The significance of the Beung Kiat Ngong Ramsar site (Champasak province, Lao PDR) and its surroundings for biodiversity conservation

Results of bird and mammal surveys and implications for site management

J.W. Duckworth and R.J. Timmins

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IUCN (International Union for Conservation of Nature)
Lao PDR Country Office
PO Box 4340
Houm 26 Sibounheuang
326/25 Ban Sibounheuang,
Vientiane, Lao PDR
Tel +856-21-216401

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Acronyms and Abbreviations

BKN	Beung Kiat Ngong
IUCN	International Union for Conservation of Nature and Natural Resources
MWD	Mekong Water Dialogues
NGO	Non-Governmental Organisation
NPA	National Protected Area
PA	Protected Area
PFA	Production Forest Area
OECC	Overseas Environment Cooperation Centre, Japan
Unpubl.	Unpublished
WWF	World Wide Fund for Nature
WCS	Wildlife Conservation Society

Conventions and Guidelines

In this document, ‘the Beung Kiat Ngong basin’ means the marsh plus associated paddies, whereas the ‘main BKN marsh’ signifies just the marsh part of the basin. This basin is one of many in the complex under discussion, which is here called the ‘Pathoumphone wetlands’ (Figure 1). However, the wetlands under discussion share no obvious character other than the administrative district in which they lie—they are not all in one local sub-catchment (all eventually drain into the Mekong), nor all in Xe Pian National Protected Area (NPA).

Bird taxonomy and nomenclature follows Inskipp *et al*. (1996), except where explicitly stated. Scientific names are given in the text only for those species not in Table 3 or Appendix 1.

Localities in and around the survey area mentioned in the text are shown in Figure 3. Locality names are based on the 1985–1987 series of 1:100,000 maps produced by the *RDP Lao Service Geographique d'Etat* following the minor nomenclature modifications of Thewlis et al. (1998) and excepting the spelling of the Xe Champon, to which a terminal ‘e’ is added (hence, ‘Champhone’), the spelling of Bung Gnai-Kiatngong as Beung Kiat Ngong and the spelling of Pathoumphon as Pathoumphone following the spelling used by the Ramsar Convention.

Species records which are provisional or unconfirmed are denoted by **[ ].**

Executive summary

Large non-flowing wetlands are among the most threatened habitats in Lao PDR. Lao PDR's first two Ramsar sites are based around this habitat type. Beung Kiat Ngong, Pathoumphone district, Champasak province, and surrounding wetlands cover about 24 km² under current Ramsar boundaries. The Ramsar site lies within a larger wetland complex, itself one of several such complexes in Champasak and Attapeu provinces.

Short surveys of the Ramsar site and surrounding wetlands (here termed the Pathoumphone wetlands) over 28 June – 5 July 2013 and 4–8 January 2014 focused on assessing the bird community, its conservation significance, and threats to it and to the wetland habitat that support it. Large mammals of conservation significance were already known to be extirpated.

The main survey covered the breeding season, a season lacking much previous survey. The January visit allowed comparison of birds found on this survey with the results of similarly-timed surveys involving the same observers in 1992–1993 and 2007–2008.

The Pathoumphone wetlands, (the Beung Kiat Ngong Ramsar site and the surrounding wetlands), comprise one of the largest complexes of standing naturally occurring wetlands in Lao PDR, with a great variety of wetland types present. They occupy the many basins, of a range of sizes and at varying stages of filling with solid matter, on a lava plain from a Bolaven plateau volcano. Vegetation ranges from closed swamp forest to extensive beds of graminoids, floating mats and open water containing aquatic species.

Some wetlands have been heavily converted to rice paddies, but the largest, Beung Kiat Ngong (also known as Bung Gnai Kiat Ngong, 'gnai' meaning large), so far retains a very large area of open, uncultivated, marsh. Few of the the Pathoumphone wetlands have been dammed. The effects on the area's bird community may have been, on balance, positive, because the dammed wetlands increase the diversity of habitats present, and result in significantly more dry-season standing water. Peat has been extracted from some small areas. All large open wetlands are heavily grazed, have extensive removal of wood (for various reasons), and the flammable parts are regularly burnt in the dry season. Some level of burning is likely to be important in retaining the areas of non-woody vegetation, particularly with the loss of native large ungulates and the suspected declines in livestock numbers. Continued grazing is essential to retain the diversity of specialist wetland birds.

Birds are hunted very heavily, even by Lao standards, as part of a general offtake of usable wildlife. No bird species is known to have a high trade value.

No resident globally threatened species were found. One long-distance migrant, Yellow-breasted Bunting *Emberiza aureola*, still occurs. The area probably (based on roosts found in 2007–2008, a much longer survey) potentially supports globally important numbers. Formerly the area would have held many other bird species now listed as globally threatened. For all of these species, the habitat remains suitable and their absence is caused by persecution. Numerous species of national conservation interest have demonstrably declined since the earlier surveys and many more are likely to have done so, but information is not precise enough to be sure.

Perhaps largely because of the size and complexity of the wetland complex, a number of species are present in nationally significant numbers: breeding Purple Heron *Ardea purpurea*,

Purple Swamphen *Porphyrio porphyrio* and Bronze-winged Jacana *Metopidius indicus*, and perhaps Watercock *Gallicrex cinerea* and Black Bittern *Dupetor flavicollis*.

The present Ramsar site is so small that retaining its global significance will be challenging. However, the entire Pathoumphone wetlands complex is already worse affected than other complexes of wetlands to the north-east and east (here termed the Bolaven slope wetlands) and the south east (the Xe Kong plains). In the 1990s these both retained globally impressive communities of highly threatened, hunting-sensitive wildlife. Improved conservation attention on these two complexes is needed. Narrow focus on the Beung Kiat Ngong Ramsar site could deflect attention away from these two more important landscapes, and it is better to use the attention to increase the conservation prospects of all three complexes. The Bolaven slope wetlands and the Xe Kong plains are vital supporting landscapes to the Ramsar site as sources of recolonists of extirpated hunting-sensitive species, should hunting in the Ramsar site be controlled. Even more important for globally threatened wetland birds (and other groups such as mammals and large reptiles) is the wetland-studded plain in western Siem Pang district, Stung Treng province, Cambodia; yet even this area does not yet have a secure future.

Global wildlife conservation resources for floodplain wildlife in this part of Indochina would therefore, sensibly, be directed most urgently to Siem Pang. However, the Beung Kiat Ngong Ramsar site is of high economic importance for a variety of ecosystem services to people from the poorest villages and to Lao PDR as a whole. Management in this interest should involve retaining healthy wildlife communities.

The most important immediate site-based action is to enforce the existing national wildlife law in order to ensure conservation of the site and to work towards rebuilding its impressive potential bird conservation significance. Enforcing the law provides adequate protection from hunting. Also of immediate urgency (and if not undertaken very soon, the window of opportunity will pass), is to control the spread of the habitat-transforming non-native Catclaw Mimosa *Mimosa pigra*. Only a concerted campaign of defence can prevent its infestation which is highly damaging to agriculture as well as wildlife. The non-native Golden Apple Snail *Pomacea canaliculata* has changed from highly localised and potentially eradicable to firmly established since 2008. The opportunity to prevent its spread has been lost. In the longer term, activities to prevent further conversion to agriculture are important, focusing particularly on swamp forest. Any further peat extraction should be considered very carefully, particularly with reference to plants and invertebrates. Optimal fire management for birds (focused on its effects on seasonally inundated graminoid beds) cannot yet be defined.

Protected area management typically selects parts of a PA for priority implementation. Such zonation, fitting for large remote forest areas, is not a priority for the Ramsar site, which is tiny by comparison with typical forest PA priority zones. However, three tracts of wetland aggregates warrant particular attention, but the viability of all depends upon effective action across the Pathoumphone wetlands, and indeed the wider area including the Bolaven slope wetlands and the Sekong plains. This viability certainly requires conservation management of an area considerably larger than the current Ramsar site.

1. Introduction

Large non-flowing wetlands are among the most threatened habitats in Lao PDR, a predominantly mountainous country where such habitats are naturally few in number. Moreover, wetlands, or at least their seasonally inundated margins, are usually favoured areas for conversion to rice paddies and, because of their typical location in flat lowland areas, are usually amid high human population densities. Wetlands are hugely productive systems capable of supporting heavy and, in many cases, sustainable plant and animal offtakes. But for species not able to bear much harvest because of the large numbers of people and the rather nonspecific approach of rural harvesters, population declines have been severe.

By fortunate coincidence there are few birds or large mammals of such wetlands that are endemic to Lao PDR and neighbouring countries. But those few that are endemic are also sensitive to hunting and are among the rarest species on Earth: Giant Ibis *Pseudibis giganteus* is a prime example. This contrasts with the forest habitats of the region, spectacularly rich in endemic species, many of which are also severely threatened in the long term, but proportionately very few of which are at imminent risk of extinction. The increased conservation efforts in Lao PDR over the last quarter-century have thus focused on forests, and from a global prespective must continue to do so. Yet from a national perspective, most of the species on the brink of national extirpation inhabit wetlands of some form. Coupled with the pivotal role of wetlands in the provision of ecological services including as resource commons for some of the region's most marginalised people, there are strong arguments for their conservation to ensure indefinite wise use.

The accelerating economic development presently underway in Lao PDR means that many wetlands are at a 'now or never' stage, as exemplified by current happenings in one of the largest, the Bung That Louang complex in Vientiane. It is likely that within a few more years this wetland will lose all conservation values for bird species—which have already been much reduced over the last two decades—and most of its capacity for ecological services. Factors similar to those driving the destruction of this formerly very important wetland will reach critical pressure, sooner or later, in all the others in Lao PDR.

A complex of wetlands in Pathoumphone district, Champasak province (Figure 1), is one such area. Its largest and best-known wetland is Beung Kiat Ngong. This is the main feature of one of Lao PDR's first two Ramsar sites, the present boundary of which (Figure 2) includes only a small proportion of the 'Pathoumphone wetlands'.

Lao PDR became a party to the Convention on Wetlands (Ramsar Convention) on 28 September 2010. The country designated two sites as Wetlands of International Importance: the Xe Champhone wetland in Savannkhet province (see Timmins 2014) and the Beung Kiat Ngong wetland, which cover about 24 km² under current boundaries.

Short surveys of the Beung Kiat Ngong Ramsar site and surrounding wetlands over 28 June – 5 July 2013 and 4–8 January 2014 focused primarily on assessing the conservation significance of the bird community present, threats to the bird community, and wetland conservation values in general. Although these wetlands would previously have supported large mammal communities of high global significance, visits during the 1990s–2000s already confirmed their effective loss (Duckworth 2008). Thus, no specific survey effort for large mammals (which would have come at cost of information gathered on the birds) was warranted.

The timing of the main survey, June–July, was selected primarily to allow an assessment of the breeding status of wetland birds: many of these breed around the start of the wet season.

The breeding community is of obvious conservation significance: it is when the individuals which die over the preceding 12 months can be replaced. Yet, other recent surveys of the area had not covered this vital period. In order to assess changes in avifauna, this survey needed to be complemented by a visit at the same season as the previous surveys, in or around January.

2. Previous surveys of the Pathoumphone wetlands

During reconnaissance surveys for the national protected area system, R. E. Salter and colleagues visited Beung Kiat Ngong (recorded as 'Bung Nong-Ngom'). They found the area under very heavy human use, but saw a good variety of birds (none individually of high conservation concern then, although at least one is evidently already locally extirpated today, Red-wattled Lapwing) and considered, largely based on its large size, that it warranted some form of protection (Salter 1989). During winter 1992–1993, birds and mammals were surveyed in and around the area now forming Xe Pian NPA (Timmins *et al*. 1993a, Duckworth *et al*. 1994, Thewlis *et al*. 1996, 1998). These surveys focused on forest areas, given that most of the Indochinese endemic birds and large mammals are forest-associated, as were at the time many globally threatened and near threatened species (Collar *et al*. 1994). But over the survey period (November 1992 – May 1993) many observations were made in the wetlands, particularly to areas accessible on foot from Ban Phapho and Ban Phalay. These were mostly in late December 1992 – mid January 1993 and 21–23 May 1993, supplemented by observations in late November 1992. M. K. Poulsen made many leisure bird-watching observations in these wetlands during 2000–2001, but these remain to be published, and time was insufficient to extract them for this report. A brief survey of Pathoumphon Production Forest Area in 2005 (Poulsen *et al*. 2005) generated some important wetland bird records.

Duckworth (2008) reported a 2007–2008 survey in Pathoumphone district for the 'Biodiversity Conservation Corridors Initiative', which took the opportunity to cover some of the wetlands in this area more deeply than had been possible under the 1992–1993 surveys. However, the Phapho wetlands and those around Ban Phalay, visited often in 1992–1993, lay outside the proposed corridor and so were not covered in 2007–2008. The conclusion from the 2007–2008 survey, with access to fuller information from the 1992–1993 surveys than went into Timmins *et al*. (1993a) or Thewlis *et al*. (1996) was that the wetlands in Pathoumphone district held a number of open-wetland bird species much declined in Lao PDR, although still common regionally; but that the wetlands to the east (mostly in Attapu province) were likely to be far more important for species of global significance. Very little information was then available for the lower Xe Champone, the Nam Ngum plain and Nong Lom on the Bolaven plateau, areas subsequently receiving much better coverage (Timmins 2014, Duckworth in press, Duckworth unpubl. records) and all yielding a number of positive surprises which require the highly positive remarks about the Pathoumphone PFA wetlands in Duckworth (2008) to be somewhat toned down. Set against this, the once-important Nakai plateau wetlands (Dersu 2008) have been submerged and, so far, the new habitat does not replace their bird conservation significance.

Survey aims

Both surveyors knew the general area and its broad habitats from previous visits. The wet-season survey, undertaken by R.J. Timmins, was in late June to early July, a period when no previous bird survey had visited the area. This visit prioritised assessing (breeding) status of a suite of predetermined focal species (predicted or already known to be present; see Timmins [2014] for rationale on selection procedure) and initial selection of survey sites both within and outside the current Ramsar boundary was undertaken based on interpretation of habitat characteristics visible on satellite images, particularly a high-resolution image available on

Google Earth at the time of the survey. In most areas away from the main BKN marsh actual survey routes were led by local guides, but in the main marsh routes were determined by Timmins. Most survey time was spent in the BKN basin, specifically the main marsh area, but some time was also spent in assessing the relative significance of other large open wetlands and very specifically trying to locate areas of tree-covered wetlands. The latter proved difficult because these are not clearly shown on available topographic maps and are not easily distinguishable from 'terrestrial' (non-wetland) forests on remote imagery.

The dry-season survey, carried out by J.W. Duckworth in early January, was at the same season as surveys in 1993 and 2008. Therefore, its primary aim was to visit areas that had previously been covered, particularly those in 2008 (when a survey was also undertaken by Duckworth) to maximise the chance of detecting changes in species abundance with time. The species focus reflected the finds judged as important by Duckworth (2008), notably various large roosts.

No attempt was made to maximize the number of species found: rather, the aim was to understand with as much clarity as possible the status of wetland-associated species known or suspected to be in decline, at least in Lao PDR and perhaps more widely. The resulting information is used to (i) assess the current importance of the survey area to wetland bird conservation in a national and global context, and (ii) propose management activities to prevent further erosion of those values.

3. Methodology

Opportunistic birding rather than structured data-collection was used to enable flexibility. Areas surveyed are shown in Figure 4.

Wet-season survey effort is presented in Table 1. Most dawns and dusks were spent on the edge of the main BKN marsh usually in static observation, with the time after or before usually spent walking along the edge (sometimes in thigh-deep water) observing birds out in the wetlands. Elephants were used on three occasions to get further out into the wetlands in the hope of detecting, in taller marsh vegetation, species difficult to observe from the edge. Boats were used twice in an attempt to get even closer to the heart of the marsh. Foot surveys were made during the daytime to other wetland areas, most of which were observed from the edge because of high water levels. Visits to these other wetlands focused on assessing habitat characteristics and signs of human use as much as on the actual bird species present. Interviews were minimal but focused on local knowledge of the breeding of a select group of wetland species, primarily species that could be discussed with local guides whilst observing them in the field. A few interviews were conducted about the historical status of species that were assumed to have occurred formerly but, given regional trends and previous information from this area, are likely to have been extirpated, particularly the Masked Finfoot *Heliopais personata*, White-winged Duck *Cairina scutulata*, storks (other than Asian Openbill *Anastomus oscitans*), Green Peafowl *Pavo muticus* and Indochinese Silvered Leaf Monkey *Trachypithecus germaini*.

In the dry season, most of the survey wetlands have water too shallow for boating, but the most bird-rich ones also have bottoms too liquid to walk through. Thus, much use was made of static observations from viewpoints around the wetlands. An elephant was used on one day. Dawn and dusk were particular foci of observation given the known presence of large, important roosts in the area and the higher activity and/or detectability of various skulking swamp species at these times. Each day, much time was spent staring skyward for the hour (usually about 09h00–10h00) when thermals began to form and large soaring birds begin to rise. Limited discussion was held with local people, chiefly about otters. No trapping or netting

was undertaken, although for a longer survey this could give valuable information on the skulking swamp and thicket warblers.

4. Results of the survey

4.1 Wildlife habitat profile of the Pathoumphone wetlands

The Ramsar site (Figure 2) is part of a much larger system of wetlands sandwiched between the Bolaven Plateau (to the north) and the low lying hills of Xe Pian NPA (to the south) (Figures 1 and 3). The wetlands have a complex system of hydrodynamics, reflecting their origin. They were probably formed in the Pleistocene, about 600,000 or more years before present (based on information in Fontaine & Workman 1978), as a product of volcanic activity on the Bolaven Plateau. Lava flows from a volcano on the plateau created dykes and dams leaving basins of various sizes, both between the flows themselves and between these flows and the hills of Xe Pian (the largest basins). These lava flows and the volcanic crater are still easily visible to this day on aerial imagery. Such a wetland formation is not unique even within Indochina, the wetlands of Cat Tien National Park in southern Vietnam having been formed in a similar manner. Basic habitat information for the wetland visited is presented in Table 2 and the boundaries of some habitat features discussed below are shown in Figure 2.

Over time most of the larger basins (over 10 ha) have become close to full, with alluvial sediments and/or 'peat'. Only relatively small areas of permanent wetland remain, often at their centres. The monsoonal climate gives strongly seasonal rainfall and each basin's relatively small catchment results in most wetlands drying seasonally. The largest basin is the Beung Kiat Ngong basin itself, which also has the Pathoumphone wetlands' largest single expanse of permanent marsh. The Ban Phapho basin is not much smaller but has now almost totally filled, and has therefore been converted largely to paddy. In contrast to the larger basins, many small but often steep-sided basins have larger proportions of permanent wetland. These small basins are often tree-covered and have open water rather than marsh vegetation. A complex network of streams may connect all the larger basins. Precise drainage patterns are not at all obvious and often convoluted, although drainage is roughly north to south. Some of the small basins are either isolated or are connected to the rest of the system only at very high water levels. Some larger basins may also be relatively isolated. For instance, in July Bung Bhar-pat was much drier than other wetland basins surveyed. Its vegetation zonation resembled that in comparable wetlands close by, yet water levels lay perhaps close to 1 m lower, assuming that eventual wet-season water levels would, relative to vegetation, resemble those elsewhere. This assumption reflected the local guide's view of wet-season water levels.

Wetland types vary considerably in the Pathoumphone wetlands. Seasonal wetlands predominate in total area, but their ratio to permanent wetlands, hard to estimate, may vary year to year. The full wetland extent is hard to visualize, as are patterns of connectivity between wetlands. No accurate map yet exists. Most basins appear to interconnect, rather than to be connected by drainage channels *per se.* On widely available topographic maps (both 1:100,000 and 1:50,000) much wetland area is not depicted as such, because a lot lies below forest. Small basins, many cryptic, quite possibly have a greater combined surface area than do the more obvious large open basins. Swamp forests, rather than open grass-sedge-herb marsh vegetation, may thus be the predominant vegetation type in the wetlands.

Larger basins now support mostly non-woody vegetation. Most have at least some paddies. Images on Google Earth suggest paddies already comprise perhaps 30-40% of total cover in these large basins. However, the main BKN basin retains a larger extent of more natural cover. Paddies cover only about a tenth of it, mainly along the western and northern edge, and

probably receive shorter inundation than is typical in areas of more natural cover. In large open basins the predominant 'natural' cover appears to depend highly on seasonality, with soil type and disturbance regime also probably significant. Where inundation and soil water logging are not prolonged, the predominant cover appears to be graminoids, with various grass species predominating. In places such as the north-east of the main BKN marsh, one species of grass forms almost a monoculture over about a tenth of the total marsh, but in other basins and other parts of the main BKN marsh the community is richer with a mix of grasses, sedges and herbs. A shrub probably *Sesbania* often occurs in quite extensive clumps, possibly in association with ground depressions (e.g. increased duration of inundation).

Lengthier inundation probably favours sedges over grasses, apparently giving the deeper areas a greater sedge component. However, extensive sedge beds seem relatively scarce: the most extensive seen were on the south-west edge of the main BKN marsh. In this latter region a tall, robust sedge, typically known as 'purr' in Lao, predominates. This is possibly *Scirpus grossus*, based on observations of a structurally similar sedge in the Xe Champhone wetland (Timmins 2014). The most permanent parts of the large basin wetlands appear to have three main types of vegetation: open water with various aquatic herbs (both floating and submerged), open water below shrubs and bushes (and, in smaller basins, trees), and floating vegetation mats. Areas of relatively permanent open water with aquatic plants seem rather limited in the large basins, especially within the main BKN marsh. During the wet season, open-water habitats become relatively common throughout the edges, although patches are often small. These have abundant ephemeral floating and aquatic herbs, as well as species with above-ground structures presumably dying back during the dry season. This seasonal aquatic floral community seemed relatively richer than in other Indochinese wetlands surveyed by R.J. Timmins. More deeply, but not permanently, inundated regions hold Lotus *Nelumbo nucifera*, such as around the southern edge of the permanent main BKN marsh.

Larger basins typically have small clumps of taller vegetation, varying in composition, but include various tree and shrub species. Commonly the shrubs were overgrown with a vine (unidentified; not *Mikania micrantha*), or a fern and a large aroid (these two seeming usually to co-occur). Those investigated seemed to mark deeper ground depressions; during the July survey, most had some open water below the canopy. Other patches, generally taller than the preceding, were dominated by one or more shrub/tree species (several species involved) without significant inclusion of vines, ferns or aroids. These also appeared to grow on deeper depressions. The latter essentially correspond to elements of swamp forest. Such elements were most prevalent around the larger basins' edges. Especially in the main BKN marsh, they occur on edges furthest from frequent human use (e.g. paddies, grazing land and villages), a pattern arising almost certainly not by chance. These swamp forest elements on the edge are in general larger and taller, with trees rather than the smaller bush-like trees and shrubs that tend to compose those elements out in the marsh. Bruselaceous trees, such as *Barringtonia*, are conspicuous in such swamp forest edges. These swamp forest elements in the larger basins generally are patches of mere fractions of a hectare in size, typically bounding the wetland edge in direct contact with remnant 'dry-land' forest.

That permanent aquatic habitats are not more common might in part be because most potential areas are covered by floating vegetation mats. The extent of floating mats is hard to estimate: in most areas they are not readily distinguishable from areas of graminoids rooted into the wetland bed. They probably occupy two- to three-tenths of the main BKN marsh. Mats are typically difficult to reach, so their composition is uncertain. Mat vegetation in the main BKN marsh seems predominantly graminoid-based, with *Imperata cylindrica* (identification provisional) prevailing. Very few, if any, shrubs grow in the mat itself, although, apparently rooted in the wetland bed, they are common but sparse in a zone around the mats. The paucity of shrubs on the BKN floating mats contrasts, for instance, with what otherwise seems to be similar mats in the Xe Champhone wetland in Savannakhet and in some wetlands of the lower Nam Ngum plain. Some mats in the Pathoumphone wetlands do have shrubs: dense

shrub and small tree growth (probably involving willows *Salix*) were seen on a mat in Nong Pakham on 1 July. Mats in this latter area also held the aroid and fern combination. Much of central Nong Boua (1 July) had what appeared to be most likely a floating mat composed of a dense mix of shrubs, aroids, sedges (but not 'purr') and ferns, differing somewhat in structure and composition from the floating mat seen in Nong Pakham (e.g. seemingly no willow). This heterogeneous mix appeared to surround a central area of taller, shrubby trees, probably rooted in the wetland bed, with perhaps open water at the centre. But here again are differences with wetlands in other areas: for example the mats in the Xe Champhone wetland rarely have extensive fern and aroid cover, but commonly willows.

Smaller basins seemed more varied in cover than large basins, generally with more shrubs and trees. Many have swamp forest, the largest probably being of several hectares. In general, relative to other swamp forests in Timmins' experience, those in the greater BKN wetland seemed relatively species-rich and structurally diverse. Bruselaceous trees often predominated. All swamp forest is probably disturbed, primarily through timber removal and clearance of adjacent areas for agriculture. The latter results very often in trees felled into the wetland, thereby damaging the swamp forest structure. As is usual under a swamp forest canopy, plant growth was relatively sparse, although during July the aquatic community often appeared relatively rich. Water retention in these small basins is also likely to be very variable in both depth and duration further adding to the heterogeneity of their vegetation. Some small basins also support agriculture. While some are open with zones of grass, sedge and/or a more herbaceous mix, others have dense beds of aroids, ferns and/or shrubs.

Tall cane-grass beds were once common in seasonally inundated areas, especially on the region's river floodplains, but are increasingly scarce. Surprisingly, the July survey's concerted search found only one patch: a small area of Bung Bhar-pat's edge. Their absence from the main BKN marsh contrasts with the Cat Tien NP wetlands where, although probably patchy, cane-grass beds are not uncommon. Large spiny bamboo groves, generally ubiquitous in riparian wetlands, were also surprisingly scarce in the Pathoumphone wetlands.

Surrounding dry-land habitats, generally degraded, would originally have consisted of two broad forest categories. The lava flows themselves support predominantly deciduous communities, variously named by different classification systems (e.g. Mixed Deciduous Forest; Nearly-Deciduous Forest; nearly fully deciduous Semi-Evergreen Forest). Aerial imagery graphically shows such forests are concentrated in the most recent lava flow's footprint: presumably the young, relatively shallow, soils have low water retention. In contrast, Xe Pian NPA's hills hold mostly Semi-evergreen Forest with a relatively low deciduous component. There, soils are older, deeper and retain much more water. Where the hill bedrock is close to or exposed on the surface, such as in Phou Asa, communities are also predominantly deciduous. Seemingly older lava flows, to both the north and east, have transitional or predominantly Semi-Evergreen Forest. This presumably reflects more developed soils, of greater age.

Established paddies are almost confined to basins, especially with, it seems, mostly alluvial soils (rather than organic 'peat' soils). 'Dryland' agriculture including plantations is increasing at the expense of forest. The shallow soils, perhaps minerally rich, seem not to hinder seasonal agriculture significantly. Plantations on these soils might be less viable, especially those with significant year-round water needs.

Marsh vegetation is likely to be very dynamic, through various factors, notably fire, livestock grazing and timber removal. During July, changes in the marsh were discussed independently with people from several villages. A perceived increase in tall sedge ('purr' in Lao) was commonly reported. In most wetlands, it was said formerly to have been scarce, and to have been almost absent in the main BKN marsh c.20 years previously. During June–July, it was a predominant element in the western main BKN marsh, common in Nong Kasay, and

predominant in the visible area of Nong Ee-lar; but scarce and localized in other wetlands visited. Furthermore the main BKN marsh c.20 years ago had reportedly much more open water, when a distinctive grass, perhaps *Imperata cylindrica*, with its characteristic cottony seed-head, was apparently scarce. This suggests that floating mat vegetation was also then scarce. *Salvinia* ('chok') was then reportedly much more common; in 2013–2014 only sporadic small dense patches were found, amongst other vegetation, in the seasonally inundated edge. Bush and tree cover had also reportedly decreased, especially in the main BKN marsh. However, this time-line may be inaccurate, because Salter (1989) described, 25 years ago, essentially the same habitat mix for the main BKN marsh as now: "Margin adjacent to forest now dry (but seasonally flooded) grassland up to 500+ m wide. [The area is] very heavily grazed by cattle and water buffalo and also by domestic elephants. Central area appears permanently saturated and supports dense growth of tall (1 m) sedges and patches of low (<2 m) shrubs. Open water limited to small patches <0.1 ha in size with water lettuce [*Pistia*] and other floating aquatics". Reported rural timelines may often be wildly inaccurate. In one dramatic case on the present survey, the guide to Nong Kasay said the retaining dam was built 'around 2000', yet the village head said '1987'. The dam had certainly been there in January 1993.

Some of these changes have parallels elsewhere, especially the loss of tree and bush cover (e.g. the Xe Champhone wetland; Timmins 2014). This is almost certainly attributable to human activities. Several local people opined that because trees and shrubs often surround deeper depressions, they might be cut to reach the aquatic life in these more permanent wetlands, and also to be placed in the water and create 'substrate and structure' there to attract more fish and other aquatic animals for capture. Other damage is likely to arise from activities including simple wanton destruction of vegetation, fodder collection, timber and other wood removal, livestock trampling (especially from elephants; including the practice of leashing livestock to vegetation) and fire. Similarly, the fringing forest, that until recently dominated the edges of even the open wetlands, is being rapidly degraded and lost by a combination of timber removal and agricultural clearance, primarily for non-rice crops.

Some changes, for instance the reported increase in the large sedge, are harder to interpret. Human use of the wetlands is changing. As local population grows, so do certain activities, especially fishing (for fish, amphibians and numerous groups of invertebrates) undoubtedly driven mostly by changes in local economics. Livestock, especially buffaloes, using the marsh have reportedly decreased substantially, a trend common to frontier rural Indochina (e.g. Wright 2011, Timmins pers. obs.) as local economies move from subsistence- to market-based systems. Buffaloes can modify and maintain various marsh characteristics, including species composition via selective grazing and browsing. Grass and/or sedge harvest patterns and/or agrochemical usage may be changing. Wetland vegetation may respond 'naturally', perhaps stochastically to subtle changes in species interactions and climatic variability. Changes, in some ways similar to those in the Pathoumphone wetlands, were reported to be ongoing in the Xe Champhone Ramsar site of Savannakhet (Timmins 2014).

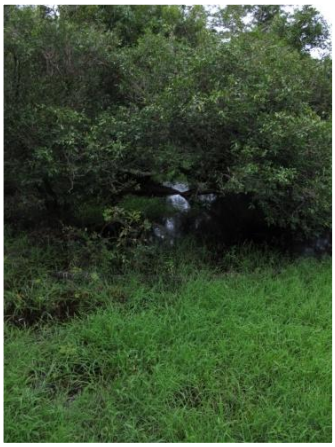
It was not possible to locate swamp forests effectively during the survey, but based on remote imagery, the largest remaining patches are tentatively mapped on Figure 5. These are widely scattered, with potentially significant patches persisting outside the three wetland complex tracts. It is particularly uncertain as to whether the forest patches mapped in the southestern part of the Pathoumphone wetlands are swamp forest, or simply Semi-evergreen Forest growing in pockets of deep, well-formed soil.

The larger basins' open nature doubtless reflects three interacting factors: fire, large ungulates and people. Without these, swamp forest would predominate in all seasonally inundated areas (including those that might dry only in very rare dry years). Swamp forests and open seasonal marsh areas support different animal communities, each with threatened components, so each is important. Even without people, herbivores and fire would maintain many large basins as

open seasonal wetlands. But the three factors also tend to remove seasonal tall cover of grasses, sedges and *Sesbania* (the latter a shrub, but with a seasonal growth pattern more akin to a graminoid). This latter factor is particularly significant because in the late dry season when the wet area is at its lowest the cover available for wetland animals is also most limited. Without human persecution this might not be serious, but all wetlands have heavy human presence. Tall graminoid habitats are also important for a small but relatively threatened community of birds. Thus, increased dry-season retention of tall graminoid and *Sesbania* patches would give at least short-term benefits, as would development of more tree and bush patches. In the long-term it is desirable to maintain large open wetlands, because many species could potentially benefit if wildlife persecution were brought under control.

Plate 1: Natural habitats surveyed

Photos taken by the authors




Above photos: Swamp forest fringe in the embayments in the south-eastern corner of the main BKN marsh


Above left: Swamp forest patch, Bung Bhar-pat, with taller 'dry-land' forest behind
Above right: In the foreground on the left is a small lava island with herbaceous cover and on the right is herbaceous marsh where Polygonum and grass predominate


Above left: Tall grass 'mono-culture' in the north-eastern area of the main BKN marsh, and with elephant for scale (above right)


Above left: Peat extraction pond and spoil at Nong Phommalu
Above right: Nong Sa-pan: extensive *Polygonum* in the foreground with swamp forest in the background and grass in the middle ground


Above left: Very degraded swamp forest in the Nong Pakau (wet-season spot)/Pakham complex
Above right: Swamp forest in the Nong Pakau (wet-season spot)/Pakham complex


Above left: Tall grass and elephant close to Don Pamuang
Above Right: Main BKN marsh looking c. 160°: tall grass is in the foreground, paler and brighter vegetation in the middle ground are short graminoids on a lava island, and in the background is a large patch of a shrub presumed to be *Sesbania*; left of the *Sesbania* is a row of small trees and bushes


Above left: Large patch of shrub presumed to be *Sesbania*, with elephant for scale in the main BKN marsh with Don Pamuang in the background
Above right: Looking 210^{o}, the palest areas are presumably dominated by *Imperata* on the central floating mat; the Purple Heron colony is on the furthest line of bushes in the middleground


Above left: South-eastern corner of the main BKN marsh: heterogeneous open marsh with presumed *Imperata* (the grass with white flower-heads
Above right: South-eastern corner of the main BKN marsh with vine-covered shrubs


Above left: Aquatic macrophytes in the secluded embayments in the south-eastern corner of the main BKN marsh
Above right: Aquatics, with probably an ephemereal ecology, in a seasonal stream close to Nong Kasay


Above photos: Main BKN marsh from the south-western edge, looking c. due north; the palest areas are presumed to be predominated by *Imperata* on the central floating mat, in front of that is a heterogeneous mix of graminoids and herbaceous aquatics, the line of whitish dots are Lotus flowers, in front of which is an extensive bed of tall sedge; in the foreground of the left image is the short-grazed pasture around the wetland sedge


Above left: Domestic water buffaloes in the eastern area of the main BKN marsh; the close bushes in the background are on a small lava island

Above right: Tall sedge and remnant bush patches in the south-western area of the main BKN marsh


Above left: Aroid, fern and shrub floating mat at Bung Bhar-pat

Above right: Nong Domngai, a small basin amidst ‘dry-land’ forest, with a fringe of evergreen trees, a ring of heterogeneous herbaceous marsh pants, and duckweed in the open water


Above left: Aroid and probable shrub-covered floating mat in the Nong Pakau (wet-season spot)/Pakham complex

Above right: Nong Naseng in the process of tilling for rice cultivation, with extensive (*Sesbania*) shrub areas in the background, largely cleared by January

4.2 Wildlife of significance to conservation in Beung Kiat Ngong and surrounding wetlands

4.2.1 Birds

Bird species found in BKN are listed in Table 3. Specific counts for wetland species are given in Table 4. Accounts for species of particular relevance to conservation are given below. National and regional context is given for these species in Appendix 1, which also contains accounts for many wetland species not found but for which habitat looks suitable (and which in many cases were found in this area by earlier surveys). These accounts are taken almost verbatim from a previous report survey of wetlands in this region (Duckworth 2008), amended where credible subsequent information changes the conclusions. The 2013–2014 surveys focused on wetland birds and made no effort to find non-wetland species. With regard to non-wetland birds, aerial species were well surveyed, given the need to search for soaring wetland birds; and the proximity of non-wetland habitats meant that many species were recorded incidentally. However, even some of the common non-aerial species may have been overlooked, and rarely can a lack of records be taken as an absence, or even rarity of, any particular non-wetland species.

Comparisons with earlier surveys relate strictly to those in November–January. Even for resident species, major changes in the waterscape round the year caution against simplistic comparisons between years and seasons simultaneously. Furthermore, effort varied greatly between years: in 1992–1993 there were multiple observers, all, however, new to the Lao and even the regional avifauna, for many days, who focused on forest species. In 2007–2008 the one observer, resident in Lao PDR, spent most days within 12–26 December and 4–17 January in pre-dawn to post-dusk survey of non-forest areas. This included five full days (19 Dec; 8, 9, 12, 16 Jan) and one full afternoon (7 Jan) at the main BKN marsh, and three mornings (15 Dec, 7, 10 Jan) at Thong Namniap. By contrast, in 2014, only one full day (5 Jan) and two half-days (4, 7 Jan) were spent at the main BKN marsh and one day (6 Jan) at Thong Namniap. The recorded bird community would hence be much richer in the earlier two surveys than in 2014, even had birds status not changed. The final day in 2008 at the main BKN marsh found Vinous-breasted Starling, White-vented Myna and Baya Weaver all for the first time on that survey. It follows that, had the 2014 survey lasted as long, 'new' species of local conservation significance would probably still have been detected at its end. The actual results of the short 2014 survey are surely highly incomplete. Notably, for wetland species also requiring forest or its edge, the January 2014 survey was poorly located for strong comparison with the earlier two. Finally, the conclusions are based heavily on only three sites (the main BKN marsh [1992–1993, 2007–2008], Thong Namniap [2007–2008] and Nong Kasay [1992–1993]), and strong vegetation change in individual wetlands might drive major change in birds at those wetlands not reflecting the wider Pathoumphone wetlands. The comments below, about possible trends over time, give the best subjective assessment, mindful of not just number of encounters, but also rate of contacts, group size, differences in survey targets, technique and aptitude between years, and any other factor perhaps relevant.

4.2.2 Selected species accounts

Lesser Whistling Duck *Dendrocygna javanica*

This species was observed in June–July, common in significantly inundated larger wetlands, usually seen in flight as singles or small groups. Quite probably several hundred birds used the main BKN marsh. The largest group seen was of at least 23 birds on 3 July in a secluded

tongue along the main BKN marsh's south-eastern edge. No evidence of breeding was recorded. In January, there were single night-time sightings of flocks of about 20 at the main BKN marsh and at Thong Namniap, and a flock of 50 low over Nong Kasay. The numbers observed resemble those of 2007–2008 but are much smaller than those found in 1992–1993, at some of the same sites.

Cotton Pygmy-goose *Nettapus coromandelianus* (at risk in Lao PDR)
Presumed pairs were seen on three occasions in June–July: on 3 and 4 July in secluded tongues along the main BKN marsh's south-eastern edge, and on 3 July around Nong Kasay. No record of sightings in January. Evidently much declined from 1992–1993 (the same sites visited). None of the sites where it was found in 2007–2008 were visited in 2014.

Stork-billed Kingfisher *Halcyon capensis*
In June–July, up to two birds were heard calling on 1–2 July from the main BKN marsh's northern forest peninsula, and one heard on 4 July from Beung Bhar-pat. There is one January record: an apparently territorial bird at Thong Namniap on the only visit, in exactly the same place as one in January 2008. No change in status is evident from 2007–2008. Comparisons with 1992–1993 are impeded by the differences between sites surveyed. But in May 1993 three or more birds were seen on two consecutive days in the Ban Phapho basin, an area not surveyed in June–July 2013 because human pressure appeared too high to warrant using the small amount of survey time there. The 1993 observation may have been a chance record: at least some birds evidently make seasonal movements between dry and wet seasons (Duckworth in press). Nonetheless, the paucity of records in June–July 2013 in otherwise similar areas probably indicates decline. Certainly the surveyed Pathoumphone wetlands held much unoccupied superficially suitable habitat for the species.

White-throated Kingfisher *Halcyon smyrnensis*
In the June–July survey, these appeared scarce, with small numbers of birds recorded only adjacent to the main BKN marsh along its south-eastern edge, the Nong Kasay area and probably also Bung Bhar-pat. In January, ones and twos were recorded at all sites with multi-hour surveys except in Ban Phalay. These January numbers seem similar to those in previous years.

Green Bee-eater *Merops viridis*
This was not recorded with certainty during June–July: *Merops* bee-eaters were heard on 1 July in the northern part of the main BKN marsh. This made an astounding contrast with the Xe Champhone wetland surveyed only a few weeks previously, where this species was recorded daily in similar wetland habitats (Timmins 2014). Small groups (maximum confirmed size, four) were found in January twice around the main BKN marsh and once at Nong Kasay: a higher contact rate than in 2007–2008, although perhaps lower than in 1992–1993. It is not possible to determine trends in local status, but a decline is certainly plausible over the last 20 years.

White-breasted Waterhen *Amaurornis phoenicurus*
Singles were observed at Beung Bhar-pat on 4 July and at Thong Namniap on 6 January. The paucity of records during the June–July survey is astounding, given the amount of survey effort in suitably shady areas especially on 1 July in the Nong Pakau complex and on 3–4 July in the south-east corner of the main BKN marsh. Considering the different wetlands visited in the years, there is no evidence for change since 2007–2008 or even 1992–1993, although a decline is certainly possible.

[Ruddy-breasted Crake *Porzana fusca*
In January, calling birds consistent with this species, and certainly of some sort of crake, were rare in the main BKN marsh (only one, despite a dusk watch) but were found at high density in Thong Namniap (nine counter-calling towards dusk). The lack of records in June–July, echoing seasonal patterns of records on the Nam Ngum plain, may indicate either that birds do not call at that season, or are not then present. Many fewer birds were recorded in the main BKN marsh than in 2007–2008, but this may have reflected differing sites within it. Numbers at Thong Namniap were similar in both years.**]**

White-browed Crake *Porzana cinerea*
A single was seen in the main BKN marsh on 30 June. The lack of January records may reflect a low effort in prime habitat. There is no evidence for change since 2007–2008, but the species has probably colonized the area since 1992–1993.

Watercock *Gallicrex cinerea* (at risk in Lao PDR)
During June–July, it was probably the commonest larger-bodied water-bird (Table 4a), being found in all inundated larger open wetlands. Calling levels were high as were other forms of breeding behaviour. Lack of January records may reflect dry-season movement of most birds out of Lao PDR and the brevity of the survey. There is no evidence for change since 2007–2008.

Purple Swamphen *Porphyrio porphyrio* (at risk in Lao PDR)
This species was common (several counts of nine or more) in the main BKN marsh during June–July, which may support low hundreds of birds. It is only otherwise found at Nong Kasay. None was found in January, strongly suggesting significant seasonal movements away from the area, unless the species becomes extremely skulking. Such a possibility is not suggested by cold-season observations on the Vientiane plain (Duckworth in press). Although 2–3 were found in the main BKN marsh in both of 1992–1993 and 2007–2008, this difference from January 2014 may be due to chance and does not necessarily indicate a decline.

Common Moorhen *Gallinula chloropus*
One was observed at Nong Pakau on 6 January; but none was recorded during the June–July survey. There is no evidence for decline since 2007–2008, when it was not recorded on any of the water-bodies surveyed in January 2014. Similarly the disparity between 2014 and 1992–1993 plausibly represents only the differing localities of survey.

Pheasant-tailed Jacana *Hydrophasianus chirurgus*
Up to seven were recorded at the main BKN marsh and four Nong Kasay in January. It was not recorded during June–July, and this is probably a reflection of seasonal absence. These are larger numbers than were seen in the main BKN marsh in 2007–2008, but smaller than at Nong Kasay in 1993; these small variations may be due solely to chance rather than any trend.

Bronze-winged Jacana *Metopidius indicus*
During June–July, this was regularly seen, but scarce (counts all in single figures) in the main BKN marsh. It was also recorded also at Nong Kasay and the Ban Phapho marsh. There were similar numbers on the main BKN marsh in January, and a count of 23 at Nong Kasay. These numbers are fairly similar to those at the same sites in 1992–1993 and 2007–2008. In May 1993 birds were found at many 'pools' in the Ban Phapho basin, with a combined count in double figures (so common that no precise count was made). This area was not surveyed in detail in June–July 2013 (human pressure appeared too high to warrant use of the limited survey time there), but similar habitats were surveyed elsewhere without yielding comparable encounter rates. However, the large difference in waterscape between late May and early July means this might have been a seasonal effect rather than evidence of decline between the two seasons.

Grey-headed Lapwing *Vanellus cinereus* (potentially at risk in Lao PDR)
During January, counts of up to seven were recorded but it was not recorded during the June–July survey, when it is seasonally absent. There is no suggestion of a major decline in the area ever since 1992–1993.

Black-shouldered Kite *Elanus caeruleus*
Single birds were seen thrice from the northern edge of the main BKN marsh during the June–July survey (all possibly the same bird), and in January near Ban Kele-2, at Thong Namniap and at Nong Kasai. This rate of recording is consistent with earlier surveys.

Harriers *Circus*
In January, 'Eastern' Marsh Harrier *C. aeruginosus spilonotus* was mostly seen as 1–2 birds at each site, but with one sighting of four near Ban Kele-2. Only one Pied Harrier *C. melanoleucos* was seen on the entire survey. With no more than two unidentified harriers seen in addition, these numbers show a large decline from 1992–1993 and even from 2007–2008. Disturbance of the main BKN marsh may now be so heavy that the former large communal roost has been replaced by dispersed roosting across many sites, as on the lower Nam Ngum plain. However, there may be perhaps simply fewer harriers coming to southern Lao PDR in total. No harriers were recorded during the June–July survey, when they are seasonally absent.

Little Grebe *Tachybaptus ruficollis*
There is only one record, of a family, in June–July, and no records in January. Whether the comparison with numbers in 1992–1993 represents a landscape-level decline (it clearly indicates major decrease at Nong Kasay, and probably at the Phapho wetlands) is difficult to say for such a mobile species.

Little Egret *Egretta garzetta*
There were no records during the June–July survey; but small numbers were confirmed in January. Identification of egrets to species was not a priority in the time available in January and it is not possible to assess any change with time.

Grey Heron *Ardea cinerea* (potentially at risk in Lao PDR)
A distant bird flying over the main BKN marsh on 29 June might have been this species. There were no records on the January survey. The area is not prime habitat and there is no evidence for any change, at least since 2007–2008.

Purple Heron *Ardea purpurea* (potentially at risk in Lao PDR)
During June–July the main BKN marsh supported small breeding colonies. Its central part appeared to have a colony mainly using three adjacent bush patches with over 20 birds in attendance and at least six active nests were suspected. A slightly smaller colony in two bush patches in the marsh's south-eastern corner had at least 15 birds in attendance, with nesting strongly suspected. Birds appeared to feed throughout the main BKN marsh, with some leaving the basin altogether. A single was seen in the Nong Kasay area. Birds seemed to be in the initial stages of breeding (with eggs apparently present in at least one nest). No evidence of young was seen. In January it was recorded again at both the main BKN marsh and Nong Kasay, and at Thong Namniap. Counting such a dispersed species is tricky, with a maximum estimate of four seen at any site. There is no evidence for any change, at least since 2007–2008.

Great Egret *Casmerodius albus*
This was not recorded during the June–July survey. Two singles were identified in January, but identification of egrets to species was not a priority in the time available, so many more were probably present. It is not possible to assess any change with time.

Intermediate Egret *Mesophoyx intermedia*
This was not recorded during the June–July survey. Two singles were identified in January, but identification of egrets to species was not a priority in the time available, so many more were probably present. It is not possible to assess any change with time.

Cattle Egret *Bubulcus ibis*
This was notot recorded during the June–July survey. Most of the birds in the roost-flights of egrets (which involved many hundreds of birds) in January were Cattle Egrets, with up to 240 found in wetlands by day. Roost-flight directions and numbers were and seemed similar to those in 2007–2008.

Black-crowned Night Heron *Nycticorax nycticorax* (potentially at risk in Lao PDR)
Not records were obtained during June–July; but two were identified at Nong Kasay on 8 January. There is no evidence for change since 2007–2008, but recording of this largely crepuscular species is somewhat random, depending on whether the surveyor happens to be on a flight line pre-dawn and post-dusk.

Yellow Bittern *Ixobrychus sinensis*
During June–July, the species was evidently much scarcer than Cinnamon Bittern, with only a single confirmed record. The January survey's single record echoed that in 2007–2008.

Cinnamon Bittern *Ixobrychus cinnamomeus*
This species is relatively common, probably in all inundated larger open wetlands, during June–July. One male was observed in territorial song and aggressive behaviour towards conspecifics. There is one record in January, echoing the scarcity at this season also in 2007–2008.

Black Bittern *Dupetor flavicollis*
Recordings were occasional to frequent in the main BKN marsh during the June–July survey, but, as would be expected, no records in January. Change with time not possible to assess.

Asian Openbill *Anastomus oscitans* (at risk in Lao PDR)
This was common in the northern and eastern sectors of the main BKN marsh during June–July. At least 64, probably more, used the main BKN marsh, apparently roosting in or close to the marsh's northern edge and dispersing to other areas by day. However, these birds were not found at any other wetlands during the survey, nor were any found in January. Presumably they are much increased since 2007–2008, but it is not possible to be certain, given the lack of June–July observations then.

Large-billed Crow *Corvus macrorhynchos*
Records during June–July were common, and these birds were sighted usually in small groups, with a group of over twelve birds seen on several days in the north of the main BKN marsh. Twice this group was associated with an area of freshly tilled paddy on the marsh edge. During January, 1–2 it was seen daily, with two duos each at Ban Kele-2 and Nong Kasay. These numbers resemble those in 2007–2008.

Black-collared Starling *Sturnus nigricollis*
Small numbers were recorded during June–July only in the main BKN marsh. Similar numbers were recorded there in January, and 22 at Nong Kasay. These counts resemble those in 2007-2008, except that the Kasay count which probably involved the chance sighting of a dispersing roost.

Weavers *Ploceus* (potentially at risk in Lao PDR / at risk in Lao PDR)
Only certainly recorded on 30 June when three birds (not identified to species) were seen in the main BKN marsh. There were no records in January. Two species were recorded there in 2007–2008, but too scarcely for the lack of records on the present survey to indicate a decline, although it is certainly possible.

Yellow-breasted Bunting *Emberiza aureola* (Endangered)
There is a record of a flock of 25, evidently having left a roost, in the Kele sector of the main BKN marsh on 8 January. There are no records in June–July, when they are seasonally absent. The 2014 count contrasts with several counts of 1700+ in 2007–2008, all made at roosts. Time was insufficient to find roosts in 2014; the site used at Thong Namniap in 2007–

2008 was checked but it had already been grazed and trampled by bovids. No comment on possible change over time is possible: global trends suggest a strong decline is likely.

4.2.3 The bird conservation significance of the Pathoumphone wetlands.

The extensive open marshes and swamp forests of the Pathoumphone wetlands must once have supported a truly extraordinary suite of wetland species, including many which today are considered globally threatened. Vestiges survived into the 1990s, but by 2013–2014 it seems likely that no resident globally threatened species remains, and even many regionally threatened species could not be found.

Many species which use these habitats, and for which the habitat type, extent and condition looked superficially suitable, were not found. Many of these species were found in the area in 1992–1993* and/or 2007–2008°. 'Missing' species include a number well known to be extirpated across almost their entire Southeast Asian range, or are very rare and presumed to have been much reduced. These include the White-winged Duck, Sarus Crane *Grus antigone*, Masked Finfoot, fish eagles *Ichthyophaga*, Greater Spotted Eagle *Aquila clanga*, Great Cormorant *Phalacrocorax carbo*, ibises (Threskiornithidae), Spot-billed Pelican *Pelecanus philippensis*°, and storks other than Asian Openbill. It would have been surprising to have found any of these, although the remaining habitat remains suitable for all of them, and all may be still occasional visitors (e.g. the pelican record in 2007).

Many species which have not shown large regional range contractions and which remain common in one or more other neighbouring countries, were not found. Many of these are scarce or extirpated across Lao PDR. While some species were doubtless overlooked, particularly given the brevity of the surveys, for some others the habitat and/or range may not in fact be suitable (this is the reason why, e.g., Striated Grassbird and Yellow-eyed Babbler are not on this list). In combination with their lack of records, this indicates a much reduced community of the following: Blue-breasted Quail *Coturnix chinensis*, Spot-billed Duck, Garganey*°, various other Palaearctic migrant ducks, breeding Common Hoopoe *Upupa epops**, Blue-eared Kingfisher *Alcedo meninting*°, Pied Kingfisher *Ceryle rudis*, Blue-throated Bee-eater *Merops viridis*, Blue-tailed Bee-eater *M. philippinus*, fish owls *Ketupa*, various species of rail and crake additional to those recorded*); breeding Common Moorhen, Greater Painted-snipe*, Black-winged Stilt *Himantopus himantopus*, Pacific Golden Plover, Red-wattled Lapwing*, Oriental Pratincole *Glareola maldivarum*, Brahminy Kite°, both (sub)species of Black Kite *Milvus migrans*, three species of resident vulture*, Darter, Little Cormorant, Indian Cormorant, breeding egrets, Little Heron *Butorides striatus**°, Great Bittern*, Long-tailed Shrike*, Racket-tailed Treepie *Crypsirina temia**°, Ashy Woodswallow *Artamus fuscus*, breeding-season Black Drongo *Dicrurus macrocercus* (common in winter), White-shouldered Starling*, Vinous-breasted Starling*°, White-vented Myna*°, Plain Martin*, Chestnut-capped Babbler, Red Avadavat, Black-headed Munia and Chestnut-eared Bunting *Emberiza fucata**°. In addition, birds of two genera were seen too poorly to identify to species and only once, when both such groups should be represented by multiple species and frequent sightings: buttonquails and weavers. For Blue-eared Kingfisher, Greater Painted-snipe (recorded by Wheatley [2012] in the far more disturbed and far smaller marsh and adjacent paddies at Ban Champasak, as was Spot-billed Duck) and Little Heron, the lack of records do not necessarily reflect poor local conservation status, but may indicate surveys in habitats and/or at times unlikely to find the species frequently. On the other hand, some of the non-recorded species were conspicuous in 1992–1993, notably Garganey, Red-wattled Lapwing and large mixed flocks of starlings and mynas.

Among the species found, many were encountered with unusual lack of frequency, compared with what would be expected for the season, style and intensity of survey: Cotton Pygmy-goose^{+}, buttonquail, Stork-billed Kingfisher (perhaps +), Green Bee-eater, White-breasted

Waterhen? (perhaps +), Eurasian Marsh Harrier^{+}, Pied Harrier^{+}, Black-crowned Night Heron and weavers. Birds marked '$^{+}$' were found markedly more often on previous surveys, whereas the others seem to have been scarce even by 1992–1993. The coarseness of the measures, stemming from the brevity, infrequency and inequality of the surveys being compared, means that other species may also have declined in the interim. However, this cannot be demonstrated. One obvious candidate is Lesser Whistling Duck. Most importantly, it cannot be confirmed that Yellow-breasted Bunting, the only globally threatened species recorded, has not declined greatly.

The net effect of the many species unrecorded, recorded only rarely, or recorded at palpably lower levels than previously, has given both authors of this study reason to reflect that this research may be among the most alarming wildlife surveys each has undertaken in Lao PDR. This is perhaps not surprising, because (a) the number of previous visits allows proof of what has declined in the last two decades (by comparison, the 2013–2014 survey of the Xe Champone wetland [Timmins 2014] was the first to be undertaken there); (b) Xe Pian and its environs was the authors' first main survey area in the country so there has been the longest period for change; (c) as stressed since Thewlis *et al*. (1998), notably by Duckworth *et al*. (2002) and subsequently, in Lao PDR within remaining extents of habitat, non-forest birds are typically much more declined than are forest birds; and (d) wetlands have suffered arguably more than any other habitat in Lao PDR, certainly so if lowland rivers are included in their definition.

The findings here are of national relevance because they point at what may well be occurring across the country's open plains wetlands. None of the others has had comparable surveys spread across recent decades. Most of the species surprisingly absent, rarely recorded, and/or much declined had already been proposed as of national concern by Thewlis *et al*. (1998), Duckworth *et al*. (1999, 2002), Fuchs *et al*. (2007) and/or, most comprehensively, Duckworth (in press). But national conservation status of some of these has not been well demonstrated or publicized, such as with Garganey, Blue-eared Kingfisher, breeding Common Moorhen, Racket-tailed Treepie, breeding Black Drongo and White-shouldered Starling. This is not a particularly unexpected list because most of these species have close relatives that are in decline. The only one which does not, Black Drongo, is ecologically distinct from its many Lao congeners through being the only non-forest species: exactly the one which would be predicted to be severely depleted within remaining habitat. All of these warrant priority attention on future surveys in potentially suitable habitat, as well as a comprehensive review of Lao records over the last 25 years.

Large aggregations of open lowland wetlands that include at least some large individual bodies are rare in Lao PDR. Given the loss of the Nakai plateau and Bung That Louang, there now remain only (south to north):

- Dong Khanthung and the Dong Kalo sector of Xe Pian NPA (small nongs);
- between Pakxe and the Xe Pian (large lava flow wetland complex, largest and most complex it seems in the Pathoumphone wetlands);
- the Xe Kong plains and other areas along the alluvial Xe Kong valley (small nongs);
- the Xe Don (several large oxbows in its lower stretch, where its mainly on a North–South course, but with generally small sporadic wetlands in the plains up to the base of the Annamites);
- the Bolaven slope (clusters of small wetlands on the lava fields, but nothing as large and complex as the Pathoumphone wetlands; best areas closer to Pakse and adjacent to those on the lower Xe Don plain; apparently no big permanent marshes);
- the lower Xe Champhone plain;
- big wetlands outside Savannakhet;
- the Xe Bang Fai (a number of big oxbows in lowest reaches, similar extent to Xe Don);

- the wetland complex between the Khammouan Limestone and the Nakai Plateau (probably largely seasonal, with only small permanent wetlands; other generally small wetlands within the limestone and around the southern and western edges);
- the lower Nam Xan – Nam Xa;
- several large Mekong oxbows between the the lower Nam Xan – Nam Xa and the Nam Ngum plain;
- the lower Nam Ngum plain.

Some other smaller complexes remain, and Latsen on the Xiangkhouang plateau and Nong Lom on the Bolaven plateau show some similarities to plains wetlands. Overall, the Pathoumphone wetlands are fundamentally a rare habitat nationally. Even with the heavy hunting and massive avifaunal losses sustained to date, they still hold some birds of conservation interest.

In the overall context, the authors of this study consider it unexpected to confirm previous suspicions that Purple Heron breeds in the area, and in substantial numbers. That it has persisted whilst birds typically perceived as more tolerant, such as mynas, have declined alarmingly is presumably because of the incidental protection afforded by the difficult-to-access main BKN central marsh, and because it is not a preferred quarry species (due to perceptions of the poor taste of adult flesh). This is doubtless the largest breeding colony in Lao PDR, although breeding has also been suspected recently in the lower Nam Ngum plain, the lower Xe Champone wetlands and Dong Khanthung in west Champasak province (Round 1998, Timmins 2014, Duckworth in press). Other notable species populations include Purple Swamphen, probably one of the 3–5 largest Lao populations of a species now very localized in Lao PDR, and Bronze-winged Jacana, probably also with one of the largest Lao populations albeit of a more widely distributed breeding species. Cotton Pygmy-goose is now so scarce in Lao PDR that even the small numbers recorded are noteworthy. The Black Bittern and Watercock populations may also be of some significance nationally, although these species are both overwhelmingly wet-season visitors so their national status remains poorly known given the few wet-season surveys outside the Vientiane-Nam Ngum plain.

The main BKN marsh is important for roosting birds, notably Yellow Wagtails and Red-throated Pipits; probably several thousands of these roost nightly during the winter, based on the 4000–8000 estimated in December 2007. Some harriers still roost there, but probably fewer than a dozen. Nearby there is a large egret roost (several thousand birds) and, presumably, at least one for Yellow-breasted Bunting (two were found in the 2007–2008 survey). As in 2007–2008, Wood Sandpiper was recorded only in the main BKN marsh, in roughly comparable numbers. Three other 'positive' finds reflect regional patterns of no conservation concern because they involve species currently expanding their ranges: White-browed Crake, Asian Openbill and (from non-native source population) Peaceful Dove.

Some non-wetland birds are typically covered well enough during wetland-focused surveys to allow informed comment on their status, especially species that are aerial, of open non-wetland habitats, and/or frequently and loudly vocal. The status of parakeets was of particular concern: the only two records concerned birds heard from Bung Bhar-pat on 4 July, and a group of three at Nong Kasay on 8 January, whereas in 1992–1993 several species were recorded in the general area, mostly found daily, with flocks of up to 80 (22 May 1993, south-east corner of the Phapho wetlands). Koel was heard only once, although neither survey overlapped the main calling period, so it may be somewhat under-recorded. Great Eared Nightjar was a typical dusk sight in the 1990s and even in 2007–2008, with 6–8 estimated over the main BKN marsh on 8 January 2008, but was seen only once in 2014 (four birds near Ban Phalay). Large-tailed Nightjar *Caprimulgus macrurus* is less visually conspicuous and the 2013–2014 survey was not optimally timed to assess calling numbers (in 2008, the

first lengthy song-bout was heard on 8 January) but the total lack of records contrasts with 1992–1993 and 2007–2008.

Both large *Streptopelia* doves, Spotted (both visits) and Oriental Turtle (potentially absent in the wet season) were strikingly scarce, not seen daily and with only one count (of 15) exceeding four birds. Red Collared Dove *S. tranquebarica* was not recorded at all. It was surprising that no green pigeons *Treron* were seen or heard at either season. The much more sensitive Green Imperial Pigeon *Ducula aenea,* was, as expected, also not seen. Both the latter genera were recorded during the 1992–1993 survey, and green pigeons were still frequent in 2007–2008. Resident diurnal raptors other than Shikra and Black-shouldered Kite were startlingly scarce, and the lack of Oriental Honey-buzzard, Crested Serpent Eagle and Rufous-winged Buzzard particularly contrasted with the previous surveys.

Red-billed Blue Magpie was also conspicuously unrecorded, although it was already scarce by 2007–2008 that this may not indicate any further decline. Common Myna was observed only in the village of Ban Phalay. Similarly, only small numbers mostly in villages were found in 2007–2008. The few records of Hill Myna, of three over Nong Kasay on 8 January, three over Nong Phommalu on 1 July, and of birds heard on 4 July in the south-east corner of main BKN marsh, contrasted with regular sightings in 1992–1993 and 2007–2008. Although the largest numbers of Hill Mynas in previous years came from further east than the current survey, the lack of any sightings of birds flying over the main BKN marsh suggest an intensifying decline.

Some woodpeckers and Crested Treeswift also seemed surprisingly scarce and may have declined (at least the treeswift, which was already in decline by 2007–2008). White-crested Laughingthrush was heard only rarely, as in 2007–2008. Although this species seems to be naturally scarce in some parts of Lao PDR, e.g. Sangthong district (Vientiane Municipality) and western Vientiane province (Duckworth 1996, SUFORD 2010), it was common in the northern fringe of Xe Pian NPA in 1992–1993 and has probably declined steeply in this area. The lack of any records of any hornbills in either survey indicates that the declines for these, large and small, detected in 2007–2008 from 1992–1993 have continued. Consistent with the birds, the squirrel genera *Callosicurus* and *Tamiops* were each seen surprisingly rarely for the habitat conditions, particularly considering the contiguity with large blocks not yet converted to non-forest habitats.

In sum, all the evidence is of an extremely reduced bird community in the surrounding habitats as well as in the wetlands: not just the species well known to be highly sensitive to threats, but many species that, while obviously absent from small fragments of semi-natural habitat, are usually still reasonably common in and even at the edge of large habitat blocks, such as constituted by the survey area.

4.3 Other wildlife

Crocodiles

No substantial recent evidence for the presence of crocodiles has to the authors' knowledge been found in the Pathoumphone wetlands. Timmins *et al*. (1993a) received reports that crocodiles persisted in BKN, but considered continued presence unlikely. No effort was made to interview locals about crocodiles during the survey, although during general discussions between guides and Timmins in the BKN area, there was speculation that perhaps these animals might still persist. Since the 1993 surveys, remnant pockets of crocodiles have been detected at a number of locations in Lao PDR, some of them relatively surprising, and suggestive of the possibility that small numbers of crocodiles can persist largely undetected (Bezuijen *et al*. 2013). It is thus perhaps possible that an animal or two might remain either in the main BKN marsh, given that the centre is largely inaccessible, or

in other well-vegetated permanent wetlands within the complex, given that there are many wetlands most of which have never been surveyed. However, it is extremely unlikely that any breeding population remains, as nesting crocodiles would be far more easily detected, and are far more vulnerable to persecution. Crocodiles may still persist around the Xe Khampho, with the last confirmation of presence in 2005 (Bezuijen *et al*. 2013). However, with no ongoing relevant conservation initiatives it any wetlands in the area, the continued presence of crocodiles should be considered uncertain.

Turtles

Because of the sheer extent and complexity of the wetlands several species of turtle are still likely to persist, of which Yellow-headed Temple Turtle *Hieremys annandalii* (Endangered) would be the most significant. Populations of all species are very likely to be highly depleted, some perhaps verging on extirpation. However, the complex and diverse nature of the Pathoumphone wetlands suggests that they probably still have considerable national and regional significance for aquatic turtles, particularly *H. annandalii* which is large, seemingly easily exploited and depleted, and has a relatively small global range. Elongated Tortoise *Indotestudo elongata* (Endangered), a terrestrial species characteristic of Deciduous Dipterocarp Forest and highly deciduous Semi-evergreen Forest, is unlikely to survive in significant numbers and might already have been extirpated.

Specific records from the Pathoumphon wetlands are relatively few, but include the following (all captive or remains of hunted animals): Elongated Tortoise, Ban Phalay-Thong on 26 November 1992 and an old carapace in Ban Phapho on 21 May 1993 (Timmins *et al*. 1993a; Timmins unpubl.); Malayan Snail-eating Turtle *Malayemys subtrijuga* (Endangered), one being prepared for a meal in ricefield huts northwest of Ban Phapho on 25 November 1992 and singles in Ban Phapho on 7 and 26 January 1993 (all Timmins unpubl.); Asian Leaf Turtle *Cyclemys dentata* complex (Near Threatened), a carapace and plastron of a single individual in Ban Phapho on 21 May 1993 (all Timmins unpubl.); Asiatic Softshell Turtle *Amyda cartilaginea* (Vulnerable), one in the Nong Ping area on 21 January 1993 (Timmins unpubl.). Slightly to the north, in the lowlands of Dong Hua Sao NPA, two further species have been recorded: *H. Annandalii,* two in Ban Sungsup (map name Ban Nongpop) on 29 June 1993; Giant Asian Pond Turtle *Heosemys grandis* (Vulnerable), a large individual in Ban Houayton (map name Ban Maknao) on 10 July 1993; Asian Leaf Turtle *Cyclemys dentata*complex seperate singles in Ban Nongkhe on 13 and 23 May 1993, two seperate single individuals in Ban Sungsup on 29 and 30 June 1993 and a single and a carapace in Ban Houayton on 8 and 16 July 1993; Elongated Tortoise, single in Ban Sungsup on 6 July 1993 single in Ban Houayton on 10 July 1993 and two individuals in either Ban Nong-Ek [map name Ban Nongphu] or Ban Nongphu [map name Ban Houayton] on 16 July 1993 (all Timmins unpubl.; see Timmins *et al*. 1993b for survey details).

To the southeast in the region of the lower reaches of the Xe Khampho there are records of at least four species, all captive, from early March 1993: Elongated Tortoise single individual; Yellow-headed Temple Turtle single individual; Giant Asian Pond Turtle single individual; Asiatic Softshell Turtle one relatively small individual (all Timmins unpubl. based on photographs from G. Q. A. Anderson and K. E. A. Cozza; see Timmins *et al*. 1993a for survey details). A juvenile of the Asian Leaf Turtle complex has also been recorded from the main block of the Xe Pian NPA from the Houay Tapkua area in mid February 1993 (Timmins unpubl. based on photographs from T. D. Evans; see Timmins *et al*. 1993a for survey details).

Otters

The area holds ideal otter habitat and otters were recorded directly in the area in the early 1990s. Although their status was not then established in detail, they were believed to be still relatively common back then. Multiple discussions with local people during 2014 found no evidence that any persisted, consistent with the conclusion of the 2007–2008 survey. Although

some respondents in 2012 spoke of them occurring in the general region and/or having occurred in the past, three separate people, all older than 25 and all (according to themselves) spending significant time in the wetlands, averred that no otters had ever lived in the area. This demonstrably false result underlines the care needed in interpreting local information. The identification of a captive litter held in Ban Phalay in 1993 as Smooth-coated Otter *Lutrogale perspicillata* (Duckworth *et al*. 1994, Duckworth 1997) was overconfident: it appears that Asian Small-clawed Otter *Aonyx cinereus* has prominent claws when young.

Apple snails
The South American invasive Golden Apple Snail *Pomacea canaliculata* reportedly reached the Pathoumphone wetlands 2–4 years before the 2007 survey, based on four independent local informants. This is fairly consistent with Duckworth (2008) finding it in only very few sites in 2007–2008, and suspecting it had only just arrived. It now abounds in many areas including the main BKN marsh, Thong Namniap, Nong Phommalu, the Nong Pakau complex, the Ban Phapho basin and Nong Kasay. The large native apple snail *Pila polita* appears also to be still widespread (although much less numerous than is *Pomacea*) and was found in the main BKN marsh, the Nong Pakau complex and Nong Kasay. In contrast to *Pomacea*, *P. polita* appears to require permanent wetlands.

Another large native *Pila* was recorded (probably *P. pesmei* or *P. ampullacea*) in Nong Kasay, where it seemed the least common of the three species. Several locals independently reported declines in native snails following arrival of *Pomacea*, although some of this perception might simply stem from the abundance of *Pomacea* now probably substantially exceeding the former abundance of native *Pila*. There appears at least circumstantial evidence that *Pomacea* invasion might lead to declines in certain *Pila* species (Timmins 2014). Several local people also independently reported that the invasion has resulted in significant damage to rice crops. Although the invasive species is eaten, it was commonly reported to taste inferior to the two native apple snails.

4.4 Threats to the Area

Hunting
Larger-bodied animals are threatened most by hunting. Most of the hunting that threatens large birds and mammals in the area is illegal. Most of the hunting-sensitive species of priority in these habitats lack significant trade value (turtles and otters being notable exceptions). They are killed simply as free meat, or even for target practice, sport or other reasons that fundamentally express basic attitudes: there is no major opportunity cost for not killing them.

Gun shots were heard day and night on a daily basis in essentially all parts of the survey area, during both seasons. Their frequency and distribution resembled, in the authors' experience, the early 1990s, before national policy widely reduced gun use, and furthermore a much higher level of gun use than has been found by the authors in other areas of Lao PDR in recent years. Little evidence for the use of aerially strung hooks and lines (*baet pheak*), or mist nets was found during the June–July survey, but several of each were found in January. In western cultures, the term 'fishing' implies largely the capture of fish and to a lesser degree crustaceans, but in Southeast Asia, 'fishing' embraces a far wider range of wildlife. Turtles, other reptiles, birds and even mammals such as otters might be undesirable by-catch in a western context, but in Lao PDR they are often more highly prized commodities than are the fish themselves. Some very unselective methods, such as unattended baited hooks, can capture a wide array of vertebrates. Populations of non-fish vertebrates that might get caught by such methods are now largely extirpated. For those that are not, and for any itinerant animals that might visit the wetlands (e.g. perhaps otters or Masked Finfoot), such unselective fishing methods probably constitute a very serious threat by the sheer numbers of such 'traps'

and their ubiquity. Hunting is the primary reason for the paucity of species observed, particularly the lack of any resident species of global conservation concern.

Peat extraction

Peat extraction has targeted several areas, including the northern edge of the main BKN marsh (now inactive), Thong Namniap (now inactive) and Nong Phommalu (ongoing). Peat extraction was not particularly extensive in any of the areas: in the main BKN marsh, probably at most 3 ha had been affected. In each of the three observed sites the extraction left a series of small basins with roadways between them. All the basins were full of water at time of survey.

In general peat is probably most extensive in the wetland basins that have been most isolated from alluvial sedimentation processes, including sections of the main BKN marsh. Peat extraction is essentially transforming one type of wetland into another, and thus the potential effects are complex and, for birds, certainly not all negative. Open water (i.e. water not covered in floating mats or swamp forest) is relatively scarce within the Pathoumphone wetlands' large basins. Such areas would suit certain species, including some at risk (e.g. Darter). Open water also may provide greater security for some species, by confounding human access to wetlands for hunting and harvest. Some peat extraction might thus benefit some birds, especially if well planned and taking into consideration the future of the wetland post-extraction. Creating 'doughnut' shaped basins would almost certainly be better than the current pattern of a matrix of small basins. Other considerations would be ensuring peat removal did not reduce water retention, e.g. by removing natural obstructions to the drainage of basins: in some basins the peat itself might form such a barrier, albeit pervious. Extraction in all basins is unlikely to be overall beneficial. For instance, in Bung Bhar-pat with its particularly diverse array of vegetation formations, peat extraction is more likely to be harmful. There is no evidence that any wetland birds in Lao PDR are associated with peat over other wetlands. The situation may be very different with other biota such as invertebrates and plants, and any plans for the resumption of peat extraction should pay particular attention to them.

Non-native invasive species

Exotic species pose a significant threat to the wetlands. Although it may not have reached some more isolated basins, the exotic apple snail *Pomacea canaliculata* is already well established in most areas (see above). It may well have significant effects on the area's biota, although these effects are poorly understood because of a paucity of research on the consequences of establishment of the species (e.g. Carlsson & Lacoursière 2005, Carlsson *et al*. 2004a, 2004b).

So far as presently known, the species with the greatest potential to modify the ecology of the area is Catclaw Mimosa *Mimosa pigra*. At present it is not widely established, and during the June–July survey none was seen. In January, two infestations were found: a small one (about a dozen plants) at the edge of a home garden in Ban Sanot, and a large area (as least 0.4 ha) beside the road at 14°46′37″N, 106°04′23″E, about 2–3 km east of Ban Phommalu. The first could be easily eradicated by cutting and then nipping of all regrowth, although a careful check of the neighbourhood would be required for other stands. The second is more challenging and might best be tackled by community action, for example on a day every few months, with some external motivation to participate provided. Plants have apparently been found also in the Ban Phalay area (R. Glemet pers. comm. 2013).

Mimosa pigra is well adapted to colonize disturbed seasonal wetlands, and can quickly form an almost monoculture-like cover. Its spines and chemical irritants discourage herbivores and other forms of damage to plants, including damage caused by people. Effects on wildlife are almost certainly overwhelmingly negative, although it benefits some species in some situations, largely by hindering harvest. The species tends to be most prevalent in agricultural margins and in areas recently cleared for agriculture. To some extent mimosa invasion

probably fosters increased clearance of 'natural' vegetation, because this is easier than is the removal of mimosa from agricultural land invaded by the species.

Although *M. pigra* has not yet established itself widely in the Pathoumphone wetlands, it is well established on the Mekong plain of Champasak province, and is also already present in the Xe Kong basin in Xekong and Attapu provinces. Once widely established meaningful control will be impossible; however, with commitment from all stakeholders, its spread within the Pathoumphone wetlands could be contained and perhaps the species might yet be eradicated. Unfortunately there is no precedent within Lao PDR for the committed, organized response needed to achieve this.

Several other exotic wetland plants are present, including Water-hyacinth *Eichhornia crassipes* and Water-lettuce *Pistia stratiotes*. None was found to be particularly prevalent. Current knowledge gives little reason to consider them currently harmful to native biodiversity.

Fire

The effects of fire on the area were not readily apparent given the timing of the visits: most fire probably occurs during February–April. In both January 2008 and January 2014, many small fires were seen daily, but it was too early to build a good picture of overall burning patterns. From various reports it is clear that many areas of graminoids are burnt annually. Based on observations in Vientiane, this could include even the mats. Fire probably has an important role in maintaining such habitat by preventing its succession to scrub and, eventually, forest. However, the effects on wildlife, particularly rare species, are likely to be negative if all areas are burnt every year. First, some ground-nesting species breed during the fire season. Second, the dead stems and accumulated 'litter' of dead leaves hold many invertebrates important as food. And third, hunting levels also tend to rise during the late dry season, so reduced cover from fire will exacerbate the effects of hunting.

The different sorts of graminoid are likely to differ in their response to fire. The role of fire in wildlife conservation in Indochina remains uncertain. However, given the loss of wild large ungulates from the area and recent declines in the numbers of domestic ungulates, it is likely that some level of fire is more important than ever in maintaining the non-woody wetland vegetation.

Tree-cutting

Tree and bush loss in general is a serious threat to the wetlands, especially the swamp forests. Loss, as already mentioned, comes in several forms. Timber removal is probably most serious around the wooded edges of the large open wetlands, where relatively large old trees are mostly targeted. These often overhang and shade the wetlands and their loss removes cover and substrate for species such as fish owls and Stork-billed Kingfisher. However such is the insatiable demand for timber that even relatively small trees are now being cut. This rampant removal from the edge ravages the structural integrity of wetland edges, and presumably greatly diminishes prospects for recovery in even the medium term. Timber removal is a lesser threat within swamp forests, because many trees there seemingly have little to no timber value.

Swamp forests seem threatened most prominently by agricultural clearance either within the wetlands or directly adjacent to them. There has probably been substantial loss of forest between the early 1990s and 2013–2014. Some relatively small areas appear to have been cleared for unknown reasons, perhaps related to harvest of aquatic species (clearance facilitating harvest; see below), or for use in purposes such as duck- and fish-ponds; both reasons drive wetland clearance on the Nam Ngum plain. The Ramsar data-sheet mentions that "a large number" of "ponds" are used annually as fish (and presumably other aquatic animal) traps, in a process whereby vegetation (presumably cut) is added to the wetland (presumably to encourage congregation of aquatic life), then as the waters recede the aquatic

life is prevented from escaping by some form of barrier, after which the vegetation is removed to facilitate the easy capture of the aquatic life. The same or similar processes (as already mentioned) were reported to Timmins to occur in depressions (e.g. dry-season pools) in the large open basins; but it seems likely that some, perhaps many, small basins could be used in a similar fashion. In fact the discrete nature of many basins, with often obvious drainage channels, probably facilitates aquatic harvests and encourages human activity and thus damage to vegetation. There is probably also non-timber use of swamp forest trees, probably for livestock fodder and perhaps firewood. Whatever the reasons, the swamp forests observed during the surveys showed frequent signs of anthropogenic damage.

Outside the wetland area, high levels of timber are being removed by residents of nearby villages, apparently from within Xe Pian NPA (and thus presumably illegally). During the January survey, many hand-tractor loads of wood were seen removed, including by night. This is not an issue of direct concern to the wetland areas, but warrants investigation on behalf of the NPA.

Agriculture
In addition to outright clearance, changes in agricultural practices and livestock husbandry are very likely to affect the area in complex ways, although predicting these changes and their effects is, on current knowledge, almost impossible. However large herbivores, especially buffalo and elephant, are likely to be important mediating factors in the ecology of the wetlands, and diminished numbers of both in the long-term are likely to be deleterious in certain ways. Agricultural water demands are also likely to be a significant factor in future ecological changes, potentially both decreasing and increasing water levels, depending on the use of the basin in question: water abstraction for irrigation or dyking of basins to increase water retention (also for irrigation).

Fishing
As apparently throughout the region, aquatic resource harvests, especially of fish and invertebrates, seem to be increasing substantially. as Along with the direct declines of particular species, these harvests are likely to cause or exacerbate destruction and changes to the vegetation (see above); change aquatic animal community structure (many large fish species are regionally or globally threatened); and increase likelihood of opportunistic slaughter of rare large non-target wildlife. All of these may therefore affect the status of birds of local conservation interest.

5. Discussion

5.1 The Ramsar site in the regional context

Lao PDR has two Ramsar sites, both focused on large open wetland systems amidst agricultural lands. This choice of wetlands does not overlap well with those supporting species at closest global and even national risk of extinction. Their claim to importance is mostly their large size. Lao PDR has several other wetland complexes that in contrast have been identified as exceptional in a global biodiversity context (e.g. Thewlis *et al*. 1998, Duckworth *et al*. 1999, Tordoff *et al*. 2005). Unfortunately these areas, unlike the Ramsar sites, have received little attention or support from the international community since the surveys of the 1990s which discovered their importance. Two areas in particular are significant in relation to the currently proposed Ramsar site: (i) the wetlands between (and including) the Xe Khampo and Xe Pian rivers (termed here for convenience the 'Bolaven slope wetlands'), and (ii) a wetland complex on the Xe Kong plains. All three are connected, although each has its differences.

The Bolaven slope wetlands share with the Pathoumphone wetlands an origin in the plateau's lava flows. They lack the very large open wetlands of the latter, but (perhaps in part consequence) are also amid much less agriculture. This results in much lower human presence and thus, in the 1990s at least, far healthier populations of hunting-sensitive species which are taken opportunistically when encountered but lack sufficient trade value to be chief quarry (in this category fit most or all the large birds of wetlands). The Bolaven slope wetlands' current status is uncertain, but probably as little as a decade previously (by when the Pathoumphone wetlands had already lost much) these wetlands retained a suite of species proven to persist into the 1990s including Siamese Crocodile, White-winged Duck and Masked Finfoot (Evans *et al*. 1997, Thewlis *et al*. 1998, Tordoff *et al*. 2005, Bezuijen *et al*. 2013).

The Xe Kong plains are contiguous with and south of the Bolaven slope wetlands, but differ somewhat in morphology and ecology. This wetland system comprises three rivers, the Xe Kong, Xe Pian and Xe Khampho, and the intervening alluvial plain. The plain is studded with small wetlands of alluvial and zoogenic origin. These are typically smaller and shallower than those on the lava plains. Once again, within the last two decades the Xe Kong plains supported a suite of high-conservation-priority species including Giant Ibis, White-shouldered Ibis, Sarus Crane, Masked Finfoot and Indochinese Silvered Leaf Monkey (Thewlis *et al*. 1998, Timmins *et al*. 2013). The current status of these and other rare species there is again uncertain and several, or perhaps all, may have been extirpated.

Both the Bolaven slope wetlands and the Xe Kong plains however still have intrinsically more significance and potential for global biodiversity conservation than do the Pathoumphone wetlands, principally because of the lower levels of human use which must to some extent allow healthier conservation status of wildlife and habitats, including particularly those species that have all shown dramatic declines across the region. By contrast, the species of national concern in the Pathoumphone wetlands (e.g. harrier roosts, various rails, mynas, Large-billed Crow, Cotton Pygmy-goose and even Yellow-breasted Bunting) remain widespread and abundant in some neighbouring countries and indeed most of them are still common within peri-urban Bangkok (Round 2008).

Focus on the Pathoumphone wetlands, which might well occur given the cachet conferred by their status as one of the country's only two Ramsar sites, thus risks eclipsing the higher conservation significance of the Bolaven slope wetlands and the Xe Kong plains. This risks these two areas' degradation to beyond recovery. Concentration on the Pathoumphone wetlands in isolation would also be futile for those wetlands themselves: recolonization and recovery by species currently extirpated from them can occur only if there are sites to act as source populations. For some wetland species, including most of those listed above, their

persistence in Lao PDR is unlikely without dedicated and focused conservation action in the wetlands where they remain; these do not include the Pathoumphone wetlands. With a paucity of wildlife conservation resources, not least of which is funding, there is no guarantee that the Bolaven slope wetlands and the Xe Kong plains will be secured, and thus that these species will not be lost from Lao PDR. Any focus on the Pathoumphone wetlands must not, therefore push these sites closer to unrecoverable degradation, and the species closer to extinction, but instead catalyze more attention to the Bolaven slope wetlands and the Xe Kong plains.

Even in the Bolaven slope wetlands and the Xe Kong plains wetlands, many of the most threatened species had very low populations by the early 1990s. It is a fair assumption that they will be even rarer there now. In fact, the most important area in the context of the Pathoumphone wetlands for potential future recovery is the Western Siem Pang area of Stung Treng province, Cambodia, which lies relatively close by across the international border (see BirdLife International 2012). Even the conservation future of this outstanding area is not yet secured. A failure to conserve this area is probably one of the greatest risks to the eventual recreation of a rich bird community in the Pathoumphone wetlands.

As currently designated, the Ramsar site covers relatively few of the Pathoumphone wetlands, and captures little of their complexity. This is problematic because it is this greater area that (i) has most potential significance for wildlife, and (ii) has particular socioeconomic importance. The complex is much more significant than the sum of its parts. The Pathoumphone wetlands retain few wildlife values. Their ability to recover them depends much on the size and complexity of the area preserved and sensibly managed. Although the current Ramsar site appears large, heavy degradation of the rest of the Pathoumphone wetlands would much impair many species' potential for recovery. Under the objectives of the Ramsar Convention a larger area also seems appropriate. At the national level, recognition of the larger area might help educate alert decision-makers to the socioeconomic significance of this wetland system and to the conditions to retain this significance.

From a global and even national species-based point of view, wildlife conservation in the Pathoumphone wetlands is currently hard to justify with so many other pressing priorities in Lao PDR. But a socioeconomic focus on the wetlands to preserve the economic value of their ecology would undoubtedly also protect much of the potential wildlife significance. In such a scenario many extirpated species might one day return, given the two important provisos discussed above (suitable source areas protected elsewhere, and a large and ecologically cohesive Ramsar, or otherwise protected, site). Similar recoveries have taken place in various temperate countries by controlling hunting (e.g. Osprey *Pandion haliaetus* and various other predatory species that were extirpated, or nearly so, in the UK; Balmer *et al*. 2013).

5.2 Conclusion

These short surveys of the Ramsar site and surrounding wetlands focused on assessing the bird community, its conservation significance, and threats to it and to the wetland habitat that support it. The findings here are of national relevance because they point at what may well be occurring across the country's open plains wetlands and fills the gap for comparable surveys across recent decades. Large mammals of conservation significance were already known to be extirpated.

A number of bird species are present in nationally significant numbers: breeding Purple Heron *Ardea purpurea*, Purple Swamphen *Porphyrio porphyrio* and Bronze-winged Jacana *Metopidius indicus*, and perhaps Watercock *Gallicrex cinerea* and Black Bittern *Dupetor flavicollis*.

A combination of the lack of records of certain species and unsuitability of habitats surveyed for the same indicates a much reduced community in Lao PDR of the following: Blue-breasted Quail *Coturnix chinensis*, Spot-billed Duck, Garganey*°, various other Palaearctic migrant ducks, breeding Common Hoopoe *Upupa epops**, Blue-eared Kingfisher *Alcedo meninting*°, Pied Kingfisher *Ceryle rudis*, Blue-throated Bee-eater *Merops viridis*, Blue-tailed Bee-eater *M. philippinus*, fish owls *Ketupa*, various species of rail and crake additional to those recorded*); breeding Common Moorhen, Greater Painted-snipe*, Black-winged Stilt *Himantopus himantopus*, Pacific Golden Plover, Red-wattled Lapwing*, Oriental Pratincole *Glareola maldivarum*, Brahminy Kite°, both (sub)species of Black Kite *Milvus migrans*, three species of resident vulture*, Darter, Little Cormorant, Indian Cormorant, breeding egrets, Little Heron *Butorides striatus**°, Great Bittern*, Long-tailed Shrike*, Racket-tailed Treepie *Crypsirina temia**°, Ashy Woodswallow *Artamus fuscus*, breeding-season Black Drongo *Dicrurus macrocercus* (common in winter), White-shouldered Starling*, Vinous-breasted Starling*°, White-vented Myna*°, Plain Martin*, Chestnut-capped Babbler, Red Avadavat, Black-headed Munia and Chestnut-eared Bunting *Emberiza fucata**°. These are species which remain common in one or more neighbouring countries.

There seems to be no policy to control the spread of *Mimosa pigra*, nationally, provincially, or at site level. Under current conditions, it is only a matter of time before it invades Pathoumphone wetlands, at great cost to the local economy, as well as local wetland wildlife.

The high potential for use of the site by local people at no detriment to its wildlife is presently nowhere near achieved as opportunities such ecoutourism development through wildlife conservation have not been fully explored.

5.3 Recommendations

5.3.1 Thematic direction

Until there is adequate protection of nearby wetlands of higher priority and their associated species now lost from the Pathoumphone wetlands, the Ramsar site is unlikely to regain its former community composition. As such, the use of globally-focused wildlife conservation resources at the site would need to be carefully justified: they are likely to be used more effectively at other sites of higher conservation priority. A socioeconomic focus on the Pathoumphone wetlands to preserve their economic value may be the best approach to their conservation. However, even for this to succeed, there needs to be a clear understanding of the extent and complexity of the linked wetland complex, and that currently cryptic features are probably as, and perhaps even more, important than the visually obvious large open basins.

In a national context, the Pathoumphone wetlands have potentially higher significance for wetland wildlife. Part of the landscape in which they lie is legally protected, and is the focus of a wider landscape initiative. Nearby wetland systems to the north-east, east and south-east have greater significance. This basis might be built upon to further secure the site's habitat and encourage recovery of wildlife populations. But a wildlife-focused course of action needs to be mindful of the previous recommendation, especially as in the case of birds and mammals — recovery in the Pathoumphone wetlands cannot be achieved without first securing populations of threatened species elsewhere.

If, after consideration of the above, general wildlife conservation actions are deemed appropriate, the following courses of action are recommended:

5.3.2 Habitat protection

Destruction of wetlands needs to be largely stopped, and sustainable land-use practices should be instigated in remaining wetlands of all types. Initially this should focus on swamp forests because these are the most threatened, are the most under-appreciated, and may take longest to regenerate once lost. Precise recommendations require additional survey, considerable community engagement (including land-use planning with local villages), and will probably meet resistance from various stakeholders. Integrated local wetland and catchment management would need to be initiated to deal with the complex issues of competing uses for the wetlands, invasive species and sustainability of wetland resource extraction. Of note, with the absence of wild large herbivores, some level of continued grazing by domestic bovids is vital to the area's habitat matrix.

5.3.3 Wildlife protection

Most imminently, further loss of species can only be prevented if various hunting activities are effectively eradicated.

Re-colonization by hunting-sensitive wildlife requires a long-term monumental change. In the interim, even small actions and initiatives if carefully considered could have benefits. Although outside the scope of these recommendations, actions that engage the community in the site's long-term problems and solutions to wildlife conservation are key, as is a focus on education and outreach potentially through schools, media and other forms of social networking. The fundamental requirement for a populated area to retain hunting-sensitive wildlife is for the people who live there to want to preserve such wildlife.

In such circumstances, foreign actors cannot secure a sustainable solution alone. Success will come from the Lao government and local communities shouldering responsibility for management of the wetlands, with commitment and significant input into planned initiatives. Without such commitment, all that can be hoped for is to maintain the status quo whilst external aid and advice is maintained. Critical to ensuring commitment is the identification and training of future Lao conservation leaders.

In the short-term, proactive conservation measures based around a trained enforcement patrol team would likely be necessary to ensure compliance in focal wildlife protection zones with national laws and local wildlife conservation agreements. These should have the mandate of habitat protection as well as animal protection.

There may be particular conservation opportunities with the Asian Openbill, which is expanding rapidly in Southeast Asia. Its expansion is believed to be due to its diet of the alien snail *Pomacea*, currently in rapid population growth in much of Southeast Asia. Because this snail is a scourge of rice crops, it is in rural people's direct interests not to kill or harm Openbills. In 2012 when Openbills arrived in Viangthong district, Houaphanh province (and were assumed by local residents, who had never seen them before, to be 'sea-birds from Vietnam'), local people soon noticed that the Openbills were eating the *Pomacea* snails, but also that they were taking fish from aquacuture ponds. Many were killed by fish-farmers, but in the interests of the wider community, there was a collective decision by the head of the District Agriculture and Forestry Office and some district officials to level a LAK 600,000 fine on anyone who shot these birds. The announcement was made via loud speaker and included an explaination that the birds were beneficial to rice farming and should be left alone. This could be replicated in Pathoumphone district. The successful control of the slaughter of Openbills might help in reducing hunting of birds of higher conservation significance.

The bird most in need of direct protection is probably the Yellow-breasted Bunting. Although no evidence of direct hunting was recorded, this is an ever-present risk particularly at roosts.

The species roosts communally in large beds of tall graminoids. These are all inundated during the wet-season but as they dry out during the dry season, they become favoured grazing areas for domestic bovids. Once grazed and trampled they no longer can support roosts, forcing the buntings to go elsewhere. The extent to which this is a problem is not clear but each move must expose the birds to a new set of potential harvesters. With no existing survey of this area in the late dry season (the buntings stay until April) it is not clear if any high-quality roost habitat remains in the last weeks of their annual stay in the area. Hence, if the Ramsar site is to be actively managed, then bunting roosts should be sought each dry season and protected. This requires seasonal fencing to repel domestic bovids, and appropriate awareness activities with the locals. The other communal roosters are much lower management priority as they are not globally threatened with extinction and they roost in vegetation not seasonally destroyed (egrets in trees and pipits and wagtails in the centre of the main BKN marsh).

5.3.4 The invasive species *Mimosa pigra*

A policy and strategy for the control of *Mimosa pigra* in the area is required. If every local person knew the consequences of invasion and was able and motivated to carry out simple eradication steps, the spread of the shrub into the Pathoumphone wetlands could be drastically reduced and probably prevented. It is essential that:

- as many people as possible understand the consequences of its proliferation;
- a government body be responsible for a simple form of monitoring;
- there is a simple and effective way of reporting sightings of pioneer establishing plants; and
- simple guidelines are developed for effective eradication of pioneer plants, as and when they are found.

5.3.5 Tourism

Sensible eco-tourism is very unlikely to cause serious threats to the area, and its potential benefits would greatly outweigh any potential negatives. Because of the scarcity of highly charismatic species that are difficult to see elsewhere, it might not be possible to attract serious ‘wildlife tourists’ and the emphasis would be on general tourists visiting southern Lao. Because eco-tourism is unlikely to provide a keystone for wildlife conservation of the area, it should be viewed as a subsidiary benefit, probably best undertaken by entrepreneurs in close dialogue with wetland managers.

5.3.6 Priority zones

Priority zones are a typical concept with large protected areas, but the Ramsar site as presently designated is very small (smaller than a typical priority zone within a forest protected area) that it does not automatically warrant spatial zonation especially for aspects of management for bird conservation. All areas of this Ramsar site require enforcement of the existing wildlife law which unambiguously protects almost all the hunting-sensitive bird species. Winter roosts and nesting colonies of congregatory species require priority. But because these are, to varying extents, mobile (in response to seasonal vegetation changes, e.g. Yellow-breasted Bunting roosts, or to hunting pressure, e.g. harrier roosts) they cannot be defined by fixed location. Similarly, the connectivity of water across the site means that activities to prevent the growth of *Mimosa pigra* must be undertaken across the whole Ramsar site (and indeed through the plains east of the Mekong–Xe Kong watershed, north of the Xe Pian NPA hills, south of the Bolaven plateau and west of the Xe Khampho).

Even for activities that can be potentially more localized, zonation is challenged by the complex nature of the wetlands and their hydrodynamics, the cryptic nature of many wetland features that are hard to ascertain from remote images or topographic maps, and the fact that only a small fraction of the wetlands have so far been surveyed. Outreach and engagement of

local communities is also required throughout, as is sensible land-use planning. Potential priority zones (Figure 5) can be broken down into several types. They should be thought of more as a guide to locations of greatest potential ecological interest in order to help refine further investigations for specific management prescriptions. The interconnectivity of the wetlands within the complex means that habitat management may require zonation along different lines.

Main Beung Kiat Ngong marsh

In terms of discrete wetland areas, the main BKN marsh probably has the highest priority for birds, largely because of its size and the presence of most of the breeding bird species of any conservation significance.

Other large open basins

Various relatively large open marsh basins exist, most of which have not been surveyed for birds. Those mapped appear to retain extensive marsh vegetation. This dispersed network is probably one factor in the persistence of species that favour open wetlands. Of those visited probably the most important are:

- Bung Bhar-pat (Ban Thongxay area): relatively distant from villages, with very little associated cultivation and particularly diverse vegetation formations.
- Nong Kasay: the substantial extent of permanent open water, as a result of damming, adds to its wildlife value.

Wetland complexes

The whole area of the Pathoumphone wetlands is a complex of wetlands, but three 'tracts' stand out as potentially of greater significance for several reasons. Each has what appears to be a relatively high density of wetlands and each appears, relatively within the Pathoumphone wetlands, less degraded with fewer areas of permanent paddy cultivation.

- NW Tract. This is probably the most complex of the three areas, and probably has the greatest extent of swamp forest remaining.
- NE Tract. This tract is probably the least complex with possibly a somewhat lower total wetland area than the other two, but it is probably also somewhat less used by local communities given that on average areas within it are more distant from villages, compared to those in the other two tracts.
- SE Tract. Its south-easterly tongue appears to encompass complex stream and swamp forest habitat. These may be the most extensive and intact swamp forests in the Pathoumphone wetlands, but this requires validation.

Swamp forests

If there is to be serious management investment of the Ramsar site, investigating and characterizing these swamp forests is a priority, although it will require significant prior planning to determine what features need to be assessed (e.g. composition, seasonality, soil type), and it would take considerable field time to document each.

5.4 Avenues of further survey

There is a slight possibility that Masked Finfoot might still occur although this would be hard to investigate further. Camera-trapping might be the most effective way to confirm the species if there were a suspicion of occurrence. If found, it would add very significantly to the wildlife conservation value of the site, and would justify species-specific initiatives, including protection of wetlands where it occurred, particularly protection from nest robbery, projectile hunting, and netting, and also the creation of no-fishing zones (as one of the greater threats to the species may be entanglement in fishing hooks and nets below the water).

Lowland, not highly modified wetlands, are becoming increasingly scarce regionally. This suggests that some of their taxa might be threatened as a result. But with birds and mammals, the species most at risk are threatened mostly by direct persecution. In general, most are relatively widespread and relatively tolerant of habitat modification, giving the suggestion that this may be the case with many other wetland associated taxa. Grassland birds are somewhat of an exception as they are likely also as sensitive to habitat degradation as persecution, gving the suggestion that perhaps other grassland taxa might also be threatened. It therefore may be useful to engage specialists in other taxonomic groups to explore the presence of other threatened taxa. However, such surveys must be clearly focused. Broad 'inventory-type' surveys, although interesting and very useful for benchmarking community composition, are unlikely to answer such questions.

Fish fauna might be a further avenue of investigation: it is clearly highly used by local communities, may have species of conservation significance, and is probably to some degree a significant factor in the ecology of the wetlands, both in terms of prey for other wildlife and perhaps also in the balance of the aquatic ecology (e.g. through perhaps fish consumption of macrophytes and snails). The questions that such investigation should ask would need to be carefully considered as management solutions for threatened species might be very different from those for sustainability of local community fisheries, as well as for management of a naturally dynamic aquatic ecology.

Ramsar boundaries

If the Ramsar site is to fulfil the Convention's objectives, a much greater area of the Pathoumphone wetlands should be included. This would require greater understanding of the wetland system and its drainage and hydrodynamics. This is a significant undertaking but one which is necessary if any ecological integrity is to be maintained. Figure 5 shows a provisional suggested boundary. This serves to indicate the size-class to aim for, which, even if not subject to further wildlife survey before being adopted, would be a major advancement on the current boundary.

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Appendices

Appendix 1 National and regional context for the survey's bird records

These species accounts for wetland birds of known or potential conservation interest in Beung Kiat Ngong and nearby wetlands in December 2007 – January 2008 are taken from a report on birds in parts of Pathoumphone district in 2007–2008 (Duckworth 2008). Time was insufficient on the 2013–2014 project to update these accounts comprehensively; only the most significant amendments have been made (marked '**2014 update**'). The accounts are otherwise verbatim from the original source with the exception of (unmarked) change of locality-name spellings for consistency with the present report. They are split into two sections, wetland and non-wetland species. Most of the species given accounts here were not found in 2013–2014 and the accounts provide the context for the report's conclusion that many species are in steep decline, even locally extirpated, in and around the area.

A1.1 Species strongly associated with wetlands, at least in the lowlands

Lesser Whistling-duck *Dendrocygna javanica*

- Nong Salar: never seen by day, but heard flighting in shortly after dusk on several evenings in both months, and before dawn on 18 January
- Nong Sam: five on 13 December; 55 on 22 December; 30 on 4 January; either feeding or loafing, sometimes having flown into the nong in the early morning
- Ban Nabon: 15 over the village at dusk on 22 December
- Ban Nam-Om: 45 low over Nong Hoy on 6 January, reported by the villager to be leaving after a night's feeding to sleep on a river to the east
- Thong Namniap: 12 at dawn on 7 January and a small flock heard on 10 January had probably just come off the marsh
- Ban Kele-2: one overhead at dusk on 12 January and heard overhead on 16 January, flying towards Beung Kiat Ngong

Lesser Whistling-duck is widespread in Lao PDR (e.g. Duckworth 1996, Thewlis *et al*. 1996, Evans *et al*. 2000, Evans 2001). Although it is in no way threatened even nationally, numbers are well below what the habitat could support. At 'protected nongs', flocks of thousands congregate, with the highest such numbers recorded recently (over 1200 and 1700, respectively) at Ban Sivilai, Vientiane province and Bung Hor, Savannakhet province (Parr & Parr 1998, Bezuijin 2006). There is a strong seasonality in numbers and spatial use of the Vientiane plain (Duckworth unpubl.) and Pakxan wetlands, Bolikhamxai province (C. Wood verbally 2005), so survey at other seasons might find much larger numbers in Pathoumphone. The numbers in 2007–2008 are much smaller than the 450 and 150 found on Nong Loum and Nong Kasay respectively (near Ban Phalay, south-east of the survey area) in 1992–1993 (Timmins *et al*. 1993a); but no wetlands with habitat similar to these two, and thus suitable as day-roosts, were found in 2007–2008. The birds seen and heard round dawn and dusk during 2007–2008 may well have been using these same two nongs, outside the survey area, as their day roost.

White-winged Duck *Cairina scutulata*

- 2007–2008: no records

White-winged Duck is one of the rarest birds in Lao PDR, having undergone major population declines across most of its world range in the last few decades. Three populations were confirmed in Lao PDR through the surveys of the 1990s: on the Nakai plateau, in Dong Khanthung proposed NPA, and in the Xe Kong basin (Evans *et al*. 1997, Round 1998). There is no recent proof that any survive; the Xe Kong population (which was recorded, among other places, in Xe Pian NPA and in lowlands east of the BCI pilot area) may be the population most likely to persist. Village reports attributed to the species by interviewers are widely noted in Lao PDR. There is undoubtedly some background level of non-indicative such reports, reflecting past occurrence, confusion with other ducks (Cotton Pygmy-goose and Spot-billed Duck) and other errors, but Poulsen *et al*. (2005) found a much higher percentage of interviews apparently reporting the species in Pathoumphone PFA than is typical in Lao PDR, and attributed this to genuine presence. Reports were also judged plausible by Evans *et al*. (2000) in the Dong Hua Sao NPA lowlands in 1996. If the species does survive in the BCI corridor, it is very threatened, highly significant nationally, and significant globally. It is difficult to confirm the species's presence at low densities: the lack of records on the present survey does not mean the species does not occur. Habitat features and human settlement patterns suggest that it may be more likely in the parts of the BCI corridor to the east of the BCI pilot area.

Cotton Pygmy-goose *Nettapus coromandelianus*

- Nong Salar: 11–15 on 12 December, four on 13 December and three on 21 December; one on 17 January. Certainly absent on the intervening visits

This duck has declined greatly in Lao PDR and is locally extinct over most of the country, with only small numbers remaining in the South and Centre (Duckworth *et al*. 1999, Fuchs *et al*. 2007, Duckworth unpubl.). It was assessed as 'common' in the northern zone of Xe Pian NPA in 1992–1993 (Thewlis *et al*. 1996) with counts of 55 and 28 at Nong Loum and Nong Kasay respectively (Timmins *et al*. 1993a). No wetlands with habitats similar to these two were checked in 2007–2008, therefore it cannot be determined whether status has changed. Also, three pairs were seen in Nong Sam on 27 June 2005 and seven were seen in a small lake along route 13 at *c*.30 km south of Pakxe on 17 September 2000 (Poulsen *et al*. 2005). Use of Nong Sam may be more likely when the nong is larger in the wet season.

Spot-billed Duck *Anas poecilorhyncha*

- 2007–2008: no records

Spot-billed Duck occurs locally across Lao PDR (Duckworth *et al*. 1999, 2002, Evans *et al*. 2000, Bezuijen 2006), and is the second most numerous duck breeding in Lao PDR after Lesser Whistling-duck. The lack of records from Pathoumphone reflects the absence of a sufficiently large water body. In Lao PDR, this duck uses a variety of large water bodies, including the Mekong (Duckworth 1996, Evans *et al*. 2000, Duckworth *et al*. 2002) and the reservoirs of Agk. Nam Ngum (four seen on 25 September 2004 and 12 on 18 February 2005, breeding status not assessed; Duckworth unpubl.). There are no reliable records from any Lao site without extensive open water.

2014 addition: Large numbers live in the lower Xe Champone catchment (Timmins 2014).

Garganey *Anas querquedula*

- Beung Kiat Ngong (Kiat Ngong sector): a small duck (the size of Garganey) was seen twice in flight on 19 December

This sole record is of concern: in Xe Pian NPA, 21 were found on Nong Kasay in 1992–1993 (Timmins *et al*. 1993a); but no wetlands with habitats similar to this nong were checked in 2007–2008, so a decline cannot conclusively be indicated. In the 1990s, Garganey was the least uncommon long-distance migrant duck in Lao PDR (Duckworth *et al*. 2002), but even so, is scarce and local, reflecting the heavy hunting pressure on large birds of open habitats. Its current status is unclear because of a lack of systematic survey of suitable habitats. Better data from adjacent Thailand indicate a recent major and ongoing decline in numbers for as yet unknown reasons (P. D. Round verbally 2007).

Stork-billed Kingfisher *Halcyon capensis*

- Thong Namniap: heard on 7 & 10 January
- Beung Kiat Ngong: heard in the Kiatngong sector on 8 January

This kingfisher was widespread and common in Lao PDR in the early–mid 1990s, but recent surveys in the Upper Lao Mekong, in Phongsali province, in the Nam Kading and on the Nakai plateau all showed steep recent declines (Duckworth *et al*. 2002, Timmins & Robichaud 2005, Fuchs *et al*. 2007, R. J. Timmins and Duckworth unpubl.). Reasons for this decline remain unclear. It was adjudged frequent in the northern zone of Xe Pian NPA but only occasional in Dong Hua Sao NPA in 1992–1993 (Thewlis *et al*. 1996), and the few records on the present survey cannot be taken to indicate a decline, because little time was spent on the clear, open, waters favoured by the species.

2014 addition: White-throated Kingfisher *Halcyon smyrnensis*

In 2007–2008, 1–2 were recorded at Nong Sam, Thong Namniap, Ban Thongpha, Ban Thopsok, the main BKN marsh (with three singles there on 9 January), Ban Nakok, Ban Nabon and Ban Nam-Om, constituting about half the sites visited which looked superficially suitable for the species. At a number of other sites *Halcyon* calls which could have been this species or Bleck-capped Kingfisher were heard. In this region it was seen daily (numbers not readily available) during 1992–1993 (Thewlis *et al*. 1996). The species was recorded widely across Lao PDR during surveys in the 1990s and 2000s, but Timmins (2014) drew attention to the need to track this species's national status better, with particular attention to their breeding numbers.

2014 addition: Green Bee-eater *Merops viridis*

In 2007–2008 there were only a couple of unconfirmed records of Green Bee-eater, neither near the main BKN marsh; 1992–1993 it was seen daily in the northern zone of Xe Pian NPA (precise locations not readily available). Duckworth (in press) drew attention to the low densities now found in many areas of superficially suitable habitat in Lao PDR, with few areas having contact rates as high as the Xe Champone (see Timmins 2014: 94, 99). Strong but poorly understood seasonality of occurrence complicates assessments of long-term trends.

Grass Owl *Tyto capensis*

- 2007–2008: no records

Grass Owl's real range in Southeast Asia has been much under-recorded. In the last few years records have come from previously unsuspected areas of Vietnam, Cambodia and Thailand (most not yet formally published). In Lao PDR, Beung Kiat Ngong is among the most likely habitats. The bird is exceedingly difficult to locate, even when specifically sought. It is largely nocturnal, but even checking harrier roosts does not reliably find it (information from R. J. Safford, P. D. Round, T. D. Evans and others *in litt*. 2007 as this redefinition of the species's Southeast Asian range unfolds). It could easily have been overlooked in the BCI pilot area during the current survey. However, excessive burning and trampling may render these sites unsuitable: one of only two Thai nests ever found was burnt out by a village-set fire as the wetland dried out (P. D. Round *in litt*. 2008).

Sarus Crane *Grus antigone*

- 2007–2008: no records

By the era of modern surveys Sarus Crane was already close to extinction in Lao PDR (Thewlis *et al*. 1998). The habitat, particularly of Beung Kiat Ngong, is suitable in type and extent and perhaps, had there not been decades of human settlement and persecution, cranes would occupy Pathoumphone.

Masked Finfoot *Heliopais personata*

- 2007–2008: no records

Finfoot has never been found in Pathoumphone, but it undertakes poorly-understood seasonal movements and most Pathoumphone surveys were in November–February, whereas most records in Indochina were in March–July (Thewlis *et al*. 1998, Timmins 2008). The forested nongs around Ban Nam-Om looked ideal, but precise habitat needs are not known, so its status in Pathoumphone cannot be predicted. Focused surveys during April–August remain necessary for this. All populations in Southeast Asia face one or more obvious threats, and the species may even be more threatened than the White-winged Duck. If it breeds in Pathoumphone, it is probably the area's highest bird conservation priority.

Crake sp(p). (*Rallidae*)

- Thong Namniap: heard on each survey day, and clearly common
- Ban Thongpha: several heard in each of several small nongs on 16 December; one seen flying between sedge-beds
- Ban Sounot: heard from a small grass-filled nong on 17 December
- Ban Thopsok: at least five at the small nong on 18 December
- Beung Kiat Ngong: at least a dozen counter-calling at dusk in the Thopsok sector on 18 December; similarly common around dawn and dusk in the Kiatngong and Kele-2 sectors. One seen flying between grass-beds at dawn on 9 January
- Ban Nabon: heard on 23 December
- Nong Saming, Ban Thangbeng: heard on 17 January

No species of crake is found commonly and widely in Lao PDR (Duckworth & Evans 2007). Calls were consistent with those of Ruddy-breasted Crake *Porzana fusca*, as were the two

glimpsed birds, but definitive identification would be rash. The regularity and ease with which calling birds were found on almost every visit to swampy or marshy vegetation contrasts with surveys of such habitats (more fragmented and degraded) around Vientiane and elsewhere in Lao PDR, where there were no such records. This suggests that these birds are genuinely rare, rather than simply overlooked. It was an oversight for all species not to be listed as 'Little Known in Lao PDR' by Duckworth *et al*. (1999).

In 1992–1993, Slaty-breasted Rail *Gallirallus striatus* was occasional in Xe Pian NPA's northern zone, and in 1996, Slaty-legged Crake *Rallina euryzonoides* was found in the Dong Hua Sao NPA lowlands (Thewlis *et al*. 1996, Evans *et al*. 2000), and so may well occur in the survey area. However, the Slaty-legged Crake record remains the only one for Lao PDR and its true status (a genuine rarity or simply overlooked) is unclear. Ruddy-breasted Crake has been recorded previously in Xe Pian, but only in the Xe Kong plains sector (Thewlis *et al*. 1996).

2014 addition: Such calls elsewhere in Lao PDR (the lower Nam Ngum plain) were confirmed as belonging to Ruddy-breasted Crake *Porzana fusca*, which is, if all such calls belong to the species, locally abundant there (Duckworth in press).

White-breasted Waterhen *Amaurornis phoenicurus*

- Nong Salar: a single on almost every visit
- Nong Sam: heard on 4 January
- Ban Sounot: heard from a small grass-filled nong on 17 December
- Ban Nongpop: one on 24 December
- Ban Nam-Om: heard at Nong Hoy on 6 January
- Beung Kiat Ngong: one in the Kiatngong sector on 8 & 9 January

This is one of only two rallids currently found commonly and widely in Lao PDR (Duckworth & Evans 2007). Records are listed only for completeness's sake.

2014 addition: It was seen daily in the northern zone of Xe Pian NPA in 1992–1993 (Thewlis *et al*. 1996).

White-browed Crake *Porzana cinerea*

- Beung Kiat Ngong: one in the Kiatngong sector on 8 January

This is the first record for South Lao PDR of a species which appears to be a recent colonist of Indochina. Only three Lao sites are known (Nong Pen, Vientiane municipality; Nong Souy, Savannakhet province; Nong Kom (= P. K. 20), Savannakhet province (Duckworth & Evans 2007, Duckworth unpubl.). As with other sites of recent records, past survey of Beung Kiat Ngong was not exhaustive enough to be certain that it was not then simply overlooked: the 1992–1993 survey spent little time in swamps and marshes (reflecting its forest priority) and did not even record such common species as Bluethroat there. Nong Salar seemed a perfect habitat for this crake (a large area of mixed *Ludwigia–Salvinia*), but while thourough effort was made to search for it, it was for certain not present. This and the sighting of only one bird on Beung Kiat Ngong are consistent with the fact that it is only a recent arrival to the area.

2014 addition: Many further sites where the species is common are now known (Timmins 2014, Duckworth in press).

Watercock *Gallicrex cinerea*

- Beung Kiat Ngong: one in the Kiatngong sector on 8 & 9 January

Small numbers of Watercocks have recently been recorded at scattered sites across Lao PDR, but numbers are low compared with historical assessments (Duckworth *et al*. 1999, Duckworth unpubl.), presumably reflecting over-hunting and habitat change. Its seasonal status in Lao PDR is unclear: north of the Bolaven, records come only from March–October. It was also found in December–January in Xe Pian NPA in 1992–1993 (Duckworth *et al*. 1999), where small numbers may overwinter regularly. Also, two pairs were seen at Nong Sam and a male and two females were seen in a small nong just outside Ban Thopsok, all on 27 June 2005 (Poulsen *et al*. 2005). This suggests that, as further north in Lao PDR, it is significantly more common in the rainy season. This was corroborated by a resident of Ban Kiatngong, who called in common at Beung Kiat Ngong in May–July; this is probably reliable, because he correctly mimicked the male's seasonal call.

2014 addition: It was found to be widespread and common in the wet season in the lower Xe Champon (Timmins 2014) and Pakxan wetlands (Duckworth unpubl.), and widespread in the lower Nam Ngum plain although not on the parts of the Vientiane plain closer to the city (Duckworth in press).

Purple Swamphen *Porphyrio porphyrio*

- Nong Sam: one on 13 December, four on 22 December, two on 4 January
- Beung Kiat Ngong: two in the Kiatngong sector on 19 December and 8 & 9 January

This large rallid is categorized as potentially at risk in Lao PDR by the authors. These are tiny numbers for such prime habitat, and for what is typical in Lao PDR. This species was found in Xe Pian NPA's northern zone in 1992–1993 (Duckworth *et al*. 1999). Also, two pairs were seen at Nong Sam on 27 June 2005 (Poulsen *et al*. 2005).

Common Moorhen *Gallinula chloropus*

- Nong Salar: one on 12 & 13 December, two on 21 & 27 December
- Ban Thongpha: four spread across several small nongs on 16 December
- Ban Nakok: eight at Nong Khorly on 20 December
- Thong Namniap: one on 10 January

This is one of only two rallids found commonly and widely in Lao PDR (Duckworth & Evans 2007). Records are listed only for completeness's sake.

2014 addition: Although wintering birds remain widespread, there are very few breeding records in Lao PDR. It was seen daily in the northern zone of Xe Pian NPA in 1992–1993 (Thewlis *et al*. 1996).

Wood Sandpiper *Tringa glareola*

- Beung Kiat Ngong, Kiatngong sector: seven on 19 December, ten on 7 January and 31 on 9 January; counts on the earlier days may well have been underestimates; one in the Kele-2 sector on 16 January

This species is widespread and common in Lao PDR during migration seasons, but few regions are known to hold significant numbers over winter (Duckworth unpubl.). It was common in Xe Pian NPA's northern zone in 1992–1993 (Thewlis *et al*. 1996).

2014 addition: 1993 counts included 62 on 2 January and at least 40 on 3 January, both on the main BKN marsh. These are higher than in 2007–2008, but may reflect differences in coverage rather than any change in population.

Greater Painted-snipe *Rostratula benghalensis*

- 2007–2008: no records

Although Duckworth *et al*. (1999, 2002) used the paucity of recent Lao PDR records of Painted-snipe to suggest it might be under pressure in the country, specific searching on the Vientiane plain (where the species might reasonably be assumed to be most threatened, given human pressures) in 2003–2005 found that it remains frequent, with seasonality of occurrence unclarified as at times it is very hard to find (Duckworth unpubl.). These factors probably underlie the few Lao records in the 1990s. There were only occasional records in the northern zone of Xe Pian NPA in 1992–1993 (Thewlis *et al*. 1996) and it may simply have been overlooked in 2007–2008.

2014 addition: Duckworth (in press) found it remains common in the Nam Ngum basin even in agricultural areas with intensive hunting.

Pheasant-tailed Jacana *Hydrophasianus chirurgus*

- Nong Salar: 14 on 12 December, 16 on 13 December, 21 on 21 December, 22 on 27 December, 19 on 11 January, 22 on 13 January, 14 on 17 January. Except for the last, differences in count may represent counting error, with birds difficult to count when dispersed across the vegetation
- Nong Sam: one on 13 December, two on 4 January
- Ban Thongpha: one on 16 December
- Beung Kiat Ngong, Kiatngong sector: one on 7 January

Neither Lao PDR jacana was considered a key species by Duckworth *et al*. (1999), but Duckworth & Tizard (2003) drew attention to the paucity of Lao PDR records. Records from Lao PDR have not yet been reviewed in detail, but few regions are known to hold the species over winter (Duckworth unpubl.). There have been major declines in the breeding population in Thailand (P. D. Round verbally 2004). The species was recorded in February 1996 in the Dong Hua Sao NPA lowlands (Evans *et al*. 2000) but no details of numbers are available. Numbers in 2007–2008 are a little higher than the four and 15 found on Nong Loum and Nong Kasay respectively (in the south-east of the Xe Pian NPA northern zone survey area) in 1992–1993 (Timmins *et al*. 1993a). It is tempting to speculate that the larger numbers in 2007–2008 are a result of the protection at Nong Salar.

2014 addition: Both on passage and over winter, this species is locally common, but prime habitat is localised on the lower Nam Ngum plain, at least where guns are little used (Duckworth in press).

Bronze-winged Jacana *Metopidius indicus*

- Nong Salar: two adults on every visit
- Ban Thongpha: one on 16 December
- Beung Kiat Ngong: 13, including both first-winters and adults, in the Kiatngong sector on 19 December; one there on 8 January and two on 14 January
- Nong Sam: two on 22 December, four on 4 January

Neither Lao jacana was considered a key species by Duckworth *et al*. (1999), but Duckworth & Tizard (2003) drew attention to the paucity of Lao PDR records. Subsequent records suggest that this is actually a species surprisingly robust (among swamp birds of comparable size) to even quite heavy human persecution. These numbers are much smaller than the up to 60 seen at two wetlands (not surveyed in 2007–2008, and somewhat different in habitat from any surveyed on the latter survey) in the Xe Pian NPA northern zone in 1992–1993 (Timmins *et al*. 1993a); but the 1992–1993 counts at Beung Kiat Ngong were similar, of 6–10 birds.

2014 addition: It is highly localized on the lower Nam Ngum plain, but this seems to reflect narrow habitat use rather than high sensitivity to hunting (Duckworth in press). One of the 1992–1993 sites was Nong Kasay.

Pacific Golden Plover *Pluvialis fulva*

- 2007–2008: no records

The rather few recent records of Pacific Golden Plover in Lao PDR come mostly from October and March–May, i.e. passage seasons (Thewlis *et al*. 1996, Evans 2001, Duckworth *et al*. 2002; Duckworth unpubl.). The only exceptions may be from near Ban Thadua in February 1999 (Duckworth *et al*. 2002) and two sightings, one of a flock of 35–40, on 10 February 2007 on the Nakai plateau (R. J. Timmins *in litt*. 2007). Nor are historical records that numerous: one at Salavan on 15 October 1931 (Engelbach 1932); regular February presence in flocks of up to forty and occasional spring records of a few birds from Xiangkhouang province, especially the Plain of Jars and Ban Latsen (David-Beaulieu 1944); a scarce passage migrant through Savannakhet province, possibly recorded once only, but other unidentified birds were probably of this species (David-Beaulieu 1949–1950). It might be genuinely rare in winter but wintering populations may well be kept at very low levels by hunting. The same features that place the Grey-headed Lapwing at risk (i.e. fairly large body size; attachment to open land with short vegetation most of which is heavily used by people, and where it is both readily found and readily shot at) are applicable to this species.

Little Ringed Plover *Charadrius dubius*

- Beung Kiat Ngong, Kiatngong sector: ten (three resident [sub]species, including two displaying, and one migrant [sub]species) on 19 December; twelve (two and seven respectively) on 7 January; at least 20 (about one-third and two-thirds, respectively)

on 9 January. Kele-2 sector: six (including one migrant) on 12 January; three (all migrants) on 16 January
- Thong Namniap: two on 10 January

Two (sub) species of this plover occur in Lao PDR. They were not distinguished in the 1990s surveys, but around Vientiane in 2003–2005 the resident form, *C.* (*d.*) *jerdoni*, is abundant along the Mekong, moving into plains wetlands at some times of year. Meanwhile *C.* (*d.*) *curonicus* is a fairly frequent passage migrant, mostly recorded in April but presumably common in autumn (when the forms are less easily separated). Given steep declines in river-channel nesting waders in Lao PDR (e.g. Thewlis *et al*. 1998, Duckworth *et al*. 1999, 2002), this conformation of continued abundance by Little Ringed Plover shows it adapts to heavy human pressure, and is no national conservation priority. The Nakai plateau may be the only other site with mid-winter records confirmed for *C. d. curonicus* (Duckworth unpubl.). Little Ringed Plover is a common breeder in the Mekong channel around Ban Pathoumphone (as seen on 17–18 January) and it is not clear whether the species actually nests in the corridor wetlands or simply travels there to feed.

Grey-headed Lapwing *Vanellus cinereus*
- Thong Namniap: eight on 15 December, two on 7 January, three on 10 January
- Ban Thopsok: one on 18 December
- Beung Kiat Ngong, Thopsok sector: three on 18 December; Kiatngong sector: eight on 19 December, ten on 7 January, seven on 8 January; 14 on 9 January; Kele-2 sector: two on 12 January, three on 16 January
- Ban Nam-Om: two at Nong Feua on 5 January
- Nong Salar: one on 11 January, two on 13 January

This species is a winter visitor and passage migrant to Lao PDR, occurring widely on passage. Only a few wintering concentrations are known in Lao PDR, including parts of the Xe Kong basin (including Xe Pian NPA's northern zone, with flocks of up to 24 in winter 1992–1993, and the lowlands of Dong Hua Sao NPA, where five were seen on 25 February 1996 just south of Ban Nabon) (Thewlis *et al*. 1996, 1998, Duckworth *et al*. 1999, 2002, Fuchs *et al*. 2007, Duckworth unpubl.). All such areas are heavily used by people so this large species is at continual risk from opportunistic hunting. Also, the species was found in 2000 and 2001 at Ban Thangbeng (up to 11 birds) and Beung Kiat Ngong, with up to 25 (Poulsen *et al*. 2005). There is no suggestion of a major decline in the area since the 1990s; that the 2007–2008 counts were a little smaller may reflect only coverage of different wetlands.

Red-wattled Lapwing *Vanellus indicus*
- 2007–2008: no records

Red-wattled Lapwing is one of a several species for which healthy populations were found widely in South and Central Lao PDR in the early–mid 1990s, but is much reduced across North Lao PDR (Duckworth *et al*. 2002, Fuchs *et al*. 2007). This decline is presumably driven through incessant over-hunting of large birds in agricultural and other non-forest habitats. The lack of records in Pathoumphone in 2007–2008, despite concentrated survey effort in prime areas, indicates a significant decline there: in 1992–1996 it was common in the

northern zone of Xe Pian NPA and occasional in the non-forest lowlands of Dong Hua Sao NPA (Thewlis *et al*. 1996, Evans *et al*. 2000). One bird was seen on a mid-channel sandbar in the Mekong at Pathoumphone on 17 January. Such a decline was also suspected by visits to Xe Bang-Nouan and Dong Phouviang NPAs in November 2007, which found the species to be very scarce, including in areas where it was common in 1994 (Evans & Timmins 1998, Duckworth unpubl.). A large and healthy population remains on the Nakai plateau (R. J. Timmins and Duckworth unpubl.) but the wider status in South and Central Lao PDR is unknown. Major post-1990s declines may be found to be widespread.

2014 addition: Few birds remain on the Nakai plateau after its flooding for the Nam Theun 2 reservoir (Timmins unpubl. sightings).

[Whiskered Tern *Chlidonias hybridus*]

- Beung Kiat Ngong: one in the Kiatngong sector on 19 December

Marsh terns are poorly recorded in Lao PDR but recent observations (Evans *et al*. 2000, Evans 2001, Duckworth *et al*. 2002, Duckworth unpubl.) indicate that this species is a regular, although scarce and short-staying, passage migrant. The only other recent winter record seems to be of a single at Ban Bungxang, Savannakhet province, on 3 November 2007 (Duckworth unpubl.).

2014 addition: Black-shouldered Kite *Elanus caeruleus*

This is locally common in 2007–2008, with 1–2 seen most days at the main BKN marsh, and occasionally at other areas, and seen frequently in 1992–1993. Timmins (2014) and Duckworth (in press) highlighted the poor understanding of this bird's needs in Lao PDR, although it remains (anomalously for a non-forest resident of this size) widespread in Lao PDR.

Black Kite *Milvus migrans*

- 2007–2008: no records

Formerly a common urban scavenger and open plains bird in Lao PDR, Black Kite of race *M. a. lineatus* is now a scarce passage migrant and a very rare winter visitor, and there is no evidence that the resident race, *M. m. govinda*, although formerly known from Lao PDR, persists at all (Thewlis *et al*. 1998, Duckworth *et al*. 2002, Duckworth & Tizard 2003).

Brahminy Kite *Haliastur indus*

A late-stage immature was seen coasting over Thong Namniap on 15 December and over the Kele-2 sector of Beung Kiat Ngong on 12 January.

The decline of Brahminy Kite in Lao PDR has been spectacular; now it is almost confined to parts of the South, perhaps persisting only because of Cambodian source populations. Occasional birds occur north to Pakxan (Thewlis *et al*. 1998, Duckworth *et al*. 1999, 2002, Duckworth & Tizard 2003). There were no records in the lengthy survey of Xe Pian NPA in 1992–1993 (Thewlis *et al*. 1996), but this may simply reflect the priority on forest habitats; wetlands were much better covered on this 2007–2008 survey.

Lesser Fish Eagle *Ichthyophaga humilis*

- 2007–2008: no records

Lesser Fish Eagle is associated with forested wetlands and would formerly have occurred widely in the survey area. Small numbers persisted in lowland Dong Hua Sao NPA and Xe Pian NPA (but not in the northern zone) in 1992–1996 (Thewlis *et al*. 1996, Evans *et al*. 2000). Numbers have been greatly reduced across Lao PDR (Thewlis *et al*. 1998) and the survey area is probably too disturbed to support anything other than occasional wanderers. These are more likely to occur in the eastern part of the Xe Pian–Dong Hua Sao corridor.

Grey-headed Fish Eagle *Ichthyophaga ichthyaetus*

- 2007–2008: no records

Grey-headed Fish Eagle has declined even more steeply in Lao PDR than the Lesser Fish Eagle, presumably because the former is more associated with plains wetlands whereas the latter reaches highest densities in hilly areas. It is very likely that Grey-headed Fish Eagle would have occurred around Beung Kiat Ngong and other large wetlands. Populations have now most certainly disappeared, and it is on the verge of extinction in Lao PDR (Thewlis *et al*. 1998, Duckworth *et al*. 1999).

'Eastern' Marsh Harrier *Circus aeruginosus spilonotus*

- Ban Nakok: a foraging first-winter at Nong Khorly on 20 December
- Ban Nabon: one on 22 & 23 December
- Thong Namniap: a late-immature male and a female/immature foraging on 10 January
- Nong Salar: a sub-adult male flew eastward low over, but did not pause to forage, at 07h50 on 17 January
- Beung Kiat Ngong: up to one adult male, one late-immature male, one adult female and one first-winter confirmed; possibly several times this number actually present; this species was more visible than Pied Harrier over the marsh by day and fewer birds were seen in transit to and from the roost, yet Marsh Harriers were found at more sites than Pied Harriers

This harrier remains fairly common in Lao PDR as a highly localized wintervisitor, and widespread and sometimes common on passage (Thewlis *et al*. 1996, Duckworth *et al*. 1998, 2002, Bezuijen 2006, Duckworth unpubl.). Some lengthy winter surveys fail to record it (e.g. Duckworth 1996, Evans *et al*. 2000, Evans 2001, Fuchs *et al*. 2007), and it is probably limited by the paucity of suitable roost sites.

Pied Harrier *Circus melanoleucos*

- Thong Namniap: a foraging female on 15 December and 7 January
- Beung Kiat Ngong: up to three adult males and one adult female confirmed; possibly several times this number actually present; most of the harriers seen in transit between Beung Kiat Ngong and other areas were Pied, but their foraging grounds were not found

There are recent Lao records from various sites mostly on the Mekong plain, but also including uplands such as the Bolaven and Xiangkhouang plateaux (Thewlis *et al*. 1996, WCS 1997, Duckworth *et al*. 1998, 2002, Round 1998, Bezuijen 2006, Duckworth unpubl.). Large areas of non-forest habitat, usually wetland (including rain-fed rice-paddies) are needed for foraging; but roost sites probably limit Lao PDR distribution.

Unidentified harriers *Circus*

Harriers are among the most difficult birds to identify in Lao PDR, and over half of sightings could not be identified to species. There were no records of unidentified birds away from Beung Kiat Ngong. At Beung Kiat Ngong, viewing conditions were never good enough to make an accurate count of the harrier roost. The maximum confirmed was about 15, but several times this number may have been present. Birds were seen flying in (at dusk) or out (at dawn) from/to areas to the north-west, north and north-east of Beung Kiat Ngong; suitable habitat for foraging is close by on all these bearings, although few birds were actually seen, and perhaps their main foraging grounds were not visited. Several birds were also seen on flight-lines with areas to the south-west, i.e. presumably flying over the low hills of Xe Pian NPA to the Mekong banks. The Mekong channel at Pathoumphone was therefore checked on 18 January: two single harriers (at 06h35 and 06h55) headed west-north-west across the Mekong, their flight line projecting back exactly to Beung Kiat Ngong. Other birds may have been missed on this morning. No observations were made to the east or south-east of the marsh, so the roosting location of birds that presumably still use the marshes around Ban Phapho is unknown. It is clear that the Kiatngong roost's foraging catchment extends substantially outside the BCI corridor area.

The lack of precision in the roost count is regrettable. Co-ordinating counts from multiple observers in 1992–1993 found 55 harriers using it in early January, even though this count came from only a quarter of the marsh (Timmins *et al*. 1993a). The failure to prove more than 15 in 2007–2008 (when only one observer was available) may indicate a steep decline (as would seem quite plausible) or simply methodological differences. The main limiting factor for harriers wintering in Lao PDR may be the availability of suitable communal ground roosts. Large, level, grassy, areas safe from predation and disturbance are sought, yet all, or almost all, such areas in Lao PDR are heavily used by people. Thus, roosting harriers presumably face heavy persecution, doubtless restraining present Lao PDR populations. Areas where the roost is amid marshland, such as Beung Kiat Ngong, are no doubt the best available, because dogs and all but determined people are thereby kept away.

2014 addition: Surveys on the Vientiane plain in 2009 suggested that in heavily disturbed areas, harriers roost in small, mobile numbers (Duckworth in press). The effects of this on their local populations are unknown. In 1993, Timmins recorded over 40 entering the roost on the evening of 3, and 45 leaving the following morning, seen from the edge close to Ban Kiatngong, the same observation place as in 2007–2008. This strengthens the likelihood that the communal roost here shrank steeply between those two surveys. This is further supported by the small numbers found (again from the same watch area) in 2014.

Greater Spotted Eagle *Aquila clanga*

- 2007–2008: no records

The only confirmed Lao PDR record is of a specimen from the Xe Banghiang (David-Beaulieu 1949–1950). Various other unidentified *Aquila* eagles historically and recently might also have been this species (Thewlis *et al*. 1998, Duckworth *et al*. 1999). There is no evidence of regular wintering by *Aquila* eagles in Lao PDR today although formerly the genus was a regular, even locally common (David-Beaulieu 1944). No doubt hunting generated this situation because the genus uses open non-forest areas, of which there are no extensive landscapes in the country with only low human presence. Pathoumphone's mix of wetlands and glades and open forest is perfect for this species.

2014 addition: There are two recent late-March Lao PDR records of birds on spring passage (Timmins & Duckworth 2013). Also the 'confirmed' 1940s record cannot now be considered certain with clarification that a second, very similar, species (Indian Spotted Eagle *A. hastata*) also occurs in the Mekong catchment (Handschuh *et al*. 2011).

Little Grebe *Tachybaptus ruficollis*

- Nong Salar: two on 12 December, one on 21 December
- Ban Nakok: one at Nong Khorly on 20 December

Little Grebe is locally common in lowland South and Central Lao PDR (Thewlis *et al*. 1996, Davidson *et al*. 1997, Duckworth *et al* 1998, Evans *et al*. 2000) north to Vientiane (Duckworth unpubl.). Many surveys do not record it (e.g. Duckworth 1996, Evans 2001, Bezuijen 2006, Fuchs *et al*. 2007) but it is unclear how much this reflects a truly localized distribution, or a lack of attention to suitable habitats. This species is more robust in the face of human activity than are most other strict waterbirds, persisting even in peri-urban Vientiane (Duckworth unpubl.). These numbers are much smaller than the c.30 each found on Nong Loum and Nong Kasay (Xe Pian NPA northern zone) in 1992–1993 (Timmins *et al*. 1993a); but this difference may simply reflect that no wetlands with habitats similar to these two were checked in 2007–2008.

2014 addition: On two consecutive days in May 1993 aggregations of up to at least 18 in wetlands associated with the Ban Phapho basin were found. Duckworth (in press) found it to be locally common on the lower Nam Ngum plain, showing considerable movement between wetlands through the year, and considered it highly resilient to hunting. However, it is possibly in rapid decline in Lao PDR with the conversion of (semi-)natural wetlands to steep-side fish ponds and rice paddies, neither of which it uses.

Darter *Anhinga melanogaster*

- 2007–2008: no records

In Lao PDR Darter changed from a common and widespread species before 1970 to a rare and localized visitor in the 1990s, mostly to the South, including a record from the Dong Hua Sao NPA lowlands in late May 1993 (Duckworth *et al*. 1999, Duckworth & Tizard 2003). Recent records from Vientiane and the Pakxan wetlands (Duckworth unpubl.) and from the Nakai plateau (Dersu 2008), and further records in the South (Bezuijen 2006) suggest that

the population is again increasing in the country. Following effective protection at the major regional colony, on the Great Lake of Tonle Sap, Cambodia, breeding numbers are rising very fast and, concomitantly, the frequency of Thai records is also rising (Goes 2005). Most Lao PDR records are during or close to the wet season; the current status in Pathoumphone therefore cannot be concluded from a survey in December–January.

Any local reports attributed to this by outside surveyors warrant great scepticism: on the current survey, several villages and government staff independently pointed out (in the Lao-language bird book based on Robson 2000) Darter as the species under observation when it was in fact Purple Heron. Such birds were always given the Lao name 'Nok Kho Ngoo' ('snake-necked bird') by people in Pathoumphone. The only name validated for Darter in Lao PDR appears to be on the Nakai plateau, where it was called 'Phet Xang' ('elephant duck') (A. C. Claassen *in litt*. 2007).

2014 addition: Darter numbers have continued to rise at wetlands across the country. High counts include about 50 at Khon falls on 12 March 2010 (R. Ayé *in litt*. 2011). Timmins (2006) recorded 150+ Darters at a roost in the Cambodian Stung Treng Ramsar site, a short distance below the Lao PDR border. Roost movements suggested that the majority had been using Lao stretches of the river.

Cormorants *Phalacrocorax*

- 2007–2008: no records

Both Little Cormorant *P. niger* and Great Cormorant *P. carbo* have shown major declines in Lao PDR and indeed most of Southeast Asia. In Lao PDR Little Cormorant is now restricted to the far South and Great Cormorant is known by a few records from the North (Thewlis *et al*. 1998, Duckworth *et al*. 1999, 2002). Unidentified cormorants have been seen in Central Lao PDR (Bezuijen 2006). The main driver of decline is the persecution of adults and/or nest contents. In parts of tropical Asia where cultural norms discourage molesting animals (e.g. India and Myanmar, where Little Cormorant even nests colonially in Yangon; Duckworth unpubl.), these birds live in agricultural landscapes. It seems certain that both species would have been using the Pathoumphone wetlands had they not declined, and there is one recent record: four adult Little Cormorants were at Nong Sam on 27 June 2005 (Poulsen *et al*. 2005), presumably post-breeding, wet-season visitors from Cambodia. It is unclear how common the species actually is at this season, given the paucity of survey.

2014 addition: Significant numbers of Little Cormorant and, the first confirmed records from Lao PDR, of Indian Cormorants *P. fuscicollis*, have recently been found in Central Lao PDR (Timmins 2014).

Little Egret *Egretta garzetta*

Small numbers of Little Egrets were widespread, with most (several dozen) at Beung Kiat Ngong.

Across Lao PDR, passage migrants are common in March–May and October–November. Wintering populations were very localized in the 1990s, the Xe Pian NPA northern zone being one of the few known. Experiences at Ban Sivilai, Vientiane province, and Pakxan wetlands, Bolikhamxai province (Parr & Parr 1998, Duckworth *et al*. 1998, 1999, 2002,

Fuchs *et al*. 2007, C. Wood verbally 2005; Duckworth unpubl.) show that, with reduction of hunting, wintering numbers rapidly rise. Egrets presumably formerly bred in Lao PDR, given their known distribution in adjacent countries (Robson 2000), but there seem to be no records: as a colonial tree-nester of open areas, they would have been very vulnerable to nest-robbery, and may have been eradicated before the arrival of European naturalists. These numbers resemble those in 1992–1993 (Timmins *et al*. 1993a: Table 7).

Grey Heron *Ardea cinerea*

- Beung Kiat Ngong: one flying up the north shore on 9 January

The species is a widespread winter visitor throughout Lao PDR in small numbers, but it is depressed by hunting (Thewlis *et al*. 1998, Duckworth *et al*. 1999, 2002). In Vientiane where hunting has been greatly reduced in recent years, numbers are much higher (Duckworth and D. Van Gansberghe unpubl.). It is likely that Grey Herons formerly bred in Lao PDR (see Little Egret). The low numbers seen during this survey reflect the limited open water-edge habitat. This species avoids densely-vegetated wetlands, and there is no reason to suspect an artificial scarcity in the corridor itself. The Mekong channel provides more suitable habitat and one was seen feeding off Pathoumphone on 18 January 2008.

Purple Heron *Ardea purpurea*

- Nong Sam: three on 13 December
- Thong Namniap: three on 15 December and 7 & 10 January
- Ban Thongpha: one on the largest of the small nongs on 16 December
- Ban Thopsok: one in a small marsh on 18 December
- Ban Nabon: one on 23 December.
- Beung Kiat Ngong: at least eight present, perhaps many more (accurate counting of this highly dispersed, skulking, species over such a large area is impossible)

A villager reported that a few pairs of Purple Herons breed each year around Beung Kiat Ngong, making nests of sticks, up trees, with clutches of 5–6 large eggs like those of ducks. There has never been any proof of this species breeding in Lao PDR, but it seems likely that it does so very locally; its breeding sites are less conspicuous than those of egrets and Grey Heron (Round 1998, Duckworth & Tizard 2003). A Purple Heron was seen on 29 June 2005 roosting in a tree next to a nong near Ban Nongpop, and one was seen on 7 August 2001 flying east above route 13, 33 km south of Pakxe (Poulsen *et al*. 2005). These records prove wet season presence. Also, 1–2 birds were found on lowland wetlands in May 1993 and January–February 1996 in Dong Hua Sao NPA and the species was frequent on wetlands in the Xe Pian NPA northern zone in 1992–1993 (Thewlis *et al*. 1998). In Lao PDR, Purple Heron uses a narrower range of habitats than does Grey Heron, chiefly with large stands of waterside or emergent tall graminoids. It is a widespread non-breeding visitor in small numbers (Thewlis *et al*. 1998, Duckworth *et al*. 1999, 2002).

Great Egret *Casmerodius albus*

- Ban Nabon: one on 22 December
- Nong Sam: one on 4 January
- Beung Kiat Ngong: at most, a few dozen—clearly, the egret most restricted in local distribution and smallest in numbers in the pilot area

The national status Great Egret mirrors that of Little Egret, although the species is less numerous. These numbers resemble those in 1992–1993 (Timmins *et al*. 1993a: Table 7).

Intermediate Egret *Mesophoyx intermedia*
Recorded commonly only at Thong Namniap and Beung Kiat Ngong, where it is probably the second most numerous egret. Small numbers were recorded at Ban Thongpha, Ban Sounot and Ban Nakok. No meaningful count was ever made at Beung Kiat Ngong but perhaps several hundred birds were using the area.

The national status of Internediate Egret mirrors that of Little Egret, although the species is less numerous. These numbers are perhaps rather larger than in 1992–1993 (Timmins *et al*. 1993a).

Cattle Egret *Bubulcus ibis*
Small numbers of Cattle Egrets were almost ubiquitous, with concentrations over 100 found only at Thong Namniap (feeding) and Beung Kiat Ngong (feeding and pre-roost flocks; no meaningful count was ever made, but certainly several thousand used the area). About 3000 egrets, mostly Cattle Egrets, came to roost at an undistinguished-looking clump of trees near Ban Kele-2 on 16 January.

The national status of Cattle Egret mirrors that of Little Egret. Outside Lao PDR, there are few places in Cattle Egret's global range where human pressure has rendered populations ecologically extinct across large areas. The egrets of Pathoumphone face some hunting pressure, shown by the reported mobility of the roosting site(s); the same was found in 1992–1993 when a roost of over 1000 near Beung Kiat Ngong in December had disappeared by January (Timmins *et al*. 1993a). The 2007–2008 roost observed was not the only one in the area. Around dawn on 17 January three small flocks (totalling 20 birds) flew over Ban Thangbeng (Ban Lak-48) from the north-west. This roost was not located but was evidently also large: that afternoon several hundred were seen flying north-east over Ban Pathoumphone, having come up the Mekong channel where it runs north-east–south-west. They maintained this flight direction at the Pathoumphone bend. After dawn on 18 January, hundreds were seen there flying in the opposite direction, downstream. The roost is probably outside the BCI corridor. Roosts of egrets in the northern part of the corridor (Ban Nabon, Ban Nongpop and Ban Laogna) were not investigated, but it is unlikely that they use the Ban Kele-2 roost.

Pond heron *Ardeola*
Small numbers of pond herons were almost ubiquitous, with over 100 at Thong Namniap, Nong Sam and Beung Kiat Ngong (no meaningful count; at least several hundred used the area).

Chinese Pond Heron *A. bacchus* occurs in Lao PDR, but Javan Pond Heron *A. speciosa* might also occur, at least occasionally, as it breeds less than 400 km away in Thailand, Cambodia and Vietnam (Robson 2000). The two species cannot be distinguished on field views in non-breeding plumage, and birds in this plumage account for over 90% of field sightings in Lao PDR. The confidence with which people routinely identify all pond herons in Lao PDR as Chinese Pond Herons is unwarranted. Based on birds in breeding plumage, Chinese Pond

Heron is a widespread and common non-breeding visitor across Lao PDR, of no special conservation concern. Pathoumphone probably supports a higher density of birds than most other areas of Lao PDR. These numbers resemble those in 1992–1993 (Timmins *et al*. 1993a: Table 7).

Black-crowned Night Heron *Nycticorax nycticorax*

- Ban Thangbeng: heard overhead pre-dawn on 16 December and at 18h30 on 10 January
- Ban Kele-2: at least three, perhaps many more, overhead at dusk on 12 and 16 January, flying towards Beung Kiat Ngong

The few recent published records from Lao PDR of this heron were reviewed in Duckworth *et al*. (1999). Since then, it has been found to be frequent around Vientiane in August–October, but rare at other times, including spring (Duckworth and D. Van Gansberghe unpubl.), with records from a few other sites (Duckworth *et al*. 2002, Fuchs *et al*. 2007; Duckworth unpubl.). As with the other colonial tree-nesting ardeids, there is no clear evidence that it ever bred in Lao PDR, but distribution in adjacent countries suggests that it ought to.

Yellow Bittern *Ixobrychus sinensis*

- Beung Kiat Ngong: one in the Kiatngong sector on 8 January

As with Cinnamon Bittern, the status of this swamp species (which has a much more localised breeding distribution in Lao PDR than does Cinnamon Bittern) in mid dry-season Lao PDR is unclear.

Von Schrenck's Bittern *Ixobrychus eurhythmus*

- 2007–2008: no records

There are only eight Lao records of Von Schrenck's Bittern, one historical (David-Beaulieu 1944), six in the 1990s (Thewlis *et al*. 1998, Duckworth *et al*. 1999) and one on the Vientiane plain near Ban Thanaleng on 5 October 2004 (Duckworth unpubl.). One of these was from the Xe Pian NPA northern zone in January 1993 (Thewlis *et al*. 1996). Given the difficulty of finding small bitterns, the species could easily have been overlooked on the 2007–2008 survey.

2014 addition: There are a few more records, which do not change the overall assessment of abundance. The species is clearly associated with small pools and streams amid forest.

Cinnamon Bittern *Ixobrychus cinnamomeus*

- Beung Kiat Ngong: one in the Thopsok sector at dusk on 18 December and one in the Kele-2 sector at dawn on 16 January
- Ban Nam-Om: four singles flushed from a small area of Nong Feua on 5 January
- Thong Namniap: one on 10 January flushed at only a few feet by a paused elephant carrying surveyors

The seasonality of this species in Lao PDR is poorly understood (Fuchs *et al*. 2007). At plains breeding areas it is rare before mid April, but there are several recent winter records from well-vegetated forest streams (Fuchs *et al*. 2007, A. C. Claassen unpubl. data). It is a common breeder in the Mekong plain and among the most tolerant of marsh non-passerines of habitat modification and hunting. The difficulty of flushing this species on the survey, except at Nong Feua, suggests that perhaps it is more common than thought at this time of year, and merely extremely hard to find.

Black Bittern *Dupetor flavicollis*

- 2007–2008: no records

A few Black Bitterns were recorded in Xe Pian NPA's northern zone and the lowlands of Dong Hua Sao NPA in May 1993 (Thewlis *et al*. 1996). The lack of records in 2007–2008 does not imply a decline, because the species is a passage migrant and presumed wet-season breeding visitor to Lao PDR (Duckworth *et al*. 1998, 1999). It seems very scarce, not using (except on short passage stopovers) the small marshes and adjacent paddies that support Yellow and, especially, Cinnamon Bitterns. The only site with records suggesting regular use outside Champasak and Attapeu may be Nong Souy (Savannakhet province; Duckworth unpubl.). It probably warrants listing as potentially at risk in Lao PDR, and fuller information on its use of the survey area is needed (i.e. to understand if - it still occurs, if it breeds, or if it is it just a migrant).

2014 addition: The species evidently breeds in the lower Xe Champone plains (Timmins 2014) and although it is undoubtedly scarce at best, as a breeder on the Nam Ngum plain (Duckworth in press) it is suspected of breeding in various other places too.

Great Bittern *Botaurus stellaris*

- 2007–2008: no records

There are only three Lao records of Great Bittern (Duckworth *et al*. 2002), a Palaearctic migrant, but it is unclear whether this reflects genuinely few birds coming south as far as Lao PDR, the scarcity of suitable habitat (tall beds of inundated graminoids), or the heavy pressure on large birds (i.e. most being shot on arrival). There were singles at Beung Kiat Ngong in late November and late December 1992 (Thewlis *et al*. 1996). The difficulty of finding bitterns means the species may have been overlooked in 2007–2008.

2014 addition: There is apparently only one more record (a long-dead bird at Nong Khouay, Vientiane province), which does not change the overall picture.

Ibises and storks (Threskiornithidae and Ciconiidae)

- 2007–2008: no records

All ibises and storks known historically in Lao PDR have declined, some massively so (Thewlis *et al*. 1998). In Pathoumphone in 1992–1996, Woolly-necked Stork *Ciconia episcopus* was frequent in Xe Pian NPA's northern zone and occasional in lowland Dong Hua Sao NPA, and Lesser Adjutant *Leptoptilos javanicus* was occasional in both areas (Thewlis *et al*. 1996, Evans *et al*. 2000). Nine Asian Openbills *Anastomus oscitans* visited Beung Kiat Ngong in

November 2000 and single Woolly-necked Storks were seen flying above Nong Sam on 17 August 2000 and 8 and 22 January 2001 (Poulsen *et al*. 2005). The lack of sightings in 2007–2008 despite sky-watching comparable in amount and season with the survey in 1992–1993 strongly indicates declines. Even by 1992–1993 there were no records of any ibis or of Painted Stork *Mycteria leucocephala*, Black-necked Stork *Ephippiorhynchus asiaticus* or Greater Adjutant *Leptoptilos dubius*.

A resident of Ban Kiatngong confidently asserted, using pictures in the Lao bird book as reference, that Painted Stork, Woolly-necked Stork, adjutants (including those that fed on carcases with vultures, i.e. Greater Adjutant) and Spot-billed Pelican used to be regular and common at Beung Kiat Ngong (the information probably relating to the 1950s–1960s). This resident's abilities identifying birds in the field, relating birds to pictures in the book (i.e. he was one of only two people who correctly identified Purple Heron during the observation mentioned above), and broad, mostly correct, knowledge of habits, calls and seasonality of birds, strongly suggested that the information is reliable.

2014 addition: Asian Openbill is now regularly recorded, sometimes in large numbers (flocks of over 100) at various sites across the country, and is evidently undergoing an extraordinary increase. A Painted Stork was seen on Beung Kiat Ngong on 4 January 2012 (Wheatley 2012).

Spot-billed Pelican *Pelecanus philippensis*

- Ban Thahou: an immature glided steadfastly south over Phou Samnong on 14 December at 11h35

This may be the first sighting of a live wild pelican during a wildlife survey anywhere in Lao PDR since surveys began in the late 1980s. It no doubt reflects the protected measures at Indochina's main colony, on Bung Tonle Sap, Cambodia (Goes 2005). It was surprisingly late for a wandering bird: most birds leave the Red River Delta, north Vietnam, during September. Pelicans have been eradicated from Lao PDR by hunting, but, if this is restrained, the species would no doubt recolonise, at least as non-breeding visitors.

Long-tailed Shrike *Lanius schach*

- 2007–2008: no records

Although not listed as a key species by Duckworth *et al*. (1999), recent evidence shows that this shrike is in decline in South and Central Lao PDR, although good populations remain in the North (Fuchs *et al*. 2007). Reasons for decline remain unclear, but lowland populations are also decreasing in Thailand (Round 2008). One of the few 1990s records from South Lao PDR was from Xe Pian NPA's northern zone (Thewlis *et al*. 1996). The lack of records in 2007–2008 shows that the species is either very rare or now absent from this area.

Large-billed Crow *Corvus macrorhynchos*

- Ban Thangbeng: 1–2 on several days
- Nong Sam: eight on 13 December, five on 22 December; heard on 4 January dispersing from roost
- Ban Thahou: two on 14 December

- Thong Namniap: two on 15 December and 7 January; one on 10 January
- Ban Thongpha: two duos on 16 December
- Ban Sounot: heard on 17 December
- Ban Thopsok: two on 18 December
- Beung Kiat Ngong: two seen on every visit, at all sectors. Maximum count of five near Ban Kele-2 on 16 January
- Ban Nakok: five at Nong Khorly on 20 December
- Ban Nam-Om: two duos on 5 January

Although not identified as a key species for conservation by Thewlis *et al*. (1998) or Duckworth *et al*. (1999), the species has declined greatly in much of Lao PDR. The only populations, as distinct from odd birds known north of the Nam Theun basin, are in the Nam Ngum and Nam Ou catchments, although the species was formerly much more common across the country (Duckworth *et al*. 2002, Bezuijen 2006, Fuchs *et al*. 2007). Causes of decline are not certain, but are assumed to relate to human persecution (of adults and/or nests) rather than habitat factors or pollution. These numbers seemed lower for what the habitat could support compared with numbers in western and central Savannakhet province in late 2007 and north-east Cambodia in 2000–2001 (Duckworth unpubl.). However, numbers are still healthy.

White-shouldered Starling *Sturnus sinensis*

- 2007–2008: no records

This starling was frequent in Xe Pian NPA's northern zone in 1992–1993 (Thewlis *et al*. 1996); many sightings were in wetlands. Lack of records in 2007–2008 suggests a decline comparable to those of the larger sturnids. If the species is just a long-distance non-breeding visitor, it may simply reflect variation between years in arrival numbers. Status as a merely non-breeding visitor, assigned by Duckworth *et al*. (1999) and Robson (2000, 2005), is challenged by observations at Xe Bang-Nouan NPA within very late May–early July 1994 (Evans & Timmins 1998) and the recent discovery of wet-season presence in channel vegetation of the northern Cambodian Mekong (Timmins 2008). It may be that, as with the larger non-forest sturnids, breeding numbers are much reduced across large parts of Lao PDR. Detailed review of Lao PDR records has never been carried out for this species.

Black-collared Starling *Sturnus nigricollis*

Groups of two seen, or birds heard, at Nong Salar, Ban Thongpha, Ban Thopsok, Beung Kiat Ngong (Thopsok sector, Kiatngong sector and Kele-2 sector), Ban Nakok, Nong Sam and Ban Nam-Om.

Black-collared Starling was widespread and locally common in Lao PDR on and south of the Nakai plateau during the early–mid 1990s, but there are only low numbers across most of the North, including in some areas where it was historically common (Duckworth *et al*. 2002, Fuchs *et al*. 2007). The declines may reflect over-harvest. In areas such as Vientiane, where it was effectively absent in the 1990s (Duckworth & Tizard 2003) but where urban bird shooting has declined in recent years, populations are rising rapidly (Duckworth unpubl.). These numbers may be rather lower than were found in Xe Pian NPA's northern zone in

1992–1993 when it was common (Thewlis *et al*. 1996; precise data are not available), but numbers are still healthy there compared to that of other sturnids.

Vinous-breasted Starling *Sturnus burmannicus*

- Beung Kiat Ngong: three briefly, with buffaloes, in the Kele-2 sector on 16 January
- Beung Kiat Ngong: several observations of high flying birds apparently to roost (maximum 12) were perhaps this species

The national Lao status of Vinous-breasted Starling has not been re-evaluated since the status of other large non-forest sturnids was seen more clearly by Duckworth *et al*. (2002) and Fuchs *et al*. (2007). It is plausible that it would have declined as have the other species with wider Lao distributions, for similar reasons. This seems to be so: during the 1992–1993 survey of Xe Pian NPA, it was common in the northern zone. There are also no recent records from Central Lao PDR, despite its former presence there and searches in late 2007 in suitable habitat in Savannakhet province (Duckworth *et al*. 1999, Duckworth unpubl.). It has also recently become much rarer in non-peninsular Thailand (P. D. Round *in litt*. 2007).

2014 addition: Small numbers were found in the Xe Champhon wetlands in 2013–2014 (Timmins 2014).

White-vented Myna *Acridotheres cinereus*

- Beung Kiat Ngong: two briefly, with buffaloes, in the Kele-2 sector on 16 January

White-vented Myna was widespread and locally common in Lao PDR on and south of the Nakai plateau in the early–mid 1990s, but there are only low numbers across most of the North, including in some areas where it was historically common (Duckworth *et al*. 2002, Fuchs *et al*. 2007). Its decline presumably reflects over-harvest. It was effectively absent from Vientiane in the 1990s (Duckworth & Tizard 2003) but bird persecution there has eased recently, and numbers are rising rapidly (Duckworth unpubl.). In contrast, the reverse pattern is seen in the more rural area of Pathoumphone: this single record, despite long and hard efforts to search in prime habitat (non-forest wetlands with abundant domestic bovids) contrasts with the assessment as ‘common’ in the Xe Pian NPA northern zone in 1992–1993 (Thewlis *et al*. 1996). If this pattern is widespread across rural South and Central Lao PDR, then the species may now be most dependent on the growing urban populations where there are less chances of people seeking out and raiding its nests.

2014 addition: At least some large non-urban populations persist and in South and Central Lao PDR. Hundreds were found in the Xe Champhon basin in 2013–2014 (Timmins 2014).

Plain Martin *Riparia paludicola*

- 2007–2008: no records

Two Plain Martins were seen near Ban Phapho in December 1992. The species is much declined in South and Central Lao PDR (Thewlis *et al*. 1998), and the lack of records in 2007–2008 is consistent with further decline, but it might simply have been overlooked. It is certainly not common in the survey area, given the survey focus on plains wetlands, with which it is much associated when outside river channels.

Yellow-bellied Prinia *Prinia flaviventris*

- 2007–2008: no records

This prinia is widespread across Lao PDR and in some places is common (Duckworth 1996, Thewlis *et al*. 1996, WCS 1997, Davidson 1998, Duckworth *et al*. 1998, 2002, Robichaud & Stuart 1999, Fuchs *et al*. 2007, Timmins & Duckworth 2013). However, its distribution is localized and it was not found on several other surveys (e.g. Steinmetz *et al*. 1999, Evans *et al*. 2000, Evans 2001). Around Vientiane it is absent from most sites, even some with tall wet graminoid beds but wherever it occurs it is often one of the commonest birds (Duckworth 1996: 222; Duckworth unpubl., from other sites during 2003–2005). Sites supporting large populations include seasonally exposed bushland of the Mekong channel (Duckworth 1996), montane secondary shrubland and ruderals (Fuchs *et al*. 2007) as well as beds of tall wetland graminoids (e.g. the Vientiane city river-front) the eutrophic Nong Tha, Vientiane city (Duckworth unpubl.) and the isolated Nong Hiang on the Bolaven plateau (Duckworth *et al*. 1998). The absence from Pathoumphone despite the numerous nongs with apparently suitable habitat is not readily explicable. As with Grey-breasted Prinia, it may be part of a genuine gap in distribution: more extensive surveys in 1992–1996 of the lowlands east of the Mekong and south of the Bolaven plateau (Thewlis *et al*. 1996, Duckworth *et al*. 1998, Evans *et al*. 2000) found it only once: in the lowlands adjacent to the Bolaven plateau in wet-season 1993 (Thewlis *et al*. 1996). This may have referred to post-breeding dispersal from the plateau (which supports large populations; Duckworth *et al*. 1998).

Rusty-rumped Warbler *Locustella certhiola*

This species is common in nongs with patches of tall grass and sedge, with particularly large numbers in Thong Namniap. It was apparently absent from stands of short graminoids.

Rusty-rumped Warbler is widespread and common on passage in Lao PDR, but few large wintering populations are known (e.g. at a few nongs with extensive tall wet graminoids on the Vientiane plain). The large population in Pathoumphone may comprise a significant proportion of the national wintering total.

Black-browed Reed Warbler *Acrocephalus bistrigiceps*

This species is present and probably common at Thong Namniap, Ban Thongpha and Beung Kiat Ngong.

Black-browed Reed Warbler is widespread and common on passage in Lao PDR, but few large wintering populations are known (the Vientiane plain does not apparently hold one). The large population in Pathoumphone may comprise a significant proportion of the national wintering total.

'Manchurian Reed Warbler *Acrocephalus tangorum*'

- 2007–2008: no records

A large passage population of Manchurian Reed Warbler (listed as Paddyfield Warbler *A. agricola tangorum* by Inskipp *et al*. 1996), in global terms an extremely rare wetland warbler highly restricted in geographical range (see BirdLife International 2001), was found at Pakxan wetlands, Bolikhamxai province, in May 2005 (C. Wood, Duckworth unpubl.). The species has never been found on the Vientiane plain despite high survey effort over 2003–

2005, and seems to be localised in Lao PDR. However, there may yet be found other stopover sites for the recently-discovered wintering population around the Great Lake of Tonle Sap, by far the largest known wintering population of the species in the world (Campbell *et al*. 2006, Davidson 2006). Pathoumphone has never been surveyed at the appropriate time to find the species on passage, but under current habitat conditions (destruction of emergent tall beds of graminoids by domestic bovid grazing and trampling) it seems unlikely that significant numbers visit on spring passage (early–mid May). They might well do so in autumn (timing not well known, probably within September–early November). It is even possible that it may be found to winter: rather few of the many small acrocephalus warblers in the tall wet grass were identified to species (all were the common Black-browed Reed Warbler *A. bistrigiceps*).

Oriental Reed Warbler *Acrocephalus orientalis*
Many of this species was found at Thong Namniap and Beung Kiat Ngong. There were fewer at many other sites. But with large flocks, the presence of Clamorous Reed Warbler could not be ruled out.

Oriental Reed Warbler is widespread and common on passage in Lao PDR, but few large wintering populations are known (the Vientiane plain does not apparently hold one). The large population in the Pathoumphone nongs probably comprises a significant proportion of the national wintering total.

Clamorous Reed Warbler *Acrocephalus stentoreus*

- 2007–2008: no records

Of all birds accepted by Duckworth *et al*. (1999) without caveat to occur in Lao PDR, this is among the least understood. There are no recent records, and at least some of the historical records were in error (Thewlis *et al*. 1996). The lack of recent records might reflect difficulties in distinguishing this from Oriental Reed Warbler (which was common on the present survey). Of more concern is the possibility that Clamorous Reed Warbler is (or was) tied to a specific sort of (semi-)natural wetland (presumably one supporting beds of tall graminoids) that has largely or entirely been converted to agriculture. It is possible that it was overlooked among the many large acrocephalus warblers that could not be confirmed to be Oriental Reed Warblers.

2014 addition: Re-evaluation of historical literature (no specimen is known) suggests that all historical claims of this species in Lao PDR were in error, and it should probably be removed from the Lao list (Duckworth in press).

Striated Grassbird *Megalurus palustris*

- 2007–2008: no records

Striated Grassbird is strangely localized within Lao PDR, and has shown recent decline and localized extinction at several sites (Fuchs *et al*. 2007). There are no records from anywhere in South or Central Lao PDR. Summing information from habitat use at known Lao PDR sites does not allow an understanding as to why it occurs where it currently does, and yet is apparently absent from other similar wet grasslands.

2014 addition: Review of Lao PDR records suggests the possibility that this species was only ever a non-breeding winter visitor to the plain, with breeding restricted to the northern highlands (Duckworth in press).

Chestnut-capped Babbler *Timalia pileata*

- 2007–2008: no records

This babbler of grasslands, including wet areas, is widespread across Lao PDR, occurring across a wide range of altitudes, and it is often common in the northern half of the country (Thewlis *et al*. 1996, Davidson *et al*. 1997, Tizard *et al*. 1997, WCS 1997, Davidson 1998, Duckworth *et al*. 1998, 2002, Round 1998, Robichaud & Stuart 1999, Walston & Vinton 1999, Evans *et al*. 2000, Fuchs *et al*. 2007). As with Grey-breasted Prinia and Yellow-bellied Prinia, the more extensive surveys in 1992–1996 of the Lao lowlands east of the Mekong and south of the Bolaven plateau (Thewlis *et al*. 1996, Duckworth *et al*. 1998, Evans *et al*. 2000) found it to be strangely rare and localized. Thus, the lack of records on the current survey does not indicate a cause for conservation concern. However, there is evidence of localized declines in Lao PDR: it is now very rare or absent in and around Vientiane city, where there were sporadic records up to at least 1994–1995 (Duckworth unpubl.).

Yellow-eyed Babbler *Chrysomma sinense*

- 2007–2008: no records

Of all the many babblers widespread in Southeast Asia, Yellow-eyed Babbler is the species most associated with grasslands, including wet areas. It is widespread and common in Thailand (Lekagul & Round 1991) but this is not so in Lao PDR (Duckworth *et al*. 1998, 2002), where it is mostly localized, particularly so in the southern half. In this context the lack of any record from the Pathoumphone lowlands is not surprising, however inexplicable.

Oriental Skylark *Alauda gulgula*

- 2007–2008: no records

There were no historical records of Oriental Skylark from Lao PDR, but an extensive, locally numerous population has recently been found on the Vientiane plain, and there are outlying records from a few other sites in North Lao PDR with one record of a non-breeding bird from Savannakhet (Duckworth 2007). Oriental Skylark's habitat use, of low-intensity paddy agriculture close to permanent waterbodies, places it under national risk of extinction because these are the choice areas for conversion to intensive irrigated rice agriculture, which does not support the species (Duckworth 2007). It is unclear whether the paucity of records reflects it having been much overlooked in Lao PDR, or a genuinely restricted distribution. Pathoumphone has much superficially suitable habitat: the total lack of records on this survey, despite ample time in the peak song period by an observer very familiar with the species, suggests genuine absence. Its wider distribution in South and Central Lao PDR remains unclear: it may genuinely be very rare.

Yellow Wagtail *Motacilla flava*
Small numbers almost ubiquitous, with concentrations >50 found only at Thong Namniap (100+ feeding, 15 December), Beung Kiat Ngong (feeding and roosting, many dates) and Ban Nam-Om (pre-roost gathering of *c*.50, 5 January. Roosting information is given under Red-throated Pipit.

Yellow Wagtail is widespread and common on passage in Lao PDR, but the distribution and size of the wintering population has not been directly determined. There are probably only few areas with winter densities comparable to those of Pathoumphone. No other roosts of this size are known, but most of the other areas that might hold them have not been surveyed adequately.

2014 addition: Several similar roosts, at least one of comparable size, exist on the Vientiane plain (Duckworth in press).

Red-throated Pipit *Anthus cervinus*
Small numbers almost ubiquitous, with >100 at Beung Kiat Ngong (feeding and roosting, many dates). The number of birds roosting there was not clear. In total with Yellow Wagtail, 2,000–3,000 were seen from a dusk watch of flying birds from the Thopsok sector on 18 December. A dusk count of birds leaving the pre-roost gathering site in the short turf and dry mud adjacent to Ban Kiatngong on 19 December estimated 4,000–8,000 birds. Boat-based observations from the south-west-centre of the marsh on 8 January showed that birds headed in the late afternoon to the Kiatngong pre-roost gathering site from the centre of the marsh, potentially even further to the east. At the Kele-2 sector at dawn on 12 and 16 January many hundreds of birds (Red-throated Pipit greatly outnumbering Yellow Wagtail) arrived from the general area of the central roost.

Red-throated Pipit is widespread and common on passage in Lao PDR, but the distribution and size of the wintering population has not been directly considered. It is unlikely that many areas support winter densities comparable to those of Pathoumphone. No other roosts of this size are known, but most of the other areas that might hold them have not been surveyed adequately. Counts in 1992–1993 estimated ‘several thousand’ Red-throated Pipits and Yellow Wagtails roosting in Beung Kiat Ngong (Timmins *et al*. 1993a), a similar situation to 2007–2008.

2014 addition: Several similar roosts, at least one of comparable size, exist on the Vientiane plain (Duckworth in press).

Streaked Weaver *Ploceus manyar*

- Beung Kiat Ngong, Kele-2 sector: *c*.30 on 12 January feeding in and around a small stand of living *Sesbania*, amid grazed wet grass; *c*.20 there on 16 January

This is the first record for Lao PDR of a species undoubtedly exceedingly scarce, given its dependence on tall swamp habitats. A small population has recently been found in adjoining North-East Thailand (P. Bawden *in litt*. 2007), and sizeable numbers remain in the north Cambodian Mekong (Timmins 2008). This flock may even have merely wandered into Lao PDR from an adjoining country: reported pressures on the habitat of Beung Kiat Ngong suggest that suitable habitat in the late dry season may be absent.

2014 addition: The species has since been found in Lao PDR at the Pakxan wetlands, and there is an overlooked historical record from the Savannakhet lowlands (Duckworth 2009).

Baya Weaver *Ploceus philippinus*

- Beung Kiat Ngong, Kele-2 sector: 11–15 on 16 January feeding amid grazed wet grass

Baya Weaver has been found on recent surveys locally in South and North Lao PDR (Thewlis *et al*. 1996, Round 1998, Duckworth *et al*. 1999, 2002, Evans *et al*. 2000), and there are unpublished records from two further sites: a small nesting colony at the Pakxan wetlands on 13–14 May 2005 and several dozen birds at Nong Souy on 12–13 and 20–21 April 2007, the first certain record for Central Lao PDR (Duckworth unpubl.). Its Lao population today is evidently greatly limited by nest robbery, persecution of adults (which feed on ripening rice), loss of waterside bushland and beds of tall graminoids and perhaps other factors (Duckworth *et al*. 1999, 2002, Duckworth & Tizard 2003). These numbers seen in Pathoumphone are tiny compared with what such a large expanse of prime habitat should support.
2014 addition: Another area supporting the species in Lao PDR has been found: the lower Nam Ngum plain, where it is also highly localized (Duckworth in press).

Asian Golden Weaver *Ploceus hypoxanthus*

- 2007–2008: no records

This weaver has never been found in Pathoumphone, but was provisionally found in the Xe Kong plains sector of Xe Pian NPA in 1993 (Thewlis *et al*. 1998). Even where it is relatively numerous, as in the other known Lao PDR site, Dong Khanthung proposed NPA, patches of superficially suitable habitat seem to be unoccupied (Round 1998), so the species could have been overlooked during the current survey, especially as males would be in female-like plumage and be less readily identifiable.

Red Avadavat *Amandava amandava*

- 2007–2008: no records

Red Avadavat is exceptionally rare in Lao PDR, with only one record, unpublished, of a few birds near Vientiane in 2005 (Duckworth 2009). It uses tall wet grassland and as a mobile flocking species it may need large areas, if not contiguous, then at least in networks within a general area. This may explain its rarity in Lao PDR, and undoubted declines in Cambodia and Thailand (C. M. Poole and P. D. Round in Fuchs *et al*. 2007). Pathoumphone, notably Beung Kiat Ngong and Thong Namniap, has among the best potential habitat in Lao PDR; this small species may have been overlooked.

2014 addition: There is one further certain record, in the Mekong channel near the 2005 sighting (Duckworth & Timmins 2013). The species may possibly also inhabit the lower Xe Champon plains (Timmins 2014).

Black-headed Munia *Lonchura malacca*

- 2007–2008: no records

The sole recent record of this munia from Lao PDR, of eight birds at Nong Souy, Savannaket province, on 13 April 2007, complements few historical records; specific recent searches indicate that the species is rare in Lao PDR (Duckworth *et al*. 1999, 2002, Fuchs *et al*. 2007). Black-headed Munia probably depends upon seasonally-inundated tall beds of graminoids. Beung Kiat Ngong and Thong Namniap are among the best potential habitats in Lao PDR; this small species may have been overlooked.

2014 addition: There are a few more records: again from Nong Souy (Timmins 2014) and several of merit birds in Vientiane, presumably caught on the Vientiane plain (Duckworth in press).

Chestnut-eared Bunting *Emberiza fucata*

- Beung Kiat Ngong, Kele-2 sector: three on 12 January feeding in a small stand of withered/burnt *Sesbania*, amid trampled rice stubble and burnt grass; eight in nearby wet grass on 16 January

Small numbers of Chestnut-eared Bunting have recently been recorded scattered across the plains and plateaux of Lao PDR (Thewlis *et al*. 1996, Davidson 1998, Duckworth *et al*. 1998, 2002, Evans & Timmins 1998, Showler *et al*. 1998; Duckworth unpubl.), but no areas regularly supporting large numbers are known.

Yellow-breasted Bunting *Emberiza aureola*

- Thong Namniap: one flew over on 15 December; at a roost where birds leaving at dawn headed directions between east and north-east, *c*.2,500 left on 7 January and *c*.2,170 left on 10 January. (The difference probably does not reflect simply counting error; birds were readily countable in blocks of ten, sometimes of 50, as they departed in a pulsed stream lasting ten minutes.)
- Ban Thongpha: one by a small nong on 16 December
- Ban Thopsok: a flock of 25 arrived shortly after dawn at a small nong on 18 December
- Beung Kiat Ngong: four over the Thopsok sector on eastward flight to roost on 18 December; one over the Kiatngong sector passerine pre-roost site towards dusk on 9 January; at least 800, perhaps many more, dispersing eastwards at dawn through the Kele-2 sector on 12 January, many stopping to feed. The roost site was found in the Ban Kele-2 sector on 16 January: 1,720 birds emerged at dawn and headed north.

Discounting a change in roost site between 10 and 12 January (which is not impossible, given the pace of trampling and grazing at Thong Namniap), there were at least two roosts and a local population of at least 4,000 birds. Both roost sites were in tall ‘soft’ grass over knee-deep water. Local people at both sites stated that only occasional, small-scale, trapping was carried out at the roosts of small passerines. Yellow-breasted Bunting is a long-distance migrant to Lao PDR which can occur anywhere at passage seasons, and is somewhat unpredictable in occurrence (Thewlis *et al*. 1996, Tizard *et al*. 1997, WCS 1997, Davidson 1998, Duckworth *et al*. 1998, 2002, Evans & Timmins 1998, Round 1998, Robichaud & Stuart 1999, Bezuijen

2006). Recent declines across its global range (Chan 2004) reflect loss of habitat and commercial trapping of the large flocks it is prone to form. The roosts could, therefore, following regional patterns, become more regularly trapped. It is listed as Endangered.

Other wetland birds
Various other wetland-associated birds were found, which are not in need of conservation measures because they can use the small patches of semi-natural vegetation amid paddies (e.g. in the drainage ditches), rice paddies themselves, small forest streams (which remain abundant), and/or non-wetland habitats, like the secondary grass and scrub of abandoned cultivation.

A1.2 Species using other habitats

The following species are not particularly associated with wetlands or grasslands, but the records are detailed there because the species are of elevated conservation concern, at least in Lao PDR (as identified in Duckworth *et al*. 1999, with some further, chiefly non-forest, species added reflecting discussion in Duckworth *et al*. 2002 and Fuchs *et al*. 2007).

Oriental Pied Hornbill *Anthracoceros albirostris*
This hornbill was heard several times, in no case with the suggestion of a large flock: Ban Thahou (14 December), Ban Thongpha (16 December), Ban Nongpop (24 December) and Beung Kiat Ngong (from the Kiatngong sector on 9 January).

Hornbills are the only closed forest birds in Lao PDR to have shown a demonstrable decline to widespread local extinction in remaining habitat (Thewlis *et al*. 1998, Duckworth *et al*. 1999). Pied Hornbill is the most robust species and in some areas it is still common, but in heavily impacted regions, it too is now rare and local (e.g. Sangthong district, Vientiane, and Phongsali province; Duckworth 1996, Fuchs *et al*. 2007). These few records suggest a decline since the surveys of Xe Pian and Dong Hua Sao NPAs in 1992–1996, when the species was common throughout (Thewlis *et al*. 1996, Evans *et al*. 2000).

Wreathed Hornbill *Aceros undulatus*

- Beung Kiat Ngong: three flew from north to south over the marsh late afternoon on 7 January; two did so mid-day on 16 January

Wreathed Hornbill remains the most widespread and numerous large hornbill in Lao PDR but has much declined (Thewlis *et al*. 1998, Duckworth *et al*. 1999, Fuchs *et al*. 2007), including in the Pathoumphone area in the last 15 years. In 1992–1993, “parties often flew over agricultural land and deciduous habitats to the north of Xe Pian [NPA] in December and January and may have been travelling to and from Dong Hua Sao [NPA]”. The comparable search effort of sky in 2007–2008 gave only two such records.

2014 addition: A. Johnson & M. Hedemark (*in litt*. 2011) saw two Wreathed Hornbills over/near Kiatngong on 29 December 2010 and Wheatley (2012) saw three flying over Kiatngong (whether the village or the marsh is not stated) towards Phou Asa on 6 January 2012.

Asian Koel *Eudynamys scolopacea*

- Nong Sam: one male seen on 13 December

Calling is unusual in December–January so Koel may be much more common than this sole record might suggest; it was common in Xe Pian NPA's northern zone in 1992–1993 (Thewlis *et al*. 1996), a survey which extended into the calling season. Koel is a brood-parasite on crows and mynas, and because these have such patchy, and in total low, populations in most of Lao PDR today, Koels are also scarce, particularly in the northern half of the country (Fuchs *et al*. 2007).

Red-breasted Parakeet *Psittacula alexandri*

- Ban Thahou: several singles on 14 December
- Ban Sounot: heard on 17 December
- Ban Nakok: a single and a flock of seven on 20 December
- Ban Nabon: heard on 23 December
- Ban Nongpop: 21 on 25 December.
- Nong Sam: heard in flight on 4 January
- Ban Nam-Om: heard several times, but probably only small numbers, on 5 January
- Beung Kiat Ngong: heard in the Kiatngong sector on 8 January
- Thong Namniap: heard on 10 January

At Ban Thahou, one bird was around a tall big-crowned *Lagerstroemia* tree: the villager reported that parakeets nested here annually, and that the nest was usually successful because (unusually) it was too much effort to climb the tree to rob it.

Although not listed as a species of elevated conservation concern for Lao PDR, numbers of this parakeet are strongly depressed in much of the country (e.g. Duckworth *et al*. 1999). These records show a major decline in Pathoumphone since 1992–1996, when it was assessed as common in Xe Pian NPA's northern zone, common around Ban Nongpop in deciduous forest areas, and overall frequent in lowland Dong Hua Sao NPA (Thewlis *et al*. 1996, Evans *et al*. 2000). Some flocks in Xe Pian (survey sector not given) exceeded 100 birds (Timmins *et al*. 1993a), a situation unimaginable on the current survey. More detailed data are not readily available for the earlier surveys.

2014 addition: All of Lao PDR's other species of parakeet are also severely declined.

Oriental Turtle Dove *Streptopelia orientalis*

- Ban Nongpop: one on 24 December; five, including one in song, in a different area near Ban Nongpop on 25 December; and song heard in a third area nearby on 26 December
- Ban Thopsok: one near the road-turn to Ban Kiatngong on 6 January
- Ban Kele-2: three on 16 January

The current Lao distribution of Oriental Turtle Dove is patchy: some large populations remain, mostly in the South and Centre, but major declines have occurred in parts of at least North Lao PDR (Duckworth *et al*. 2002, Fuchs *et al*. 2007), presumably through human persecution. A complication in assessing national status is the unknown balance between

resident and seasonal immigrant populations: that no birds were recorded in Dong Hua Sao in the 1993 survey (May–July) but were recorded in 1996 (February) and the present survey (December–January) suggests that it is a winter visitor to this area.

Spotted Dove *Streptopelia chinensis*
Small numbers of Spotted Doves were almost ubiquitous (including around Ban Thangbeng); in good habitat (e.g. around Ban Thahou, Ban Nakok and Ban Nam-Om) densities were high, with many songsters audible and many sightings of singles and small groups each day.

The current Lao distribution of Spotted Dove is patchy: large populations remain, mostly in the South and Centre, but major declines have affected parts of at least North Lao PDR (Duckworth *et al*. 2002, Fuchs *et al*. 2007), presumably reflecting human persecution. The lack of suggestion for decline in Pathoumphone since 1992–1996 is noteworthy given the steep falls in some other medium-sized non-forest birds.

Peaceful Dove *Geopelia striata*

- Beung Kiat Ngong: one heard singing in the Thopsok sector on 18 December and one feeding (silent) in the Kele-2 sector on 16 January
- Ban Thangbeng: one heard singing on 27 December

This is a recent colonist of Lao PDR and these may be the first record from South Lao (see Duckworth *et al*. 2002), but because the bird is a popular cagebird, it is difficult to judge the source of any individual record. The birds merely heard may have been free-flying or in cages (even that in Beung Kiat Ngong), while even the bird observed may not have been a genuine colonist but an escaped cagebird. However, colonization of Vientiane has proceeded rapidly and there seems no reason why this dove will not also establish in the plains non-forest areas of South Laos.

2014 addition: There are now many records of Peaceful Dove from many parts of Lao PDR; colonization has been extremely rapid (Duckworth, Timmins, D. Van Gansberghe unpubl. records). The species is not of direct conservation interest but is included for comparison with other pigeons and doves.

Thick-billed Green Pigeon *Treron curvirostra*
Small numbers of green pigeons, mostly not identified to species, were widespread. On the basis of birds that were identified, on the present survey and in 1992–1996, most or all were presumably this species. Only three concentrations of >30 were found: 60 (only one confirmed as this species) at Ban Nakok on 20 December; 47 (five confirmed as this species) flighting to roost over Ban Nongpop on 23 December; 60–100+ (20+ confirmed as this species) at a fruiting tree near Ban Nongpop on 26 December.

This pigeon remains widespread and locally common in Lao PDR (e.g. Duckworth 1996, Thewlis *et al*. 1996, Duckworth *et al*. 1998, 2002, Evans & Timmins 1998, Evans *et al*. 2000, Brooks and Sørensen 2001, Fuchs *et al*. 2007) but there have been localized extinctions (e.g. Fuchs *et al*. 2007), presumably through hunting: the species, with a fair amount of meat per bird, forms large flocks and predictably visits fruiting trees and saltlicks, offering easy hunting opportunities at both types of site,. It is unclear whether there has been a decline in

the Pathoumphone area since 1992–1993, when it was considered common in the Xe Pian NPA northern zone and frequent in the Dong Hua Sao NPA lowlands (Thewlis *et al*. 1996).

Vultures *Gyps* spp. and *Sarcogyps calvus*

- 2007–2008: no records

All three resident vultures of Lao PDR have shown such major declines in range and population that it is questionable whether any viable populations remain in the country. Recent records come only from the far south (Thewlis *et al*. 1998, Pain *et al*. 2003). Declines in Pathoumphone have continued since the survey of Xe Pian in 1992–1993, when all three species were found, two of them frequently, in the northern zone (Thewlis *et al.* 1996): comparable amounts of sky-watching in 2007–2008 gave no records. Four White-rumped Vultures (two adults and two young) were seen circling above Ban Thangbeng on 30 June 2000. In interviews in 2005, vultures were reported in nearly half the interviews in Pathoumphone, and Ban Thongpha villagers stated that they regularly saw a few vultures and once in 2003 saw about 200 around a dead buffalo (Poulsen *et al*. 2005).

Vulture status was discussed with various villagers, who all stated that they had not seen vultures for a decade or more, usually with a statement along the lines of "but they only come when there are dead ungulates left lying outside, and there have not been any of those for years". This latter was attributed to advances in veterinary treatment and immediate use of domestic bovid carcases. It was usually stated that the birds would presumably come if a carcass was left out, on the assumption that they were still 'around'. But, one man (in Ban Kiatngong) independently outlined exactly the theory developed by R. J. Timmins for decline in the region: there are far too few wild ungulates to support vulture populations, so the remaining birds rely on domestic stock for food. Heavily settled areas have too much persecution and too few carcases left out to for vultures to survive, so they are restricted to 'frontier' areas at the edge of human settlement. He said Xe Pian NPA's northern zone was such an area until a decade ago, but no longer: there are too many people and too effective hands-on husbandry of stock.

Common Myna *Acridotheres tristis*

- Ban Thangbeng: up to three on several days
- Nong Sam: three on 4 January
- Ban Nabon: one on 22 December, two on 23 December
- Beung Kiat Ngong: three low over the Kele-2 sector on 16 January

Common Myna was found during the early–mid 1990s to be widespread and locally common in Lao PDR south of the Nakai plateau but there are only low numbers across most of the North, including in some areas where it was historically common (Duckworth *et al*. 2002, Fuchs *et al*. 2007). The declines presumably reflect over-harvest. In Vientiane, where it was scarce in the early 1990s (Duckworth & Tizard 2003), persecution of urban birds has eased in recent years, and numbers have risen rapidly (Duckworth unpubl.). It was only found occasionally in the northern zone of Xe Pian NPA in 1992–1993 and in Dong Hua Sao NPA in 1993 (Thewlis *et al*. 1996), so the current low numbers do not indicate any further decline. Larger numbers live in Ban Pathoumphone, perhaps associated with the irrigated paddies there and/or the Mekong channel: 16 were counted on 18 January.

Hill Myna *Gracula religiosa*

Small numbers widespread, but the only flocks of ten or more were: 38+ near Ban Nongpop on 24 December; 28+ in a different area near Ban Nongpop on 25 December; 34+ in a third area of Ban Nongpop on 26 December; and ten near Ban Nam-Om on 6 January.

Hill Myna was specifically noted as being common in 1992–1993 in degraded dry forest close to villages in Xe Pian and Dong Hua Sao NPAs; flocks (in all areas surveyed those years) only sometimes exceeded 20 (Thewlis *et al*. 1996, 1998). There is thus no suggestion of a further decline. However, numbers must be below natural levels, because the biggest flocks (flock-size being the best indicator of local population status) were in the eastern sites, furthest from route 13, with its ready access into wildlife trade.

Tables

Table 1. Survey areas and effort

(a) First survey: early wet-season 2013

Date	Site	Type of survey	Effort
28 June	SW BKN marsh edge from Ban Kiatngong	Foot-based observations from the wetland edge	17h10–dusk
29 June	SW and W BKN marsh edge from Ban Kiatngong	Foot-based observations from the wetland edge	05h17–10h00
29 June	Thong Namniap from Ban Thopsok	Foot-based cursory observations from the wetland edge	14h00 for c.20 min
29 June	Northern BKN marsh edge from Ban Phommalu (satellite)	Foot-based cursory observations from the wetland edge	c.15h30 for c.15 min
29 June	SW BKN marsh from Ban Kiatngong	Boat-based observations	16h45–18h26
30 June	SW BKN marsh edge from Ban Kiatngong	Static observations of marsh	05h12–06h00
30 June	SW BKN marsh from Ban Kiatngong	Elephant-based observations in outer wetland zone	06h00–10h00
30 June	Forested peninsula (Don Pamuang*) on northern edge of BKN marsh from Ban Phommalu (satellite)	Foot-based cursory observations of northern edge; static observation over the central marsh areas	c.30 min 17h40–18h35
1 July	BKN marsh edge from Don Pamuang	Static observations over central marsh	05h10–07h35
1 July	NE BKN marsh from Don Pamuang	Elephant-based observations in outer wetland zone	08h05–10h20
1 July	Nong Phommalu from Ban Phommalu	Foot-based cursory observations of wetland	11h30–12h10
1 July	Nong Pakau / Kharnun / Pakham / Naseng complex	Foot-based observations of wetland complex	c.12h15–15h45
1 July	Nong Sa-pan / Boua	Foot-based cursory observations of wetland complex	15h50–17h00
1 July	BKN marsh edge from Don Pamuang	Mainly static observations over central marsh	c.17h30–18h30
2 July	BKN marsh edge from Don Pamuang	Static observations over central marsh	c.05h30–08h15
2 July	SE BKN marsh edge embayments	Foot-based observations of marsh	10h40–15h50
3 July	S BKN marsh edge embayments	Foot-based observations of marsh	05h20–12h00
3 July	Nong Kasay area	Foot-based survey of wetlands and intervening degraded forest	c.12h30–17h10
3 July	Ban Phapho wetlands NE of the village	Foot-based observations of marsh	c.17h55–18h50
4 July	S BKN marsh edge embayments	Foot-based survey of wetlands and intervening degraded forest.	05h20–06h45
4 July	SE BKN marsh edge embayments	Elephant-based observations	06h45–10h15
4 July	Bung Bhar-pat (Ban Thongxay area)	Foot-based survey of wetlands and intervening degraded forest.	12h55–17h15
4 July	Nong Domngai / Bung Houakhoay	Foot-based cursory survey of wetlands and intervening degraded forest.	17h35–18h05
5 July	SE BKN marsh edge from Ban Kiatngong	Boat-based observations	05h05–07h30
5 July	NW BKN marsh edge from Ban	Foot-based observations from the	16h20–17h35

	Kiatngong	wetland edge.	

*Don Pamuang is a forested peninsula into BKN

(b) Second survey: mid dry-season 2013–2014

Date	Site	Type of survey	Effort
4 Jan	Main BKN marsh edge from Ban Kiatngong	Boat (but not into useful area), walking, dusk roost watch	16h00–post-dusk
5 Jan	Main BKN marsh edge between Ban Kiatngong and watchtower, including embayments (now as discrete pools) and pasture	Walking, static during heat of day, dusk roost watch	Pre-dawn (05h45)–post-dusk (18h45)
6 Jan	Thong Namniap SW edge	Dawn roost watch, static watch	Pre-dawn–08h00
6 Jan	Thong Namniap centre	Elephant-based crossing of swamp	08h00–09h00
6 Jan	From Thong Namniap via Ban Sounot, Nong Pakau, Nong Naseng, Nong Boualeng, Nong Khekong to Thong Namniap	Elephant-based; directly and rapidly through dry areas, pauses at wetlands and crossings of tall wet graminoids	09h00–14h00
6 Jan	Thong Namniap SW edge	Foot-based search of forested stream followed by static watch over grassland then dusk roost watch there	14h00–post-dusk
7 Jan	Main BKN marsh edge from Ban Kele-2	Foot-based crossing of paddy stubbles and intervening wet grass followed by long static watch over marsh, return by same route	06h15–11h15
7 Jan	Wetlands near the Phapho–Phalay road, about 2–3 km west of Ban Phalay	Interspersed foot-based and static watches at several pools	15h45–18h15
8 Jan	Nong Kasay	Static watch from bund	Pre-dawn–10h45

Table 2. Details of wetlands visited in June–July 2013

Thong Namniap; 14°47′50.85″N, 106°02′45.72″E	Large open marsh, mainly grass/sedge and *Polygonum*, no visible tall sedge, a few patches of [*Sesbania*]; bushes and open water scarce (from observation point). Peat extraction not extensive and apparently ceased.	Visited very briefly, with observations made from one spot on the edge
Nong Phommalu; 14°48′29.66″N, 106°04′19.97″E	Relatively small open marsh, mainly grass, high density of fern/aroid patches, a few small patches of tall sedge. Peat extraction affecting c.20% of area, apparently ongoing.	Visited fairly briefly
Nong Pakau / Pakham; 14°48′09.67″N, 106°04′08.86″E	Swamp forest, floating mat with shrubs, aroids and ferns, a smallish area of cultivation	Most of edge surveyed
Nong Naseng; 14°48′05.15″N, 106°04′25.25″E	Moderately sized open wetland, mainly tilled paddy, remaining marsh are mainly grass, but with extensive areas of [*Sesbania*]. Swamp forest probably along northern edge.	Visited very briefly, with observations made from one spot on the edge
Nong Sa-pan; 14°48′26.08″N, 106°03′53.28″E	Southern end with swamp forest surrounding aroid, possibly mat centre; northern end smallish open marsh of mainly grass and *Polygonum.*	Visited fairly briefly
Nong Boua; 14°48′30.49″N, 106°03′46.46″E	Grass fringe, aroid/shrub/fern (possibly mat), small trees towards the centre, possibly with an open water centre, swamp forest apparently in one arm?	Visited fairly briefly, only small section of edge surveyed
Nong Kasay; 14°42′55.27″N, 106°07′49.29″E	Relatively large open wetland with a concrete dam and water level artificially higher; extensive grass, but also large patch of tall sedge and deeper wetland with aquatics and open water, including probable *Eleocharis*.	Reasonably well surveyed
Nong Ee-lar; 14°43′04.62″N, 106°08′04.25″E	Tall sedge very extensive, more heterogeneous than Nong Kasay, with probably a swamp forest nong. Connects 'downstream' of Nong Kasay.	Visited very briefly, with observations made from one spot on the edge
Ban Phapho NE marsh; 14°44′04.12″N, 106°05′49.40″E	Predominantly grass, much *Imperata* visible, fairly heterogeneous, small patch of [*Sesbania*]. Lotus along southern part of eastern edge.	Visited fairly briefly, only small section of edge surveyed
Bung Bhar-pat (Ban Thongxay area); 14°46′56.07″N, 106°08′31.52″E	Rather dry at time of survey; grass extensive but complex with many swamp forest patches and bush patches and aroid/fern clumps, also one small patch of cane grass. A few small patches of tall sedge. One small area recently cleared for agriculture.	Well surveyed
Nong Domngai; 14°46′17.62″N, 106°08′19.52″E	Small basin; open water with duckweed cover and herbs/grasses/sedges around edge.	Visited very briefly, with observations made from one spot on the edge
Bung Houakhoay; 14°46′10.89″N, 106°08′20.73″E	Small open wetland covered with *Polygonum* and grass	Visited very briefly, with observations made from one spot on the edge

Note: The 'Nong Pakau' site visited was a few hundred meters from that visited in July. It was not clear whether this reflected different guides' views on names of features, or whether the two spots were different ends of the same perceived feature.

Table 3. Birds recorded in the Beung Kiat Ngong Ramsar site and surrounding wetlands, Pathoumphone district, Champasak province, Lao PDR over 28 June – 5 July 2013 and 4–8 January 2014

ENGLISH NAME	*SCIENTIFIC NAME*	Abundance	
		June–July	Jan
[Red Junglefowl]	*[Gallus gallus]*	[P]	
Lesser Whistling-duck	*Dendrocygna javanica*	C	F
Cotton Pygmy-goose	*Nettapus coromandelianus*	O	
Unidentified buttonquail	*Turnix*		P
Lineated Barbet	*Megalaima lineata*	P	C
Blue-eared Barbet	*Megalaima australis*		C
Coppersmith Barbet	*Megalaima haemacephala*	P	C
Indian Roller	*Coracias benghalensis*	P	F
Common Kingfisher	*Alcedo atthis*		F
Stork-billed Kingfisher	*Halcyon capensis*	LP	O
White-throated Kingfisher	*Halcyon smyrnensis*	O	C
Black-capped Kingfisher	*Halcyon pileata*		O
Green Bee-eater	*Merops orientalis*		F
Unidentified bee-eater	*Merops*	P	
Chestnut-winged Cuckoo	*Clamator coromandus*		P
Banded Bay Cuckoo	*Cacomantis sonneratii*		P
Plaintive Cuckoo	*Cacomantis merulinus*	P	C
Violet Cuckoo	*Chrysococcyx xanthorhynchus*		F
Asian Koel	*Eudynamys scolopacea*		O
Greater Coucal	*Centropus sinensis*	P	C
Lesser Coucal	*Centropus bengalensis*		C
Unidentified parakeet	*Psittacula*	O	O
Brown-backed Needletail	*Hirundapus giganteus*		P
Unidentified needletail	*Hirundapus*		C
Asian Palm Swift	*Cypsiurus balasiensis*	P	F
Crested Treeswift	*Hemiprocne coronata*		O
Asian Barred Owlet	*Glaucidium cuculoides*	P	C
Brown Hawk Owl	*Ninox scutulata*		C
Great Eared Nightjar	*Eurostopodus macrotis*		O
Oriental Turtle Dove	*Streptopelia orientalis*		O
Spotted Dove	*Streptopelia chinensis*	C?	F
Unidentified *Streptopelia* dove	*Streptopelia*	C	
Peaceful Dove	*Geopelia striata*	P	C
White-breasted Waterhen	*Amaurornis phoenicurus*	O	O
Ruddy-breasted Crake	*Porzana fusca*		LC
White-browed crake	*Porzana cinerea*	P	
Watercock	*Gallicrex cinerea*	C	
Purple Swamphen	*Porphyrio porphyrio*	LC	
Common Moorhen	*Gallinula chloropus*		O
Pintail / Swinhoe's Snipe	*Gallinago stenura / G. megala*		C
Common Snipe	*Gallinago gallinago*		C
Spotted Redshank	*Tringa erythropus*		O
Common Greenshank	*Tringa nebularia*		O

Green Sandpiper	*Tringa ochropus*		F
Wood Sandpiper	*Tringa glareola*		LC
Pheasant-tailed Jacana	*Hydrophasianus chirurgus*		LC
Bronze-winged Jacana	*Metopidius indicus*	LC	LC
Little Ringed Plover(1)	*Charadrius dubius*		F
Grey-headed Lapwing	*Vanellus cinereus*		F
Black Baza	*Aviceda leuphotes*		O
Black-shouldered Kite	*Elanus caeruleus*	O	F
Eurasian Marsh Harrier(2)	*Circus aeruginosus*		F
Pied Harrier	*Circus melanoleucos*		P
[Crested Goshawk]	*[Accipiter trivirgatus]*	[P]	
Shikra	*Accipiter badius*	[P]	F
Peregrine Falcon(3)	*Falco peregrinus*	O	
Little Grebe	*Tachybaptus ruficollis*	P	
Little Egret	*Egretta garzetta*		P[C]
[Grey Heron]	*[Ardea cinerea]*	[O]	
Purple Heron	*Ardea purpurea*	LC	C
Great Egret	*Casmerodius albus*		P
Intermediate Egret	*Mesophoyx intermedia*		P
Cattle Egret	*Bubulcus ibis*		C
[Chinese] Pond Heron(4)	*Ardeola [bacchus]*		C
Black-crowned Night Heron	*Nycticorax nycticorax*		O
Yellow Bittern	*Ixobrychus sinensis*	O	P
Cinnamon Bittern	*Ixobrychus cinnamomeus*	C	P
Black Bittern	*Dupetor flavicollis*	LO	
Asian Openbill	*Anastomus oscitans*	LC	
Brown Shrike	*Lanius cristatus*		C
Large-billed Crow	*Corvus macrorhynchos*	C	C
Black-naped / Slender-billed Oriole	*Oriolus chinensis / O. tenuirostris*		P
Rosy / Swinhoe's / Ashy Minivet	*Pericrocrotus roseus / P. cantonensis / P. divaricatus*		C
Black Drongo	*Dicrurus macrocercus*		F
Ashy Drongo	*Dicrurus leucophaeus*		F
Spangled Drongo	*Dicrurus hottentottus*	P	F
Greater Racket-tailed Drongo	*Dicrurus paradiseus*	P	F
Black-naped Monarch	*Hypothymis azurea*	P	C
Common Iora	*Aegithina tiphia*	P	
Blue Rock Thrush	*Monticola solitarius*		P
Eurasian Blackbird	*Turdus merula*		P
[Eyebrowed Thrush]	*[Turdus obscurus]*		[P]
Asian Brown Flycatcher	*Muscicapa dauurica*		F
Red-throated Flycatcher	*Ficedula parva*		C
Unidentified blue flycatcher	*Cyornis*	P	P
Grey-headed Canary Flycatcher	*Culicicapa ceylonensis*		C
Siberian Rubythroat	*Luscinia calliope*		C
Bluethroat	*Luscinia svecica*		P
Oriental Magpie Robin	*Copsychus saularis*		P
White-rumped Shama	*Copsychus malabaricus*	P	

Common Stonechat	*Saxicola torquata*		C
Black-collared Starling	*Sturnus nigricollis*	F/O	F
Common Myna	*Acridotheres tristis*		P
Hill Myna	*Gracula religiosa*	O	P
Barn Swallow	*Hirundo rustica*		F
Red-rumped / Striated Swallow(5)	*Hirundo daurica / H. striolata*	P	C
Black-headed Bulbul	*Pycnonotus atriceps*		P
Black-crested Bulbul	*Pycnonotus melanicterus*		C
Streak-eared Bulbul	*Pycnonotus blanfordi*	P	P
Black Bulbul	*Hypsipetes leucocephalus*		O
Zitting Cisticola	*Cisticola juncidis*	P, L?	P
Bright-headed Cisticola	*Cisticola exilis*	C	
Plain Prinia	*Prinia inornata*	C	C
Lanceolated Warbler	*Locustella lanceolata*		P
Rusty-rumped Warbler	*Locustella certhiola*		C
Black-browed Reed Warbler	*Acrocephalus bistrigiceps*		P
Oriental Reed Warbler	*Acrocephalus orientalis*		LC
Dark-necked Tailorbird	*Orthotomus atrogularis*		C
Dusky Warbler	*Phylloscopus fuscatus*		C
Radde's Warbler	*Phylloscopus schwarzi*		C
Yellow-browed Warbler	*Phylloscopus inornatus*		C
Greenish Warbler	*Phylloscopus trochiloides*		C
Pale-legged / Sakhalin Leaf Warbler	*Phylloscopus tenellipes / P. borealoides*		C
White-crested Laughingthrush	*Garrulax leucolophus*	O	
Puff-throated Babbler	*Pellorneum ruficeps*		P
Striped Tit Babbler	*Macronous gularis*	C	C
Yellow-vented Flowerpecker	*Dicaeum chrysorrheum*	P	
Scarlet-backed Flowerpecker	*Dicaeum cruentatum*	P	
Olive-backed Sunbird	*Nectarinia jugularis*		C
Plain-backed Sparrow	*Passer flaveolus*		P
Eurasian Tree Sparrow	*Passer montanus*	P	P
Forest Wagtail	*Dendronanthus indicus*		P
White Wagtail(6)	*Motacilla alba*		O
Yellow Wagtail	*Motacilla flava*		C
Richard's Pipit	*Anthus richardi*		C
Paddyfield Pipit	*Anthus rufulus*		C
Olive-backed Pipit	*Anthus hodgsoni*		P
Red-throated Pipit	*Anthus cervinus*		C
Unidentified weaver	*Ploceus*	O	
White-rumped Munia	*Lonchura striata*	O/F	O
Scaly-breasted Munia	*Lonchura punctulata*	O/F	O
Unidentified munia / avadavat(7)	*Lonchura / Amandava*	F	
Yellow-breasted Bunting	*Emberiza aureola*		O

Notes:
Provisional records are in square brackets. Where a species name is in square brackets, this indicates that all records on the 2013–2014 survey were provisional.

Abundance codes: C = common (found daily or nearly so, in suitable habitat); F = frequent (found about half of days); O = Occasional (found only a few times); P = Present, abundance not assessed; L (modifier) = evidently localised even within remaining suitable habitat; ? indicates unconfirmed possibility

(1) Two of the three Little Ringed Plovers seen were of the resident (sub)species *C. (d.) jerdoni*.
(2) All Marsh Harriers seen showed characters of the eastern (sub)species *C. (a.) spilonotus*.
(3) The Peregine seen was a full-masked, dark plumaged bird of presumed resident race.
(4) Pond herons in non-breeding plumage cannot be identified safely to species; they identification of these birds is based solely on geographic locality.
(5) Most, perhaps all *Cecropia* swallows were probably Striated Swallows of the resident race *H. d. stanfordi*.
(6) All the surprisingly few White Wagtails seen were of the race *M. a. leucopsis*.
(7) Abundance assessment includes only birds not identified to species.

Table 4. Counts of wetland birds (and selected other species of local conservation interest) at individual wetland visits

(a) June–July 2013 survey

Survey site	BKN	BKN	BKN	BKN	BKN	BKN	BKN	BKN	BKN	BKN	Nong Kasay	Phapho wetlands	BKN	BKN	BKN	BKN
Survey type	Static	Foot	Boat	Static	Elephant	Static	Elephant	Static	Static	Foot	Foot	Foot	Foot	Elephant	Boat	Foot
Date	28 June	29 June	29 June	30 June	30 June	1 July	1 July	1 July	2 July	3 July	3 July	3 July	4 July	4 July	5 July	5 July
Lesser Whistling-duck	5+	15-25+/13	20+	2+	13+/31+	6++	2+	5+	7+	28-52+	4-8+	10-13+	8+	12-23+	9-15+/4+	8+
Cotton Pygmy-goose										2	2			2		
Stork-billed Kingfisher						2		1	1							
White-throated Kingfisher										1	2+		1	[1]		
Spotted Dove		[1]/15			0/2	+			3	4			+			
Peaceful Dove		+														
Unidentified *Streptopelia*		7			8+/10+				1				[8+]			
White-browed Crake					0/1											
Watercock	5+	12+/8	12	5+	9/4	9	8	5	5	1	+	3		2	6	3+
Purple Swamphen	3	9/6	4	2	11/8	1	10	1	2		+			+	7/2	
Bronze-winged Jacana		5+/5	1		6+/4					1	7	2+		4	0/1	
Black-shouldered Kite								1	1							
Shikra													[1]	[1]		
Peregrine Falcon														1		
Little Grebe													2			
Purple Heron	[1]	15+/5			0/1	19+	20+	21+	16+	1	1		2	18+		
Grey/Purple Heron		1														
Yellow Bittern							1									
Cinnamon Bittern	2	3/1	1	1		5	4		5		1	2+				2

Black Bittern							2		1							
Asian Openbill		11+	61			20-34	5	28	64	1				16-24		1
Large-billed Crow		4+/5		4	4/1	12+	8		2+	5			3	6	0/2	+
Black-collared Starling					2/0		+			3+			+	2		
Zitting Cisticola		2													1	
Bright-headed Cisticola			3			3+	3		2+		+	+		7	5/3	+
Plain Prinia		11/12	4	1	8/+	+	2		3	3		+		+	4/4+	
Unidentified weaver					3/0											
White-rumped Munia										3						
Scaly-breasted Munia		9														
Unidentified munia / avadavat		3		6	0/3										0/3	

Notes:

- Addition to the tabulated counts are listed below:
  - Wetlands round Ban Thopsok, foot, 29 June: Watercock present;
  - Nong Phommalu, Nong Pakau / Nong Kharnun / Nong Pakham / Nong Naseng complex and Nong Sa-pan / Nong Boua 1 July, foot: no wetland birds noted;
  - BKN, foot, 3 July: Lesser Whistling-duck, Watercock, Purple Swamphen, Purple Heron all present; and
  - Bung Bhar-pat, foot, 4 July: 1 Stork-billed Kingfisher, [2 White-throated Kingfishers], parakeets heard, 1 White-breasted Waterhen.

- Sites away from the Beung Kiat Ngong basin are shaded yellow.
- Scientific names are given in Table 3; sites are profiled in Table 2.
- *Codes*:
  - '+' denotes count is suspected to be an undercount of birds present.
  - A '+' alone signifies that at least one individual was seen, but more were suspected to be present.
  - 'p' denotes species present, but not counted;
  - '/' denotes separate counts for either periods of the day, or geographical subunits, of the site.
  - Ranges of counts are given as the suspected minimum and maximum number of individuals recorded from a site, and is used for mobile species where the same individual may have been counted multiple times.
  - Counts in square brackets are provisional identifications.

(b) January 2014 survey

Survey site	BKN - Kiatngong	BKN - Kiatngong	Thong Namniap	Nong Pakau	Nong Naseng	Nong Boualeng	BKN - Kele-2	Phalay wetlands	Nong Kasai	
Survey type	Foot/boat	Foot	Elephant	Elephant	Elephant	Elephant		Foot	Foot	Foot
Date	4 January	5 January	6 January	6 January	6 January	6 January		7 January	7 January	8 January
Lesser Whistling-duck	20		21							50
Unidentified buttonquail								1		
Common Kingfisher	1			1					1	1
Stork-billed Kingfisher			1							
White-throated Kingfisher	1	1	1					2		1
Black-capped Kingfisher		1								
Green Bee-eater		1						4		[1+]
Asian Koel		1								
Lesser Coucal		3	2					1		1
Unidentified parakeet										3
Great Eared Nightjar									4	
Oriental Turtle Dove										1
Spotted Dove			3					1		
Peaceful Dove	1~2		2					1	1	1
White-breasted Waterhen			1							
Ruddy-breasted Crake		[1]	[9]							
Common Moorhen				1						
Pintail/Swinhoe's Snipe	3	2	2					1		
Common Snipe	2		5						3	
Unidentified snipe					1					
Spotted Redshank								1		
Common Greenshank								1		
Green Sandpiper		2							3	
Wood Sandpiper	16	3								
Pheasant-tailed Jacana	2	7								4
Bronze-winged Jacana		5								23

Little Ringed Plover	1						1 *jerdoni*	1 *jerdoni*	
Grey-headed Lapwing	7	3	4				2	2	1
Black Baza		1	2						
Black-shouldered Kite			1				1		1
Eurasian Marsh Harrier		2	2				4	1	
Pied Harrier		1							
Unidentified harrier	2		1						
Shikra		1	1						3
Little Egret		2					6	1	2
Purple Heron		4	2				3		2
Great Egret							1		1
Intermediate Egret							1		1
Cattle Egret	30	30	70			30	240	50R; 2	lots R
Unidentified egret	1000+R	1000+R	lots R		15		lots R		
[Chinese] Pond Heron	100	dozens	16	6		4	2	12	87
Black-crowned Night Heron									2
Yellow Bittern		1							
Cinnamon Bittern		1							
Large-billed Crow	1	1	2				4	2	4
Black Drongo		3	2				4		
Bluethroat		1					2		
Black-collared Starling			1+			1+	2	1	22
Common Myna								2 vill	
Hill Myna									3
Zitting Cisticola							2		
Plain Prinia	p	lots	p				p		
Unidentified *Locustella* warbler		p	p			p	p		p
Black-browed Reed Warbler		1	1						1
Oriental Reed Warbler	lots	lots	1				2		
Plain-backed Sparrow							1		

Yellow Wagtail	1000+	hundreds	30	a few	5	2
Red-throated Pipit	100+	a few	15	a few	70	a few
White-rumped Munia						5
Scaly-breasted Munia			16			
Yellow-breasted Bunting				25		
Unidentified Bunting					1	

Sites away from the Beung Kiat Ngong basin are shaded yellow.
Scientific names are given in Table 3; sites are profiled in Table 2.
Codes: p = present, not counted; R = in roost movement.

Maps

Figure 1. Beung Kiat Ngong Ramsar Site and Surrounding Landscape

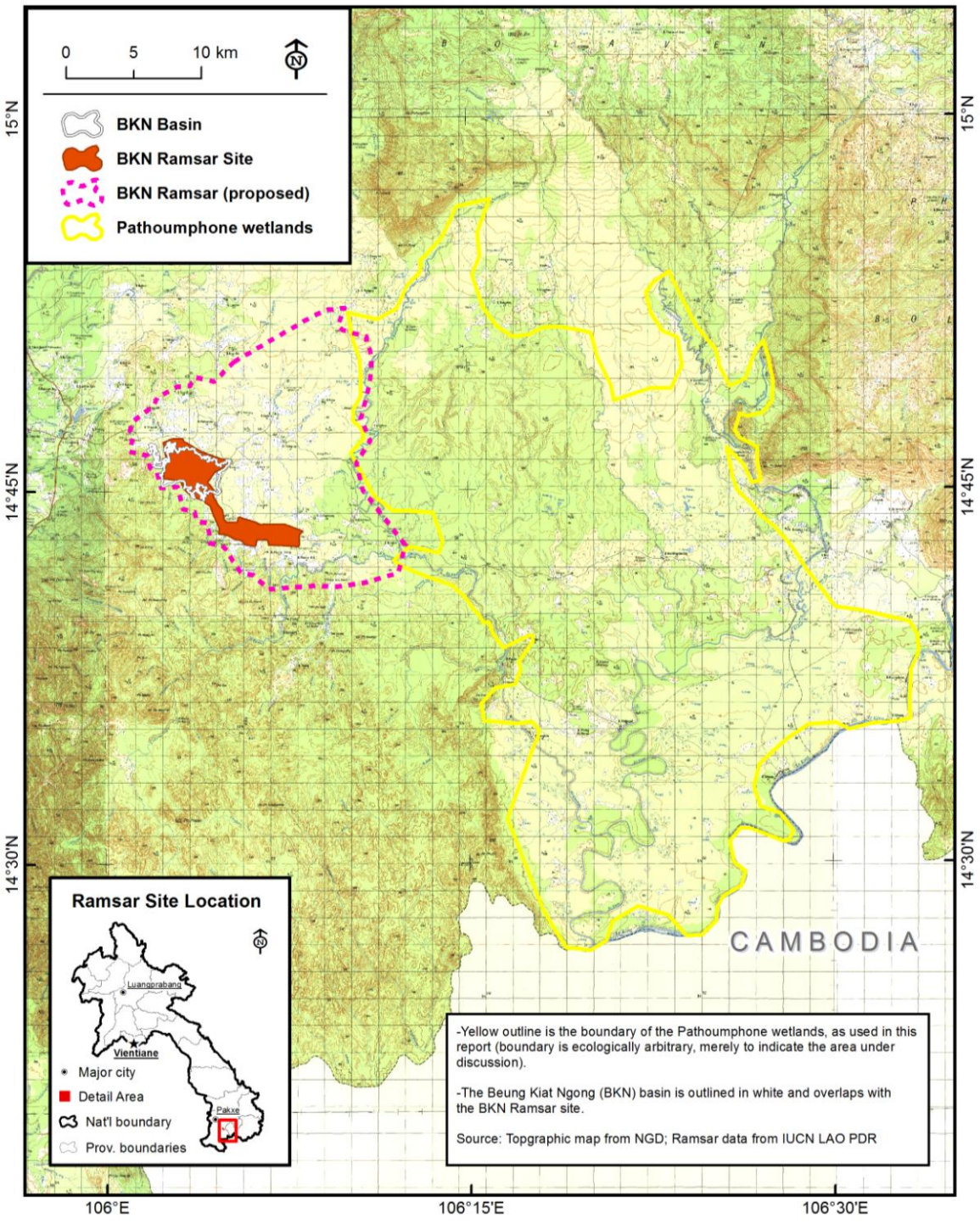


Figure 2. Current Ramsar site boundary

Figure 3. Localities mentioned in the text

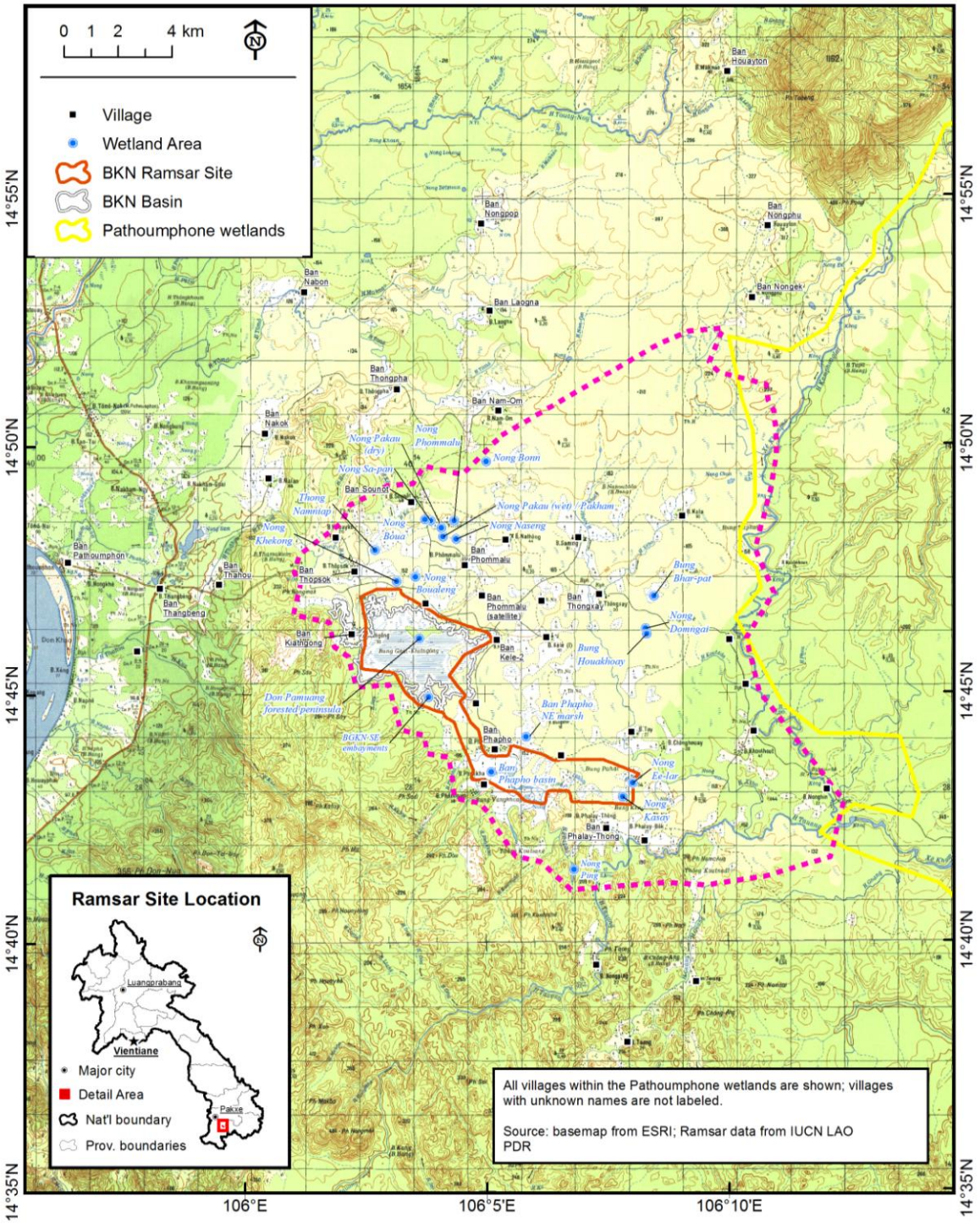


Figure 4. Survey routes

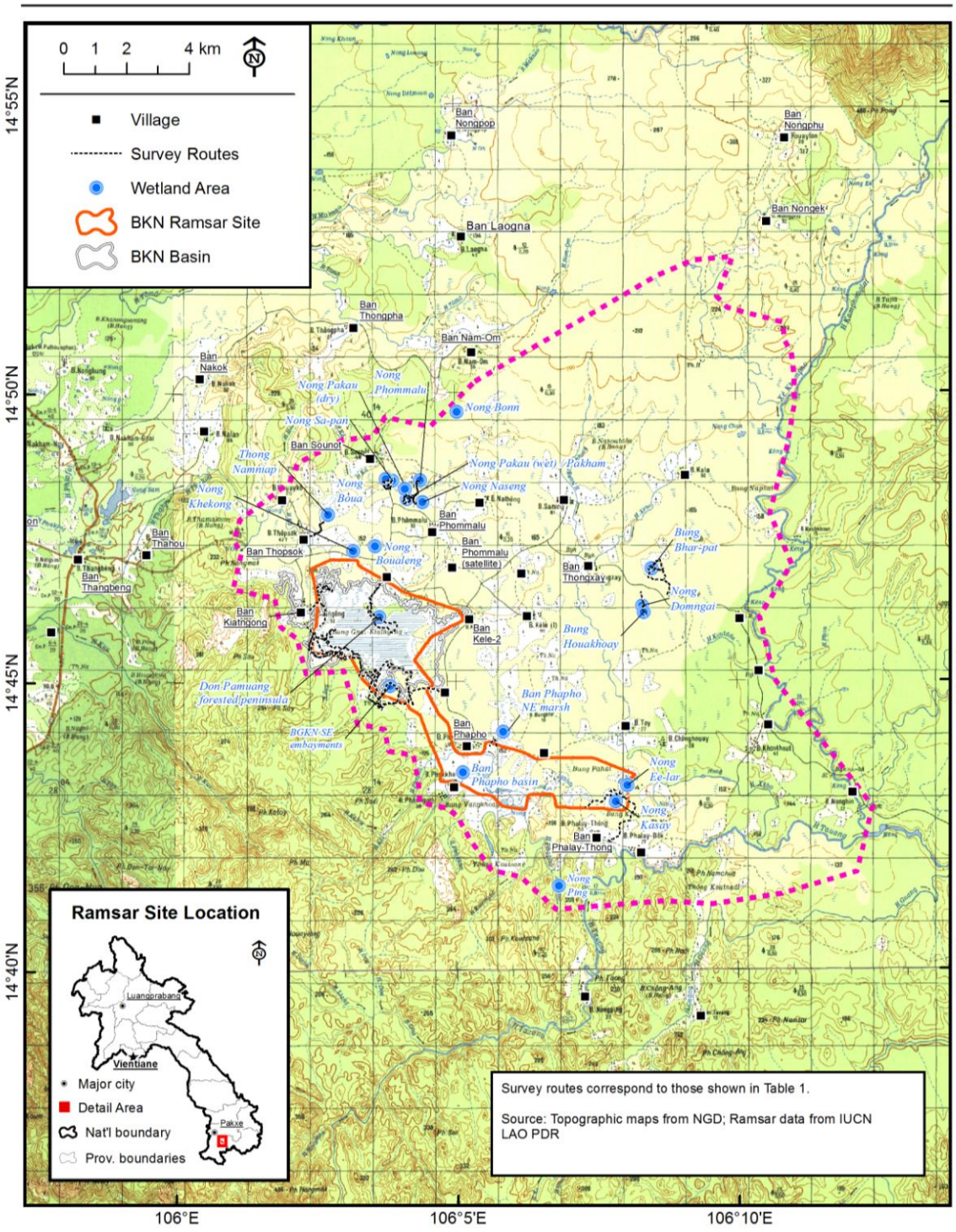


Figure 5. Priority zones

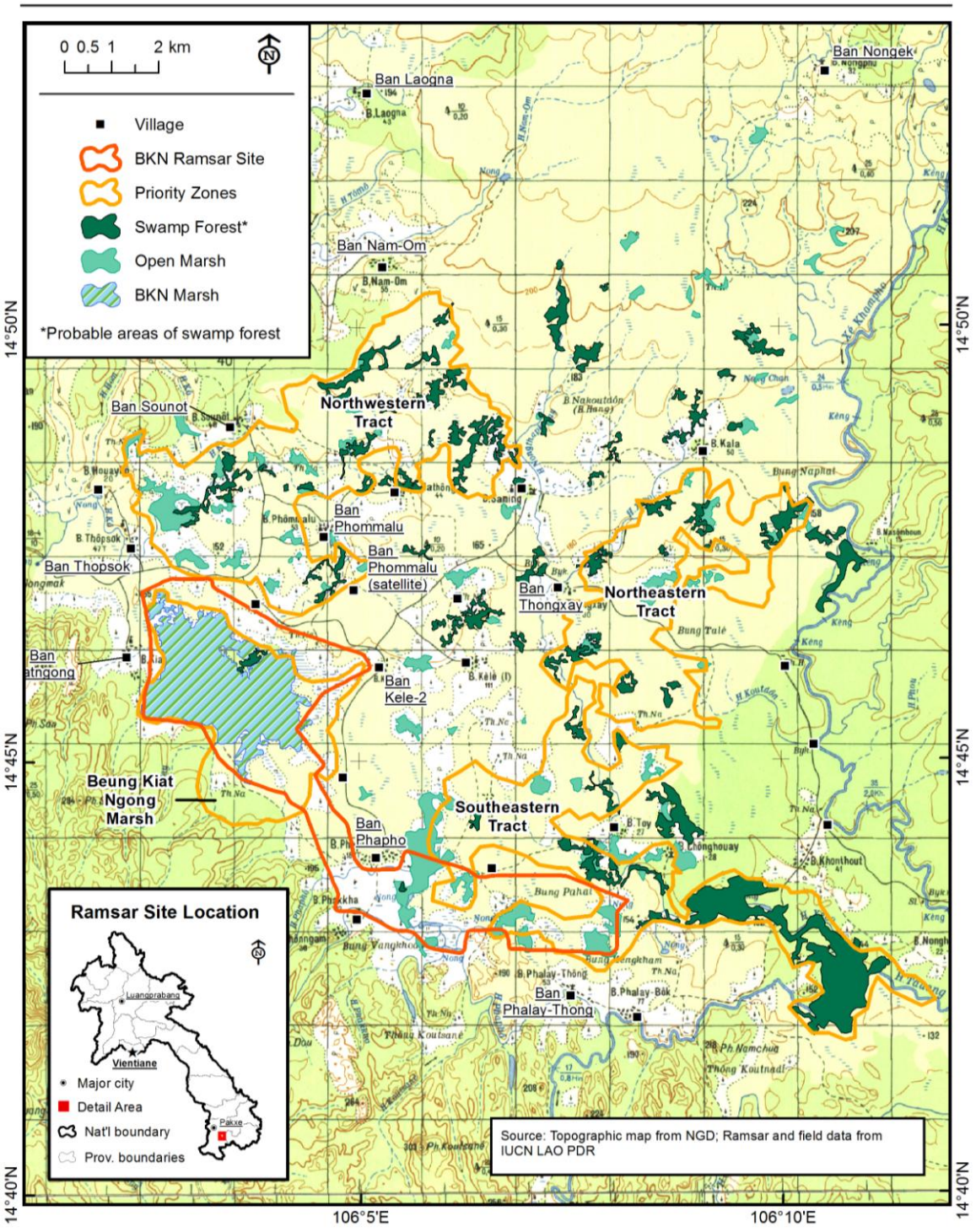


Figure 5a. Priority zones: Northwestern Track

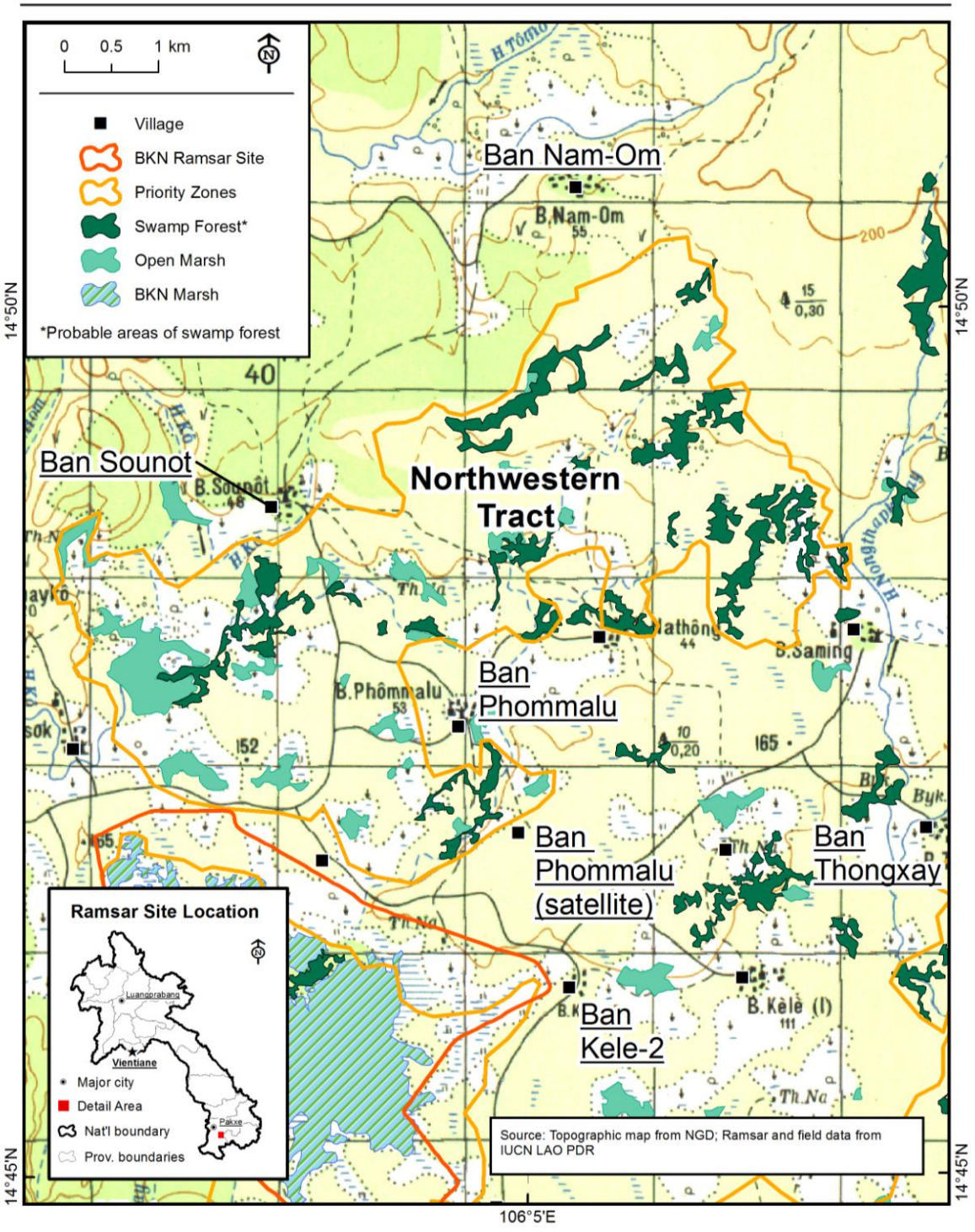


Figure 5b. Priority zones: Northeastern Track

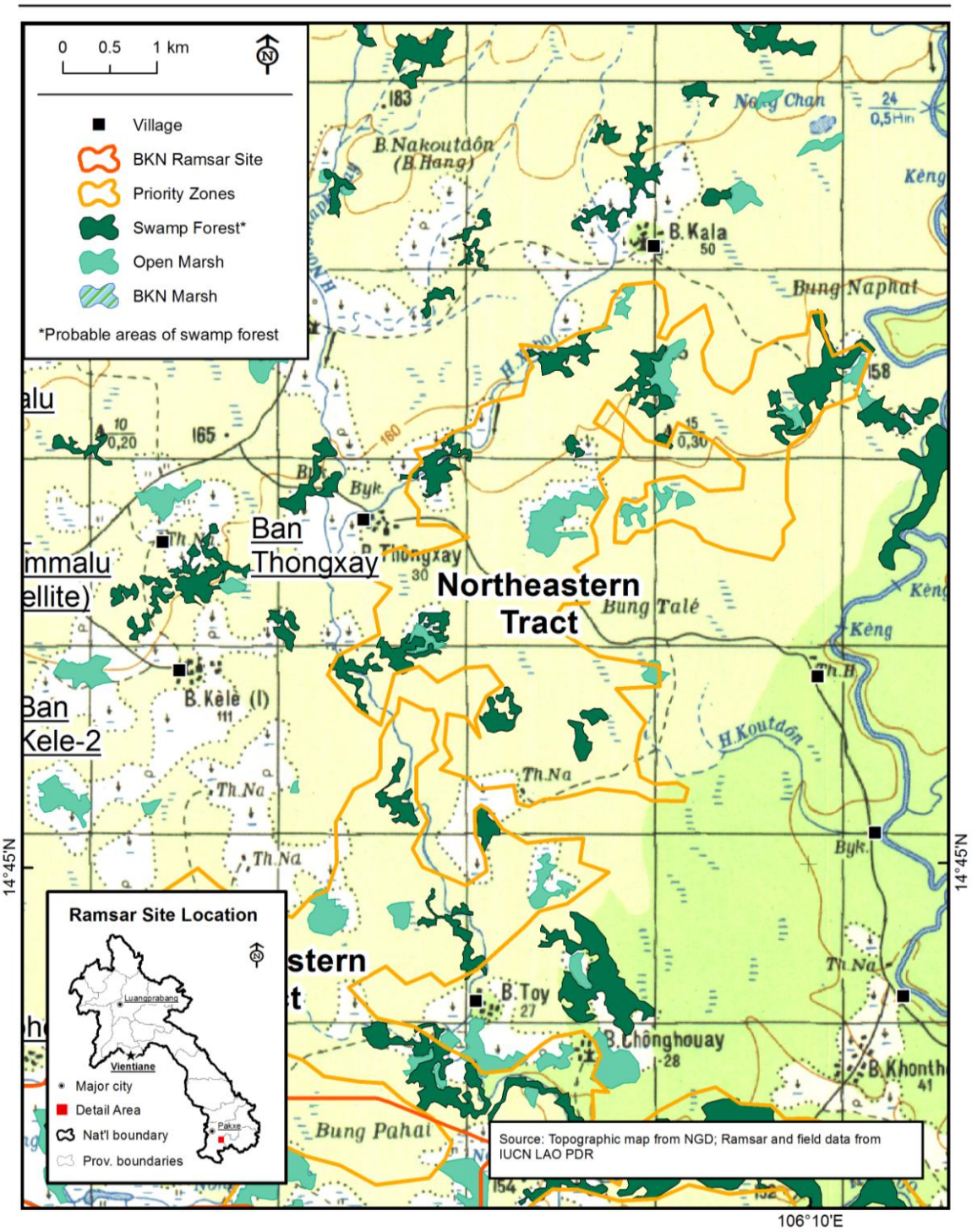


Figure 5c. Priority zones: Southeastern Track

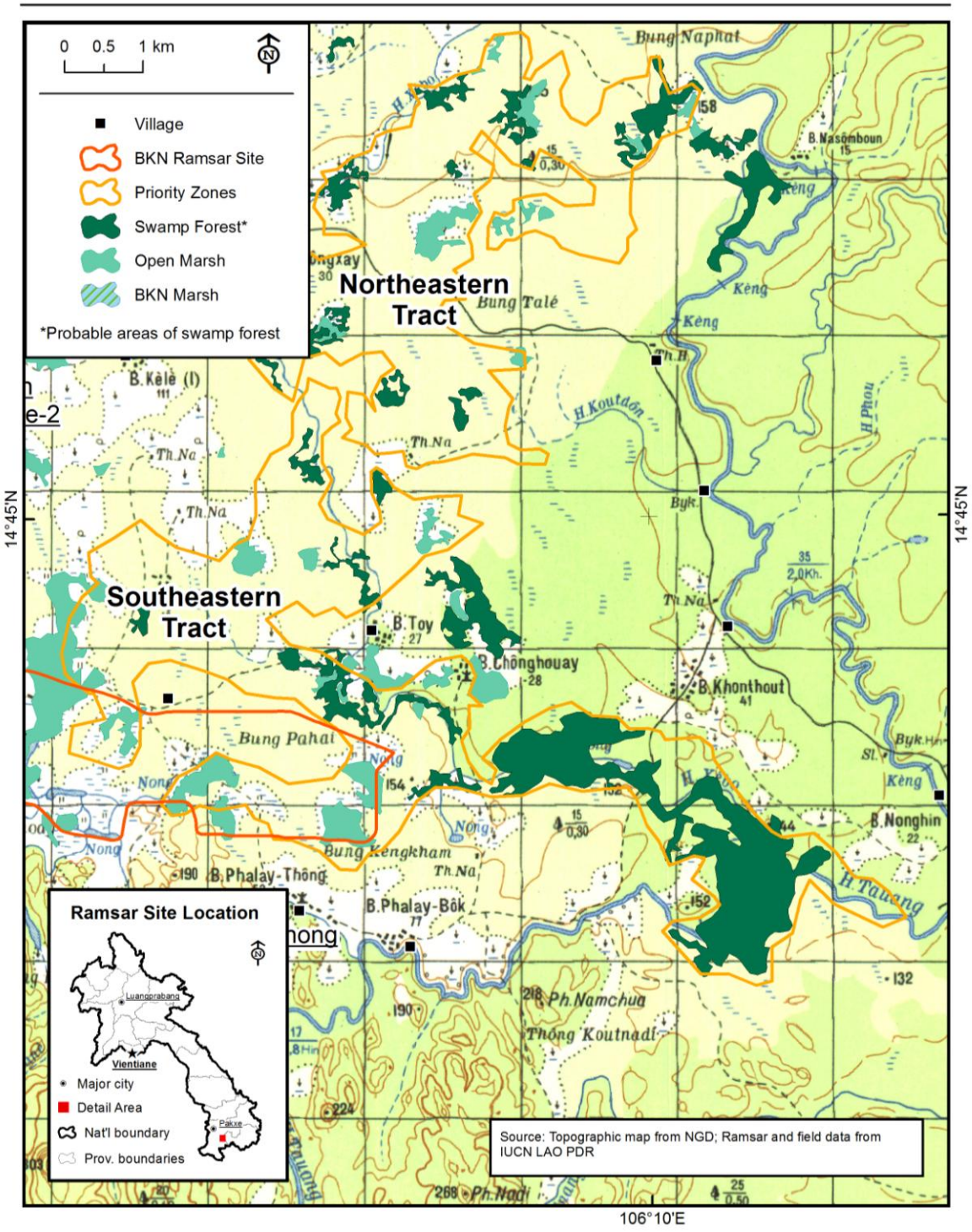
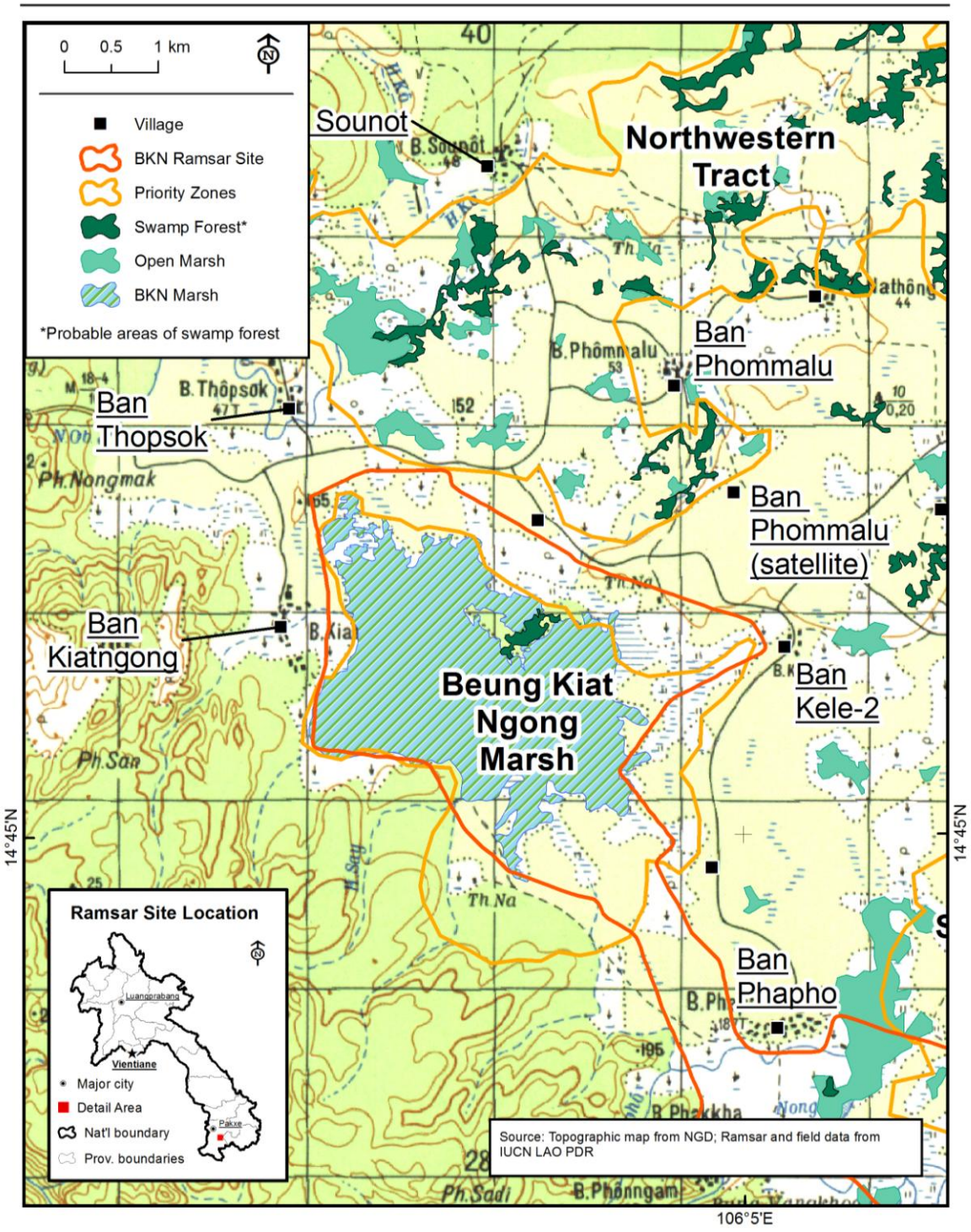


Figure 5d. Beung Kiat Ngong Marsh



INTERNATIONAL UNION
FOR CONSERVATION OF NATURE

LAO PDR COUNTRY OFFICE
Houm 26 Sibounheuang
325/26 Ban Sibounheuang
Vientiane, Lao PDR
Tel +856-21-216401
www.iucn.org/lao