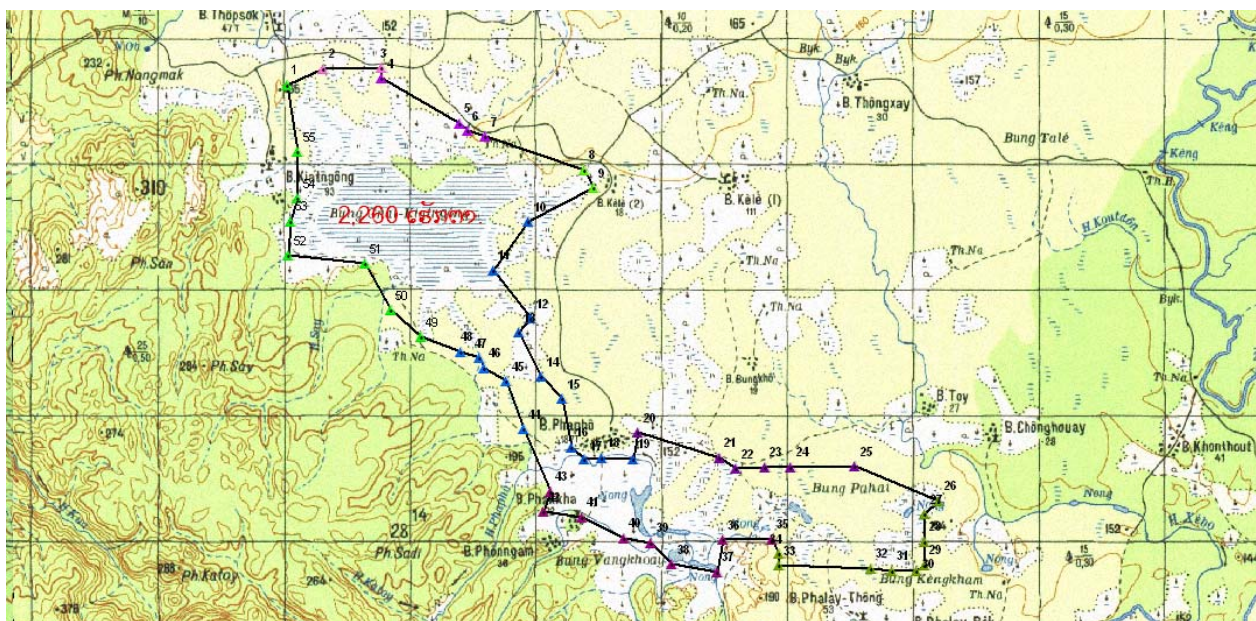
**Table 9: Zones of the Beung Kiat Ngong Wetlands, as set out in the Regulation**

I. Protected areas								
No.	Local Name	Areas (ha)	Responsible village	Location				Remark
				North	South	East	West	
1..	Done Yang (Nong Joke)	28.5	Kiat Ngong	Done Yang	Done Ya Ka	Done Time Pa MOUNG	Done Lao Kao	Fish conservation pond
2.	Done Ka Dun	164	Kiat Ngong	Done Ka Dun	Done Kuang	Done Tome Done Hor	Done Lao Kao	Fish conservation pond
3.	Done Nok Hor	73	Phapho	Done Thome	Pak Thong Hi	Done Kork	Done Kuang	Fish conservation pond
	<b>Total</b>	<b>265.5</b>						
II. Seasonal protected areas								
1.	Wang Nong Lak	0.7	Kiat Ngong	None Pa Kok, near Nong Lak river	Done Ngai (Time Pa MOUNG)	Na Nong Lak areas	Leuam + Khem's rice paddy	Fish conservation pond
2.	Wang Takuang	0.5	Kiat Ngong	Done Pa Pao	Phuta khuane	Phuta khuane	Upland rice paddy	Fish conservation pond
3.	Wang Mak Jeng	0.3	Kiat Ngong	Beung field	Done Nok Hor – End	Done Nok Hor – Begin	Mango tree, Done Mak Jeng	Fish conservation pond
4.	Wang Kuai	3.2	Kiat Ngong	To's rice paddy				Fish conservation pond
5.	Wang Yao	0.6	Kiat Ngong	Bounthavy's rice paddy			Soun's rice paddy	Fish conservation pond
6.	Wang Nong Na Mood	0.3	Pakka	None Hin Lang (small Dou tree)	Lee's rice paddy	Kork Hin Lang (Peuy Tree)	Pone Hin Lang (Nom's rice paddy hut)	Fish conservation pond

7.	Wang Nong Pa Poi	0.4	Palai	Kisang's rice paddy (village area)	Kok Lang near Papoi pond	Kok Lang near field	Upland rice fall to Papoi pond	Fish conservation pond
8.	Wang Kasai (Beung Kasai)	8.5	Palai	Hong Tami	Sai + Pheung's rice paddy	Irrigation	Hong Kae	Fish conservation pond
	<b>Total</b>	<b>14.5</b>						
<b>III. Specific conservation areas for certain activities</b>								
9.	Done Yai Time Pa Mouang	4	Kiat Ngong	Sing, Leum, Khem's rice paddy and Nong Lak conservation pond	Khamvong's rice paddy	Nu Phone's rice paddy or Na None Ngai Done Pa Mouang	Done Pa Ya Ka	No logging and agriculture areas
10.	Done Pa Ya Ka	0.7	Kiat Ngong	Done Yang (Nong Joke)		Done Ngai (Time Pa Muang)		No logging and agriculture areas
	<b>Total</b>	<b>4.7</b>						
		<b>Overall total: 299.2 ha</b>						

Source: Regulation on Wetlands (2010)

**Map 4: Wetland boundaries related to villages' patrolling responsibilities**



## **8.2 Proposed/planned conservation measures**

- Continued awareness-raising about the importance of the wetlands, sustainable use, zoning and boundaries, including dissemination and testing of regulations and putting up signboards;
- Development of a co-management plan; gain its approval and ensure implementation;
- As part of the co-management plan, set up local-level (e.g. khumban) wetlands committees.
- Continued work on NTFPs, sustainable tourism, community-managed fisheries, environmental education, and so on, by organizations such as IUCN, WWF and GAPE.

## **8.3 Key actors**

Wetlands in Lao PDR are managed through a number of government agencies and other actors, at the national, provincial and local level. Key actors in the management of Beung Kiat Ngong include:

- At the district level, the District Wetlands Committee and the Pathoumphone District Agriculture and Forestry Offices (DAFO) are strongly involved in the governance of the wetlands;
- At the provincial level, the Champassak PAFO, and the provincial Water Resources and Environment Office (PWREO).
- At the national level, WREA is the lead agency in the Lao water sector and is responsible for the implementation of the Ramsar Convention in Lao PDR; the national-level Division for Forest Resources Conservation (DFRC), oversees NPAs, including Xe Pian and Dong Hua Sao.
- The National Committee for Wetlands Management for the Ramsar Convention, which includes high-level representatives from a number of Lao PDR ministries (such as WREA, MAF, NLMA and NTA) and is chaired by Vice Prime Minister Asang Laoly. The Committee held its first meeting in January 2011.
- Other government departments in the province are also concerned, such as the Provincial Tourism Office and the Land Management Office.
- The Communications, Education and Public Awareness (CEPA) focal point for the Ramsar Convention in Lao PDR is IUCN Lao PDR.

More information on stakeholders associated with the wetlands is provided in Annex 1.

## **9. Changes and threats**

There are a number of factors (past, present or potential) adversely affecting the site's ecological character and the sustainable use of natural resources, including changes in land and water use.

For example:

- Peat extraction for fertilizer was carried out in the northern part of the wetland for several years. Although this practice has ended, it has had an impact on the wetlands, with the creation of numerous holes and the release of carbon dioxide. The holes, however, have been converted to fish ponds by local villagers.

- Beung Kiat Ngong's ecology and local livelihoods may be negatively affected by the potentially unsustainable harvest of aquatic resources (such as fish), wildlife and NTFPs. Prior to intervention through the LLS project, for example, Malva nut stands were being destroyed through unsustainable harvesting practices, driven by strong demand for this product. Further studies are required to determine the status of fish and NTFP stocks in and around the wetlands. Illegal hunting of wildlife also remains a threat in and around the wetlands.
- Increased number of cattle and buffalo might generate more pressure on the capacity of the wetlands. The current level of around 5,400 "grazing units" (including cattle, buffalo and elephants) indicates that the wetlands provide an important function for the local economy in this respect. As the population in the area continues to grow, this pressure will grow as well.
- Insufficient human and financial resources to implement regulations and management plans effectively remain an important concern for the future of Beung Kiat Ngong. As in other parts of Lao PDR, the government departments charged with managing wetlands, the environment more generally and local planning, are often under-funded and poorly equipped. This can lead to patchy implementation of laws, policies and plans. On a positive note, the Regulation on the Wetlands has already been agreed to by villages in the area and passed in 2010. In addition, it is hoped that the Ramsar Convention status of Beung Kiat Ngong will help attract and direct resources towards better management of the site.
- Environmental and social issues which may be associated with tourism expansion have not been properly studied or addressed. Pathoumphone District, including the wetlands and other sites such as Phou Asa, are attracting an increasing number of tourists. The Ramsar status of Beung Kiat Ngong, along with improved infrastructure and increased tourism numbers more generally, can be expected to boost the number of visitors in the future. Further assessment of the environmental and social risks of tourism in the area is required, along with measures to ensure that negative impacts are minimized while benefits are shared among the communities of the wetlands. If well-managed, tourism can offer an important contribution to local livelihoods and the management of the site.
- There have been some indications that agricultural practices may pose a threat to the wetlands in the future, such as increased use of chemical fertilizers for growing rice. Further irrigation projects are also under consideration, which may result in more water being taken from the wetlands.
- Although not practiced in the wetlands, aquaculture does take place nearby, requiring vigilance to prevent the introduction of invasive/non-native fish species such as tilapia into the wetlands.
- Despite the protection offered by the new Regulation and the site's Ramsar status, land use change remains a potential threat. Even NPAs in Lao PDR face problems from illegal encroachment and conversion into agricultural land or plantations, or the issuance of concessions for infrastructure or mining projects within their boundaries. It has been shown that conversion of wetlands to agricultural land rarely results in increased economic benefits (see Section 7). Conversion of the remaining natural marsh areas into rice-paddy fields, or the wider conversion of nearby forestlands into plantations or other uses, must still be guarded against.
- The impacts of hydropower development on the rivers and streams, such as the Xe Pian and Xe Kong, feeding the wetlands must also be considered. Planned

- hydropower developments include, among others: the Xekong 4 and 5 projects (300 and 400 MW installed capacity respectively) in Sekong; and the Xe Pian- Xe Namnoi (390 MW) in Attapeu and Champassak (International Rivers, 2010).
- Upgrade of existing roads, such as Route 18a from Pathoumphone to Sanamxay, as well as new roads may also result in negative impacts on the wetlands.

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# ANNEXES

## Annex 1: Stakeholder analysis for Beung Kiat Ngong Wetlands

Level	Actor	Interests/activities
National Govt	<b>Water Resources &amp; Environment Administration (WREA)</b>	<ul style="list-style-type: none"> <li>o Responsible for Ramsar implementation in Lao PDR and water resources in general</li> <li>o Partner in a number of upcoming wetlands projects in Lao PDR, such as MRC/IUCN update of wetlands inventory</li> <li>o Member of National Committee on Wetlands Management for the Ramsar Convention</li> </ul>
	<b>Division of Forest Resources Conservation (DFRC), MAF</b>	<ul style="list-style-type: none"> <li>o Responsible for the management of national protected areas, including Xe Pian and Dong Hua Sao</li> <li>o Responsible for wildlife management</li> <li>o DFRC is focal point within MAF for the Ramsar Convention in Lao PDR</li> </ul>
	<b>Department of Livestock &amp; Fisheries, MAF</b>	<ul style="list-style-type: none"> <li>o Responsible for fisheries</li> </ul>
	<b>Ministry of Planning and Investment (MPI)</b>	<ul style="list-style-type: none"> <li>o Responsible for economic planning and investment strategies in Lao PDR, including issuance of concessions and investment permissions (above a certain level, e.g. 1000 ha)</li> </ul>
	<b>National Land Management Authority (NLMA)</b>	<ul style="list-style-type: none"> <li>o Responsible for land use planning and titling, as well as land surveys and advice on concessions</li> <li>o Member of National Committee on Wetlands Management for Ramsar</li> </ul>
	<b>LARReC (under NAFRI)</b>	<ul style="list-style-type: none"> <li>o Lao Aquatic Resources Research Center, which is the main body for aquatic species and fisheries research in Lao PDR</li> <li>o Also the Scientific Focal Point for Ramsar in Lao PDR</li> </ul>
Champassak Provincial Govt	<b>Provincial Agriculture &amp; Forestry Office (PAFO)</b>	<ul style="list-style-type: none"> <li>o Key partner in environmental and livelihood programs in the wetlands and the province more broadly, such as BCI, LLS, etc.</li> <li>o Will play key role in implementation of Ramsar at provincial level</li> </ul>
	<b>Provincial Water Resources &amp; Environment Office (WREO)</b>	<ul style="list-style-type: none"> <li>o Responsible for implementation of environmental laws &amp; policies at the provincial level, including monitoring environmental impacts of businesses and development projects</li> <li>o Will play key role in implementation of Ramsar at provincial level; planning to set up District office</li> </ul>
	<b>Provincial Land Management Office (PLMO)</b>	<ul style="list-style-type: none"> <li>o Responsible for land use planning and titling, as well as land surveys and advice on concessions at the provincial level</li> </ul>
	<b>Provincial Tourism Office (PTO)</b>	<ul style="list-style-type: none"> <li>o Oversees tourism in the province, including involvement in granting of tourism concessions</li> </ul>

	<b>Provincial Department for Planning &amp; Investment (PDPI)</b>	<ul style="list-style-type: none"> <li>o Responsible for economic planning and investment strategies for Champassak Province, including issuance of concessions and investment permissions (at a certain level, e.g. 100 - 1000 ha)</li> </ul>
<b>District/local govt</b>	<b>District Agriculture &amp; Forestry Office (DAFO)</b>	<ul style="list-style-type: none"> <li>o Key partner in environmental and livelihood programs in the wetlands and the province more broadly, such as BCI, LLS, etc.</li> <li>o Member of District Wetlands Committee</li> </ul>
	<b>District Wetlands Committee</b>	<ul style="list-style-type: none"> <li>o Established in 2009 to oversee governance of the Beung Kiat Ngong Wetlands</li> <li>o Includes representatives from District government agencies, village leaders, Lao Women's Union</li> <li>o With assistance of NPA directors and IUCN, BCI and SUFORD Field Coordinators</li> </ul>
	<b>Khumbans</b>	<ul style="list-style-type: none"> <li>o Village development clusters will be the selected level for the development of local Wetlands Committees</li> </ul>
<b>Villages</b>	<b>13 wetlands villages</b>	<ul style="list-style-type: none"> <li>o The Regulation on the Wetlands was agreed upon and applies to 12 wetlands villages in 3 clusters (eight core villages plus 4 more).</li> <li>o An additional village is also engaged in work on Ramsar and wetlands management</li> <li>o Relevant projects in the area, such as BCI &amp; LLS have worked in 11 villages in Pathoumphone District</li> <li>o Each village cluster has a representative on the District Wetlands Committee; local Committees planned at the khumban level in the future.</li> </ul>
<b>Local people &amp; organizations</b>	<b>Local villagers</b>	<ul style="list-style-type: none"> <li>o Approx. 11,500 people in the 8 core villages (plus additional surrounding villages) are beneficiaries of the wetlands and dependent on the wetlands and surrounding areas for their livelihoods</li> <li>o Customary use of the wetlands involves allocation of paddies, fish ponds and traps to individual villagers/households</li> <li>o Local villagers play a very important role in implementing the Regulation on the Wetlands, as well as customary practices, and will be key partners in further management/conservation of the site</li> </ul>
	<b>Ethnic groups</b>	<ul style="list-style-type: none"> <li>o Most people in the area are of the Lao Loum majority</li> <li>o One village, Ban Houay Ko, is considered a Brao village. Brao are a Mon-Khmer group who live around the Bolaven Plateau area and border region with Cambodia.</li> </ul>
	<b>Village Malva Nut Groups</b>	<ul style="list-style-type: none"> <li>o Established by the LLS Project in certain villages in Pathoumphone District to oversee the care, harvest and trade of Malva nuts</li> </ul>
	<b>Mass organizations</b>	<ul style="list-style-type: none"> <li>o Mass organizations such as the Lao Women's Union (LWU) and Lao National Front maintain a network at</li> </ul>

		<p>the village level</p> <ul style="list-style-type: none"> <li>○ District LWU is represented on the District Wetlands Committee</li> </ul>
<b>International organizations &amp; NGOs</b>	<b>Ramsar Convention</b>	<ul style="list-style-type: none"> <li>○ The Ramsar Convention on Wetlands of International Importance accepted Lao PDR as a party in September 2010, after many years of preparation</li> <li>○ Two sites were nominated by Lao PDR as wetlands of significance: Beung Kiat Ngong in Champassak Province and Xe Champhone in Savannakhet Province</li> <li>○ Joining the Convention signals commitment to work actively to support its “three pillars”: 1) ensuring the conservation and wise use of wetlands it has designated as Wetlands of International Importance, 2) including as far as possible the wise use of all wetlands in national environmental planning, and 3) consulting with other Parties about implementation of the Convention, especially in regard to transboundary wetlands, shared water systems, and shared species.</li> </ul>
	<b>ADB</b>	<ul style="list-style-type: none"> <li>- The ADB is currently implementing Phase 2 of its BCI project which includes Beung Kiat Ngong; the BCI is paralleled by one of the GMS economic corridors, linking Thailand to Vietnam across Lao PDR.</li> </ul>
	<b>IUCN</b>	<ul style="list-style-type: none"> <li>- IUCN has been working in the wetlands area for some years, including some tasks for BCI, followed by the LLS project, starting in 2008.</li> <li>- IUCN also supported the GoL in preparations for joining the Ramsar Convention and has been named CEPA focal point for this Convention in Lao PDR.</li> <li>- Ongoing work in the wetlands will be supported under IUCN's Mekong Water Dialogues project (Phase 2) and a number of other IUCN projects.</li> </ul>
	<b>WWF</b>	<ul style="list-style-type: none"> <li>- WWF has been implementing the ADB's BCI project in the corridor that includes Beung Kiat Ngong</li> <li>- Also supported work on community-based tourism in Xe Pian NPA and piloting Green Club environmental education activities in schools.</li> </ul>
	<b>Elefant Asia</b>	<ul style="list-style-type: none"> <li>- Carries out vet-care visits to the domestic elephants in Beung Kiat Ngong</li> <li>- Consultant for WWF/BCI on elephant tourism potential in the area</li> <li>- Other relevant programs include support for elephant breeding/baby bonus, plus experience in helping to set up mahout association (in Sayaboury).</li> </ul>
	<b>GAPE</b>	<ul style="list-style-type: none"> <li>- GAPE has been working on community-based natural resource management in the area since 2001.</li> <li>- Its Remote Village Education Support Project (RVESP), involving support for education, environmental education, agriculture, etc, has been implemented in 28</li> </ul>

		<p>villages in Pathoumphone District.</p> <ul style="list-style-type: none"> <li>- These activities were due to finish in 2010; eco-tourism work is also under development for 2011.</li> </ul>
	<b>SUFORD</b>	<ul style="list-style-type: none"> <li>- The Sustainable Forestry for Rural Development project is a multilateral cooperation between GoL, Finland and the World Bank, aiming to introduce a nation-wide forest management system.</li> <li>- Has included the establishment of production forest areas in a number of provinces, including Champassak, and support for participatory forest management with local villages.</li> <li>- SUFORD has been working in a number of villages in the area, e.g. set up village forestry organizations in 9 BCI villages, plus nurseries in several villages.</li> </ul>
<b>Private sector</b>	<b>Kingfisher Lodge</b>	<ul style="list-style-type: none"> <li>- Lao/Italian family operated guesthouse in Beung Kiat Ngong; offers activities as well as accommodation</li> </ul>
	<b>Other tourism operators</b>	<ul style="list-style-type: none"> <li>- Community Guesthouse in Ban Kiat Ngong &amp; community-based guides/treks</li> <li>- Green Discovery Laos, a national company with tours to Bolaven, Xe Pian and Dong Hua Sao and investment in Dong Hua Sao zipline &amp; treehouse project.</li> <li>- Other international and national tour companies running programs to the area, such as Exotissimo and Diethelm.</li> </ul>
	<b>Industry</b>	<ul style="list-style-type: none"> <li>- No industrial companies currently directly draw on the wetlands for water</li> <li>- Beerlao established a plant 19km south of Pakse in 2008, which produces beer and soft drinks. There were plans to boost its production at this plant to 100 million liters in 2010.</li> </ul>
	<b>Household businesses</b>	<ul style="list-style-type: none"> <li>- Household businesses are also an important source of income in the area, including handicrafts, transportation services, restaurants and small shops.</li> </ul>
<b>Other</b>	<b>Pakse City</b>	<ul style="list-style-type: none"> <li>- Beung Kiat Ngong is located 56km south of Pakse City, the provincial capital of Champassak. Although Pakse receives few direct benefits from the wetlands, such as water supply or flood mitigation, the site does provide: <ul style="list-style-type: none"> <li>o Tourism destination and business opportunities for Pakse-based operators</li> <li>o Food production, with many wetlands products such as fish sold in the markets of Pakse</li> </ul> </li> </ul>

**Annex 2: Complete list of bird species reported in 2008 BCI biodiversity survey (Duckworth, 2008)**

Table 2. Bird species recorded in the BCI pilot area

ENGLISH NAME	SCIENTIFIC NAME	Pilo t	DHS	X P	Lak- 48	Meko ng
Red Junglefowl	<i>Gallus gallus</i>	P	P	[P]		
Lesser Whistling-duck	<i>Dendrocygna javanica</i>	P	P	P	O	
Cotton Pygmy-goose [Garganey]	<i>Nettapus coromandelianus</i> [ <i>Anas querquedula</i> ]				LC	
Buttonquail	<i>Turnix</i>	P		P		
White-browed Piculet	<i>Sasia ochracea</i>	P				
Rufous Woodpecker	<i>Celeus brachyurus</i>			P		
Laced Woodpecker	<i>Picus vittatus</i>		P			
Red-collared Woodpecker	<i>Picus rabieri</i>		P			
Common Flameback	<i>Dinopium javanense</i>	P				
Greater Flameback	<i>Chrysocolaptes lucidus</i>	P	P			
Pale-headed Woodpecker	<i>Gecinulus grantia</i>		P			
Heart-spotted Woodpecker	<i>Hemicircus canente</i>		P			
Lineated Barbet	<i>Megalaima lineata</i>	C	C	C	O	P
Green-eared Barbet	<i>Megalaima faiostricta</i>	P		P		
Blue-eared Barbet	<i>Megalaima australis</i>	C	C	C	F	
Coppersmith Barbet	<i>Megalaima haemacephala</i>	C	C	C	C	
Oriental Pied Hornbill	<i>Anthracoceros albirostris</i>	O	O	O		
Wreathed Hornbill	<i>Aceros undulatus</i>			O		
Orange-breasted Trogon	<i>Harpactes oreskios</i>	P	P			
Indian Roller	<i>Coracias benghalensis</i>	C	P	C	F	P
Dollarbird	<i>Eurystomus orientalis</i>			O		
Common Kingfisher	<i>Alcedo atthis</i>	C	C	C	C	P
Blue-eared Kingfisher	<i>Alcedo meninting</i>	[P]				
Banded Kingfisher	<i>Lacedo pulchella</i>	C	C	C		

Stork-billed Kingfisher	<i>Halcyon capensis</i>	O		O		
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	F	O	C	O	
Black-capped Kingfisher	<i>Halcyon pileata</i>	O		O	C	
Green Bee-eater	<i>Merops orientalis</i>	[O]	[O]			
Chestnut-headed Bee-eater	<i>Merops leschenaulti</i>	F	F	F	O	
Bee-eater	<i>Merops</i> sp.					P
Chestnut-winged Cuckoo	<i>Clamator coromandus</i>		P			
Banded Bay Cuckoo	<i>Cacomantis sonneratii</i>	C*	C*	C*		
Plaintive Cuckoo	<i>Cacomantis merulinus</i>	C*	C*	C*	C*	
Violet Cuckoo	<i>Chrysococcyx xanthorhynchus</i>	C	C	C		
Drongo Cuckoo	<i>Surniculus lugubris</i>	C*	C*	C*		
Asian Koel	<i>Eudynamys scolopacea</i>				P	
Green-billed Malkoha	<i>Phaenicophaeus tristis</i>	P		P		
Greater Coucal	<i>Centropus sinensis</i>	C	C	C	C	C
Lesser Coucal	<i>Centropus bengalensis</i>	C	O	C	F	
Vernal Hanging Parrot	<i>Loriculus vernalis</i>	C	C	C		
Red-breasted Parakeet	<i>Psittacula alexandri</i>	F	O	O	O	
Brown-backed Needletail	<i>Hirundapus giganteus</i>	P	P	P		P
Needletail	<i>Hirundapus</i> sp(p).	C			P	
Asian Palm Swift	<i>Cypsiurus balasiensis</i>	P	P	P	C	P
House Swift	<i>Apus affinis</i>	O	O	O		
Crested Treeswift	<i>Hemiprocne coronata</i>			O		
Collared Scops Owl	<i>Otus bakkamoena</i>		O			
Asian Barred Owlet	<i>Glaucidium cuculoides</i>	C	C	C	C	C
Brown Hawk Owl	<i>Ninox scutulata</i>	P	P	P	P	
[Javan Frogmouth]	<i>[Batrachostomus javensis]</i>			[P]		
Great Eared Nightjar	<i>Eurostopodus macrotis</i>		P	C		
Large-tailed Nightjar	<i>Caprimulgus macrurus</i>			C		
Oriental Turtle Dove	<i>Streptopelia orientalis</i>	O	O	O		
Spotted Dove	<i>Streptopelia chinensis</i>	C	C	C	C	
Barred Cuckoo Dove	<i>Macropygia unchall</i>	O				
Emerald Dove	<i>Chalcophaps indica</i>	F	F			
Peaceful Dove	<i>Geopelia striata</i>			P	[P]	
Thick-billed Green Pigeon	<i>Treron curvirostra</i>	F	F			
Green pigeon	<i>Treron</i> sp(p).	F	P	O	O	
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	O	O	O	P	
Crake	small Rallidae	LC	P	C	P	
White-browed Crake	<i>Porzana cinerea</i>			O		
Watercock	<i>Gallicrex cinerea</i>			P		
Purple Swamphen	<i>Porphyrio porphyrio</i>		P		P	
Common Moorhen	<i>Gallinula chloropus</i>	LC			P	
Pintail/Swinhoe's Snipe	<i>Gallinago stenura / megala</i>	LC	P	C		P
Common Snipe	<i>Gallinago gallinago</i>	LC		C		
Common Greenshank	<i>Tringa nebularia</i>			L		P
				C		
Green Sandpiper	<i>Tringa ochropus</i>	LC		C		P
Wood Sandpiper	<i>Tringa glareola</i>			C		
Common Sandpiper	<i>Actitis hypoleucos</i>	O				P

Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	O		O	LC	
Bronze-winged Jacana	<i>Metopidius indicus</i>	O		LF	LC	
Little Ringed Plover	<i>Charadrius dubius</i>			C		C
River Lapwing	<i>Vanellus duvaucelii</i>					P
Grey-headed Lapwing	<i>Vanellus cinereus</i>	F		C	O	
Red-wattled Lapwing	<i>Vanellus indicus</i>					P
Small Pratincole	<i>Glareola lactea</i>					C
River Tern	<i>Sterna aurantia</i>					P
[Whiskered Tern]	<i>[Chlidonias hybridus]</i>			[O		
				]		
Black Baza	<i>Aviceda leuphotes</i>	F		F	O	
Oriental Honey-buzzard	<i>Pernis ptilorhyncus</i>		[O]	O		
Black-shouldered Kite	<i>Elanus caeruleus</i>			L		
				C		
Brahminy Kite	<i>Haliastur indus</i>	O		O		
Crested Serpent Eagle	<i>Spilornis cheela</i>	F	F	F		
Eurasian Marsh Harrier	<i>Circus aeruginosus</i>	O	F	C	O	
Pied Harrier	<i>Circus melanoleucos</i>	O		C		
Harrier sp(p).	<i>Circus sp(p).</i>					P
Shikra	<i>Accipiter badius</i>	F	F	F	F	P
Rufous-winged Buzzard	<i>Butastur liventer</i>			L		
				C		
Grey-faced Buzzard	<i>Butastur indicus</i>			O		
Collared Falconet	<i>Microhierax caerulescens</i>			O		
Little Grebe	<i>Tachybaptus ruficollis</i>	O			O	
Little Egret	<i>Egretta garzetta</i>	C	C	C	C	C
Grey Heron	<i>Ardea cinerea</i>			O		P
Purple Heron	<i>Ardea purpurea</i>	LC	O	C	O	
Great Egret	<i>Casmerodius albus</i>		O	C	O	
Intermediate Egret	<i>Mesophoyx intermedia</i>	C	[O]	C		
Cattle Egret	<i>Bubulcus ibis</i>	C	C	C	C	C
Pond Heron	<i>Ardeola sp(p).</i>	C	C	C	C	C
Little Heron	<i>Butorides striatus</i>	O	O		LC	
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>			L	O	
				C		
Yellow Bittern	<i>Ixobrychus sinensis</i>			P		
Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	P		P		
Spot-billed Pelican	<i>Pelecanus philippensis</i>			P		
Banded Broadbill	<i>Eurylaimus javanicus</i>	O				
Asian Fairy Bluebird	<i>Irena puella</i>	P	P			
Blue-winged Leafbird	<i>Chloropsis cochinchinensis</i>	P		P		
Golden-fronted Leafbird	<i>Chloropsis aurifrons</i>	P			P	
Brown Shrike	<i>Lanius cristatus</i>	C	C	C	C	P
Red-billed Blue Magpie	<i>Urocissa erythrorhyncha</i>	[P]		[P]		
Racket-tailed Treepie	<i>Crypsirina temia</i>	P	P			
Large-billed Crow	<i>Corvus macrorhynchos</i>	C		C	F	P
Black-naped / Slender-billed Oriole	<i>Oriolus chinensis / tenuirostris</i>	C	C	C	F	
Black-hooded Oriole	<i>Oriolus xanthornus</i>	O	F			



Large Cuckooshrike	<i>Coracina macei</i>					[P]
Black-winged Cuckooshrike	<i>Coracina melaschistos</i>	P	P			
Swinhoe's Minivet	<i>Pericrocotus cantonensis</i>					[P]
Ashy Minivet	<i>Pericrocotus divaricatus</i>	P				[P]
Ashy / Rosy / Swinhoe's Minivet	<i>Pericrocotus divaricatus / roseus / cantonensis</i>	C	C	C	C	P
Scarlet Minivet	<i>Pericrocotus flammeus</i>	O	O	O		
Bar-winged Flycatcher-shrike	<i>Hemipus picatus</i>	F	F			
Black Drongo	<i>Dicrurus macrocercus</i>	F		C	C	C
Ashy Drongo	<i>Dicrurus leucophaeus</i>	C	C	C	F	
Bronzed Drongo	<i>Dicrurus aeneus</i>		P			
Lesser Racket-tailed Drongo	<i>Dicrurus remifer</i>		P	P		
Spangled Drongo	<i>Dicrurus hottentottus</i>	C	C	C	F	
Greater Racket-tailed Drongo	<i>Dicrurus paradiseus</i>	P	P	P	P	
Black-naped Monarch	<i>Hypothymis azurea</i>	C	C	C	F	C
Asian Paradise-flycatcher	<i>Terpsiphone paradisi</i>	P	P	P		
Common Iora	<i>Aegithina tiphia</i>	P				
Great Iora	<i>Aegithina lafresnayei</i>	C	C	P		
White-throated Rock Thrush	<i>Monticola gularis</i>		P			
Blue Rock Thrush	<i>Monticola solitarius</i>					C
Blue Whistling Thrush	<i>Myophonus caeruleus</i>	P				
Eurasian Blackbird	<i>Turdus merula</i>				O	
Asian Brown Flycatcher	<i>Muscicapa dauurica</i>	F	C	C	C	C
Red-throated Flycatcher	<i>Ficedula parva</i>	C	C	C	C	C
Verditer Flycatcher	<i>Eumyias thalassina</i>	F	P			
Hainan Blue Flycatcher	<i>Cyornis hainanus</i>	P				
Hill / Tickell's Blue Flycatcher	<i>Cyornis banyumas / tickelliae</i>	P				
Blue flycatcher	<i>Cyornis sp(p).</i>	C	C	C	O	P
Grey-headed Canary Flycatcher	<i>Culicicapa ceylonensis</i>	C	C	C	O	P
Siberian Rubythroat	<i>Luscinia calliope</i>	C	C	C	P	P
Bluethroat	<i>Luscinia svecica</i>	LC		L		C
Siberian Blue Robin	<i>Luscinia cyane</i>	P	P			
Oriental Magpie Robin	<i>Copsychus saularis</i>		[P]			
White-rumped Shama	<i>Copsychus malabaricus</i>	P	P			
Common Stonechat	<i>Saxicola torquata</i>	C	C	C	LC	P
Black-collared Starling	<i>Sturnus nigricollis</i>	O		F	F	P
Vinous-breasted Starling	<i>Sturnus burmannicus</i>			O		
Common Myna	<i>Acridotheres tristis</i>		P	O	F	C
White-vented Myna	<i>Acridotheres cinereus</i>			O		
Golden-crested Myna	<i>Ampeliceps coronatus</i>		O			
Hill Myna	<i>Gracula religiosa</i>	F	C	F		

Barn Swallow	<i>Hirundo rustica</i>	O		F	O	P
Red-rumped Swallow	<i>Hirundo daurica</i>	O	O	C	O	P
Striated Swallow	<i>Hirundo striolata</i>	O		O		
Northern / Asian House Martin	<i>Delichon urbica / dasypus</i>	O	O	O	O	
Black-headed Bulbul	<i>Pycnonotus atriceps</i>	C	C	C	P	
Black-crested Bulbul	<i>Pycnonotus melanicterus</i>	F	C	F		
Stripe-throated Bulbul	<i>Pycnonotus finlaysoni</i>	C	C	F		
Streak-eared Bulbul	<i>Pycnonotus blanfordi</i>	C		C	C	C
Puff-throated Bulbul	<i>Alophoixus pallidus</i>	O	F	O		
Grey-eyed Bulbul	<i>Iole propinqua</i>	O	F	O		
Black Bulbul	<i>Hypsipetes leucocephalus</i>			O		
Zitting Cisticola	<i>Cisticola juncidis</i>	P		C*		
Bright-headed Cisticola	<i>Cisticola exilis</i>	P				
Rufescent Prinia	<i>Prinia rufescens</i>	P				
Plain Prinia	<i>Prinia inornata</i>	C*	C*	C*	LC*	P
Lanceolated Warbler	<i>Locustella lanceolata</i>	P		P		
Rusty-rumped Warbler	<i>Locustella certhiola</i>	LC	[P]	L	O	
				C		
Black-browed Reed Warbler	<i>Acrocephalus bistrigiceps</i>	LC		L		
				C		
Oriental Reed Warbler	<i>Acrocephalus orientalis</i>	LC		L	O	
				C		
Thick-billed Warbler	<i>Acrocephalus aedon</i>	P			P	[P]
Common Tailorbird	<i>Orthotomus sutorius</i>	P	P	P	C	P
Dark-necked Tailorbird	<i>Orthotomus atrogularis</i>	C	C	C	C	
Dusky Warbler	<i>Phylloscopus fuscatus</i>	C	C	F	C	C
Radde's Warbler	<i>Phylloscopus schwarzi</i>	C	C	F	O	
Yellow-browed Warbler	<i>Phylloscopus inornatus</i>	C	C	C	C	P
Arctic Warbler	<i>Phylloscopus borealis</i>			[O		
				]		
Greenish Warbler	<i>Phylloscopus trochiloides</i>	C	C	C	C	
Pale-legged / Sakhalin Leaf Warbler	<i>Phylloscopus tenellipes / borealoides</i>	C	C	C	C	P
White-crested Laughingthrush	<i>Garrulax leucolophus</i>	[O]	P [C]	[O		
				]		
Puff-throated Babbler	<i>Pellorneum ruficeps</i>	C	C	P		
Scaly-crowned Babbler	<i>Malacopteron cinereum</i>	LC	LC	L		
				C		
Large Scimitar Babbler	<i>Pomatorhinus hypoleucos</i>			P		
Striped Tit Babbler	<i>Macronous gularis</i>	C	C	C	C	P
Grey-faced Tit Babbler	<i>Macronous kelleyi</i>	LC	LC	L		
				C		
Mountain Fulvetta	<i>Alcippe peracensis</i>	LC	LC			
White-bellied Yuhina	<i>Yuhina zantholeuca</i>			P		
Thick-billed Flowerpecker	<i>Dicaeum agile</i>	P	C	P	P	P
Yellow-vented Flowerpecker	<i>Dicaeum chrysorrheum</i>	P		P		
Plain Flowerpecker	<i>Dicaeum concolor</i>			P		

Scarlet-backed Flowerpecker	<i>Dicaeum cruentatum</i>	C	P	C		
Brown-throated Sunbird	<i>Anthreptes malacensis</i>					P
Ruby-cheeked Sunbird	<i>Anthreptes singalensis</i>	P	P	P	P	
Purple-naped Sunbird	<i>Hypogramma hypogrammicum</i>	P				
Purple-throated Sunbird	<i>Nectarinia sperata</i>	LC	LC			
Olive-backed Sunbird	<i>Nectarinia jugularis</i>	P	P	P		P
Crimson Sunbird	<i>Aethopyga siparaja</i>	P	P			
Little Spiderhunter	<i>Arachnothera longirostra</i>	F	F	P		
House Sparrow	<i>Passer domesticus</i>				O	
Plain-backed Sparrow	<i>Passer flaveolus</i>					P
Eurasian Tree Sparrow	<i>Passer montanus</i>	LC	LC	L	LC	C
				C		
Forest Wagtail	<i>Dendronanthus indicus</i>	C	C	C		C
White Wagtail	<i>Motacilla alba</i>	O	O	O	O	C
Yellow Wagtail	<i>Motacilla flava</i>	LC	P	C	C	P
Grey Wagtail	<i>Motacilla cinerea</i>	O				
Richard's Pipit	<i>Anthus richardi</i>	O		C	O	P
Paddyfield Pipit	<i>Anthus rufulus</i>	O	O	C	O	C
Olive-backed Pipit	<i>Anthus hodgsoni</i>	P		P	P	
Red-throated Pipit	<i>Anthus cervinus</i>	LC		C	F	P
Streaked Weaver	<i>Ploceus manyar</i>				O	
Baya Weaver	<i>Ploceus philippinus</i>				O	
White-rumped Munia	<i>Lonchura striata</i>	C	P	C	C	
Scaly-breasted Munia	<i>Lonchura punctulata</i>	LC		O		
Chestnut-eared Bunting	<i>Emberiza fucata</i>				O	
Yellow-breasted Bunting	<i>Emberiza aureola</i>	LC		L		
				C		
<b>Black-headed Bunting</b>	<i>Emberiza melanocephala</i>				O	

Pilot = BCI pilot area excluding those parts within the two NPAs.

DHS = Dong Hua Sao NPA (all surveyed parts lying within the BCI pilot area).

XP = Xe Pian NPA (all surveyed parts lying within the BCI pilot area).

Lak-48 = Ban Thangbeng, chiefly Nong Sam, Nong Salar and Nong Samiang, also including the town.

Mekong = the Mekong channel and bankside habitats at Ban Pathoumphon (adjacent to, but outside the survey area; records included here for context and because the area is used by some birds roosting within the survey area).

Abundance assessments are for those parts of the named area visited. They should not be viewed as characterising the area's avifauna, especially not for the two NPAs which have large areas of additional very different habitats not covered on these surveys. The assessment relates to days in suitable habitat, not total survey days.

C = Common (seen daily or almost so); F = Frequent (seen on more than half days); O = Occasional (seen on fewer than half of days); P = Present, abundance not assessed; L = localised distribution, being less abundant in some (perhaps) much of apparently broadly suitable habitat; \* = assessment is based (largely or solely) on calling birds and because the survey took place at a

season known to be of low calling frequency, actual detections would have placed the species in a lower abundance category.

**Annex 3: List of villages involved in various studies/projects in the Beung Kiat Ngong area**

<b>Village</b>	<b>BCI</b>	<b>LLS</b>	<b>Core wetlands village</b>	<b>Outer wetlands village</b>
Ban Kiat Ngong	X	X	X	
Ban Phalai (previously Phalai Bok & Phalai Thong)			X	
Ban Phapho			X	
Ban Phommaleu			X	
Ban Kele (previously Ban Kele Nyai & Kele Noi)			X	
Ban Nongmang Ek (previously Beung Ko and Nongmang Ek)			X	
Ban Phakha			X	
Ban Topsok	X	X	X	
Ban Thahou	X	X		X
Ban Houayko	X	X		X
Ban Somsouk	X	X		
Ban Sanot	X	X		X
Ban Nabon	X	X		
Ban Nakok	X	X		
Ban Laonga	X	X		
Ban Namom	X	X		
Ban Thongpa	X	X		
Ban Saming				X