The significance of the Xe Champhone Ramsar site (Savannakhet province, Lao PDR) and its surroundings for biodiversity conservation:

Results of bird and mammal surveys, and implication for Ramsar site boundary revision

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R.J. Timmins February 2014

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Local communities visited during the survey were by and large very friendly and helpful, maintaining good humour even when weather conditions at times became atrocious, and on one occasion when floodwaters engulfed the research team's field camp. Their enthusiasm leads one to hope that there might be a future for wildlife in the area.

Acronyms and shortened names

IUCN	International Union for Conservation of Nature and Natural Resources
NGO	Non-Governmental Organisation
OECC	Overseas Environment Cooperation Centre, Japan
WWF	World Wildlife Fund
WCS	Wildlife Conservation Society

Introduction

This report covers the findings from two relatively brief surveys, focused predominantly on the bird community, of what is often termed the Xe Champhone (indicated in the map as Xe Champhon) wetlands of Savannakhet Province. The first of these surveys was undertaken by the author between 29 August and 8 September 2012, the second between 12 and17 June. The primary goal of these surveys was to assess the relative status of bird species of conservation concern in Xe Champhone and determine those species of highest priority for conservation intervention and their conservation needs.

The project was developed primarily to generate information and management recommendations for the Xe Champhone Ramsar site, which only covers approximately the northern third of what, ecologically, would be considered the Xe Champhone wetlands. The Ramsar boundary, however, was developed in the absence of detailed data, relying largely on local reports of wildlife, habitat and ecological processes of significance. Given this background and a paucity of information on the wildlife of the Xe Champhone wetlands, it was considered prudent to include within the initial survey area all of the floodplains and associated wetlands in the lower valleys of the Xe Champhone and Xe Xangxoy – the ecological extent of the Xe Champhone wetlands.

The westerly Xe Champhone flows in a crescent across the floodplain heading towards the southeast, taking on a lowland meandering course about 15 km north of the town of Ban Kengkok, while the easterly Xe Xangxoy takes a meandering course across the floodplain flowing south westwards from approximately Ban Bungxang, where the Provincial Route #6 crosses the river. They meet towards the centre of the floodplain, after which the combined river (the Xe Noy) meanders for a further c. 4.5 km before meeting the Xe Banghiang. As the crow flies (if flying the length of these two river stretches) this forms a 'boomerang' shaped floodplain system of about 50 km in length, and up to c. 7 km wide.

The wetlands are covered by three separate districts of Savannakhet province, Muang Champhone in the northwest, M. Xounabouli in the Northeast and M. Samkhon in the central south. On 16 June 2010 a portion of the Xe Champhone arm of the floodplain was designated as a Ramsar site (see Figure 1). In the official Ramsar Sites Database this is listed as the Xe Champhone Wetlands (site # 1942) with an area of 12,400 ha centred on 16°23'N, 105°13'E
(See http://ramsar.wetlands.org/Database/SearchforRamsarsites/tabid/765/Default.aspx for documentation supporting the site's designation). Ultimately the current survey was commissioned by IUCN to aid in development of a management plan for the Ramsar site. A secondary aim of the analysis of the survey results was to provide comments and recommendations on the boundary of the Ramsar site.

Numerous villages lie along the periphery of the floodplain, and a few inside it on 'islands' of higher ground. The floodplain of these rivers has many man-made reservoirs that were largely created for irrigation of the surrounding agricultural land. These vary greatly in size from a few hectares (or even less) to the three largest: Nong Souy (16.538^{o}N, 105.201^{o}E; central co-ordinates), Pai Bak (16.487^{o}N, 105.180^{o}E) and Pai Chiao (16.349^{o}N,105.211^{o}E) each of which is close to or over 1000 ha in size. Judging from the US Army Map Service

(1965-70) 1:50,000 topographic maps these reservoirs inundated a number of relatively large water bodies. The natural permanent wetlands that remain at the time of writing are largely 'linear' oxbow-lakes usually 30–60 m in width and several hundred metres long, with some being over 2 km in length. One large natural lake, Nong Louang, remains. With an average dry-season surface area of probably around 300 ha, this is one of the largest natural water bodies in Lao PDR. Nong Louang has a hydrological system somewhat akin to the Tonle Sap of Cambodia, with water flowing into it when the Xe Champhone and Xe Banghiang systems are in flood.

Most wildlife survey efforts in Lao PDR have rightly (given a priority of elucidating the status of Globally Threatened wildlife) been focussed on the national system of large forest-dominated National Biodiversity Conservation Areas (NBCA), while the wetlands of the Mekong plains (including its tributaries) – few of which are actually within the NBCA system – have by comparison received little attention. In a comprehensive review of the conservation status and needs of wildlife (= tetrapod vertebrates) in Lao PDR, Duckworth *et al.* (1999: 41) identified that the "birds and large mammals in wetland complexes of Savannakhet province" constituted an obvious gap in the national knowledge of these two groups.

As this report was going to press, in January 2014 several days were spent surveying birds in the area; Appendix 1 details these observations, but the existing text of the report has not been amended.

1. Historical and recent survey coverage of the Xe Champhone wetlands

1.1 Historical Surveys

Historical data on the wildlife of Lao PDR is relatively sparse, although that for birds is better than most. Rather fortunately the Savannakhet area was the focus of publications by David-Beaulieu (1949–1950), itself one of the most important historical sources of information on birds in Lao PDR (Thewlis *et al.* 1998, Duckworth *et al.* 1999, Duckworth 2007). However, great care needs to be taken with this source as the text was written from memory since the author believed his specimens and notes had all been previously lost (David-Beaulieu 1949–1950, Duckworth 2007; see also Duckworth in press: Section 2.3.1). Furthermore, the text itself presents anomalies and ambiguities, for instance the introduction (p. 49) leads one to assume that David-Beaulieu saw Sarus Cranes *Grus antigone* regularly, whereas in the species account (p. 73), it appears unambiguous in that he saw them only once. There are also oddities such as the lack of mention of the Spot-billed Duck, yet it appears implausible that the species could have been absent or even scarce during the years he spent in Savannakhet. Further examination of some of his specimens, which later surfaced, clearly show that some of his identifications were incorrect (e.g. Dickinson 1970). David-Beaulieu (1949–1950) certainly spent time in the Xe Champhone wetlands, noting Ban Kengkok and Nong Louang in his writings, although the full extent of his travels in this area is unclear.

1.2 Recent Surveys

The Xe Champhone wetlands were not visited during cursory surveys for development of the national protected area system in the early 1990s, although Nong Louang was flown over in 1992 (see Salter 1993, Duckworth *et al.* 1999: p. 2). These surveys, which relied heavily upon village interviews, gathered anecdotal information on a small number of species which were reported to occur in the area by local people from other areas of Savannakhet (see e.g. Sarus Crane; Thewlis *et al.* 1998). The first recent attention paid to the area in terms of conservation came from exploratory field visits during a national review of wetlands (Claridge 1996). Claridge (1996) visited the area in April–May 1993, visiting Nong Souy, Pai Bak, Ban Dongmuang, Bung Sangha and the Kout Kok-Kout Koang area, and possibly also Nong Louang, although the text is not clear on the latter, but generated very little information on the wildlife of the area. The first significant attention to the area occurred during national surveys for Siamese Crocodiles with initial surveys undertaken in September 2003 followed by more extensive surveys in March 2005 and then May-June 2008 (Chanthone Phothitay and Somphanith 2003, Bezuijen *et al.* 2006, Cox and Phothitay 2008, Hedemark *et al.* 2009, Bezuijen *et al.* 2013). Incidental observations of other wildlife were made during the 2005 surveys, with bird records written up by Bezuijen (2006). Beginning in April 2010 a site-based crocodile conservation project was initiated in the area under the technical guidance of the WCS Lao Programme. This project was ongoing at the time of writing. Various incidental wildlife observations have been made over the course of the project, most notably by S. G. Platt (Platt 2012, S. G. Platt pers. comm. 2013).

Prior to the current survey there had been no extensive recent bird surveys, with the exception of several short-duration visits made to parts of the area by birdwatchers. The first of these appears to have been a few days at Nong Souy, Savannakhet province in February

2007 (D. Van Gansberghe *in litt*. to J. W. Duckworth 2007), followed by four days (12, 13, 20 and 21) at the same site in April 2007 (J. W. Duckworth *in litt.* 2013) (highlights of both observers' visits published in Dersu 2008). On 12 April four hours were spent in the afternoon surveying on foot along the dyke while the following day 4.5 hours were spent in the morning surveying the reservoir by boat. During the latter visit observations began on both days around 5.00 am, with surveys by boat being undertaken later in the morning. Observations on 20 April included a dusk watch, but the site was left by 12.30 pm on 21 April. On 9 and 10 November of the same year the Nong Louang area was surveyed by the latter observer, with a survey of the nong by boat on 9 November and a survey of the area to the west, around Nong Mong, from Ban Dongsavang-Thong on 10 November (Duckworth 2007, J. W. Duckworth *in litt.* 2013). On 21 June 2010 a short visit was made to Nong Souy by a visiting birder, who surveyed by motorbike from the dyke (C. Luppi *in litt.* to J. W. Duckworth 2013).

2. Methods

2.1 Survey site selection and logistical access

Since there had never been a comprehensive survey of the Xe Champhone Ramsar site and its surrounding wetlands in recent times for anything other than crocodiles, and given most opportunistic visits had repeatedly occurred in the same localised sites, prior planning relied heavily on research of indicators of potential sites of significance. Viewing of aerial imagery on Google Earth and consultation with topographic maps (both 1:100,000 and 1:50,000) prior to the first survey made it clear that the potential wildlife habitats of the area formed a very complex mosaic at a relatively fine scale, from which it was difficult to determine where the most productive survey sites might be and where the most significant wildlife habitats might lie. It was also clear from these sources that access was potentially going to be difficult and a very important aspect of survey planning. The imagery available on Google Earth (as of August–September 2012) was used during both the surveys to help guide and plan survey routes and itineraries. Some trails visible on the Google Earth imagery were digitised and uploaded to a GPS.

Another influence in the areas surveyed was an effort to visit a selection of the sites already the focus of the established Siamese Crocodile project and additionally to seek further recommendations, in discussion with project personnel, on potentially interesting sites based on various habitat characteristics. This had two potential benefits: firstly, logistics to reach such sites were already known and could be easily arranged, thus reducing waste of survey time; and secondly, it was thought that crocodiles were likely to survive to some significant extent in those areas least affected by people, suggesting these would also be better than average sites for target species. A further consideration in the areas surveyed, was to visit those locations where significant observations had been made previously during visits by other biologists, to assist in comparison of the survey results with those of previous data from the area, and thus to help gauge wildlife trends in the area. These locations included Nong Souy (which is located within the present boundaries of the Ramsar site) Pai Chiao reservoirs and Nong Louang.

Initially during the first survey in August–September 2012, a rather rapid assessment of access was made by vehicle around the western and southern edge. This showed, as had

been expected, that access into the wetlands by vehicle would be difficult. The roads present were in poor condition, thus limiting access largely to foot and boat. But since almost all villages lie essentially around the periphery and as the Xe Champhone goes through the heart of the area, it was thought more productive to use the river as the primary means of access to most areas, the most promising of which seemed to be closer to the Xe Champhone rather than the peripheral villages. The majority of nights were thus spent camped along the river. However, in order to facilitate surveys of particular areas some nights were spent in villages so that the researcher could be guided in the early morning out to particular areas of interest.

The second, longer survey was largely guided by the results of the first survey. This time the most interesting sites found during the first survey were revisited, and a number of new sites explored. Again the Xe Champhone was used extensively for access and once again the majority of nights were spent camped in the field. Survey sites and routes from both surveys are shown on Figure 2, while localities named in the text are shown on Figure 3.

2.2 Survey breath and focus

The surveys aimed to cover a broad swath of the area including representative areas of the main wildlife habitats present. As already mentioned locations that were thought likely to be 'richer' in wildlife (e.g. remoter from human activity, or wildlife habitats of known importance to target species (see below)) were specifically targeted. It quickly became clear from the convergence of several lines of evidence (satellite imagery, prior crocodile surveys, and local reports) that a 'core area' of a complex mosaic of wetland and floodplain habitats existed around the central reach of the Xe Champhone, with the Pai Chiao reservoir as its most readily identifiable feature. Accordingly, this area became a primary focus during both surveys, the first survey confirming its significance for wildlife. Throughout the report reference to the core area refers specifically to this area, as depicted on Figure 4.

Since floodplain grasslands and their associated bird community are particularly "Regionally at Risk", a special effort was made to try and locate the most significant areas of these. This was not easy as they are one of the least distinctive of vegetation types on remote imagery. But with a combination of informed guesswork and local knowledge, it is thought that a significant extent of the remnant floodplain grassland was seen.

2.3 Target species

Bird and mammal status is reasonably well understood (see e.g. Duckworth *et al.* 1999), allowing reasonable prediction of broad patterns of likely occurrence, and more specifically the identification of proxy indicators of likely status. The most prominent factor in patterns of wildlife status is proximity of people; wildlife habitats with high human population densities in close proximity have almost always lost species sensitive to human persecution and habitat degradation. The relative isolation of the Xe Champhone wetlands from large tracts of (human) uninhabited forest and wetlands, instead laying amidst a 'sea' of agriculture and ringed by villages, clearly indicated even prior to the survey that large mammals and a suite of large-bodied, persecution-sensitive birds would be unlikely to retain populations of significance within the area, although it was thought that perhaps a small handful might persist. This likelihood and the actual significance of any remaining populations were considered to be low, and thus no significant effort was directly focused on investigating the

status of potential remaining populations. They (and or their signs) were incidentally looked for during the survey and some interviews were carried out (see below).

Thus to use survey time efficiently to assess conservation priorities and needs of birds within the survey area, a suite of target species were selected as primary foci. Target species were first and foremost the species considered most likely to have conservation-significant populations within the study area. A broad rather than narrow range of target species was selected, on the basis of previous records from the study area and/or nearby regions, to help ensure that the surveys adequately assessed bird communities (and threats to them) geographically and throughout significant study area habitats. The key objective for all target species was to assess their status and conservation needs within the study area. They were selected from those possessing various attributes:

(i) Categorised on *The IUCN Red List of Threatened Species* as globally threatened (Vulnerable, Endangered or Critically Endangered), globally Near Threatened or globally Data Deficient (IUCN 2012).

(ii) Considered “At Risk” in Lao PDR, “Potentially at Risk” in Lao PDR, “Conditionally at Risk” in Lao PDR or “Little Known” in Lao PDR (Duckworth *et al.* 1999).

(iii) Species identified in Lao PDR after 1999 as greatly decreased or at least surprisingly rare.

Most of these are non-forest species, their omission from the 1999 list reflecting the heavy 1990s survey focus on forest areas. Some species were profiled in Duckworth *et al.* (2002) or Fuchs *et al.* (2007); and most that are relevant to the survey area are discussed in depth in Duckworth (in press).

(iv) Tied very closely, at least regionally as far as known with wetlands, marshes and floodplain habitats especially grasslands.

2.4 Field methods

Wildlife observation was carried out in a relatively unstructured manner, rather than using time consuming structured methodologies that are inappropriate for short-duration surveys. Mornings from dawn onwards and late afternoons until dusk are generally the most productive times for making observations, and as such effort was made to make sure the observer was in suitable survey areas at such times. A combination of foot-based and boat-based observations were made, largely depending on accessibility of various areas. Due to high water levels in most areas visited, more time was spent overall in wildlife observation from boats. Small boats were used, paddled by local boatmen, with the route chosen generally being an ad hoc combination of areas that looked at the time good for wildlife and on the knowledge of the local boatmen. Most observations focused on the habitat in the immediate vicinity, but on a few occasions (mainly around dawn and dusk) watches were specifically made at locations where a greater area was visible, to allow detection and assessment of large wide-ranging species such as storks and egrets. Within this framework observations aimed to maximise encounters with the target species.

2.5 Interviews with local people

Relatively little time was spent interviewing local people, because of the generally equivocal results that usually arise from the method. Those few interviews that were done were very informal and focussed on only a few topics. Namely:

- Assessing whether large waterbirds, herons, egrets or darters breed within the area.
- Assessing the extent of (Baya) Weaver breeding in the area and whether nests were heavily collected.
- Assessing the status of a few mammal species, principally deer, otters and diurnal primates in the area.
- On a few occasions, exploring an interviewee's understanding of the *phet* ('ducks') and '*phet*-like' birds present or formerly present, primarily to see if there might be local knowledge of Masked Finfoot, but also secondarily of the presumed extirpated White-winged and Comb Ducks. The illustrations in Robson (2005; ducks and geese, rallids and finfoot and cormorants and darter) were shown once characteristics of plumage and ecology had been established.
- Occasionally after particular 'charismatic' species had just been sighted, questioning local guides about the perceived status of these species in the area, especially whether they breed. This was only done for Asian Openbill, Darter, Spot-billed Duck, Lesser Whistling-Duck, Cotton Pygmy-Goose, Purple Gallinule, Watercock and Pheasant-tailed Jacana. On a few occasions later in the day these locals were asked to identify the birds seen in the plates of Robson (2005).
- Determining potentially significant areas of remaining tall floodplain grassland; this proved not particularly easy as 'grassland' in Lao terminology is linguistically termed in several different ways, in part based on the species (or at least graminoid type) composition, with the traditional uses of these species also intertwined in the terminology. Hence there was some confusion in conversations between floodplain and non-floodplain 'grasslands' and between 'grasslands' and 'sedge beds'.

2.6 Limitations

Probably the most significant limitation to the project was the inability to survey the area during the mid dry-season. Due to the availability of the author the first survey was undertaken in the August–September 2012 period. At the end of that survey it was apparent that the bird species for which the wetlands were most significant were a suite of wetland associated birds, nationally or regionally threatened as a result of various human activities. There were no mammals for which the wetlands retained even national significance. But it was not possible to determine whether the site had a nationally or regionally significant role to play in water bird conservation, or whether water bird populations had been so devastated by human persecution that future management interventions would need to focus on restoration type initiatives.

The majority of these bird species have complex patterns of dispersal and seasonal movement, and especially following the breeding season many sub-adult and immature

birds, as well often as adults, disperse across the region. Thus for much of the year it is difficult or even impossible to assess local breeding status of these species. But assessing breeding status is particularly important because effective conservation management of the site would need to be focused on protecting and enhancing the local breeding populations, or in the case of extirpated species potentially implementing restorative actions. Conservation management of the site could thus vary significantly depending on the status of various (potentially) breeding species.

It was thus recommended that the second survey be conducted within the short window of May to June 2013. Information from Lao PDR and neighbouring countries indicated that this timing would coincide with the peak of breeding for wetland birds (various sources but particularly J. W. Duckworth *in litt.* 2012, P. D. Round *in litt.* various years).

The alternative timing of a midwinter survey (ideally December to mid-February) while potentially useful for documenting wintering populations of northern breeding waterfowl, was considered unlikely to result in the collection of an equivalently significant body of information relevant to short to mid-term conservation management of the site. This is because few of the wintering species that might be detected are of any conservation significance, and of the species that are (e.g. Baer's Pochard *Aythya baeri* Globally Threatened–Endangered) their presence is so unlikely (and very difficult to detect even if they are present from time to time), that a survey for them has low priority when compared to the more pressing need to assess breeding status of species that were already known to occur in the Ramsar site and the surrounding wetlands.

Although assessing wetland habitat conditions and human use in the dry-season would be useful, most such aspects can be inferred at other times of the year, nearly as well as they could be assessed during the dry-season, especially when time available for the surveys is short (< month), and thus most time must be spent on bird species assessment. Wetland vegetation communities unlike birds do not move and thus experienced surveyors can extrapolate from prior observations of other wetlands in the region to infer dry-season habitats. Human uses are difficult to interpret in detail at any time of year, while basic patterns are often inferred indirectly, often from evidence that itself is not seasonally dependent.

3. Results of the survey

3.1 Observations on wildlife habitats

The area is a very complex mosaic of habitats, all modified to some extent by human activity. The most visually obvious are numerous large reservoirs, created apparently largely to supply irrigation water to surrounding agricultural land. Probably most such reservoirs predominantly replaced floodplain forest and woodlands, and perhaps an equal area of grassland and low-intensity agriculture, as well as some wetlands (small by comparison to the resulting reservoir). One could be forgiven for thinking that these reservoirs are natural bodies of water (until the dams and dykes are seen), as wetland vegetation development in and around most is quite astonishingly advanced. Large thick floating mats of graminoids have established themselves in all of the large reservoirs visited during the survey, and the aquatic vegetation (e.g. larger non-woody macrophytes) is at least comparatively as rich as the researcher has observed in any natural Indochinese wetlands. It seems certain that

these reservoirs owe this wetland vegetation richness to both wetlands that were inundated (at relatively shallow depth) during reservoir construction (thus providing a source of propagules) and probably to a lesser degree the flood cycle of the Xe Champhone.

Many oxbows (often known as *kout* or *xelat* / *xehak* in Lao language) also remain. The full evolutionary gamut of oxbows can be seen, from newly created open, relatively deep bodies of water, to largely infilled marsh-like depressions. They are furthermore modified to varying degrees by human activity, with some largely naturally infilled oxbows now being used as paddies, while the drainage channels of others have been dyked to create higher water levels and larger permanent wetlands than were present pre-impoundment. Surveying oxbows was generally difficult as the majority had thick bankside growth making observations of all but small sections of their surfaces difficult. The Google Earth imagery supports the observations from the survey that oxbows are very varied in their macrophyte cover, and that a relatively small proportion have significant patches of open water. Many, perhaps even the majority, appear to have developed thick floating graminoid mats with woody growth over a large proportion of their surfaces. Bezuijen *et al.* (2006, 2013) also provided characteristics of some. Reportedly Kout Care had only three to four years previously been predominantly open water, but at the time of the survey was largely (>75%) covered in floating graminoid mats. Similarly, Nong Pa-lan close to Ban Ban Kengpoun had apparently for at least forty years been predominantly open water until about three to four years ago when mats started to form; the wetland is now almost completely covered by mats. Nong Pa-lan was a 'spirit' wetland where day time loafing whistling ducks were protected, the birds using the site in large numbers, however around three to four years ago they ceased using the site for unknown reasons. It was not clear whether the ducks left because of the mat formation, or if the mats developed in the absence of disturbance from the ducks, or if purely a coincidence.

There are also a range of non-oxbow wetlands varying greatly in size; most notable are several large wetlands which could be referred to as lakes. The hydrology of some has probably been altered to some degree either by drainage or dyking although the original morphology is largely the same (i.e. not modified to the drastic extent as in the main reservoirs). The largest of these is Nong Louang which is connected in the wet season to a series of smaller wetlands, draining to the Xe Champhone, the lower ones in the series appearing to have been impounded to a certain extent. Another is Nong Datphon close to Ban Kadan. Both these wetland systems in contrast to the reservoirs have considerable expanses of open water surface with proportionally much smaller areas of aquatic vegetation, especially of floating graminoid mat, but also to some extent beds of aquatic macrophytes as well. Several smaller wetlands, all of which had probably to some extent altered hydrology, had rather varied vegetation characteristics with for example extensive sedge beds in Nong Poohhong-Khangseng and Nong Per / Nong Tamluang, and extensive lotus seen in others (e.g. Nong Deun) close to Ban Kengkok.

Discussions with locals suggested that the large thick floating mats of graminoids developed relatively quickly. After completion of the Pai Chiao Dyke in c. 1982, mats started forming within a few years, and in the Houay Talung reservoir, which was completed c. 16 years ago, within three to four years significant areas of mat had begun to form. As noted (above) on some oxbows mats apparently have overtaken open water within the space of a few years,

although in both cases it is perhaps possible that the mats or parts of them might have been carried to the oxbows from other wetlands during extreme floods.

The genesis for these mats was often reported to be from a build up of '*chok' Salvinia* colonies, the resultant thin 'proto-mats' or carpets forming a substrate for establishment of grasses and sedges. As the sedges and grasses grow and expand they add greater structural stability through their root systems and ultimately mass in the entrapment of dead plant matter (which is slow to decay). This may well be the predominant genesis of mats, and various stages in this postulated process were observed during the survey. Initial formation of carpets of *Salvinia* is probably significantly aided by entanglement of *Salvinia* colonies on woody snags, either at the wetland edge, or in the case of the reservoirs on the woody remnants of the inundated former vegetation. It is noteworthy in this respect that Claridge (1996) specifically mentions that the vegetation was not cleared before the creation of Nong Souy in its current form (dam and dykes finished in the early 1980s), and that during his visit "there [were] extensive flooded areas of dead trees and shrubs which [were] difficult to penetrate". The visible remnants of the dead trees and shrubs are now largely gone, but in their place are presumably now the floating graminoid mats. As the mats become solidified they appear to be colonised by shrubs, of several species, although a willow *Salix* appears to be the most predominant especially at Pai Chiao. On oxbow mats, shrubs were possibly more varied in composition, while at Nong Souy *Salix* in particular appeared either scarce or absent. A climbing pitcher plant *Nepenthes* sp. was observed growing in shrubs on mats in at least two oxbows.

Mats are somewhat dynamic in distribution and extent, not only expanding and growing, but also being lost. Evidence seen during the survey suggested that occasionally mats (usually small fragments) lose their buoyancy and can sink, some (as observed) later re-emerging (perhaps as a result of gas build up from anaerobic decay). In particularly dry years they may (or at least parts of them) be prone to significant burning, with small burnt surface patches seen on several mats in several parts of the survey area. They are also to some degree prone to movement, although this is likely dependent on many factors. Significant movement of large mats is largely constrained by attachment to bankside or underlying anchor points. In the reservoirs these anchor points are the underlying remnants of inundated trees and shrubs, while in the oxbows they are the rooted trees and shrubs around the edges. It is possible that during very high and severe floods larger sections of mat might move and perhaps in some instances be lost from wetlands. Mats clearly do move to some extent: in Pai Chiao, in particular, the distribution of mats was often not the same between that in the Google Earth images and that observed during the survey, with open water channels found during the survey, which were covered by mats in the images and vice versa. Given the rate at which a majority of locals said that mats had developed in their life-times, without the presence of destructive forces mats would surely cover the majority of open water surfaces within the space of decades rather than millennia. It is interesting, in this respect, that locals in the Nong Louang area considered both graminoid mats and *Salvinia* had been much more extensive in the past and that in the c. 60-year memory of one local, both had covered substantial areas up to about 20 years ago. Since that time several locals seemed to unanimously agree that both had declined to the point that during the survey hardly any *Salvinia* was seen and no real area of mat found.

Other significant aquatic plant communities found included extensive beds of tall sedge probably *Scirpus grossus* (based on identifications in Maxwell 2007), growing in relatively deep water, and the majority only probably exposed in the very driest of years. Such beds were particularly extensive in Nong Souy, although significant extents also occurred in Pai Chiao and to a somewhat lesser extent in the Nong Louang wetland complex, with additionally some small wetlands also extensively covered. Rich beds of floating macrophytes were also found at many wetlands. The composition of these varied quite considerably in the relative proportions of individual species, but common constituents were usually *Hydrilla verticillata*, *Ludwigia adscendens*, *Polygonum* sp(p)., *Salvinia* and *Nymphoides indica*. Lotus *Nelumbo nucifera* was more patchily observed, although when present it was often extensive, while water lilies *Nymphaea* and water caltrop *Trapa bicornis* were both more occasional (based on identifications in Maxwell 2007). Such beds were particularly extensive in Nong Souy and Pai Bak, usually in association with floating graminoid mats. Lotus and water lilies were much scarcer in Pai Chiao, although beds of the other species were relatively common. Such beds appeared very scarce in the Nong Louang wetland complex, where even *Salvinia* appeared very rare and no lotus was observed. Local people from the Nong Louang area reported that such aquatic beds, in particular lotus and *Nymphoides indical*, had declined significantly in extent within the last decade or two. Rich macrophyte beds were observed sporadically elsewhere on occasion even in relatively small wetlands. Several small wetlands, often close to villages, were seen with dominating growth of lotus. Water hyacinth *Eichhornia crassipes* was relatively scarce although generally widely distributed in the three large reservoirs, but not seen in the Nong Louang wetland complex. It does however form dense carpets on the surface of some oxbows, especially on what would otherwise be open water adjacent to floating graminoid mats. Water lettuce *Pistia* appeared to be even more localised, only being detected (albeit in dense carpets) on a small number of oxbows adjacent to the Xe Xangxoy. Claridge (1996) also noted presence in the Kout Bakkok – Koang area, also along the Xe Xangxoy. *Typha* (often referred to as bulrush or cattail) was very rarely seen, and never in anything other than small patches.

Within the core area adjacent to the Xe Champhone relatively extensive although highly degraded floodplain forest remains. Timber removal has largely depleted these forests of large trees, and many patches (especially on levees and higher river terraces) are probably regenerating secondary forest on former agricultural patches. Large spiny bamboos are frequent, while palms, even rattans *Calamus* are remarkably scarce (seen only once in the core area and otherwise only a sparse cluster of plants found at Nong Louang), suggesting anthropogenic modification has been severe. Similar vegetation that might best be termed swamp forest (since it is inundated for the majority of the year) occurs around the edges of many wetlands that lie in the core area, as well as wetlands outside it. There is also swamp forest cover over a number of, presumably old, oxbows, this differing from the shrub growth on the floating mats in being rooted in the ground rather than in the mats. Similar swamp forest has developed around the margins of the reservoirs, especially the eastern edge of Pai Chiao.

Probably the rarest and most threatened wildlife habitats in the area are floodplain grasslands. These are scattered throughout and usually characterised by dense, tall (>1.5 m) grasses. Patches are generally small; none of more than a couple of hectares were seen. The most extensive and intact are probably ‘cane-grass’ patches associated with the banks of the Xe Champhone and adjacent floodplain to the southeast of Pai Chiao in the Nong

Care area, where the grass forms an intricate mosaic with forest and oxbow wetlands. Elsewhere most such patches were interspersed amongst agriculture and woody floodplain vegetation, as in the area between the Xe Champhone and Nong Koutkhen. It was clear in both the Nong Care and Nong Koutkhen areas that such grassland patches had been cleared for new agricultural land. Another relatively large grass species with dark red-brown seedheads reaching to almost 2m in length characterised low-intensity agriculture mosaics in several areas. The grass formed thickets on paddy bunds and small patches of uncultivated ground, as well as on older fallow fields (uncultivated for several years). Other grasses, including occasional larger 'cane-grasses', shrubs and other scrubby vegetation were generally mixed in. Such habitat was observed extensively in the area south of the Nong Souy dyke, the area between the Xe Champhone and Nong Koutkhen, a band of agriculture southeast of the Pai Chiao dyke, the Thong Nong Ore area, the Nong Per / N. Tamluang paddies and the Hong Sumhong area. In all of these areas the habitat was essentially in a transitionary band between more intensively used paddies and wetlands or secondary growth. In the Thong Nong Ore and the Nong Per / Nong Tamluang areas the low-intensity paddy area appears to be above the major river floodplain. Although these areas have associated wetlands, presumably somewhat floodplain-like conditions have developed at least partly as a result of paddy development.

Higher ground above even the highest floods supports various habitats, including paddies (predominant), degraded Deciduous Dipterocarp Forest, grasslands and smaller patches of highly degraded Semi-evergreen Forest. These grasslands, although superficially visually similar, are significantly different from the floodplain grasslands mentioned above, and also different from the low-intensity agricultural areas with abundant grass, and have a different conservation value and priority lower than both.

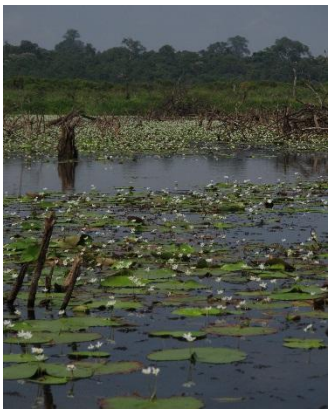
Several invasive plant species are already well-established in the Xe Champhone wetland; the most detrimental of these is almost certainly *M. Pigra,* which is widespread and even dominant in many areas. The outer margins of the reservoirs on the transition to agricultural land as well as the margins of many other wetlands, especially small shallow wetlands within agricultural mosaics often have extensive *Mimosa pigra* growth. Open wetland margins (e.g. those without swamp forest) were the exception rather than the rule, with *Mimosa* the commonest constituent of what otherwise would have been open wetland margins. This shrub is also notably prevalent around the margin of some oxbows, especially those that appear relatively recent in origin with open water surfaces. It is also present along the banks of the Xe Champhone, in some places forming dense thickets. The species is an especially vigorous colonist of disturbed areas in wetlands, and the densest growths seen were very clearly on fallow agricultural fields and other anthropogenically cleared land. For example, in the Thong Nong Ore and Kout Hi areas, which appeared to have been recently converted to paddies, *Mimosa* was extensive and dominant, yet in the adjacent Nong Per / Nong Tamluang area of low-intensity paddies *Mimosa* was present but far from dominant. On the Google Earth images the latter area is clearly visible as established paddies, while the former areas are still covered in a grass and scrub mosaic. Clearly the species appears less able to invade established habitats (as speculated previously by Timmins 2006), although there appears little research as to the long-term efficacy of *M. pigra* to replace or at least dominate native wetland vegetation types. Similarly *Mimosa* appeared to be very scarce within the floating graminoid mats, and peculiarly scarce in some other areas for example

around Nong Sumhong and Nong Datphon, this may either be because of competitive exclusion or perhaps the species has yet to establish itself in such areas.

Historically piecemeal clearance of wetland and floodplain habitat for low-intensity agricultural patches, alongside sporadic patchy abandonment of agricultural land, almost certainly had a relatively benign overall effect on the area's wildlife, creating instead a rich wildlife mosaic of successionary habitats. This scenario was likely to have aided establishment of grassland in particular, since without removal of trees and shrubs by people, animals or fire (or all three), grassland would almost certainly revert eventually to forest. However, such a status quo is likely to be no longer possible because of the aggressiveness with which *M. pigra* invades disturbed agricultural land, thus preventing a natural succession back to grassland, woodland or forest.

Plate 1 Natural Habitats surveyed



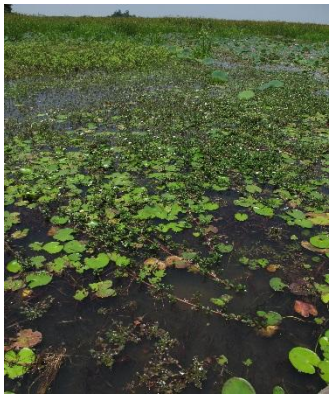


Rich beds of floating macrophytes


(L) Tall sedge and floating macrophytes (early wet-season; (R) Extensive beds of tall sedge probably *Scirpus grossus* (same view as (L); late wet-season).


Low intensity agriculture with tall grass

Extensive *Mimosa* growth on cleared land



(L) Rich beds of floating macrophytes and tall sedge; (C) Floating graminoid mats; (R) Tall floodplain grassland


(L)Swamp forest and marsh vegetation in an oxbow; (R) Lotus bed and tall sedge


(L) Darters on a dead tree remnant amongst floating graminoid mats; (R) 'Proto-mats' of '*chok'* *Salvinia* sp. colonies, amongst floating graminoid mats


(L) Degraded swamp forest; (R) Tall riparian grass along the Xe Champhone

3.2 Bird surveys

3.2.1 Significant bird species recorded recently from the Xe Champhone wetlands

Birds recorded during the survey are listed in Table 2 while counts of target species from sites visited during the survey are presented in Table 3. This section concentrates on details of target species found recently in the Xe Champhone wetlands.

Blue-breasted Quail *Coturnix chinensis*: "Little Known" in Lao PDR

A presumed male and female were seen together in a low-intensity agriculture mosaic in the Nong Per–Nong Tamluang area on 25 June.

The numbers of quail and buttonquail (see below) seen was encouraging, but is still far from the numbers one might expect if hunting levels were low. Resident and migrant quail species all appear to have declined considerably in Lao PDR (Fuchs *et al.* 2007, Duckworth in press).

[Rain Quail *Coturnix coromandelica*: conservation status in Lao PDR not assessed

A single quail very noticeably larger in size than Blue-breasted (or buttonquails) was seen in low-intensity agriculture in the area between the Xe Champhone, the Houay Talung reservoir and Don Kheo on 18 June.
The bird was only seen very briefly from the rear, at which point prominent "toffee" coloured flanks were noted, while no contrast between the wing coverts and remiges was noticed. Although female Yellow-legged Buttonquail is apparently nominally of similar size and has orange brown flanks, the jizz of the bird was much more like that of a quail. Although not noted in bird-guide descriptions, some images available on the WWW (Google search of "Rain Quail"; August 2013) clearly show Rain Quail with pale orange brown 'toffee' coloured flanks.

Rain Quail has otherwise never been recorded from Lao PDR. In Thailand the species was not discovered until 1969, presumably having been overlooked until then (Round 2008). This may have been the same case in Lao PDR. Resident and migrant quail species all appear to have declined considerably in Lao PDR (Fuchs *et al.* 2007, Duckworth in press).]

Lesser Whistling Duck *Dendrocygna javanica*

Common, recorded throughout the area (Table 3) most often as small groups of less than ten birds (predominantly duos). The highest numbers during both surveys were found at Nong Souy and Pai Chiao. Well grown juveniles were seen at a small wetland (Nong Pen) in the southern part of the survey area at Thong Nong Ore on 5 September. Many more birds were seen during the June survey and on a more frequent basis, although in general group sizes were similar between the two survey periods. However in June some very high counts were obtained of large numbers of birds in flight, generally at a distance, and probably due to human disturbance. The largest of these was of 350-470 birds over the southern and eastern areas of Pai Chiao on 17 June. The largest concentration seen down in a wetland was approximately 50 birds in Pai Chiao on 16 June.

Other recent records: Claridge (1996) reports 450+ whistling ducks in May 1993, although it is not clear whether this was the author's own observation or not. These have also been recorded by Bezuijen (2006), Platt (2012), Duckworth (2007), Dersu (2008) and C. Luppi in *litt* to J. W. Duckworth (2013). J. W. Duckworth *in litt.* (2013) recorded a group of c. 95 on 9 November 2007 at Nong Louang. In 2007 at Nong Souy, J.W. Duckworth *in litt.* (2013) recorded the following: 40+ on 12 April, 70+ on 13 April, 30+ on 19 April, 60+ on 20 April, and 40 on 21 April. Also recorded during the WCS camera-trapping in 2012 (WCS unpublished data).

Local people reported that they breed in the area and several gave firsthand accounts of collecting eggs from nests, seemingly most often found on floating mats in the larger reservoirs. As reported by locals the species is clearly a year-round resident in the survey area, although numbers might be augmented by non-breeding visitors. The 2007 dry season observations are somewhat intriguing as especially the April observations are very small numbers for the late dry season when concentrations of several / many hundred are the rule in other areas of Lao PDR. This suggests either that the big numbers of ducks from this area go somewhere else, or so much suitable habitat survives even in the late dry season, that they are not forced to concentrate; the later seems probably the more plausible. The timing of breeding is not particularly clear, in the Pai Chiao area the few local people questioned seemed to believe that most nesting took place in the months of April and May, but locals at Nong Souy said it was in July and August, although discussion was generally rather vague in both cases. If the former were correct, it is perhaps surprising that so many birds were seen in June, with no certain observations of young birds. So birds perhaps nest predominantly in July–August, which would help explain the lower number of observations in the later wet-season survey (family parties staying out of sight); a time when local people are busiest with rice cultivation, thus possibly an explanation for fewer encounters between local people and breeding ducks.

Cotton Pygmy-goose *Nettapus coromandelianus*: "At Risk" in Lao PDR

During the June survey small numbers (up to a maximum estimated 19 birds) were observed in wetlands throughout the area surveyed. The largest counts were at Nong Souy and Pai Chiao. Birds were almost always in presumed pairs, the highest concentration being of five presumed pairs at Pai Chiao on 15 June. During the later wet-season survey this species was only observed on a single occasion; a single female seen on 7 September in an extensive sedge bed in Nong Souy. The local boat men at the time seemed relatively unfamiliar with the species.

Other recent records: nine seen at Nong Souy on 13 April 2007 (J. W. Duckworth *in litt* 2013; Dersu 2008). The species was also recorded by Platt (2012) in the dry-season of 2011.

Local people reported that they breed in the area, seemingly most often found on floating mats in the larger reservoirs, although because of somewhat confusing name terminology it was unclear if any firsthand accounts of collecting eggs from nests were reported. The timing of breeding is not particularly clear (see the account of Lesser Whistling Duck for further discussion on this subject).

There are no recent records of large numbers in Lao PDR, although the species still occurs also in the North (Duckworth in press) and South (Timmins in prep.). Although these numbers recorded are exceptional by Lao standards, regionally the species can still be found in the hundreds and very locally even in the thousands (see e.g. Round 2008). The species must be greatly reduced at the site.

Spot-billed Duck *Anas poecilorhyncha*

During the June survey these ducks were recorded widely throughout the wetlands of the area, often seemingly in pairs (especially birds down in wetlands) with the highest numbers found in Nong Souy, Pai Chiao, the Thong Nong Ore area and Nong Louang. The highest single concentration found was at Pai Chiao where 20–25 birds were seen 'loafing' in a secluded area amidst extensive floating mats on 16 June. In the later wet-season survey the species was also recorded throughout the survey area and present in similar numbers, although counts were perhaps down somewhat. The largest group of at least 21 birds was seen associated with inundated fallow paddy (and much *Mimosa*) and wetlands on Thong NongOre in the southern part of the survey area, other high counts were recorded at Nong Souy (>20 probably many more) and Pai Chiao (>10).

Other recent records: recorded from Nong Souy, "where several dozen were found in April 2007, and local people averred it a breeding species there" (J. W. Duckworth *in litt.* 2013; Dersu 2008). These were also recorded by Platt (2012) and by Bezuijen (2006). Duckworth (*in litt.* 2013) recorded groups of 2, 6 and 2 on 9 November 2007 at Nong Louang and groups of 2, 9 and 1 on 10 November 2007 at the nearby Nong He.

Most birds not seen in flight or that were flushed by the survey team were seen in small groups of one to six birds, with duos perhaps the most common, but birds observed in flight were often in somewhat larger groups. Estimating total numbers on any given day was difficult as birds frequently took flight on detection of the observer or other people, and were frequently also seen in flight. However, the ubiquity with which birds were found indicates that most birds seen at different locations were 'new' individual birds. It is now likely to be the largest bodied resident bird species (with the possible exception of Purple Heron), with probably a local population of at least several hundred birds.

Local people reported that they breed in the area and several gave firsthand accounts of collecting eggs from nests, seemingly most often found on floating mats in the larger reservoirs. As reported by locals the species is clearly a year round resident in the survey area, although numbers might be augmented by non-breeding visitors. The timing of breeding is not particularly clear, the few local people questioned giving conflicting and rather vague reports with both April and May and July and August stated as the main period of nesting. However, if the former period were correct it is perhaps surprising that there were no certain observations of young birds (see the account of Lesser Whistling Duck for further discussion on this subject).

Along with Lesser Whistling Duck this species appears to be remarkably resilient to human activities in its wetland habitat, although numbers are undoubtedly much reduced from those which the wetlands could support in the absence of human persecution. The species is however far more localised than is Lesser Whistling Duck, and has undoubtedly been

extirpated from many smaller and more heavily modified wetland sites (see e.g. Duckworth in press). The numbers found are some of the highest recorded in recent years from Lao PDR, and considering the relatively small area from which they originate, this is probably the densest sub-population present in the country.

Barred Buttonquail *Turnix suscitator*

A single bird was seen in low-intensity agriculture in the area between the Xe Champhone and the Koutkhen reservoir on 19 June. Additionally, birds thought more likely to be buttonquails than Blue-breasted Quails (e.g. contrastingly pale wing coverts noted in flight), and thus potentially either Barred or Yellow-legged Buttonquails, were seen as follows: two birds together on 18 June in the area between the Xe Champhone, the Houay Talung reservoir and Don Kheo, two singles on 20 June in the area between the Xe Champhone and the Koutkhen reservoir and two birds together on 25 June in the Thong NongOre area. A single certain buttonquail seemingly noticeably smaller in size than either Barred Buttonquail or Blue-breasted Quail (thus suggesting [Small Buttonquail]) was seen in low-intensity agriculture in the Nong Louang area on 24 June. All of the later birds were in areas of low-intensity agriculture.

Barred Buttonquail appears to be the most resilient and widespread of the Lao species, and buttonquails in general remain commoner and more widespread than quails (Fuchs *et al.* 2007, Duckworth in press), although even Barred may have declined significantly in some areas (Fuchs *et al.* 2007, Duckworth in press).

Blue-eared Kingfisher *Alcedo meninting*

A single bird was seen on Kout Mak-peo on 2 September in the forested inundated margin. There were a further two unconfirmed records on 6 September in the inundated agriculture and secondary forest margin of the Houay Talung reservoir associated with a mosaic of inundated wooded agriculture and secondary forest.

Although little more than half of all small *Alcedo* kingfisher records were identified as Common Kingfisher *A. atthis*, it seems unlikely that many of the unidentified records were Blue-eared. During the June survey *Alcedo* kingfishers were only recorded on two occasions (on both occasions unidentified), both along the Xe Champhone, suggesting the species is scarce and probably very local in the survey area.

The species status is somewhat enigmatic; there are for instance no records of the species from the Nam Ngum basin (Duckworth in press), although the species is usually found in small numbers on small streams in extensive forest areas (e.g. Woxvold 2009, Timmins and Duckworth 2012).

Stork-billed Kingfisher *Halcyon capensis*

Neither seen nor certainly heard during the June survey, with only two unconfirmed records of calling birds on 16 June in Pai Chiao and 25 June in the Thong Nong Ore area. Observed only once during the later wet-season survey on 4 September close to the outflow of the Pai Sainongtum reservoir, but the species was heard on three other occasions including a bird relatively close to that seen on 4 September, another on 1 September in the Pai Chiao area

and one late in the afternoon on 4 September calling close to camp along the Xe Champhone in the Nong Lamsakon area. Unconfirmed calling was also heard during the boat surveys of Pai Chiao on 30, 31 August and 3 September and may have involved at least four different birds.

The species appears to be worryingly scarce, given the extent of suitable wooded and forested wetland habitat. The survey results add further evidence to a pattern of widespread decline across Lao PDR (Fuchs *et al.* 2007, Dersu 2008, Timmins and Duckworth 2012, Duckworth in press).

White-throated Kingfisher *Halcyon smyrnensis*

Very scarce in June; a single first seen on 19 June along the Xe Champhone, with another seen and probably a further bird heard on 24 June in the Nong Louang area. Another was probably heard in the Ban Kouthe paddies on 23 June. By the later wet-season survey the species was relatively common.

Other recent records: not certainly recorded in the Nong Louang area in November 2007, though an unidentified *Halcyon* heard at Nong Mong on 10 November might have been this species. No records even of birds unidentified to species at Nong Souy in April 2007 (J. W. Duckworth *in litt.* 2014).

It has been assumed that the species is a widespread breeder in Lao PDR, although documented evidence for this is scarce. J. W. Duckworth verbally (2013) recorded the species in song relatively widely in the northern highlands, and saw captive young in May in the Vang Vieng area. On the Nam Ngum–Vientiane plain there appears to be movement out of the plain in the late dry-season, coinciding with increased numbers along Mekong, with an influx into the plain in July presumed to be due to post-breeding dispersal (J. W. Duckworth verbally 2013). Long-term observations from a few wetlands on the plain are suggestive of possible declines at Houay Nhang and Nong Souang, but in the Ban Sivilai area the numbers appear to have remained stable and suggestive of breeding (J. W. Duckworth verbally 2013).

One could easily speculate that as with many other relatively large-bodied hole nesters, the breeding population in Lao PDR may be relatively small and considerably reduced compared to that possible in the absence of persecution. As with many wetland and open-country species in Lao PDR that have (or had) both breeding and non-breeding populations, the status of the breeding population may be considerably masked and confused by the numbers of non-breeding birds that appear to be present for much of the year.

Blue-throated Bee-eater *Merops viridis*

Not recorded during the surveys.

Other recent records: a flock of 20 at Nong Souy on 12 April 2007 (J.W. Duckworth *in litt.* 2013, Dersu 2008).

The species' historical breeding status in Lao PDR is enigmatic, although the species is recorded infrequently on passage (Duckworth *et al.* 1999). But the species is known to breed

locally for example in the lowlands of Thailand (Round 2008), and the same may have once been the case in Cambodia (Timmins 2008).

Grey-headed Parakeet *Psittacula finschii*

None recorded during the survey.

Other recent records: two seen in the Nong Louang area close to Ban Dongsavang-Thong at 16°15'12''N 105°18'19''E on 10 November 2007 (J.W. Duckworth verbally 2013).

Probably the most widespread of the Lao parakeets, but the species has certainly declined in the Northern Highlands and lowland areas of Lao PDR (Fuchs *et al.* 2007) as also evident from the species' status in similar habitats in Cambodia (RJT pers. obs).

Blossom-headed Parakeet *Psittacula roseata*: "Potentially At Risk" in Lao PDR

Seventeen or more birds were recorded on 24 June in a mosaic of degraded forest and paddies to the northwest of Nong Louang. It is possible other birds might have been overlooked amongst larger flocks of Red-breasted.

The location where the birds were seen had a low intensity agricultural mosaic with many remnant dipterocarp trees and with patches of Deciduous Dipterocarp-like Forest in the vicinity.

This was the only characteristic Deciduous Dipterocarp Forest species (SUFORD 2010) seen during the survey, but it is also a mobile species. The species has clearly declined significantly in Lao PDR (Duckworth 2007) as also evident from the species' status in similar habitats in Cambodia (RJT pers. obs).

Red-breasted Parakeet *Psittacula alexandri*

During the June survey birds were found throughout the more wooded parts of the survey area with concentrations found in the Pai Chiao and Nong Louang areas (seen daily in these areas). In both these areas large groups (up to c. 60+ and c. 120+ respectively) were recorded flying fairly high, presumably as birds left communal roost sites in the morning. Generally smaller numbers (c. <10) were seen during the rest of the day, and relatively few birds were found actually within vegetation in the immediate survey area. During the later wet-season survey small numbers were recorded commonly in the core area, with the highest single count being of c. 12 birds on 31 August at Pai Chiao. No birds were recorded in the Nong Souy area during either survey.

Other recent records: Nong Louang, two small flocks on 9 November 2007; Nong Kounchan, 12 and 10 November 2007.

The species remains widespread through much of Lao PDR although it has certainly declined (Duckworth in press), as also evident from the species' status in comparable habitats in Cambodia (RJT pers. obs).

Red Turtle Dove *Streptopelia tranquebarica*

The species was common throughout the open wooded parts of the survey area. During the June survey the species was recorded on several occasions in relatively large numbers in areas of low-intensity agricultural mosaic, with an estimated 200 or more birds observed to the south of the Nong Souy dyke on 13 June and 106 or more birds to the northwest of Nong Louang on 24 June. Only small numbers were recorded during the later wet-season survey.

Other recent records: Nong Souy, four on 3 March 2007 (D. Van Gansberghe *in litt.* to J. W. Duckworth 2007) and "up to 20 per day (with some in song, so probably breeding locally) in April 2007" (J. W. Duckworth *in litt.* 2013; Dersu 2008). A male was recorded at Nong Kounchan (16°16'03"N, 105°20'21"E) on 10 November 2007 (Duckworth 2007).

Although Dersu (2008) stated that there appeared to be only recent records from two areas of Central Lao PDR the species has subsequently been found more widely, e.g. Duckworth (2007) found the species "widespread in agricultural areas". This perhaps reflects a genuine increase, as surveys in the early 1990s of Phou Xang He and Xe Bang Nouan NBCAs (Duckworth *et al.* 1993, Timmins and Bleisch 1996) did not record the species. This increase, which has also been noted on the Vientiane–Nam Ngum plain, appears to be the result of an expanding Thai population using agricultural and urban habitats, rather than *in situ* increase of a Lao residual Deciduous Dipterocarp Forest population (Duckworth in press, J. W. Duckworth verbally 2013).

[Masked Finfoot *Heliopais personata* Globally Threatened–Endangered: "At Risk" in Lao PDR

No records during the survey.

Other recent records: none.

The species' historical range is uncertain, but finfoot was very likely to have been present, as at least seasonal breeders. Continued presence seems highly unlikely, although it is perhaps possible that a very small number of this secretive species might persist. Most locals appeared to be unclear in their knowledge of similarly sized water birds, but during the September survey one man, clearly familiar with the core area and who was able to relatively accurately describe basic details of the commoner water birds, also described what might have been Masked Finfoot, suggesting that he only very rarely saw it in the late dry-season. In June another local from Ban Tansoum described a '*phet*' [duck]-like bird, by the local name of *pet gurp* that he said was large and dark with webbed feet and very scarce. At one point he identified a cormorant that was flushed from the water surface as the *pet gurp*, but went on to say later, that in the 2012 wet-season that he had found the nest of *pet gurp*. The nest was in a tree within a wetland, on the edge of an area of paddy he was cultivating, close to the Xe Champhone. He said he saw birds on several occasions, and that rather than flying when the nest was approached, that it instead slipped down into the water.

Following the discussion he picked out, from the pages of ducks, rallids and cormorants in Robson (2005), the illustration of Masked Finfoot as what he believed was *pet gurp*.]

White-breasted Waterhen *Amaurornis phoenicurus*

Surprisingly scarce, only occasional to frequent observations during the June survey with a seemingly disproportionate number of records from Pai Chiao and Nong Souy. There were slightly more observations in the later wet-season survey. Also recorded by other observers during the non-breeding season.

The breeding population is very probably well below the levels possible in the absence of persecution. As with other species that appear to have both breeding and non-breeding populations in Lao PDR, elucidating breeding status is difficult due to the masking effect of potentially large numbers of non-breeders. There appears to be a lot of movement, both within the region (presumably from both Thai and Lao breeding populations) and of northern birds coming into Lao in the winter (Duckworth in press, J. W. Duckworth verbally 2013).

The species was the most commonly 'captured' bird during the WCS camera-trapping during February to May 2012 being recorded from ten of approximately 24 locations (WCS unpublished data).

White-browed Crake *Porzana cinerea*

This is probably common in the large wetlands with well vegetated marsh type vegetation (for records see Table 3).Also recorded by other observers during the non-breeding season.

The species is almost certainly a very recent arrival at the site (as it appears to be elsewhere in Lao PDR (Duckworth and Evans 2007)). One seemingly knowledgeable local who saw the species at close quarters in Pai Chiao during the survey, stated that he began seeing the species for the first time only within about the last year.

Watercock *Gallicrex cinerea*: "At Risk" in Lao PDR

Survey records: During June birds were recorded commonly throughout wetlands and wet, low-intensity agriculture of the survey area. However the number of birds recorded per day was generally low (<10). During the later wet-season survey five birds were recorded on 29 August at Nong Souy, but only one heard there on 7 September. Recorded on only one other occasion when a single bird was heard from a grassland-wetland-agriculture mosaic on 2 September.

Other recent records: single males on 20 and 21 April 2007 at Nong Souy (Dersu 2008, J. W. Duckworth *in litt.* 2013). C. Luppi (*in litt.* to J. W. Duckworth 2013) recorded approximately eight birds below the dyke of Nong Souy on 21 June 2010. 'Captured' once on 26 April 2012 during the WCS camera-trapping (WCS unpublished data).

During the June survey birds were heard or observed in a wide range of wetland types, from damp paddies relatively distant from significant marsh-like habitat to floating mats and rooted sedge beds within the large reservoirs.

Local people who appeared to recognise the species said that it breed in the area. Although certain evidence of breeding was not found, the commonness of birds, the level of calling and the behaviour of some birds seen, was suggestive of breeding. Males were seen

chasing/following females in flight on a number of occasions, and once a female with what appeared to be two different males in attendance rather prospectively entered an emergent bush clump at the edge of Nong Souy. Dersu (2008) postulated that the species "evidently arrived at Nong Souy in 2007 between 13 and 20 April". David-Beaulieu (1949–1950) wrote that he encountered small numbers when the rice crop was quite mature. This seems contradictory, since elsewhere he seems to imply that much of the rice crop in the Xe Champhone wetlands was recessionary, growing through the dry-season as wetland water levels fell, thus implying mid to late dry-season occurrence of the species.

The species is probably only a wet-season breeding visitor to the area. This fact might explain why the species status appears so much better than many other wetland breeders the majority of which are probably resident; the breeding population of Watercock potentially evades persecution for much of the year while on non-breeding grounds outside Lao PDR and might also be continually being replenished by dispersing birds from elsewhere.

Purple Swamphen *Porphyrio porphyrio*: "At Risk" in Lao PDR

Found at only two locations, Nong Souy, where recorded during both surveys and Pai Bak. At Nong Souy during the June survey probably over 25 birds were recorded on 14 June, and probably at least 18 on 13 June, when one concentration of at least eight birds was found. On 7 September a total of four birds were seen in a localised area of inundated sedge. At Pai Bak approximately seven were recorded on 27 June in habitat similar to that at Nong Souy.

Purple Swamphen (*Porphyrio porphyrio)* © Robert Tizard

In June birds were more often heard than seen and were associated with areas where aquatic vegetation was extensive, especially tall sedge beds, but also areas of floating mat with associated lotus and lily beds. The number of birds in the Nong Souy area in June was presumably in the low hundreds, as both days' surveys covered somewhat different areas. Although familiar with the species the local boatmen at the time considered them to be relatively scarce throughout the year, but also asserted that they breed in the area. The scarcity of previous recent records, as well as the apparently smaller numbers detected in

the later wet season, suggests that the species may be predominantly a seasonal visitor to the area, or perhaps less likely, there has been a recent recolonisation and or population increase in the survey area. Given the dates of occurrence the species presumably breeds. David-Beaulieu (1949–1950) found the species only in the rainy season and start of dry season as lakes 'dry out', and only found them on three to four large lakes; all were large, with extensive *roseao* ['reed'] along the edge.

The species has been recorded from a number of the more significant and generally large wetland sites and complexes around the country, although actual breeding status at many locations is uncertain. The species' apparent absence from Pai Chiao in particular is presumably largely a result of human persecution, as much suitable habitat is otherwise present there. On the Vientiane – Nam Ngum plain the species' distribution is highly indicative of a hunting sensitive species, being resident only on a few large permanent wetlands with difficult to penetrate extensive floating mats and dense shrubs (J. W. Duckworth verbally 2013). There appears to be some (local?) movement there, as birds appear in July–August–September on some wetlands where the species does not breed.

Common Moorhen *Gallinula chloropus*

The Common Moorhen was not recorded during either survey.

Other recent records: the species was recorded by Bezuijen (2006), and Platt (2012) reported possibly hearing the species in 2011. J. W. Duckworth (*in litt.* 2013) recorded two on 12 April, five on 13 April, and two on 21 April 2007 at Nong Souy. Duckworth (2007) also recorded the species in the Nong Louang area (one at Nong Mong on 10 November 2007). 'Captured' once on 24 April 2012 during the WCS camera-trapping (WCS unpublished data).

At best the species could only be a very scarce resident, although numbers undoubtedly become greatly bolstered by an influx of migrants, presumably largely northern breeders, during the northern winter. The only certain evidence of breeding in Lao PDR comes from C. Wood (*in litt.* to J. W. Duckworth 2013), who found the species breeding at two sites during the wet season (Pakxan wetland and an area in Oudomxai province).

Greater Painted-snipe *Rostratula benghalensis*

Not recorded during the survey.

Other recent records: the species was recorded by J. W. Duckworth (*in litt.* 2013) at Nong Souy with two birds seen on 20 April and a pair and a lone male on 21 April.

The species is suspected to breed in Lao PDR, in relatively open marshy areas often associated with agriculture mosaics (Duckworth *et al.* 1999, Duckworth in press, J. W. Duckworth verbally 2013). The lack of records during the survey is difficult to intepret, as suitable areas were covered, with what was thought to be significant effort to interpret this species' status. But for instance the species remains widespread on the Vientiane plain in areas with much heavier human activity (J. W, Duckworth *in litt.* 2013).

Pheasant-tailed Jacana *Hydrophasianus chirurgus*

Seen only twice during June; on both occasions single birds on Nong Souy (12 and 14 June). Observed on a single occasion during the later wet-season survey; a single in breeding plumage seen on 7 September in an extensive sedge bed in Nong Souy.

Other recent records: the species was recorded by J. W. Duckworth (*in litt.* 2013) at Nong Souy with records as follows: between five and nine birds on 12 April, two singles on 13 April, eight on 20 April and twelve and two singles on 21 April 2007.

Lao status is poorly understood; it is relatively widespread on passage and less so as non-breeders in the winter (Duckworth in press). Breeding has, however, never been confirmed. Although almost certainly a former resident breeder (it is known to breed in mainland Thailand), it is uncertain if the species currently breeds in Lao PDR. The survey records are somewhat equivocal in answering this question, because the birds may simply be non-breeding wanderers for example a single breeding plumaged bird was seen in early July 2005 on the Vientiane plain at a site where the species was certainly not breeding (J. W. Duckworth verbally 2013). Even if the June presence indicated a resident breeding population in the Xe Champhone wetlands, they are now very scarce indeed. The April 2007 records presumably involved breeders from elsewhere, most likely China, using Lao PDR and areas to the south as a wintering area. David-Beaulieu (1949–1950) appeared to have had very few records from Savannakhet, noting that they were neither seen on the marshes nor at any of the locations where he saw Bronze-winged Jacana.

Bronze-winged Jacana *Metopidius indicus*

Observed on a single occasion; a single adult plumaged bird seen on 7 September in an extensive sedge bed in Nong Souy.

Other recent records: two birds were recorded by C. Luppi (*in litt.* to J. W. Duckworth 2013) on 21 June at Nong Souy. A single was seen in paddies on the outskirts of Ban Kengkok on 6 July 2013 (S. Platt *in litt.* 2013). However, none was found despite specific searching at Nong Souy in April 2007 or in the Nong Louang region in November 2007.

It is probably notable that the species was not found despite specific searching at Nong Souy in April 2007 or in the Nong Louang region in November 2007 (Dersu 2008, J. W. Duckworth *in litt.* 2013), giving further credence that the species must be at best a very rare resident. The species is still resident at several wetlands on the heavily human modified and used Vientiane plain (Duckworth in press). Even so on the Vientiane – Nam Ngum plain the species has only been found at a proportion of sites surveyed, with evidence of apparent disappearance from one site (Duckworth in press, J. W. Duckworth verbally 2013). The species appears to be resident on the plain, showing very little movement, with confirmed breeding at one site. It is thus very surprising and alarming that the species appears to be so scarce in the survey area. The species is also locally common in the presumed breeding season at wetlands in Champasak (Timmins in prep.). David-Beaulieu (1949–1950) account suggests the species was scarce, although one wetland close to Ban Kengkok and adjacent to a village had several birds.

Black-winged Stilt *Himantopus himantopus*

Only recorded during the later wet-season survey when small numbers were observed at three locations in wetland edge paddies.

Although quite possibly a former breeder, it seems inconceivable that the species could nest undisturbed in the area, and birds are probably now only non-breeding visitors.

River Lapwing *Vanellus duvaucelii*: "At Risk" in Lao PDR

Three recorded along the lower Xe Xangxoy on 26 June.

Finding River Lapwings was one of the most surprising observations of the survey, as based on the level of river use by local communities one would predict that they would have by now been extirpated. Despite flushing as the boat passed them the birds were at the same spot on the return journey, suggesting that they were potentially residents, rather than wanderers from the Xe Banghiang or further afield (although June is a time of significant dispersal from breeding areas with birds turning up even in central Vientiane at that time; J.W. Duckworth *in litt.* 2013). Even so it seems unlikely that they were the offspring of former residents.

Both rivers have very extensive sand channel bed features and theoretically could support large numbers of River Lapwing. However, the species is clearly sensitive to human persecution (Duckworth *et al.* 1998b, Claassen 2004) and on the verge of extirpation in the survey area.

River Lapwing (*Vanellus duvacelii*) © Robert Tizard

Grey-headed Lapwing *Vanellus cinereus:* "Potentially At Risk" in Lao PDR

Not recorded during the surveys

Other recent records: Recorded at Nong Souy on 13 and 20 April (seven and two birds respectively; J. W. Duckworth *in litt* 2013). "12-15 birds observed in shallow, drying wetland adjacent to [Koutkhen reservoir] on 23 December 2011" Platt (2012).

The species is only a winter non-breeding visitor to Lao PDR and the 2012-2013 surveys were outside this period; thus, nothing should be inferred about its local status from the lack of records. The species' preferred habitat is grazing land adjacent to wetlands, often in areas of low-intensity agriculture and natural grasslands.

Red-wattled Lapwing *Vanellus indicus*

Only recorded during the June survey, when six birds were seen and either the same birds or more likely a different group were heard on 24 June in a low-intensity agricultural mosaic adjacent to Nong Louang, 26 June when birds were heard adjacent to the lower Xe Champhone and from very distant unconfirmed calls heard on 12 June at Nong Souy.
Other recent records: Recorded by Bezuijen (2006).

Although the species' preferred habitat was surveyed relatively infrequently, the number of encounters was surprisingly low, suggesting as elsewhere in Lao PDR that significant declines have occurred (Fuchs *et al.* 2007, Duckworth in press).

Oriental Pratincole *Glareola maldivarum*

Five or more were seen flying over Nong Souy on 14 June, [there were also unconfirmed records of high flying birds over Nong Souy on 13 June (three or more) and on 29 August (five).

The species certainly breeds on the Vientiane plain, during the late dry, very early wet season (Duckworth in press, J. W. Duckworth verbally 2013). This is probably a result of re-colonisation from the Thai breeding population rather than a residual Lao population. As with so many other breeding species in Lao PDR, status of the breeding population remains enigmatic and confused by large numbers of non-breeders (Duckworth *et al.* 1998a, Duckworth in press), but there is no reason why the species should not breed in large numbers, other than the punishingly high levels of persecution that befall open country, wetland associated ground nesters.

Brahminy Kite *Haliastur indus*: "At Risk" in Lao PDR

A small number of birds (max concentration of 5 in June) were recorded during both surveys, only from the core area and mainly from the Pai Chiao area. Observations in June suggested no more than a single adult breeding pair largely centred on the southern half of the reservoir, although at least three immature birds were also present. None was observed at Nong Souy or Nong Louang.

Other recent records: Duckworth (2007: J. W. Duckworth verbally 2013) observed four to five birds at Nong Louang on 9 November 2007, including at least two adults and two immatures,

with another single immature seen that may have been different from the former. On 10 November the observer saw a single adult in the Nong Mong area.

The species probably still breeds in the area, probably now the most northerly breeding population in Lao PDR. The records would probably be consistent with a single breeding pair, especially as the birds seen away from the immediate vicinity of Pai Chiao were immature. The later wet-season records however suggested a slightly greater spread, although at best only a few resident pairs are likely to be present in the whole survey area.

Brahminy Kite (*Haliastur indus*) © Robert Tizard

Black-shouldered Kite *Elanus caeruleus*

Small numbers, usually singles, observed throughout the area during both surveys; many other recent records from other observers.

The species still appears to remain widespread in Lao PDR, although the breeding status is somewhat enigmatic. No breeding behaviour was observed during the survey.

Darter *Anhinga melanogaster*: Globally Near-Threatened (as *A. melanogaster* sensu stricto): "At Risk" in Lao PDR

Common in June at Pai Chiao, where probably at least 50 birds were present, with single counts as high as 27 birds. There were none seen elsewhere during this survey. During the later wet-season survey, recorded on only four occasions all from the core area, with records of resting and fishing birds only from Pai Chiao (present during all visits), where an estimated 12 birds were seen on 3 September.

Other recent records: Platt (2012) recorded six birds in Pai Chiao in June 2011.

Darter (*Anhinga melanogaster*) © Robert Tizard

Historically quite common in Lao PDR, including Savannakhet (Thewlis *et al.* 1998), the species with the exception of very small numbers, probably of itinerant visitors, was extirpated from Lao PDR or very nearly so in the 1990s. However, due to very successful conservation efforts by WCS at breeding colonies in Cambodia (Sun Visal and Mahood 2011) birds began to return to Lao PDR probably in the mid 2000s, but only as non-breeding visitors (Bezuijen 2006, Dersu 2008, Woxvold 2009, Duckworth in press). It is not certain when birds first started to visit the survey area in any numbers. Intriguingly Chanthone, Phothitay and Somphanith (2003) reported seeing darters in the Pai Chiao area on 5 September 2003, but whether the identification was correct is hard to determine. The fact that Bezuijen (2006) did not record any is probably significant, although most birds appear to arrive in Lao PDR somewhat later (Dersu 2008, Duckworth in press, RJT own data). A knowledgeable local from Ban Tansoum said that he thought they had been coming to the Pai Chiao area for about two to three years.

Local people were apparently not aware of any local breeding, and at present the species is almost certainly only a non-breeding visitor, although it is possible that some birds may be present for much or all of the year. The difference in numbers between the two surveys might have several explanations. In Cambodia birds are noteworthy for breeding coinciding with the wet-season, so birds may be leaving the Xe Champhone area in the early wet-season to return to Cambodian breeding colonies. But, numbers are likely to be increasing anyway in the Xe Champhone wetlands area, as they are at many sites throughout Indochina and Thailand. The species is likely to attempt to breed in the Xe Champhone area if numbers continue to increase, however successful breeding is unlikely unless breeding colonies are actively protected from human hunters.

Little Cormorant *Phalacrocorax niger*: "At Risk" in Lao PDR

A single bird was seen associated with Indian Cormorants and Darters perched in dead trees on the eastern edge of Pai Chiao on 15 June.

The species is now only a scarce visitor to Lao PDR in small numbers, except for a very small area of the Seephandon Mekong wetlands in Champasak (Duckworth *et al.* 1999, Timmins 2006). However the numbers visiting Lao PDR are likely to be on the increase because of waterbird nesting colony protection at Prek Toal in the Tonle Sap Great Lake of Cambodia (Sun Visal and Mahood 2011, see Darter account), or possibly from population expansion in Thailand (Round 2008).

Indian Cormorant *Phalacrocorax fuscicollis*

Three birds seen associated with a Little Cormorant and Darter perched in dead trees on the eastern edge of Pai Chiao on 15 June. A single flushed from water in Pai Chiao on 16 June. Single unidentified cormorants were also seen at Pai Chiao on 16 and 17 June.

Other recent records: a single unidentified cormorant was recorded by Bezuijen (2006).

The species' historical status is enigmatic, these being some of the first confirmed records for Lao PDR (Duckworth *et al.* 1999). However, Timmins (2006) recorded large numbers flying from the Siphandon Mekong wetlands in Champasak, Lao PDR into Cambodia. The species was probably overlooked historically or had already declined significantly prior to the period of historical exploration, as appears to be the case for Great Cormorant (Thewlis *et al.* 1998, Duckworth *et al.* 1999). Numbers of non-breeding visitors are now likely to be on the increase because of waterbird nesting colony protection at Prek Toal in the Tonle Sap Great Lake of Cambodia (Sun Visal and Mahood 2011, see Darter account). The species may also be increasing in numbers in Thailand (Round 2008).

Little Egret *Egretta garzetta*

Very scarce in June; a small group of c. 20-50 seen in roadside paddies between the national highway and Ban Kengkok on 12 June, with the only other definite records of the species being two birds in flight over Nong Souy on 14 June and a single at Pai Chiao on 16 June. This species was common during the later wet-season survey. There are many records of this and other egrets from the area recorded by other observers.

Of the mainland Southeast Asian nations (and also China) Lao PDR is the only one that does not have any known (or even presumed) breeding populations of any egret species. This disparity is presumably only the result of human persecution, leaving open the possibility that one or more egret species might attempt to breed in Lao PDR one day

Many local people were asked if they were aware of *nok gnang* (the generic term commonly used for white herons) breeding in the Xe Champhone wetlands area, all either stated that they did not, or that they did not know, but had never seen or heard of nesting.

Numbers of egrets have been increasing at least over the last two decades in Lao PDR (Duckworth in press); this includes both the numbers of birds wintering as non-breeders in Lao PDR (rarely seen in the 1990s), but also (in much smaller numbers) the numbers of birds remaining during the wet-season. Claridge (1996) remarks for instance that Nong Souy was the only area visited in the Xe Champhone wetlands at which the author saw egrets. These lines of evidence suggest that hunting pressure, perhaps largely projectile mediated hunting, has seen a significant decrease over the same period. This accords with the

national voluntary removal of large numbers of firearms in the 1990s from rural areas and probably to some degree increasing economic incentives that have reduced 'spare-time' available to hunting (see Duckworth in press: section 2.5.3.1; note however more lucrative hunting has concurrently increased). However, gun hunting appears to be on the upswing again, and other forms of bird hunting much more prevalent than they were in the 1990s.

The bird at Pai Chiao on 16 June was unusual in having relatively prominent head and back plumes, but a pastel straw coloured tinge to the back, pale pastel yellow feet, and rather pale slate grey legs and bill.

Grey Heron *Ardea cinerea*: "Potentially at Risk" in Lao PDR

No certain records during the surveys (see Purple Heron for records of unidentified large herons).

Other recent records: Duckworth (2007) recorded the species as 'common' in the Nong Louang area in the non-breeding season (November 2007). Platt (2012) recorded four birds perched in dead trees in Pai Chiao in 2011.

The species is now almost certainly only a non-breeding visitor to the area; although the species presumably must have at one time bred. The species is not known to breed anywhere in Lao PDR, although it does in surrounding nations (Duckworth *et al.* 1999, Round 2008, Timmins 2008).

Purple Heron *Ardea purpurea*: "Potentially at Risk" in Lao PDR

Few observations from either survey, almost all from Pai Chiao, where singles were observed on 16, 17 and [15] June and on 31 August when two to three birds were seen. Another single was seen in the mosaic of low-intensity agriculture and wetlands east of the Xe Champhone and west of Koutkhen reservoir within the Ban Kadan village lands on 19 June. Unidentified large herons were also seen over Pai Chiao on 15 June and two together flying high and distantly over the core area on 19 June.

Other recent records: sub-adult on 12 April, two to three on 20 April and a single adult on 21 April at Nong Souy (J. W. Duckworth *in litt.* 2013). 'Captured' on two occasions at different locations during the WCS camera-trapping, with a further unconfirmed record at third location (WCS unpublished data).

The species may breed in the area, most likely within the secluded floating mats of Pai Chiao, although there could clearly only be small numbers involved. The species also breeds in small numbers (certainly more than in the survey area) very locally in the south (Timmins in prep.) and probably prior to inundation also on the Nakai Plateau (Dersu 2008, RJT pers. obs.), and also probably in very small numbers, very locally in the north (Duckworth in press).

Purple Heron (*Ardea purpurea*) © Robert Tizard

Great Egret *Casmerodius albus*

Frequent to common throughout the more secluded wetlands of the survey area in June, with the highest count being a minimum estimate of 20 birds at Pai Chiao on 15 June. Similarly frequent to common during the later wet-season survey.

During June the majority of feeding and loafing birds were observed in relatively secluded habitat, rather than areas of marginal agricultural mosaic. Seemingly a higher proportion of non-flying birds were seen in areas dominated by agriculture in the later wet-season survey. The numbers seen in June are exceptional for Lao PDR, and perhaps suggestive of a prelude to a breeding attempt. See Little Egret for discussion of the potential for breeding.

Intermediate Egret *Mesophoyx intermedia*

Only a single definite record of the species in June, and relatively few certainly identified to species in the later wet-season survey.

Cattle Egret *Bubulcus ibis*

Birds were seen frequently in flocks of up to c. 65+ throughout the survey area during both surveys, usually in areas of agriculture mosaic adjoining wetland areas; not surprisingly mirroring the distribution of livestock.
Some birds especially in June were in breeding plumage. See Little Egret for discussion of the potential for breeding.

Black-crowned Night Heron *Nycticorax nycticorax*: "Potentially at Risk" in Lao PDR

The species was recorded only on 7 September at Nong Souy when at least 16 birds were seen, apparently after being disturbed from a roost in bushes on an island.

Other recent records: five or more seen at Nong Souy on 12 April 2007 (J. W. Duckworth *in litt.* 2013). 'Captured' once on 3 April 2012 during the WCS camera-trapping (WCS unpublished data).

As a skulking crepuscular and nocturnal species it was probably overlooked to some degree, although no vocalisations were heard from any survey sites during the night or crepuscular hours. Its status in the survey area is uncertain, although it seems most likely to be a non-breeding visitor (see Duckworth (in press) for seasonal patterns of occurrence).

Yellow Bittern *Ixobrychus sinensis*

Almost all records during both surveys came from Nong Souy, where the species was evidently common. The only other records were of singles at Pai Chiao in June.

Other recent records: Nong Souy, singles on 20 and 21 April 2007.

The distribution of records suggests the species perhaps has relatively narrow habitat requirements in the breeding season, although given the pattern also mirrors that of some other species, especially Purple Swamphen, human persecution factors may also be involved. The species is similarly patchy in occurrence on the Vientiane – Nam Ngum plain during the presumed breeding season, showing some correlation in occurrence with jacanas (Duckworth in press, J. W. Duckworth verbally 2013). Evidence suggests a significant national decline has taken place in the breeding population (Duckworth in press).

Cinnamon Bittern *Ixobrychus cinnamomeus*

This species is very common throughout the survey area during both surveys. There are also many previous records from the area.

The great majority of birds seen appeared to be adult, although a few juveniles were seen.

This appears to be the most robust of the Lao breeding heron species (Duckworth in press, J. W. Duckworth verbally 2013).

Black Bittern *Dupetor flavicollis*

Birds of this species were seen commonly during both surveys at the larger wetlands throughout the survey area. Birds were almost always seen in flight usually as singles. The highest count was of approximately 14 birds in Pai Chiao on 17 June.

Other recent records: one or two birds on 12 April, a single on 13 April, two parallel flying, one in high display flight and another single on 20 April and four singles in high display flight on 21 April at Nong Souy (J. W. Duckworth *in litt.* 2013).

Although no certain breeding behaviour was seen during the survey, the species almost certainly breeds in the area, as evidenced by the display behaviour seen by J. W. Duckworth (*in litt.* 2013). Recent Lao records are relatively few (e.g. on the Vientiane-Nam Ngum plain there are only about four records Duckworth in press), although the species was also found relatively commonly in wetlands in Champasak (Timmins in prep.), suggesting the Xe Champhone wetlands may be the nation's stronghold for the species.

Asian Openbill *Anastomus oscitans*: "At Risk" in Lao PDR

The species was recorded daily within the core area, during both surveys. Around Pai Chiao small numbers, often only ones and twos, were found on all survey dates. However, in June larger numbers apparently of birds either flying from or to, one or more, roosts in the eastern edge of Pai Chiao were seen. The highest such count was of c. 101+ birds. On 20 June at least 71 birds were seen rising and then circling and then descending and loafing in trees in the late morning in the Nong Arr area (between the Xe Champhone and the Koutkhen reservoir), where they had presumably been feeding. The largest gathering recorded during the later wet-season survey was of 16 birds resting in trees close to the Xe Champhone on 2 September. At this time the highest concentration of feeding birds was found in Pai Chiao. None was seen in the Nong Souy-Pai Bak area during either survey.

Other recent records: in June 2010 C. Luppi (*in litt.* to J. W. Duckworth 2013) observed three unidentified storks in the Nong Souy area. Platt (2012) recorded three openbills in the Pai Chiao area in June 2011.

In June birds appeared to be roosting, probably in dead trees, in the secluded eastern edge of Pai Chiao, but the majority of birds flying north beyond Pai Chiao during the day, with observations of at least 38 birds flying southish over the Xe Champhone at c. 5.30 pm on 15 June, 101+ birds seemingly coming in to Pai Chiao from the north on 16 June (> 5.00 pm), 26 from the north at 5.30 pm on 17 June and at least 63 birds flying northish over the Xe Champhone before 6.00 am on 19 June. Numbers remaining in the Pai Chiao area during the day in June were hard to estimate, but probably lay in the low tens.

At Nong Souy local people appeared to know of openbills and said that they were rare to scarce visitors. Locals in the Pai Chiao area considered that the species was present all year round; however no reports of nesting were received during the survey despite this being the topic most frequently discussed with local people.

Although the historical status of openbills in Lao PDR is enigmatic (there are no historical records; Thewlis *et al.* 1998, Duckworth *et al.* 1999), the presence of suitable habitat, the distribution of breeding colonies elsewhere (e.g. Round 2008, Rasmussen and Anderton 2005), and the fact that birds are known to move large distances when not breeding (Round 2008), suggests that they surely must have been common visitors to Lao PDR and probably breeders. Their demise in Lao PDR probably started well over a hundred years ago, aided by their colonial nesting and preference for feeding on snails which probably reach greatest abundance in floodplain wetlands and rice fields the focus of human activities (unlike many other storks which feed in small forest pools and rivers). Rasmussen and Anderton (2005) note that it is the "only stork that breeds well in human-disturbed areas". It was clear, however, by the 1990s that the species was at best a very scarce visitor to Lao PDR (Thewlis *et al.* 1998).

The current birds presumably originate from breeding colonies in Thailand where it is estimated that there are tens of thousands of breeding birds (Round 2008). Alternatively they may be dispersing from the Tonle Sap Lake in Cambodia where there is a smaller but rapidly growing breeding colony now numbering around 13,000 nests (Sun Visal and Mahood 2011). According to Round (2008) and Sun Visal and Mahood (2011) the species is a dry-

season breeder in both Thailand and Cambodia, which might explain the paucity of records from this season in the survey area, if the majority of birds are returning to breeding colonies there. At the Prek Toal colony in Cambodia many birds however remain into June (Sun Visal and Mahood 2011). The period in which birds started visiting Lao PDR and the survey area in larger numbers is uncertain, but probably began around 2011 (J. W. Duckworth verbally 2013), this seems to accord with the rather vague reports from local people of when the species first appeared.

The species might well attempt to breed in the survey area in the near future, especially if the number of birds at the site continues to increase. However, it is very likely that any nesting attempt would quickly attract the attentions of local people and lead to nest robbery and perhaps even persecution of adults. Preemptive awareness raising with local communities on the species' role in eating *Pomacea* snails might help in gaining local support for protection of the Asian Openbill.

Asian Openbill (*Anastomus oscitans*) © Robert Tizard

Asian Openbill (*Anastomus oscitans*) during flight, Cambodia © J. C. Eames

Large-billed Crow *Corvus macrorhynchos*

Small numbers recorded on almost all days throughout the area, with the highest counts being of at least 20 flying to roost (in smaller groups) in the Nong Souy area on 29 August, and at least 19 birds aggregation around a recently used fishing camp along the Xe Champhone on 26 June.

Other recent records: Nong Souy, seven on 12 April, five on 20 April, one on 21 April 2007. Four between Ban Lahanam-Thong and Ban Sagnak-Tai, seven at Nong Louang, and two at Ban Sagnak-Tai on 9 November 2007.Six near Ban Dongsavang and 12 at Nong Mong on 10 November 2007 (all records J. W. Duckworth *in litt.* 2013).

The numbers seen are typical for central and southern Lao PDR, although probably significantly below the ecological threshold that the survey area could support. Although the species is conspicuous, it occurs ecologically at relatively low density, and this factor together with a predisposition for ecological association with habitats favoured by people and indiscriminate human persecution of almost all vertebrates, quarry species or not, in all human occupied areas of Lao PDR, especially during the last half century is what lead to the species' extirpation from large parts of Lao PDR and decline everywhere (Timmins and Duckworth 2012).

Ashy Woodswallow *Artamus fuscus*

Not recorded during the survey.

Other recent records: the species was recorded by Duckworth (2007) from the Nong Louang area. Two heading south at 12h00 on 9 November 2007.

The species' historical breeding status is enigmatic, but like so many other lowland species with similar uncertainty it may have once been a widespread, although probably localised breeder. Suspected breeding populations are now probably very localised mainly to highland regions (Duckworth *et al.* 1998a). Recently however the species started to breed in the Vientiane area, having first returned to the area as a winter visitor (Duckworth in press, J. W. Duckworth verbally 2013). The species may have narrow ecological requirements especially during the breeding season, with a seeming association with electrical pylons and radio masts noted both in Vientiane and on the Bolaven Plateau (J. W. Duckworth verbally 2013). These might perhaps be replacing the giant dipterocarp trees that once studded the lowlands. In Thailand a historical association with palms and high dead tree snags and stumps for nesting was noted, and more recently on telegraph poles and similar structures such as radio masts (Round 2008). In Sekong Province the species was found in mid May 2012 in high elevation pine forests, with large remnant trees (RJT pers. obs). Birds were and probably still are vulnerable to nesting site loss and nest related persecution.

Black Drongo *Dicrurus macrocercus*

Not recorded during the June survey, but frequently observed in small numbers later in the wet-season.

Other recent records: Recorded by both Duckworth (2007) and Bezuijen (2006) and by J. W. Duckworth (*in litt* 2014) at Nong Souy in April 2007; the dates of all these observations fit with winter migrants.

The species' historical breeding status is somewhat enigmatic, but like so many other lowland species with similar uncertainty it should have once been a widespread, although probably localised breeder. The species is thought to still breed locally on the Vientiane–Nam Ngum plain (J. W. Duckworth verbally 2013). It is however at best a very scarce breeder in the Xe Champhone wetlands, but has probably already been extirpated.

White-shouldered Starling *Sturnus sinensis*

[At least two small starlings probably this species, were seen at Nong Souy on 7 September.]

Other recent records: seven on 12 April and at least several amongst 28 small starlings on 13 April at Nong Souy (J. W. Duckworth *in litt.* 2013).

There is no evidence of the species ever breeding in Lao PDR.

Black-collared Starling *Sturnus nigricollis*

Common, although numbers generally not high (double figures rather occasional), throughout the survey area. The counts in Table 3 are certainly under representative, especially from some of the agricultural mosaics, reflecting the observer's concentration on other guilds of target species.

Other recent records: recorded by Bezuijen (2006), Duckworth (2007, Nong Souy *in litt.* 2013) and Platt (2012). Claridge (1996) reports a roost of several thousand in swamp forest at Bung Sangha; it is not clear if the author observed this, and it seems more likely that it was probably a local report, as the number would be astonishingly large for the 1990s and even for the present day. More likely would have been a mixed roost of large sturninds with White-vented Myna the commonest species.

Vinous-breasted Starling *Sturnus burmannicus*

A single and [a group of ten or more] seen in the low-intensity agricultural edge of Nong Souy on 7 September. Two were seen close to Ban Laonat in an area of predominantly agriculture on 8 September.

Other recent records: [Claridge (1996) reports a roost of starlings and mynas in swamp forest at Bung Sangha as holding this species; it is not clear if the author observed this, and it seems more likely that it was probably a local report, in which case the record should not be considered confirmed.]
These are possibly the first recent records for Central Lao PDR (Duckworth 2007, J. W. Duckworth verbally 2013).

Common Myna *Acridotheres tristis*

This species was common in agricultural areas and village vicinities throughout the survey area, although numbers are not high, double figures being relatively rare. The counts in Table 3 are certainly under-representative, especially from some of the agricultural mosaics, reflecting the observer's concentration on other guilds of target species. Additionally the species was seen within Ban Kengkok and in or very close to several other villages, these observations are not included in Table 3. There are many recent records from other observers in the area.

White-vented Myna *Acridotheres cinereus*

This species is the commonest of the mynas in wetland-dominated parts of the survey area. Numbers however were not particularly high, with the highest of estimated minimum numbers seen in a day being only in the region of 50 birds. The counts in Table 3 are certainly under representative, especially from some of the agricultural mosaics, reflecting the observer's concentration on other guilds of target species. There are many recent records from other observers in the area.

Few of the birds observed were certainly identified to species and a few birds appeared to show characteristics of Crested Myna *Acridotheres cristatellus* although none seen well enough were certainly this species. On the basis of location it is possible that the latter species might occur as it is has been recorded further east in Savannakhet (Duckworth et al. 1999).

Chestnut-capped Babbler *Timalia pileata*

Found to be locally common in June, although remained undetected in the later wet-season survey.

Other recent records: Nong Souy, two on 12 April 2007 (J. W. Duckworth *in litt.* 2013).

Records came from quite a wide range of habitats almost always with some grass component, including bushes amidst floating mats on Nong Souy, *Mimosa* scrub at the edge of Nong Arr, tall seasonally inundated grass and bushes in low-intensity agriculture, and 'dry'-grassland with bushes and trees amidst low-intensity agriculture.

The species appears to be one of the more widespread and tolerant of the lowland grassland associated bird species, although significant declines have certainly taken place (Duckworth in press). The status of this species in the survey area suggests that other more sensitive grassland associated species might still survive albeit in very low numbers and or highly localised.

Weavers *Ploceus*

Weavers were locally frequent to common in the survey area during the June survey, although the numbers recorded are low. Even fewer were recorded in the later wet-season survey, although the counts in Table 3 are certainly under representative, especially from some of the agricultural mosaics, reflecting the observer's concentration on other guilds of target species. Only a single species, Baya Weaver *Ploceus philippinus* ("Potentially at Risk"

in Lao PDR) was confirmed during the surveys. Small numbers of male Baya Weaver identifiable by the presence of breeding plumage were seen as follows during the June survey: at least three in a group of over 20 weavers in a small area of paddy fallow on 15 June at Pai Chiao, at least two (a male and female) along the Xe Champhone on 15 June close to at least one nest in a small banktop tree, at least two (in two locations close together) on 16 June in *M. pigra*, willow, bamboo and secondary scrub at the edge of Pai Chiao, at least one on 18 June in tall grass along the Xe Champhone, at least two in association with a partially completed nest out in a floating willow mat and at least one male with at least four other weavers actively nest building in a low-intensity agriculture mosaic at the edge of the Houay Talung reservoir (Ban Dondeng area) on 18 June, at least two associated with at least three other weavers on 26 June in trees amidst tall riparian grass along the Xe Champhone. Baya Weaver nests that appeared to have been constructed within the previous few months were additionally seen as follows: 4 (none fully completed) on 12 June in a tree alongside the road across the Nong Souy dyke, one (partially completed) on 13 June in a low-intensity agricultural mosaic directly to the South of Nong Souy, three or more in a banktop tree, and in a close by stretch one or more nests (with at least two birds in the vicinity) in a banktop tree along the Xe Champhone on 15 June, two (partially completed) with at least two weavers in association and a single (nearly complete) in tall riparian bamboo along a relatively short stretch of the Xe Champhone on 18 June, and in August the remains of three Baya Weaver nests (from the early wet-season) were found in a tree in inundated paddy fallow at the edge of Pai Chiao.

Other recent records: Dersu (2008) stated of Baya Weaver that “several dozen at Nong Souy on 12–13 and 20–21 April 2007”, with precise numbers as follows: two on 13 April, c. 30 on 20 April and a male singing and a group of c. 20 on 21 April, in addition two green nests were on display at a roadside cafe (J. W. Duckworth *in litt.* 2013).

It was generally stated that local people collect the nests and otherwise raid colonies. Nests can apparently be sold locally for c. 3,000 kip (c. 40 US cents) each, largely for household decoration. In support of this, the small colony observed in August, had apparently at least five nests in June, which were subsequently raided by local people (WCS support staff verbally 2012). The following June there was no signs of birds using the same tree, although male Baya were seen in the vicinity on 15 June. Recently collected Baya Weaver nests were seen on several occasions: a woman carrying c. 15 on a motorbike headed towards Ban Kengkok on 12 June, four in two different houses in Ban Dongmuang on 13 June and one in a boat on Pai Bak on 27 June.

Historically Streaked Weaver *Ploceus manyar* was known from Savannakhet (Duckworth 2009) and Asian Golden *Ploceus hypoxanthus* (Globally “Near-Threatened”; “At Risk” in Lao PDR) must surely have been present at one time (since it is known from both the north and south of Lao PDR (Thewlis *et al.* 1998, Duckworth in press). Both might perhaps persist in small numbers.

Black-headed Munia *Lonchura malacca*: “Little Known” in Lao PDR

Records were few; [a single] out in the extensive floating mats of Nong Souy on 13 June, and up to two birds at two relatively close together locations amidst the extensive floating mats of Pai Chiao on 15 and 16 June.

Other recent records: on 13 April 2007, eight birds were seen out on floating mats at Nong Souy, in bulrush *Typha* and feeding on *Imperata cylindrica* (a grass) seedheads (Dersu 2008, J. W. Duckworth verbally 2013). C. Luppi (*in litt.* to, J. W. Duckworth 2013) in June 2010 observed three to four birds "in dry paddy area. Among Scaly Breasted Munia" below the Nong Souy dyke.

The birds in 2007 were the first confirmed recent records of the species from anywhere in Lao PDR. The species is still only known for certain from the field in Lao PDR from the Xe Champhone wetlands (J. W. Duckworth verbally 2013). Although common in parts of its global range, the species appears to have declined significantly in at least both of Lao PDR and Cambodia, being even scarce and seemingly localised in Cambodia (a nation where most species are of much healthier population status than in Lao PDR) (Timmins 2008, Duckworth in press). Duckworth (in press) feared "Black-headed Munia may be among the most threatened birds in Lao PDR". There are also signs of decline in parts of Thailand (Round 2008).

[Red Avadavat *Amandava amandava*

Four plus birds were first seen in a strip of mixed grass and *Mimosa* in a small wetland (Nong Pooheye) within the extensive paddy area on Thong Nong Ore in the southern part of the survey area on 5 September. Three small groups, all possibly different, of at least eight, at least fifteen and at least eight were seen in a grassland-wetland-agriculture mosaic on 6 September in the area between the Xe Champhone and the Koutkhen reservoir (Ban Kadan area).

The identity of the birds remains questionable as no adults were seen. Plumage was relatively uniform, with paler and somewhat cleaner appearing underparts, the vent and undertail coverts somewhat contrastingly paler still, breast seeming somewhat fawny (compared to somewhat duller rest of plumage), tertials and to some extent the wing coverts had paler fringes and or tips, lores and region around eye a darker dusky tone, but ill-defined, and somewhat greyer below the eye and lores, bills uniform and of the same darkness as head, seemingly slate grey. One bird on 5 September appeared to have pale, dark bordered spots on the belly. Juvenile Scaly-breasted Munia has a similar appearance, but the face and wing pattern in particular appear to make it unlikely that the birds were this species.

Both sites were in the general vicinity of the most extensive floodplain grasslands found during the survey. Agriculture was extensive in both areas, but patches of scrub and grass were abundant within the majority of the mosaic. At both sites birds were seen feeding on tall grass seed heads, in small patches of grass mixed with *M. pigra*. At both sites it was clear that much of the paddy area had been relatively recently created, and conversion of grassland and scrubland was ongoing.

The species probably has a similar ecology to Black-headed Munia and like that species its historical and current range in Lao PDR is enigmatic, the species being recorded in Lao PDR for the first time in 2005 and subsequently only found at one other site (Duckworth and Timmins in IUCN 2013). The species is also very localised in Cambodia (RJT pers. obs.)

and in Thailand considered an “uncommon to rare resident, widespread in lowland areas with tall grass” (Round 2008). Its rarity is probably a consequence of a strong grassland habitat association (probably a very narrow ecological niche), and quite possibly either direct persecution and or sensitivity to anthropogenic habitat degradation.]

Yellow-breasted Bunting *Emberiza aureola* Globally “Threatened–Vulnerable”

Not recorded during the survey.

Other recent records: a flock of around 400 birds was seen at Pai Chiao on 13 March 2005 (Bezuijen 2006).

The species is a winter non-breeding visitor to Lao PDR. On its wintering grounds the species appears to associate with habitats with extensive (wet) grass (including low-intensity rice cultivation) and sedges, almost always in association with wetland areas. The species’ global decline has been attributed to excessive trapping of birds on their wintering grounds (e.g. Round 2008), but in light of climate change in recent decades other factors could potentially be in operation on the breeding grounds.

There is too little information to say for sure, but the survey area might potentially be a significant site for wintering birds in Lao PDR given the relative abundance of suitable habitat. David-Beaulieu (1949–1950) recorded the species on passage noting the presence of massive flocks in autumn, but less so in spring, which seems to imply that the species was then not wintering in the area in significant numbers. The species does not winter on the Vientiane–Nam Ngum plain (Duckworth in press, J. W. Duckworth verbally 2013), but suitable habitat there is perhaps scarce, with significant wintering numbers in Lao PDR only known from Champasak (Duckworth 2008). However, in Thailand the species at one time wintered at least as far north as Chiang Saen (>20^{o}N), although the species is now hard to find anywhere in Thailand in the winter (P. D. Round *in litt.* 2013).

3.2.2 Bird status in the Xe Champhone wetlands

There are a suite of clearly former resident species, known for instance to David-Beaulieu (1949–1950; see also Thewlis *et al.* 1998), which have now been extirpated including Green Peafowl, White-winged Duck, Pied Kingfisher, Sarus Crane, vultures (three species), Lesser Fish-eagle, White-shouldered Ibis, Painted Stork and Woolly-necked Stork (scientific names are given in Table 4). Some may have persisted until relatively recently, Sarus Crane for instance probably persisting into the 1980s and perhaps even the early 1990s (Salter 1993, Thewlis *et al.* 1998). Although Darter is now once again present (but only as a non-breeding visitor) it clearly otherwise fits in within this same suite of species, having been extirpated from the Xe Champhone area probably for at least several decades of the twentieth century.

For other species including Comb Duck, Black Kite, Grey-headed Fish Eagle, Grey Heron, egrets (four species), pond heron, Glossy, Black-headed and Giant Ibis, Black-necked Stork and Lesser and Greater Adjutants, historical breeding status in Lao PDR is unclear (largely from a lack of detailed evidence), and even a century ago some species already appeared to be rare (David-Beaulieu 1949–1950, Thewlis *et al.* 1998, Duckworth *et al.* 1999). For most it will probably never be possible to determine if in fact they once bred, but there seems no

reason on ecological and range grounds why they would not have at one time (prior to human persecution reaching high levels) breed in the Xe Champhone wetlands area. Some others, Little and Indian Cormorant and Spot-billed Pelican for instance, were perhaps less likely to have bred, given their ecology, but if any of these species had ever breed in Lao PDR, Savannakhet is probably the most likely of places in its ecological suitability, because of the extensiveness of the wetlands, the presence of at least one large lake, and the close proximity of the Mekong. A case can be made for even one of the most uncertain of former residents, Asian Openbill, not recorded in Lao PDR until 1996 (Thewlis *et al.* 1998); of all the congregatory, colony nesting species, openbill ecology coincides perhaps the most with human patterns of wetland use, making it potentially one of the first to succumb to human persecution.

Others including Collared Kingfisher, White-bellied Sea Eagle and Great Cormorant, although probably not breeding in the Xe Champhone wetlands were probably regular visitors from breeding sites close by along the Mekong and Xe Banghiang, although their decline appears to have begun well before David-Beaulieu's (1949–1950) time (Thewlis *et al.* 1998). Three others, River and Black-bellied Terns and Plain Martin, have however disappeared since David-Beaulieu (1949–1950) recorded them breeding in large numbers along these rivers, while Blue-tailed Bee-eater would appear to have already been in major decline at that time (Thewlis *et al.* 1998, Duckworth *et al.* 1999, Duckworth 2007).

Especially amongst the species above whose historical status is unclear, or that appear to have been in decline a century ago or more ago, there appears to be a correlation with both colony nesting and a flocking tendency whilst foraging, behaviours that would have placed the species at risk of persecution. But all large bodied residents or breeding visitors, with the possible exception of Purple Heron have been eradicated, presumably because of the obvious reason that large birds make easy targets, but also the absolute number of individuals (e.g. density) is relatively low (the case especially for the raptors). The two ducks were also large, larger than Spot-billed, and appear to have had factors perhaps relating to hole nesting and flightless-ness during moult that predisposed them to persecution. Vultures additionally probably declined as much because of a massive decline in food availability (with rapidly declining wild very large mammal populations and changes in human livestock husbandry and butchering) as persecution per se (Pain *et al*. 2003). The bee-eater and martin although small are also colony nesters, usually using riverbanks in which to build their nesting burrows. Pied Kingfisher is somewhat of an exception, but its lack of secrecy, river bank hole-nesting behaviour and group-living tendency, presumably contributed significantly to the species' decline. Collared Kingfisher is perhaps the greatest enigma, although as a hole nester and perhaps always a localised (with considerable overlap with human patterns of wetland use) and low-density species it is not hard to envision its demise.

Another suite of species have seemingly fared somewhat better in Lao PDR than those species already discussed, but their status in the Xe Champhone wetlands is hard to determine precisely, although none could be now more than scarce breeders, and probably several at least are likely to have already been extirpated, including Barn Owl, fish owls *Ketupa* (probably at least two species once present) and Spotted Wood Owl *Strix seloputo*. The core area would be the most likely place for these to survive, but no calls were heard during any of the nights spent there. Owls, like fish-eagles are relatively large-bodied and naturally relatively low in density, but being somewhat more secretive in behaviour they may

have survived longer. Nightjars also appear to be on the decline in Lao PDR and two species in particular appear to warrant concern, Indian Nightjar and Savannah Nightjar (Duckworth in press, Duckworth and Timmins in IUCN 2013); no evidence for either has been found recently in the Xe Champhone wetlands, and nightjar records (of any species) from the survey were alarmingly few (Table 2 and 3).

A number of species (Masked Finfoot, Asian Golden and Streaked Weavers amongst others) were not recorded historically in Lao PDR, but it is inconceivable that they could have colonized Lao PDR in the last half century. Streaked Weaver was in fact 'found' historically, but the specimens were never identified until recently (Duckworth 2009), proving at least in this instance that the species' absence from historical literature was purely oversight. It is clear that historical data are very incomplete and a lack of evidence or even a scarcity of records for almost any species in Lao PDR or just Savannakhet should not be taken as strong evidence of historical status. There can be little doubt that all would have at one time occurred, and all in fact might still persist, in the Xe Champhone wetlands, although the continued persistence of Masked Finfoot is rather unlikely. The weavers are both colonial nesting, and almost certainly have a greater wetland affinity, and habitat specificity than the surviving Baya Weaver. Masked Finfoot is relatively large bodied, probably naturally low density and seemingly associated with forested wetlands, it may also be easily caught in fishing nets and on fish hooks.

Historical evidence for Blue-throated Bee-eater and Asian Pied Starling in the Xe Champhone wetlands area is also lacking but both these might be candidates for overlooked species. Currently the bee-eater is only a non-breeding passage migrant to Lao PDR, whilst the starling if not extirpated is a very scarce and local resident of northern Lao PDR (Duckworth *et al.* 1999, Duckworth *et al.* 2002, Duckworth in press). But the known ecology and current and historical regional breeding distribution of both strongly suggests that they should historically have been breeders in Lao PDR, and the Xe Champhone wetlands ideal habitat for both. The bee-eater is once again a colonial hole-nester, while the starling, semi-colonial in its nesting, would probably have had a very narrow niche being probably the most wetland associated of the Lao resident starlings.

Other species that were not found historically in Lao PDR include Eurasian Thick-knee, Rain Quail and Grass Owl, and even today their status is somewhat enigmatic because of cryptic behaviour. All could be widespread, although the paucity of recent records suggests all are probably scarce and nationally threatened. However, all fit a pattern of open-country, ground-nesting species, with probably narrow habitat niches, easily overlooked in part because of their behaviour, but quite possibly because even decades ago they were already scarce as a result of persecution. All three might in fact persist in the Xe Champhone wetlands, although they are undoubtedly scarce to rare. By analogy the ecologically somewhat similar Blue-breasted Quail also appears to be scarce.

A number of grassland species were presumably once resident but have now probably been eradicated, several are still breeders in the northern highlands of Lao PDR (Duckworth *et al.* 2002, Fuchs *et al.* 2007, Duckworth in press), and if it were not for the fact that they are still present on the plains of Thailand and Cambodia (Round 2008, Timmins 2008, F. Goes *in litt.* 2008, T. Gray verbally 2013, S. Mahood *in litt.* 2013, RJT pers. obs) one might be remiss for

ever thinking they would have occurred in the study area (and there are indeed records of very small numbers from other lowland grasslands in Lao, e.g. Duckworth in press).
Candidates include Grass Owl, Long-tailed Shrike, Striated Grassbird, Yellow-eyed Babbler and probably even the Near-Threatened Rufous-rumped Grassbird which has never been recorded in Lao PDR. These birds appear to have already been very scarce (or perhaps already extirpated) on the plains of Lao PDR nearly a century ago. It is easy to see that they probably largely succumbed over the course of millennia to a combination of unrelenting hunting and grassland fire, with agricultural conversion of habitat a lesser issue until more recently. Grass and grassland habitats are routinely burnt to varying degrees on a yearly basis (and this appears to have been the case for millennia), which although by itself would not necessarily be problematic, can leave birds very vulnerable to hunting as they concentrate in small remaining unburned patches. The localised and disconnected nature of such habitats in combination with these two threat factors would make local populations prone to extirpation. The fact that not all grassland associated species have succumbed, probably lies largely in the greater adaptability and habitat tolerance of those that remain, especially in using scrubby habitats (e.g. Chestnut-capped Babbler), as well perhaps as greater dispersal ability. While for other species, regular burning may also reduce habitat quality, e.g. through the reduction in leaf litter and other debris build up, and thus these may be more sensitive to the above postulated process.

National status assessment of breeding populations of species including White-breasted Waterhen, Greater Painted-snipe, Moorhen, White-throated Kingfisher and Black Drongo, appears to have been to a significant degree masked by the fact that all occur commonly as non-breeders in Lao PDR. But the results of the survey show that each of these species, least so White-breasted Waterhen, are at best scarce breeders in the Xe Champhone wetlands, the later three perhaps not breeding at all.

Several other species occur in the Xe Champhone wetlands at least regularly as non-breeding visitors; Pheasant-tailed Jacana like so many of the above species has an enigmatic historical status, but given what is known of its breeding ecology and breeding range it would be astounding if it had not once breed in Lao PDR. Although clearly very rare during the breeding season, it is possible that a few may still breed at Nong Souy. Habitat specificity (and considerable overlap with wetlands used by people), conspicuous behaviour, and nesting in low wetland vegetation were surely the main correlates of the species' decline. Much the same can be said for Black-winged Stilt, although it surely no longer breeds either in the Xe Champhone wetlands or anywhere in Lao PDR and Oriental Pratincole, which might possibly breed in very low numbers in the Xe Champhone wetlands. Both are ground nesters either in fallow fields or open wetland edges.

Given the decline in so many wetland species it seems perhaps surprising that several relatively-large bodied presumed breeders still remain. Spot-billed Duck is one of these interesting exceptions, and it is perhaps possible that prior to reservoir creation the species may have been a scarce resident (or perhaps even extirpated as a breeder). David-Beaulieu (1949–1950) never mentions the species, leading one to wonder whether this oversight (or omission of the species during typesetting) or whether the species might have been so heavily persecuted he never encountered it. It is probably through a combination of relatively prolific breeding and secretive nesting behaviour and the development of floating vegetation mats on the reservoirs that have allowed it to survive in such numbers. The second

interesting exception is Purple Swamphen, whose persistence is somewhat inexplicable given the species' apparent narrow habitat niche and relatively large body size. However the species' absence from Pai Chiao might perhaps be a clue, perhaps prior to reservoir creation the species was scarce and close to extirpation, and it was by chance that a residual population persisted in former natural wetlands within the bounds of the current Nong Souy reservoir, while birds were eradicated in the Pai Chiao area prior to reservoir creation. A smaller (than present) version of Nong Souy was reportedly the oldest of the reservoirs in the Xe Champhone wetlands, being built apparently in the 1960s and or 1970s, lending some credence to this scenario. However, it seems surprising that the species would not have dispersed by now to Pai Chiao. Alternatively perhaps the species like Darter and Asian Openbill could be a relatively recent recolonist of the Xe Champhone wetlands, although again in this scenario it is equally inexplicable why Pai Chiao appears not to support the species (at least in significant numbers).

The ability to nest undetected on the floating mats of Pai Chiao is perhaps also one of the reasons why the large-bodied Purple Heron survives (if indeed it actually still breeds), and it too could possibly be a recolonist. Brahminy Kite although very scarce is also somewhat of a surprise given that there was no evidence of similar-sized resident forest raptors persisting in the survey area. For instance there were no records of Black Baza *Aviceda leuphotes*, Oriental Honey-buzzard *Pernis ptilorhyncus*, Crested Serpent Eagle *Spilornis cheela* or Rufous-winged Buzzards *Butastur liventer*, suggesting that perhaps the creation of the reservoirs may have helped in Brahminy Kite persistence and or current birds might possibly be recolonists. Dispersing Brahminy Kites are known to wander some distance (RJT pers. obs).

Both Lesser Whistling-duck and Cotton Pygmy-goose are well known to disperse (allowing continual recruitment to the breeding population) and make seasonal movements between breeding and non-breeding areas (allowing birds to move away during the dry season), and this together with reservoir creation (safer nesting and better dry-season seclusion) has presumably aided the survival of both in the Xe Champhone wetlands.

Watercock and Black Bittern for their size are also relatively surprising breeders in significant numbers, but both are probably only, or predominantly, breeding-season visitors. Human persecution levels in the Xe Champhone wetlands are almost certainly at (present) their lowest during the wet-season when rice agriculture occupies most peoples' time. Presumably the birds escape heavy persecution by moving to non-breeding areas in the dry-season where persecution levels are far lower.

A few species, all suspected to be recent colonists, are almost certainly on the increase: Peaceful Dove, White-browed Crake, Pied Fantail, Yellow-vented Bulbul, Bright-headed Cisticola, House Sparrow and probably Brown-throated Sunbird (see Duckworth in press), all of which appeared relatively common in appropriate habitats during the survey. These species, which appear to have taken advantage of anthropogenic modification and degradation of natural habitats, appear to be colonizing the Mekong lowlands throughout Lao PDR (Duckworth in press).

There also appears to be an increasing trend in some other species nationally especially Black-collared Starling, Common Myna, (but not Chestnut-tailed Starling, Asian Pied Starling

or Vinous-breasted Starling), Spotted Dove and Red Collared Dove, which probably signifies reduction in projectile based hunting (Duckworth in press). It is hard to determine the trend in the Xe Champhone area, but observations were consistent with the increasing trend elsewhere in Lao PDR, especially the fact that Common Mynas were seen very close to and even within several villages, and surprisingly large flocks of Red Collared Doves were found feeding in several areas of fallow paddy.

Both Darter and Asian Openbill, presumably both at one time Lao breeders and nearly even eradicated as non-breeding visitors, are now returning to Lao PDR in significant numbers on a regular basis. This turn around in status largely reflects changing attitudes and protection outside Lao PDR, which has resulted in rapidly expanding populations of both species. But to some degree the fact that birds appear to have settled in the Xe Champhone wetlands is an indication that hunting and other harassment levels in the area are at a level where birds feel reasonably secure, as well undoubtedly as the factor played by the seclusion offered in particular by Pai Chiao. (Re)colonization as breeders, however, would likely be a very different scenario, human persecution levels are almost certainly too high for it to occur.

3.3 Large mammal surveys

3.3.1 Significant mammals species recorded recently from the Xe Champhone wetlands

Rhesus Macaque *Macaca mulatta*: "Potentially at Risk" in Lao PDR

A single semi-habituated population, quite probably of well over 100 animals resides in and around a degraded 'spirit' forest remnant at the village of Ban Dongmuang.

The taxonomic identity of the population is probably not clear cut for at least two reasons. Rhesus Macaque (a northern species) has a known zone of introgression with Long-tailed Macaque (a southern species) in which local populations often show a mix of characteristics of the two species; the Xe Champhone wetlands are on current knowledge on or close to the northern edge of this zone. Additionally, habituated animal populations often elicit, from the general public, release of captive animals, thus it is possible and probably even likely that macaques from other areas of Lao PDR have been released at the site. Given the small size of the population and the highly constrained resources available to it, hybridisation with released individuals of macaques of other species would be quite likely to occur. All adults observed showed characteristics predominantly of Rhesus Macaque especially the rusty red tone of the thighs and hind quarters and a dark posterior-ward pointing arrow shaped hair tract on the cheeks. Several individuals also showed a very pronounced brown crown 'cap', well demarcated from the sides of the crown. The Northern Pig-tailed Macaque has a very distinctive darker brown 'cap', and while none of the observed Xe Champhone animals had such a distinctive feature, some had more pronounced caps than the author, from recollection, has previously observed in Rhesus Macaques. Although this perhaps might be an indication of interbreeding, other aspects of the crown pelage, especially the orientation of the hair tracts appeared to be consistent with Rhesus. Long-tailed Macaque may perhaps show a generally clearer crown cap than Rhesus, but no individuals had a central peak to the crown, a feature present in some Long-tailed Macaques. Average tail-length was probably on the long extreme side of the range for Rhesus Macaque being characteristically at least half of the head and body length. Taken together these observations suggests as

indicated by the geographic location that the Xe Champhone wetlands lie on the northern edge of the zone of intergredation with Long-tailed Macaque.

The macaques appear to owe their persistence, like crocodiles and some turtles in the area, to spiritual beliefs that have protected them very locally from persecution. Their protection may also now be being partially generated by 'local pride' in combination with real or perceived economic value as a tourist attraction.

The district official who accompanied the survey said that there were concerns about a reported increase in the monkey population and conflict with local people. It would appear at present that the monkey population is significantly supplemented by food brought mainly by visiting tourists (largely Lao). At present the hostile nature of surrounding areas, where macaques would surely be killed if encountered, along with the severe lack of suitable habitat in the vicinity of Ban Dongmuang make a harmonious future for the macaques extremely unlikely.

It is not clear if the macaques have always been present at the site, however it is suspicious that in May 1993 when Claridge (1996) visited the village, no mention is made in the text to the presence of macaques. However Moore *et al.* (2013) were apparently told that the macaques had 'always' been present.

[Silvered Leaf Monkey *Semnopithecus cristatus*: "Globally Threatened–Endangered" (as *Trachypithecus germaini*): "Conditionally At Risk" in Lao PDR

No clear local knowledge of the species was found. They are likely to have been extirpated many years ago.]

[Otters (up to four species could potentially have occurred, all are considered either globally or regionally threatened)

No evidence was found and they were widely reported to have been extirpated a human generation or more previously.]

[Hog Deer *Axis porcinus*: "Globally Threatened–Endangered", "Conditionally At Risk" in Lao PDR

A few deer tracks that were found during the later wet-season survey on the Xe Champhone levee at the northern end of Pai Chiao were most probably those of muntjacs. Apparently there is little to no local knowledge of the species, suggesting extirpation very many years ago.]

3.3.2 Large mammal status in the Xe Champhone wetlands

Not surprisingly given the high levels of human use and the relative isolation of the Xe Champhone Ramsar site and surrounding wetlands from significant forest tracts, almost all large mammals have been eradicated from the area. This includes almost all species with a strong wetland or riparian association. The only large mammals recorded during the survey were from the core area, these included two squirrels, *Tamiops maritimus* and *Callosciurus* sp. (almost certainly *C. finlaysonii williamsoni*), both seen frequently in remaining forest, and Small Asian Mongoose *Herpesestes javanicus* seen only once in paddy fallow on the

eastern edge of Pai Chiao. Below is a summary of wetland associated species, the majority of which are now clearly extirpated.

3.4 Notes on the molluscs of the Xe Champhone wetlands

Although not a central focus of the survey observations were made of the large aquatic molluscs in the survey area.

Several species of large apple snails appear to be present, including the invasive exotic *Pomacea canaliculata*. *P. canaliculata* which is most easily identified by its pink egg masses was only observed in Nong Souy where it was common. In Pai Chiao it was at the time of the surveys almost certainly absent, as was the case in the majority of other wetlands, including Nong Louang, where reasonable time was spent. A word of caution is warranted here, as there appears to be some confusion in literature over the identity of apple snails present. Platt (2012) states “Wetlands throughout the project area are infested with golden apple snails (*Pomacea canaliculata*; Ampullariidae)”. However, Figure 23 in the publication implicitly labelled as “Golden apple snails (*Pomacea canaliculata*)” actually shows the large native *Pila polita*.

A large native *Pila polita*, recognisable by its rather ovoid shape with a relatively high spire and dark brown usually glossy shell, was found in most permanent wetlands surveyed, including Nong Souy. This is in accord with local accounts that the species does not survive well out of water. Several locals stated that of the apple snails present in the Xe Champhone wetlands area this was the most favoured for human consumption. In Nong Souy it was possible that *P. polita* was commonest in the beds of rooted tall sedge and areas of floating mat with adjacent extensive beds of aquatic macrophytes, whilst *P. canaliculata* was commonest around the ‘disturbed’ margin adjoining seasonal agricultural land. If indeed this pattern is present, it might be both a reflection of human collection preference as well as snail ecology. *P. canaliculata* is noted for its ability to capitalise on seasonal wetlands and is a noted pest of rice cultivation (Naylor 1996; local residents of Champasak verbally to RJT 2013).

One or more other large *Pila* species were also found at the majority of wetlands surveyed. These were less ovate and more globose in form, often with spiralling bands on the shell, and thus superficially rather like *P. canaliculata* in form. At least some of these were almost certainly *P. pesmei*, although *P. ampullacea* may also be present (identification based on Brandt 1974). In the Nong Louang area a possibly smaller species, perhaps *Pila gracilis,* was found in a mosaic of seasonal wetlands and paddies. During the June–July survey the abundance of these *Pila* increased dramatically after the first significant rain, with snails obviously emerging from aestivation in ‘dry-land’ situations. None of these other *Pila* species however (including empty shells) were found at Nong Souy.

The impact of the introduced *P. canaliculata* is at present very hard to determine. At present none of the native apple snails are considered of any particular conservation concern, but whether *P. canaliculata* invasion will result in competitive exclusion of any of the natives is unclear as there appear to be no long-term studies. The herbivorous *P. canaliculata* invasion may also effect wetland vegetation (Carlsson and Lacoursiére 2005), however given the presence of at least two other large native apple snails, its effects may be subtle, especially

as wetlands in the area are clearly also changing due to a number of other anthropogenically mediated factors, such as the creation of reservoirs, clearance of seasonal wetland vegetation for agriculture, and probably an increasing use of agro-chemicals.

At least three relatively large unionid bivalves (fresh water mussels) were observed, of which two species at least appeared to be associated with oxbows and other static wetlands rather than the rivers. Some of the unionid mussels may require specific host fishes for reproduction. In North America the Unionidae has a high proportion of “at risk” species, although there river systems are generally in a substantially poorer state of ecological health.

3.5 Threats to the Xe Champhone wetlands

Probably the least appreciated, but one of the greatest threats to the area is the conversion of floodplain tall grassland mosaics to agricultural land. The full extent of the remaining areas is small and they are undergoing conversion for expanding agriculture. An almost equal threat is the intensification of agriculture in areas of low-intensity rice paddies where tall grass and scrub patches are abundant. Several small birds, most notably Red Avadavat and Black-headed Munia, are probably at least seasonally highly dependent on both these types of grassland patches, and not by coincidence these are also the bird species of most significance in the area. These habitats are also important for a number of other species including quails and buttonquails and potentially wintering Yellow-breasted Buntings. As already mentioned in the description of habitats, recently converted areas of tall floodplain grassland were found in the north and south of the site alongside patches yet to be affected.

The greatest immediate threat to the area after loss of grassland habitat comes without any doubt from various forms of human persecution of wildlife. Many species have already been eradicated from the area, most notably the large mammals and large waterbird species, and many others are now only present in very small numbers or simply non-breeding visitors to the area. In 1993 Claridge (1996) wrote that “waterbirds are hunted continuously” and specifically for the Nong Souy area notes high levels of hunting with individual hunters perhaps averaging 20 birds per day in the dry-season. Possibly the most deleterious of current activities is the capture of birds (and probably also bats) in mist nets and on long lines of suspended hooks (usually called *bhaet phiak* in Lao). These were found throughout the survey area, at all sites visited, and as one might expect their location often corresponded with some of the best areas for wetland birds. Lines of hooks were much more common than nets, presumably simply because of the cost, and lines of hooks often ran for several hundred metres. Nets and hooks have the potential to catch a wide range of species, and in most cases their placement suggested they were largely targeting water birds, often being strung over sedge beds, mats of aquatics and/or floating mats. They were also found in areas of low-intensity agriculture, but again tended to be situated in or close to small wetland patches or areas of taller grass and scrub. Use of guns appears to be approaching the levels of two decades ago when guns in many rural areas of Lao PDR could be heard numerous times a day, both during daylight and night time hours. During the survey guns were heard on an almost daily basis especially in the core area. The use of other forms of projectile hunting (especially handheld catapults) also seems to be rife. Gun and other projectile hunting is relatively unselective in its targeting, much like netting, although the range of species affected probably differs significantly between these two methods.

However, other forms of hunting are potentially more damaging for other species, although it is difficult to determine the prevalence of such methods. Based on generalised regional knowledge the following are all likely to be of concern in the area. Collection of nest contents (e.g. eggs and chicks and on occasion even the adults) is likely to affect any large-bodied species particularly gallinules and ducks, and several other species if they were ever to nest in the area (e.g. Darters and Asian Openbills) would be particularly vulnerable to this type of hunting. Use of snares may be minor, but could be particularly devastating for certain species, e.g. potentially larger rallids. Unattended gill nets, and hooks set below water probably significantly affect a small number of species, although there are very few data on their effects on non-fish species regionally (and even globally for non-marine artisanal fisheries). Probably one of the most susceptible species, Masked Finfoot, may already have been extirpated. Lastly Baya Weavers are targeted for their nests, which can be sold as traditional ornaments (probably due to religious and or 'good luck' significance). Although the taking of the nest post-breeding would have no detrimental effect on the weavers, nest are apparently often taken whilst birds are still nesting, probably because of the added benefit of collecting the eggs and or chicks and because they are a 'common' resource and thus 'best to get when you have the chance'.

Many villages have what are often referred to as 'protected areas'. In essence these are areas where local people believe 'spirits' are concentrated and active, often in the form of animals, and as such and out of respect for the spirits, local people have rules governing what may or may not happen in such areas (see Moore *et al.* 2013 for a more detailed discussion). It is particularly noteworthy that several wetlands have crocodiles and turtles that are protected for this reason, and it is probably only for this reason that crocodiles have survived in the area (Bezuijen *et al.* 2013). However, for the majority of wildlife such areas are insignificant for their conservation, because of a number of factors. Foremost amongst these is that the majority of areas are much too small to sustain viable populations, and for most birds and mammals not even large enough to sustain the individuals that might use them. Animals that stray away are generally not protected, thus for example during the survey two sites were visited where roosting birds were protected, but the birds are only protected while at the site roosting: they have no protection during the day or night, when in surrounding lands foraging. This later factor is significant because it shows the true nature of the sentiment of the local beliefs; people protect wildlife only because they fear retribution from 'spirits', not out of appreciation for the wildlife or because of concerns over species' declining status. If the spirits could be driven away presumably there would no longer be protection for the wildlife. Overall the survey results are abundantly clear that such 'spirit' forests and wetlands have done nothing to halt the decline of birds and most mammals with the possible exception of Rhesus Macaque (which remains in a rather precarious position).

Invasive species constitute perhaps the greatest long-term threat to the area, with several species already well established. *Mimosa pigra* is almost certainly the most damaging of the invasives, largely because it appears to prevent natural regeneration of floodplain grasslands and forest, at least in the short term. In the long-term floodplain forest may overcome *Mimosa* thickets, but this seems less likely with grasslands which are themselves a successionary vegetation community prone to overgrowth by shrubs and trees. Currently *Mimosa* is the primary and most aggressive colonist of fallow agricultural land and other disturbed areas with mesic conditions. As such the current trend to clear grassland and floodplain forests for agriculture is resulting in a concurrent expansion of *Mimosa*, because

agricultural clearance invariably results in areas of fallow and other 'abandoned' land. This basic process is probably leading to a vicious cycle whereby agricultural land taken over by *Mimosa* thickets is far less favourable to '*re*-clear' than are grassland and forest areas, therefore resulting in acceleration of the clearance of grassland and forest. In contrast however, *Mimosa pigra* appears to be slow, or otherwise has difficulty, in establishing itself within 'intact' floodplain grassland and forest, suggesting that the best way to minimise the impact of *Mimosa* is to minimise new clearance of both floodplain grassland and forest. Although various species use *Mimosa* thickets, those that do appear in general to be generalist species of no conservation concern, whilst in particular the grassland specialists are very unlikely to be able to utilise *Mimosa* to any significant degree. Elsewhere in Lao PDR, Streaked Weaver has been known to nest in *Mimosa* thickets, but birds still seem to require grasslands, marshes and low-intensity agriculture in which to forage (J. W. Duckworth verbally 2013).

The arrival date of *M. pigra* in the Xe Champhone wetlands is uncertain. Several locals concurred that *Mimosa* was already present along the Xe Champhone when the Pai Chiao reservoir was created around 1982, it spreading quickly thereafter. However Claridge (1996) wrote that it was first seen in 1987. Claridge (1996) wrote "the *Mimosa* infestation in the southern part of the area poses a very significant threat…" noting in particular large areas of *Mimosa* (presumably based on reports) from the "Houay Chiao" area. Few other areas are noted to have *Mimosa* in Claridge (1996) suggesting that it was yet (in 1993) to become widely established in the Nong Souy area.

Agricultural intensification in general threatens the Xe Champhone wetlands in a number of ways. The removal of grass and scrub patches and trees reduces the suitability of agricultural area to a number of species, especially quails, Watercock, starlings and mynas, and Chestnut-capped Babbler, and probably Black-headed Munia and Red Avadavat. The loss of small shallow wetlands potentially affects many more species. Such changes have been implicated in the declines of several species in the region (Round 2008, Duckworth in press). The consequences of building irrigation reservoirs are rather difficult to assess, as clearly there are great benefits as well as potential threats. Claridge (1996) lists as threats the future creation of the Koutkhen and Houay Makmi reservoirs and the impact they would have on flooding natural wetlands. Post creation, these reservoirs have probably on balance benefitted wildlife, for instance in the absence of Pai Chiao and Nong Souy it is debatable if certain species (e.g. Purple Swamphen, Brahminy Kite and Purple Heron) would still occur as potential breeders in the area. It would be remiss however to suggest that modification of all natural wetlands, especially the oxbows, would be an overall positive step; there may for instance be specialised niches with localised and or threatened species in the natural wetlands, that are not replicated in the reservoirs.

More difficult to quantify are the effects of agricultural chemicals. It was outside of the scope of the survey to assess such usage, and in general there appears to be very little research on the subject of the effects of agricultural chemical use on wildlife in Southeast Asia. It is easy to speculate based on studies from further afield however, that pesticides would certainly reduce the prey base for some species, especially those for which invertebrates are a high proportion of the diet, while herbicides (if used) presumably could affect seed-eaters. But it is hard to speculate on how wide-ranging these effects might be, not only because the parameters of local usage are not known, but because it is outside of the scope of this

review to investigate the potential of such chemicals to spread beyond the site of application, and the persistence that they have in the environment beyond the objectives of their primary application. As the catchment for the Xe Champhone wetlands covers an extensive area of rice agriculture, these concerns have the potential to be a significant threat to the wildlife of the area, although the effects on the current bird community itself might not be great. Claridge (1996) based on surveys in 1993 noted even then use of both chemical fertilizers and particularly pesticides in the agricultural areas surrounding the Xe Champhone wetlands.

Fertilisers almost certainly pose a significant future threat in the form of wetland eutrophication, but the effects might be complex and could potentially in some instances be beneficial. They may already be having an effect on the wetlands; one could speculate for example that the rapid growth of floating graminoid mats may in part be attributed to agro-fertilisers (note, as above: fertilisers appear to have been in use as long ago as 1993). A vast reduction in open water surface and or the build-up of algal blooms, both known consequences of eutrophication, would presumably have significant implications for the ecology and thus wildlife composition of the wetlands.

A final effect of agricultural intensification is water abstraction from the wetlands to irrigate dry-season agriculture. All of the reservoirs were apparently created for this purpose, but also some proportion of the natural wetlands are also being used for this purpose (observed during the survey; Platt 2012). In both Nong Souy and Pai Chiao it appeared as though much of the originally constructed irrigation system has fallen into disrepair and that the current irrigation water use is some fraction of the designed capacity. In both these reservoirs current water use does not appear to be detrimental to the wildlife recorded, but it is very difficult to say without detailed study whether more or less water usage (within reason) would be either beneficial or harmful. For example the tall sedge beds almost certainly require significant drawdown for their maintenance, and it might be beneficial at least occasionally for patches of floating graminoid mats to occasionally dry out and burn. But too much drawdown would probably result in concentration of aquatic wildlife, resulting in excessive death, but probably a more threatening development would be increased opportunity for human hunters. Harmful extraction levels are certainly likely to occur if the majority of surrounding agricultural land were to become dry-season irrigated.

Abstraction of water from natural wetlands is likely to be more harmful than in the reservoirs simply because they are easier to drain due to their smaller water volumes. There are already apparently serious concerns in some of the small wetlands inhabited by crocodiles that water abstraction levels are too high and potentially threatening the dry-season refuges of these animals (Platt 2012, A. McWilliam verbally 2013).

Fluctuation in average water levels between years may be as important a factor in the long-term health of the wetlands, as controlling maximum extraction levels. The climate of Southeast Asia, especially rainfall patterns and the amounts of water available to wetlands are extremely variable especially when viewed on timescales of decades (Timmins 2012). Thus in natural systems there will always be years when water levels remain high throughout the dry-season, as well as years when water levels drop so drastically that all but the most permanent of wetlands dry out. This variability, poorly understood as it is, is likely to be important in maintaining a status quo between certain habitats and their wildlife

communities. Water management, however, tends to reduce such variability, and thus potentially put at risk ecological balancing processes that depend on variability.

4. Discussion

4.1 The state of wildlife in the Xe Champhone wetlands

Globally Threatened species by definition have largely declined everywhere, and thus the absence (both in the survey area and in many cases Lao PDR) of the great majority of Globally Threatened species (especially birds and mammals) that would have once occurred in the Xe Champhone wetlands, is not entirely surprising. What is more surprising for anyone not familiar with Lao PDR is that a rather large number of wetland associated bird species which are generally considered common globally or regionally and that should be breeding in the Xe Champhone wetlands are also either extirpated from the Xe Champhone wetlands or at least now very scarce. In fact Lao PDR as a nation has already lost a great deal of its wetland breeding bird fauna.

Whilst in Lao forests the seasonality of the bird community is often relatively simple, largely consisting of resident species and non-breeding 'winter' visitors, and a few 'wet-season' breeding visitors, that of wetlands is significantly more complex, with in particular it would seem many species having both breeding (or at least formerly breeding) and non-breeding populations, with additionally much, relatively local, seasonal patterns of movement of breeding species. This complexity in seasonality within species has certainly constrained accurate status assessment of Lao wetland species to date, in part because most survey work has been undertaken during the dry-season, when patterns of occurrence are least easily assessed in terms of breeding versus non-breeding status. Furthermore, in many cases status assessment for a species has not taken into account the possibility of separate breeding and non-breeding populations, and in most instances has focused on 'dry-season' status. However, there has been growing realization that breeding and non-breeding status of species in Lao PDR that have quasi-separate populations of both are often vastly different. Alarmingly in the overwhelming majority of instances it is the breeding population status that is of most concern in a national context.

Frequently during the survey, when discussing the objectives with local people including government staff, they would suggest returning in the December – February period, when there were "lots of birds around especially [egrets]". There is probably a general sense, even among government staff in the Ministry of Environment, that the 'lots of non-breeding visitors' are what makes the site, and others like it, important for conservation. Yet it is breeding populations that are arguably the most important for consideration in the context of wildlife conservation at the national level. Because species are often most vulnerable when breeding (e.g. hunting of young birds), and it is a species' breeding habitat that is often most vulnerable to factors that will effect population viability, it is the breeding populations at a site that are generally most threatened, but equally it is breeding populations that can most easily be managed in a national context. Non-breeding birds tend to spread out geographically and often use a broader range of habitats and thus individual sites become less important *per se*.

Egrets are a near-perfect example of this phenomenon. Little and Cattle in particular remain common on passage through Lao PDR, and increasingly as non-breeding visitors, yet there appears to be no documentation of any egrets ever breeding in Lao PDR. Egrets however still breed in every adjoining nation to Lao PDR, and there is no lack of suitable breeding

habitat for egrets in Lao PDR. Together the evidence is very compelling that egret breeding colonies must have been eradicated from Lao PDR prior to the advent of ornithological surveys. That this could have happened so long ago, may seem hard to believe, but one only has to look at the documented history of British wildlife to realise that people with minimal technology are capable of eradicating seemingly resilient species from large areas of land (wild pigs were probably extirpated from the British Isles around the end of the 13th century, seven hundred years ago!) (Yalden 1999).

The culture of Britain has radically changed since the 13th century, but that of Lao PDR since the eradication of egret colonies has probably not. The past few decades in Lao PDR has seen dramatic and alarming changes in other deleterious factors affecting wildlife, especially economic changes affecting land use, especially access to wetland areas, intensification of agriculture and conversion of wetland and open-country habitats, and many species continue to be pushed towards the brink of extirpation in Lao PDR. These trends are particularly worrying because without a broad change in cultural attitudes towards wildlife, and with the continuing loss of passive protection afforded by formerly large and remote areas of wetland, further extirpations seem inevitable.

Although there are signs of change, for example the 'return' of significant numbers of both Darter and Asian Openbill, this turn-around in status to a large degree reflects changing attitudes and protection outside Lao PDR, and there is certainly no reason for complacency given the abundant indications encountered during the survey that the hunting culture of local communities is still very strong.

With the eradication of most large mammals, especially wetland associated species, the majority of large waterbirds and a suite of other wetland and grassland associated birds, the area has lost any global significance it might have formally had for these groups. Its international significance now probably largely rests with its remnant population of Siamese Crocodile. The hard reality is that Xe Champhone wetlands are highly depauperate in terms of higher vertebrates, and that the underlying causes are deeply embedded in Lao culture.

4.1.1 Birds of most significance

The wetland bird community is clearly significant nationally, but certainly not significantly more important than similar communities at a number of other sites nationally. If confirmed the presence of [Red Avadavat], along with the clearly resident population of Black-headed Munia, is the most significant finding of the survey. In both cases their Lao range is poorly known, although both are clearly extremely scarce and localised. Red Avadavats are otherwise only known from two other sites (both in the Vientiane plain area and only 30 km apart) and Black-headed Munia from none (although there are records of merit-release birds in the Vientiane area). Regionally both species have an association with plains-level, usually wetland and/or agriculture associated grassland. Within the Xe Champhone wetlands area the [avadavats] would appear to have a significant linkage to taller grass within low-intensity agricultural mosaics, while the floating mats of grass and sedge would appear to be particularly significant to Black-headed Munia. Both are probably however to some degree reliant on a heterogeneous mosaic of natural floodplain grasslands, floating grass mats, low-intensity agriculture with extensive fallow and other patches of tall grass and sedge beds in marshes. The relative commonness of Chestnut-capped Babbler is probably indicative of the

extensiveness of this mix of grass-prevalent habitats, and suggests, since a relatively small proportion of such habitat was surveyed, that perhaps some other grassland specialists may still survive (albeit now very scarce). Although the wide-spread presence of breeding Baya Weavers (another marsh/grassland/agriculture associated species) is nationally noteworthy, the fact that breeding colonies are small, together with the lack of recent records of Asian Golden Weaver and Streaked Weaver, and the low total numbers of all weavers recorded, is rather alarming. The low-intensity agricultural areas appear to have a relatively high significance for another group of grassland associated species the quails and buttonquails, although they are still probably relatively widespread but scarce throughout similar habitats of Lao PDR.

Of the species more closely associated with pools and marshes than the latter suite of species, probably most noteworthy are the populations of Purple Swamphen, Black Bittern and Cotton Pygmy-goose perhaps in each cases the largest in Lao. The Spot-billed Duck population is probably the most concentrated in Lao although similar if not higher numbers breed on the Mekong north of Vientiane (Duckworth and Timmins in IUCN 2013). Also notable is the presumed breeding presence of Brahminy Kite, which perhaps now only otherwise breeds in the Seephandon area of Champasak. Noteworthy, but of lower significance are the large numbers of Lesser Whistling Duck and Watercock, and the probable breeding presence of Purple Heron. However in other respects the findings are alarming, especially for jacanas few of which now appear to breed in the wetlands (although any breeding of Pheasant-tailed Jacana would be nationally significant).

The presence of significant numbers of Darter and Asian Openbill is very encouraging, as in both cases it is likely to be a prelude to breeding. But at present the significance of the numbers is little more than an indication of the extent, heterogeneity and passive protection afforded by the site. But the latter factor is unlikely to protect birds if they do attempt to breed at the site, as breeding colonies would inevitably be easily found and harvested by local people.

Although a dry-season survey was not undertaken, there are unlikely to be any species – which would either be more easily found or only visit at this season – that would make the area of particularly high conservation value. A number of species globally or regionally threatened, might make use of the site to varying degrees as non-breeding visitors, the most significant of these are likely to be the Vulnerable Yellow-breasted Bunting, a grassland-favouring species recorded from the area by Bezuijen (2006), the Manchurian Reed Warbler *Acrocephalus tangorum* (Globally Threatened–Vulnerable; Little Known in Lao PDR; *A. agricola tangorum* in Inskipp et al. 1996; a sedge and grassland favouring species not yet recorded), and Grey-headed Lapwing (grazed grassland and marsh edge, recorded by Platt (2012) and J. W. Duckworth *in litt.* 2013). However, the site is not likely to be particularly significant to any of these except perhaps the former, and even for this species the current global decline may well (at least in part) be due to factors at work in breeding areas. The site is probably only a minor (in global terms) wintering area for the species, and thus roughly of equivalent importance to other ‘grassland’ species of national significance. It is however once again clear that it is the grassland and well-vegetated marsh habitats and low-intensity agricultural land that would be most significant to wintering species. Several wintering wildfowl might occasionally visit the area, but even the Critically Endangered Baer's Pochard *Aythya baeri* or the Near-Threatened Ferruginous Pochard *Aythya nyroca* are very unlikely

to occur in any significant numbers. Other potentially threatened winter visitors would be Black Stork *Ciconia nigra* and *Aquila* eagles, but none are likely to occur in significant numbers. Even with more information on dry-season visitors it is unlikely that any of the recommendations would be different, hunting and habitat conversion remain the greatest threats to all of the above mentioned species.

4.1.2 Areas and habitats of significance

The highest concentrations of target birds were not surprisingly associated with the largest wetlands and the least human modified habitats. This distribution pattern is largely a function of habitat extent buffering the effect of human hunting. Simply put, it is harder for people to enter and hunt in large versus small areas, while species' populations are intrinsically larger in small versus large areas. This pattern of the most healthy wildlife populations in the largest, most difficult to reach habitat blocks, is particularly prevalent in Lao PDR and works as well for remote Annamite forests as it does for plains wetlands. It is however a very significant factor to bear in mind for conservation management, because in the absence of effective protection measures, any local developments that ease human access into an area, or effectively reduce that area's size, rapidly increase the threat level and reduce the viability of threatened species populations.

Although more time was spent in the Pai Chiao area than anywhere else, the abundance of many target species was clearly higher there than elsewhere. This was particularly clear in the case of Darters and Brahminy Kite. The majority, if not all, of the openbills present in the survey area were also using this wetland as their primary roost site, despite dispersing to other wetlands during the day. Numbers of ducks were almost certainly higher there than anywhere else, and during the June survey Great Egret and Purple Heron records were also concentrated there. The only cormorants recorded were also at Pai Chiao. This is perhaps not surprising as the area is very large and largely inaccessible to casual human exploration being covered in extensive floating mats, many of which have relatively thick shrub growth on them. On the basis of high resolution imagery on Google Earth (viewed over the period August 2012 – August 2013) the wetland is likely to be over 1000 ha in size, but probably > 75% is covered in floating mats. It is probably this enormous cover of vegetation which led Bezuijen (2006; *et al.* 2013) erroneously to estimate the wetland area at a mere 67 ha. The eastern edge in particular is both furthest from villages and has the most complex floating mat vegetation, with secluded and inaccessible open water patches, and the dead remnants of the forest inundated in its creation. This same eastern area is also important for crocodiles.

The Pai Chiao area however lies at the central western edge of an even larger 'core area' of natural and artificial wetlands in a mosaic of low-intensity agriculture, highly degraded floodplain forest, and small patches of floodplain grassland which adds further to its wildlife value. This is particularly so for species such as Stork-billed and Blue-eared Kingfishers which require wooded wetlands. Floodplain forest and natural oxbow pools are in best condition in the area directly east of Pai Chiao on both sides of the Xe Champhone and to the south, to and some distance beyond the Thong Nong Ore area.

This core area also includes large artificial wetlands east of the Xe Champhone with the Koutkhen and Houay Talung reservoirs forming an extensive mosaic. Although not

extensively surveyed, field observations and interpretation of the Google Earth imagery suggests that although a very large area of mat-like vegetation exists. This is in wildlife terms far less complex than in Pai Chiao, in particular lacking extensive but also secluded bodies of open water, and being more linear in shape so that much more of the area is relatively speaking accessible from the edge.

The Nong Souy area is by far the largest of the artificial wetlands, but unlike the 'core area' in which Pai Chiao lies, its edge is largely accessible and surrounded by cultivation and human habitation. It does however have very extensive floating mats, albeit with less shrubby vegetation than at Pai Chiao, and unlike any of the other survey sites also very extensive beds of a large rooted sedge, furthermore beds of lotus, lily and submerged aquatics were probably also more extensive there than at any other survey site. These differences probably reflect the differences in bird communities found between Nong Souy and Pai Chiao, especially the absence of darters and openbills at the one and of swamphens and jacanas at the other. It is however surprising that no jacanas or swamphens were recorded at Pai Chiao (or elsewhere) as the area does have extensive sedge beds and sizeable areas of beds of lotus, lily and submerged aquatics, so other factors may be at play, hunting being the most likely. Pai Bak of the wetlands visited is most like Nong Souy in terms of its wildlife habitats and it had probably the most similar bird community to Nong Souy being in particular the only other site where swamphens were recorded. Between these two reservoirs is an important area of low-intensity agriculture, scrub, grasslands and small wetlands and together Nong Souy, Pai Bak and the intervening area forms probably the second most significant area for wildlife conservation within the project area.

Nong Louang, which lacks extensive floating mats and extensive beds of aquatics, was visibly poorer in the numbers of wetland bird species found. The string of smaller, seemingly rather heterogeneous, wetlands that are hydrologically connected but poorly surveyed during the project, probably add significantly to the importance of wetland bird populations in the area, but even so the edge of this combined wetland area appears to be relatively accessible, and without remote and secluded sections the numbers of breeding ducks is likely to be much lower, while Purple Heron, swamphens and jacanas (if even present as breeders) are likely to be considerably scarcer than in the core area or Nong Souy. It seems unlikely that Brahminy Kite breeds in this area and openbills and darters are probably only occasional visitors. The area is however a very intrinsically significant wetland area, especially as its hydrology has not been as drastically altered as is the case in much of the core area and Nong Souy. If there is ever significant recovery of wildlife in the Xe Champhone wetlands area, the Nong Louang wetland complex could support wildlife of equal significance to that in the core area or Nong Souy. Furthermore, the surrounding plains between the Xe Xangxoy and the Nong Louang complex comprise a very significant area (in the context of the Xe Champhone wetlands area) of low-intensity agriculture, with significant patches of grass and scrub, and small heterogeneous wetlands.

Grasslands occur largely as patches within other more extensive habitats, and for many grass associated species, grass patches amongst low-intensity agriculture are very important. Both grassland patches and agriculture with a high grass component tend to be most extensive on the interface between extensive agricultural land and the wetlands and floodplain forest at the core of the survey area. The most extensive true tall floodplain grassland occurs in the southern part of the core area (as defined here), largely south of the

Xe Champhone and east of Pai Chiao, as well as along both banks of the Xe Champhone in the same area. Significant areas of low-intensity agriculture with extensive tall grass patches are to be found particularly in the northern portion of the core area, and both in and adjacent (e.g. within the proposed greater Ramsar boundary, as defined here) to the southern portion of the core area. There also appears to be significant areas of grass and scrub throughout the largely low-intensity agriculture of the Nong Louang – Xe Xangxoy plain.

The significance of individual natural oxbow wetlands to birds is rather low; however they appear to be a significant refuge to Siamese Crocodiles and could be of significance for other wildlife. It is possible that the flora and fauna of these wetlands is somewhat different from the larger artificial reservoirs or the Nong Louang wetland complex. The presence in particular of a pitcher plant species on some of those oxbows with extensive floating mat cover, may be indicative of specialised wildlife communities. This might also be likewise indicated by the presence of two large bivalves which appeared to have an oxbow association. It is difficult to say if such communities and their associated taxa are widespread or not (the case with many lowland taxon groups), or if any are particularly at risk even nationally. However lowland permanent wetlands are intrinsically rare in Lao PDR, and indications suggest most are in one form or another highly modified, with certainly an increasing trend towards modification. From a precautionary principle it might be wise to investigate them further and minimise modification. Probably the most significant concentration of oxbows lies within the core area, however there is also a high concentration (including ones known to support crocodiles) along the lowest sections of the Xe Champhone and Xe Xangxoy (see Platt 2012, Bezuijen *et al*. 2013). Other than human modification, probably two of the greatest dangers to these oxbow habitats may be passive invasion by exotic aquatics (plants and animals) and eutrophication from agrochemicals. In the case of both of these threats it may be that the most hydrologically isolated oxbows, and or those highest upstream (e.g. those with the smallest agricultural catchment area and those upstream of wet-season flood flow), would have the greatest resilience. Thus if any oxbow-associated taxa were at risk, oxbows outside the two areas mentioned above, and perhaps even outside the buffer zone, might be the most significant for their conservation. But even if the mature floating mat communities of both natural oxbows and artificial reservoirs were the same, these communities would at least have national significance, as such habitat is both highly localised and very restricted in extent nationally, that in the Xe Champhone wetlands being the most extensive.

The lowland forests in the survey area are in poor condition and this is reflected in the bird communities found. Most quarry species have been lost or are now exceptionally rare, no hornbills, imperial *Ducula* or green pigeons *Treron*, Hill *Gracula religiosa* or Golden-crested Mynas *Ampeliceps coronatus* were recorded. It was somewhat surprising that Laced and Rufous Woodpeckers persist as other studies regionally have suspected woodpeckers as a group to be particularly sensitive to chronic habitat degradation in combination with high hunting pressure.

True floodplain or ‘swamp’ forests are rare and localised in Lao PDR, and with the exception of perhaps stands in Attapu and Champasak, those albeit highly degraded remnants in the survey area are quite probably the most extensive remaining in Lao PDR. There are, however, few bird or mammal species strongly associated with them (one candidate being perhaps Slaty-legged Crake *Rallina eurizonoides*), and no such species were recorded during the survey (although their detection may be difficult). Thus those in the project area

probably have no significant value for birds and mammals, but might still harbour some significance for other groups, including perhaps the plants themselves. The majority of such forests remaining in the Xe Champhone wetlands area lie within the combined areas of the core area, and the area surrounding the concentration of oxbows adjacent to the lowest reaches of the Xe Champhone and Xe Xangxoy.

The Deciduous Dipterocarp Forest bird community in particular appears to be in very poor shape, with no records of any of the particularly characteristic species (see SUFORD 2010, BirdLife International Cambodia Programme 2012) with the exception of Blossom-headed Parakeet. The apparent ecological absence of species such as Brown Prinia *Prinia polychroa* and White-browed Fantail *Rhipidura aureola* underlines prior speculation that several Deciduous Dipterocarp Forest specialists are sensitive to degradation (SUFORD 2010, BirdLife International Cambodia Programme 2012).

Other than the true floodplain and 'swamp forests' the forests of the survey area should not be considered a focus of conservation attention within the area.

4.1.3 Xe Champhone wetlands in a wider conservation perspective

Even within Lao PDR the Xe Champhone wetlands are arguably not the most important for wildlife conservation. This is not to say that for instance the Siamese Crocodile population is not the most important nationally, as clearly the Xe Champhone wetlands have a role to play in the global conservation of that species, but on the balance of wildlife status in the area, other areas in Champasak and Attapu have higher concentrations of threatened species, and thus warrant higher levels of global wildlife conservation attention. Unfortunately, these southern areas are poorly defined and have suffered from a lack of attention, in part because many of them lie outside the national system of NBCAs. The current status of "Threatened" species within them is now poorly known, but two species in particular, White-winged Duck and Masked Finfoot, which probably survive in these areas, make them of high international significance; they may still be some of the most important populations of these species globally. These wetlands, consisting of a network of rivers and generally small forest pools, are considerably more important than the Xe Champhone wetlands because a whole suite of other Threatened species probably also makes use of them, including for example Silvered Leaf Monkey, Siamese Crocodile, and a number of large waterbirds including probably Lesser Adjutant and perhaps Sarus Crane and both Giant and White-shouldered Ibis (Tordoff *et al*. 2005, Timmins *et al*. 2013). It is unfortunate then that Lao's only other Ramsar site the Bung Gnai-Kiatngong wetland complex in Champasak province also fails to incorporate the wetlands that are of significance to the above mentioned species.

The huge area of wetland within the Xe Champhone area however does give it greater significance than probably all other large open wetland sites (i.e. not the forested wetlands above) in Lao PDR, including Bung Gnai-Kiatngong, the Vientiane–Nam Ngum plain wetlands, the Pakxan wetlands, the lower Xe Bang Fai wetlands and the Latsen wetland on the Xiangkhouang Plateau. However, for some species these other wetlands are more significant, e.g. Bung Gnai-Kiatngong for Purple Heron. Furthermore given the nature of the majority of species remaining (species in general not threatened regionally), much smaller areas in general would suffice for conservation of the remaining community. Area for area several small wetlands around the country (including individual wetland sites within the above mentioned areas) are arguably almost as significant currently as any wetland within

the Xe Champhone area, although the Pai Chiao area stands out to some degree from the rest (if it were not for the absence/scarcity of jacanas and swamphens it would be a clear winner).

In a long-term perspective the sheer size of the Xe Champhone wetlands make them stand out (amongst similar wetland types) because in Lao PDR at least there are no other large open marsh and lake mosaics that come close in size, complexity and quality (highly degraded as it is) to that of this area. Modification of wetland habitats is especially advanced and accelerating for instance on the Vientiane–Nam Ngum plain. However a long-term vision aiming to maintain the ecological integrity of the Xe Champhone wetlands as a landscape cannot be complete without first considering that much integrity has already been lost with the loss of many bird and mammal species. However, for the Xe Champhone wetlands ever to regain this integrity fully, global wildlife conservation must stay focused on protecting the wetland sites and landscapes where these species still survive. If this does not happen, then for instance White-shouldered Ibis will never again grace the Xe Champhone wetlands with its presence. With so many other pressing priorities to prevent wetland species extinctions globally, it is hard to rationalise how global wildlife conservation resource investment in the Xe Champhone could be justified on a purely site-based globally significant current bird or mammal population importance.

In fact for the majority of species potential habitat is common if not abundant around the country, and what is needed is a cultural change in attitude towards wildlife conservation, rather than a focus on protection of residual populations of globally common species. Of course the situation is not as black and white as stated, and for instance some focus on the latter (e.g. to create educational and other outreach opportunities) may be a key step in achieving the former. Indeed one of the cornerstones of changing cultural attitudes is very likely to include creating actual opportunities for average Lao people (especially urbanites) to experience wildlife, especially ‘wildlife spectacles’ and thus foster empathy for wildlife conservation. Experience from across the world shows that a direct observational connection with wildlife is highly beneficial to improvement of people’s attitudes towards it. At present there are essentially no sites in Lao, with the exception of highly ecologically altered situations such as the macaques of Ban Dongmuang, where Lao people can easily observe birds or mammals of many species in abundance in semi-natural conditions. Such sites probably need three main attributes; (i) easy access to urban centres; (ii) good viewing opportunities; and (iii) large flocks of large-bodied birds doing exciting things. Localised areas within the Xe Champhone wetlands could be ideal sites for such a long-term objective. The danger of course is that the conservation goals of ‘wildlife spectacle’ sites and the Ramsar site become confused, resulting in suboptimal and perhaps even deleterious results, e.g. a switch from Siamese Crocodiles as the main focus to creating a wildlife spectacle. Particularly it is important to distinguish the subtle difference between the goal of such an initiative and the message that it would hopefully convey, while the goal would be creating a wildlife spectacle based around species of relatively low conservation value, the message (or ultimate goal) should be about the need for conservation of much higher priority species.

4.2 Recommended Actions

The Xe Champone wetlands no longer have any global significance for the conservation of birds and mammals, and thus use of proposed biodiversity conservation resources in the Xe Champone area should very carefully consider whether these resources could be used more effectively at other sites and/or for species of higher conservation priority.

In a national context, the site potentially has high significance for wetland wildlife, particularly as it is already formally recognised as a Ramsar site and has an active conservation programme for Siamese Crocodiles. This basis might be built upon to further to secure the site and encourage recovery of wildlife populations; this is a realistic expectation for many bird species, which still remain relatively common in Thailand and Cambodia. But this course of action needs to be mindful of the first recommendation, especially as in the case of birds and mammals, full recovery in Xe Champhone area cannot be achieved without first securing protected populations of threatened species elsewhere in Southeast Asia.

The Siamese Crocodile population in the wetland has at least moderate to high global conservation significance for this species, thus actions that benefit both crocodiles and other wetland wildlife should be encouraged. But until other high priority species are identified, the primary focus needs to remain on the crocodiles themselves.

If after consideration of the above recommendations general wildlife conservation actions are deemed appropriate in Xe Champhone the following courses of action are recommended:

4.2.1 Instigate better land use practices

Conversion of floodplain and wetland habitats needs to be largely stopped, and sustainable land-use practices instigated. Initially this should focus on floodplain grasslands as these are both the most threatened and most significant of such areas for nationally threatened wildlife, as well as also being the most underappreciated. This will require additional survey, considerable community engagement (including land use planning with local villages), and will probably meet a great deal of resistance from various stakeholders. Restoration might be possible, but protecting remnant areas is most important, as the invasive *M. pigra* will be a serious threat in any restoration effort.

Water abstraction may already be a serious issue in some wetlands, and should be investigated further. In the long-term, integrated local wetland and catchment management would need to be instigated to deal with issues of invasive species, and the detrimental effects of agricultural chemicals (e.g. fertilisers and pesticides) from surrounding agricultural lands.

4.2.2 Instigate better wildlife protection

In the long-term, this requires a monumental change in Lao culture. Although daunting, almost certainly even small actions and initiatives, if carefully considered, could have benefits. Outside the scope of these recommendations, actions that engage the community in the long-term problems and solutions to wildlife conservation at the sites are key, as are a focus on education and outreach potentially through schools, media and other forms of social networking.

However, foreign donors and expatriate experts cannot be expected to achieve a positive outlook alone. The onus must be placed on the Lao government and local communities to shoulder the responsibility for management of the wetland, with an expectation of sincere commitment and significant resource input into planned initiatives. Without this commitment, all that can be hoped for is fort-holding activities whilst external aid and advice is maintained. Critical to gaining commitment is the identification and apprenticeship of future Lao conservation leaders.

In the short-term proactive conservation measures based around a trained enforcement patrol team would probably be necessary to ensure compliance in focal wildlife protection zones with national laws and local wildlife conservation agreements. The crocodile conservation project has so far largely relied upon 'passive' protection, mediated through general local community support for the project and self-policing of their activities. This might be further extended to benefit other wildlife. Although this recommendation in a context of forest mammals is very naive, given the latter's high trade value, there is no evidence for significant income generation coming for anyone, now, from harvesting birds and large mammals in the Xe Champhone area; the opportunity costs of stopping such harvest are low, with behavioural inertia the main challenge. However, some aspects of habitat conversion may have significant economic aspects that will make voluntary self-policing challenging as a main strategy. Ultimately a proactive and more independent situational monitoring and policing body would probably need to be established, as a much more broadly organised project, with a less charismatic focus (e.g. small grassland birds) is unlikely to be able to engage local communities to the same extent as for crocodiles.

Most importantly use of *bhaet phiak* 'hook lines' and mist nets needs to be eradicated. Secondly, any use of snares needs to be minimised, and thirdly nest-robbery especially of waterbirds and weavers should be strongly opposed. These actions may not be covered by Lao laws, so local agreements and rules need to be sought. Sale of Baya Weaver nests potentially provides an economic income to locals, but their collection need not be detrimental to the status of the species, if carried out in a thoughtful, organised manner. In fact if well organised this could result in colony expansion in accessible areas (for easy nest collection and protection), potentially even within villages.

4.2.3 Make use of the site as appropriate for tourism and sustainable utilisation of natural resources

Possibly one of the more important reasons for investing conservation resources at the site would be to foster the creation of 'wildlife spectacles' easily accessible to the Lao populace. It is impossible at present to easily see anywhere in Lao concentrations of many bird species in semi-natural conditions, and thus it is difficult to excite 'average' people about wildlife and kindle the beginnings of 'grass-roots' wildlife conservation. Such spectacles are with little doubt one of the key elements in what will clearly be a long process of changing Lao cultural attitudes to wildlife. Such spectacles would need to be based around easy to access wetlands, such as Nong Souy and particularly Pai Bak. The benefits of such an activity for the Ramsar site would hopefully accrue in the long-term, whilst fostering wildlife conservation sentiment for Lao as a whole. In the short- and even medium-term however such an activity is unlikely to have much direct benefit for priority species, because the sites that such an activity would need to be concentrated on could only be a small proportion of the whole Ramsar site, and additionally they would need to be easily accessed. There is

even a danger that too much focus on such goals in the short-term could actually be harmful, if it diverts attention from the real need for conservation action for crocodiles.

Sensible international focused eco-tourism is very unlikely to cause serious threats to the area, and its potential benefits would greatly outweigh any potential negatives. It cannot be hoped, however, to attract serious 'wildlife tourists' given the paucity of highly charismatic species, so the emphasis would have to be on general tourists visiting central Lao. But eco-tourism is very unlikely to provide a keystone for wildlife conservation of the area; rather, it should be viewed as a potential subsidiary benefit, probably best undertaken by entrepreneurs maintaining a close dialogue with wetland managers.

Using the site to promote sustainable environmental practices, farming and wetland resource harvests, could help both tourism and wildlife, and if done in an entrepreneurial fashion perhaps even bring economic benefits beyond these linkages (e.g. perhaps through supply of organic food markets). But it is very unlikely to provide a keystone for wildlife conservation in the area.

4.2.4 Avenues of further study

There is a slight possibility that Masked Finfoot might still occur. This would be hard to investigate further, but for instance staff and others closely involved with the crocodile project should be made aware of the possibility. 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 sightings occur, especially protection from nest robbery, projectile hunting, and netting, but also the creation of no fishing zones (as potentially one of the greater threats to the species is entanglement in fishing hooks and nets below the water). It may be worth including discussion of the species' conservation needs during any village communal gatherings undertaken by the crocodile project, and also potentially taking the species into consideration if any further camera-trapping were carried out.

Lowland, not highly modified wetlands are becoming increasingly scarce regionally suggesting that perhaps some taxa might be threatened as a result. In the case of birds and mammals the most highly threatened species are threatened not by modification but by direct persecution, and most in general are relatively widespread and relatively tolerant of habitat modification, suggesting this may be the case with many other wetland associated taxa. Grassland birds are probably somewhat of an exception in being as sensitive to habitat degradation as persecution, suggesting that other grassland taxa might also be threatened. It thus might be useful to engage specialists in other taxonomic groups to explore the probability of presence of other threatened taxa. However, inventory-type surveys, although interesting and very useful for benchmarking community composition, are unlikely to answer such questions. Such surveys largely fail in evaluating an area's conservation needs because so little is generally known of other taxonomic groups to place findings in the context of global and regional patterns of status, threats, and in many cases even basic occurrence data. Investigation of the pitcher plant *Nepenthes* sp. and perhaps also the unionid bivalves might illuminate species of conservation significance.

The fish fauna might be a further avenue of investigation; it is clearly highly utilised by local communities, might perhaps 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 fish eating macrophytes and snails, or in dispersal plant propagules perhaps). The questions that such investigation asked 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 perhaps as even for management of a naturally dynamic aquatic ecology.

4.2.5 Implication for Ramsar site boundaries

The current boundaries although capturing a significant extent of the wildlife conservation values present in the area are certainly somewhat esoteric. It is recommended that they be modified to better reflect wildlife significance and conservation priorities in the area, as well as the mission of the Ramsar Convention.

A 'greater' Ramsar area is suggested in Figure 4. This would encompass all significant core areas, as well as the greater majority of the hydrological floodplain system of the lower Xe Champhone catchment. As such it would incorporate numerous small wetlands and remnant areas of scrub and grassland, and also extensive areas of low-intensity agriculture. Attention to the whole area is needed if long-term effective management of the floodplain system were contemplated. Management under any scenario would be difficult, and agricultural intensification is inevitable, but for the long-term health of wildlife communities this greater area should form the minimum boundary for discussion of the future development of the Xe Champhone wetlands floodplains. This greater area seems the most appropriate in fulfilling the stated Ramsar Convention's mission of "the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world", where 'wise use' of wetlands is interpreted as "the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development". In its current form the Ramsar site only approximates the northern half of this area, thus requiring considerable extension to the south and west to incorporate the lower reaches of the Xe Xangxoy and the Nong Louang plain, both ecologically integral to the health of the area, and even some extension to the north notably for the Nong Souy area.

This greater area holds several areas where wildlife values are clearly more concentrated, and where management interventions would be preferentially targeted. Of these the core area (as defined here), of Pai Chiao and associated wetlands, forms the heart of the area and is the most important for wildlife conservation. A further area of oxbow wetlands, floodplain and swamp forests surrounding the lowest reaches of the Xe Champhone and Xe Xangxoy is particularly significant for crocodiles and probably Masked Finfoot if it were to survive, along potentially with a host of other taxa. The Nong Souy – Pai Bak floating mats and aquatic vegetation beds and an area of low-intensity agriculture mosaic between the two are also clearly important. The Nong Louang wetland complex, even as the least significant for current wildlife populations, would be nearly essential in a long-term vision for wildlife conservation in the area by adding considerable additional wetland area and heterogeneity.

The remaining parts of the proposed 'greater' Ramsar area have lower intrinsic value, although together they become significant for the many species, especially those associated with low-intensity agricultural mosaics within the area (e.g. quails, feeding ducks, breeding Watercock). Agricultural development of these areas cannot be prevented, but perhaps it is possible to strategise with stakeholders to guide development in directions with minimal impacts on wildlife. Particularly minimising intensification in buffer zones around even small wetlands, and investigating ways of maintaining patches of low-intensity agriculture. If there were ever to be a long-term vision for recreation of former wildlife communities including for instance Sarus Crane, storks and ibises and perhaps even vultures, these additional areas would play a vital role, particularly for foraging birds.

4.2.6 Next Steps

Before any unilateral, multilateral or other forms of wildlife conservation initiatives are developed for the Ramsar site, it would be very sensible to develop a management plan. Management planning for such a site would be complex and require a prolonged dialogue between many stakeholders. A participatory approach including both local government and local communities is essential. It is however also essential that qualified biological expertise be included. Development of such a management plan would presumably best be developed through a combination of workshops and consultations. Ensuring practical expectations on the part of donors and external implementers is also crucial to developing an effective management plan. This should include pragmatic planning for the necessary duration of anticipated initiatives as well as realistic identification of funding sources in order to carry these out.

It is clear for success of any management plan that the current goals and visions of all stakeholders are investigated, especially the vision that both local government and local communities have for agriculture and water resources in the area. Incorporating and investigating actions and goals of the current Siamese Crocodile initiative is also very important. A management plan should include, amongst other things, detailed zoning of agreed upon uses and the rules and regulations governing those uses. In terms of wildlife conservation, focus of such zoning on the core areas is most important. Other aspects of the management plan might include some or all of the recommendations already presented in the preceding sections.

Conventions

Bird taxonomy and nomenclature follows Inskipp *et al.* (1996), except for explicit departures. Scientific names of birds are given in the text only for those not in Tables 3 & 4.

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

'Large mammals' are considered those families where all or most species are identifiable on field views, following Dorst & Dandelot (1970).

Throughout the report wetlands, villages and other features are identified by their names on the 1985–1987 series of 1:100,000 maps of the *RDP Lao Service Geographique d'Etat* (RDPL SGE) maps. The only exception to this is the spelling of the Xe Champhon; this report uses the spelling "Xe Champhone" to maintain consistency with other IUCN documents. Where there is no RDPL SGE map-name, the name in local usage is given. The transliteration of these follows the author's phonetic renditions. Local usage often differs from the maps; where this is known to be so, the local name is also provided in Table 5. In many cases, however, map names were not checked against local usage. Localities mentioned in the text are shown on Figure 3.

References

Berry, E. 2011.*Ramsar site management plan for Xe Champhone, Lao PDR: Preparing a co-management plan on wise use of Xe Champhone Ramsar wetland.* IUCN, Vientiane. [Unpublished]

Bezuijen, M. R. 2006. Incidental wetland bird observations from Attapu and Savannakhet provinces, Lao PDR, March-June 2005.*Forktail* 22: 49-56.

Bezuijen, M. R., C. Phothitay, M. Hedermark, and S. Chanrya 2006. *Preliminary status review of the Siamese crocodile (*Crocodylus siamensis *Schneider, 1801) (Reptilia: Crocodylia) in the Lao People's Democratic Republic*. Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme, Vientiane.

Bezuijen, M. R., Cox, J. H. Jr., Thorbjarnarson, J. B., Chanthone Phothitay, Hedemark, M. and Akchousanh Rasphone 2013. Status of Siamese Crocodile (*Crocodylus siamensis*) Schneider, 1801 (Reptilia: Crocodylia) in Laos. *Journal of Herpetology* 47 (1): 41–65.

BirdLife International Cambodia Programme 2012. *The biodiversity of the proposed Western Siem Pang Protected Forest Stung Treng Province, Cambodia*. BirdLife International Cambodia Programme, Phnom Penh.

Brandt, R. A. M. 1974. The non-marine aquatic mollusca of Thailand. *Archiv fuer Molluskenkunde* 105: 1-423.

Carlsson, N. O. L. and Lacoursiére, J. O. 2005. Herbivory on aquatic vascular plants by the introduced golden apple snail (*Pomacea canalicul*ata) in Lao PDR. *Biological Invasions* 7:233-241.

Claassen, A. H. 2004. *Abundance, distribution, and reproductive success of sandbar nesting birds below the Yali Falls Hydropower Dam on the Sesan river, northeastern Cambodia*. World Wide Fund for Nature / Danida / The Wildlife Conservation Society / BirdLife International, Phnom Penh.

Claridge, G. (compiler) 1996. *An inventory of wetlands of the Lao P.D.R*. IUCN, Bangkok.

Chanthone Phothitay and Somphanith 2003.*Crocodile survey report of wetland areas in Savannakhet and Attapeu Provinces*. Living Aquatic Resources Research Center, National Agriculture and Forestry Research Institute, Ministry of agriculture and Forestry. [Unpublished]

Cox, J. H., and Somvongsa, C. 2008.*Community-based crocodile resource management plan for Savannakhet Province, Lao PDR*.WCS / National University of Laos, Vientiane. [Unpublished; not seen]

David-Beaulieu, A. 1949–1950. Les oiseaux de la Province de Savannakhet (Bas-Laos).*L'Oiseau et la Revue française d'Ornithologie* 19: 41–84, 153–194; 20: 9–50.

Dersu and Associates 2008.*Baseline inventory: wildlife and habitat studies of the Nakai Plateau*. C880: consultancy agreement for wildlife program phase 1. Vientiane: Nam Theun Power Company.

Dickinson, E. C. 1970. Notes upon a collection of birds from Indochina. *Ibis* 112: 481–487.

Dorst, J. and Dandelot, P. 1970. *A field guide to the larger mammals of Africa*. London: Collins

Duckworth, J. W. 2007. *A rapid reconnaissance of current biodiversity and conservation needs of dry forests in Savannakhet and Salavan province, Lao PDR*. Vientiane: WWF Lao office.

Duckworth, J. W. 2008. *A reconnaissance wildlife survey of the BCI pilot villages in the BCI Xe Pian–Dong Hua Sao corridor*. Vientiane: WWF Lao office

Duckworth, J. W. 2009. Eight new birds for Laos. *Forktail* 25: 96–103.

Duckworth, J. W. in press. *Wildlife of the Nam Ngum basin, Lao PDR*. Vientiane: Integrated Watershed Management Unit, Ministry of Agriculture and Forestry. [Unpublished]

Duckworth, J. W. and Evans, T. D. 2007. First records of White-browed Crake (*Porzana cinerea*) for Laos and its current range in Southeast Asia. *Wilson Journal of Ornithology* 119: 253–258.

Duckworth, J. W., Timmins, R. J. and Cozza, K. 1993. *A wildlife and habitat survey of Phou Xang He Proposed Protected Area*. Forest Resources Conservation Sub-programme, Lao-Swedish Forestry Cooperation Programme, Vientiane.

Duckworth, J. W., Tizard, R. J., Timmins, R. J., Thewlis, R. M., Robichaud, W. G. & Evans, T. D. 1998a. Bird records from Laos, October 1994–August 1995. *Forktail* 13: 33–68 (including errata sheet distributed with *Forktail* 14).

Duckworth, J. W., Timmins, R. J. and Evans, T. D. 1998b. The conservation status of the River Lapwing *Vanellus duvaucelii* in southern Laos. *Biological Conservation* 84: 215–222.

Duckworth, J. W., Salter, R. E. and Khounboline, K. (compilers) 1999.*Wildlife in Lao PDR: 1999 Status Report*. Vientiane: IUCN–The World Conservation Union / Wildlife Conservation Society / Centre for Protected Areas and Watershed Management.

Duckworth, J. W., Davidson, P., Evans, T. D., Round, P. D. and Timmins, R. J. 2002. Bird records from Laos, principally the upper Lao/Thai Mekong and Xiangkhouang Province, in 1998–2000. *Forktail* 18: 11–44.

Fuchs, J., Cibois, A., Duckworth, J. W., Eve, R., Robichaud, W. G., Tizard, T. and Van Gansberghe, D. 2007. Birds of Phongsaly province and the Nam Ou river, Laos. *Forktail* 23: 22–86.

Hedemark, M., Cox, J. H. Jr. and Somvongsa, C. 2009.*Community-based crocodile resource management plan and project document for Savannakhet Province, Lao PDR*. Wildlife Conservation Society, Vientiane. [Unpublished; not seen]

IUCN 2013. *Ecological survey of the Mekong River between Louang Phabang and Vientiane Cities, Lao PDR, 2011-2012*. Vientiane, Lao PDR: IUCN.

IUCN 2013. *IUCN Red List of Threatened Species*. Version 2013.1. <www.iucnredlist.org>.

Maxwell, J. 2007. [*Plant list from Nong Souy*]. Dersu and associates, Vientiane. [Unpublished]

Moore, P., Minavanh Pholsena, Ketsana Phommachanh and Glemet, R. 2013. *Review of statutory and customary law in the Xe Champhone Ramsar Site, Lao PDR: implications for a rights-based approach to conservation*. Vientiane: IUCN.

Naylor, R. 1996. Invasions in agriculture: assessing the cost of golden apple snails in Asia. *Ambio* 25:443-448.

Pain, D. J., Cunningham, A. A., Donald, P. F., Duckworth, J. W., Houston, D. C., Katzer, T., Parry-Jones, J., Poole, C., Prakash, V., Round, P. and Timmins, R. 2003. Cause and effects of temporospatial declines of Gyps vultures in Asia. *Conservation Biology* 17: 661-671.

Platt, S. G. 2012. *Community-based crocodile conservation in Lao PDR*. Wildlife Conservation Society, Vientiane. [Unpublished]

Rasmussen, P. C. and Anderton J. C. 2005.*Birds of South Asia*. The Ripley Guide. Volume 2.Smithsonian Institution and Lynx Edicions, Washington and Barcelona.

Robson, C. 2005. *A field guide to the birds of South-East Asia*. New Holland Publishers Ltd, U. K.

Round, P. 2008. *The birds of the Bangkok area*. Bangkok: White Lotus Co Ltd.

Salter, R. E. 1993.*Wildlife in Lao PDR.A status report*. Vientiane: IUCN.

SUFORD 2010.*Preliminary biodiversity assessment and management recommendations of SUFORD–AF Production Forest Areas*. Sustainable Forestry for Rural Development Project – Additional Financing (SUFORD – AF), Vientiane. [Unpublished]

Sun Visal and Mahood, S. 2011. *Monitoring of large waterbirds at Prek Toal, Tonle Sap Great Lake, 2011*.Phnom Pehn: Wildlife Conservation Society, Cambodia Program.

Thewlis, R. M., Duckworth, J. W., Evans, T. D. and Timmins, R. J. 1998. The conservation status of birds in Laos: a review of key species. *Bird Conservation International* 8 (Supplement): 1-159.

Timmins, R. J. 2006. *An assessment of the biodiversity conservation significance of the Mekong Ramsar site, Stung Treng, Cambodia*. Stung Treng: Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme.

Timmins, R. 2008. Birds. Pp. 53-80 in Bezuijen, M. R., Timmins, R., and Seng Teak, editors. *Biological surveys of the Mekong River between Kratie and Stung Treng Towns, northeast Cambodia, 2006-2007*.Phnom Pehn: WWF Greater Mekong - Cambodia Country Programme, Cambodia Fisheries Administration and Cambodia Forestry Administration.

Timmins, R. J. 2012. *An assessment of the 'vulnerability' of the Proposed Western Siem Pang Protected Forest to climate change, with recommendations for adaptation and monitoring*. Phnom Penh: BirdLife International Cambodia Programme.

Timmins, R. J. in prep. *The significance of the Bung Gnai-Kiatngong wetlands, Champasak province, for wildlife conservation*. Vientiane: IUCN.

Timmins, R. J. and Bleisch, W. V. 1996.*A wildlife and habitat survey of Xe Bang Nouan NBCA*. Vientiane: Wildlife Conservation Society.

Timmins, R. J. and Duckworth, J. W. 2012.*A survey of gibbons and other wildlife in the Bokeo section of Nam Kan National Protected Area, Lao PDR*. Fauna & Flora International, Cambridge, U.K.

Timmins, R. J., Steinmetz, R., Poulsen, M. K., Evans, T. D., Duckworth, J. W. and Boonratana, R. 2013. The Indochinese Silvered Leaf Monkey *Trachypithecus germaini* (sensu lato) in Lao PDR. *Primate Conservation* 26: 75–87.

Tordoff, A. W., Timmins, R. J., Maxwell, A., Huy Keavuth, Lic Vuthy and Khou Eang Hourt 2005. *Biological assessment of the central Indochina dry forest ecoregion*. Phnom Pehn: WWF Cambodia Programme.

Woxvold, A. (compiler) 2009*. A wildlife survey of the Minerals and Metals Group's Sepon Expanded Development Area (Draft*). Coffey Natural Systems and The Wildlife Conservation Society, Vientiane. [Unpublished]

Yalden D. 1999.*The history of British mammals.* London: T & A D Poyser Ltd.

Appendixes

Appendix 1 Notes from a visit to the Xe Champone wetlands, 9-13 January 2014

J. W. Duckworth

Aim

To supplement the wet-season surveys of the area by R. J. Timmins, with particular focus on Palaearctic migrants of potential conservation interest not seasonally present during the earlier surveys. These are, particularly: Palaearctic ducks (various genera); Greater Spotted Eagle *Aquila clanga* and Black Kite *Milvus migrans*; and Yellow-breasted Bunting *Emberiza aureola* and other buntings. The main report states that "probably the most significant limitation to the project was the inability to survey the area during the middle of the dry season".

Schedule

See Table 1.

Bird records

All species found are listed in Table 2.

Numbers of Palaearctic migrants of conservation interest were extremely low. Only four Palaearctic ducks (all Garganeys at Nong Souy) were found, despite checking of extensive prime habitat. Gargeney numbers seem to have dropped in Lao PDR over the last 20 years and also neighbouring Thailand, possibly for reasons unrelated to human activity in the wintering areas (Duckworth in press). Other Palaearctic duck species no doubt occur in small numbers from time to time (and may have been present but overlooked at the time of survey), but it seems unlikely that numbers significant to conservation use the observed wetlands, or, perhaps, anywhere in the Ramsar site and surrounds. The survey took place at the perfect season to assess these ducks' status. Less confident comments can be made about the lack of Greater Spotted Eagle and Black Kite records, given the strong winds that may have reduced soaring. Significant numbers still winter at similar latitudes, and to the south, in adjacent Thailand and Cambodia (e.g. Mallalieu 2007), and there may be a regular northward passage through at least northern Lao PDR in late March – April (Timmins & Duckworth 2013). The lack of records on the present survey corroborates the great rarity of records of both species from the southern half of Lao PDR in and since the 1990s (e.g. Thewlis *et al*. 1998). Only one bunting was seen – plausibly, on call, a Yellow-breasted Bunting. Assessing the local status of this species is challenging and best undertaken through finding roosts; but this is rather hit-or-miss, so on such a short visit nothing can be concluded about the use of the area by the species. By contrast, the Nong Souy harrier roost in swamp vegetation by the dam, near the eastern extent of open water, was (involving at least 26 birds) the largest the observer has seen in Lao PDR since at least the 1990s, despite 2000s searches in several key areas (e.g. Duckworth 2008, in press). Similarly, the numbers of White-shouldered Starlings (non-breeding migrants presumably from China)

were higher than observed anywhere in Lao PDR in the 2000s-2010s, recalling the large flocks in the northern zone of Xe Pian NPA in 1992-1993 but seemingly now gone (Duckworth 2008).

By contrast, the status of Oriental species generally corroborated the importance of this area in a national context. Black-headed Munia was again seen at Nong Souy; the Xe Champone wetlands remain the only part of Lao PDR with records since the 1930s. Numbers of Cotton Pygmy-goose and Spot-billed Duck observed, and, in particular their presence at nearly all, and all (respectively) sites checked indicate a very large population by Lao standards also at this season. The duo of Little Ringed Plovers seen east of Ban Kadan were identified morphologically as the resident race. They were on a large sandbank in the Xe Champone and showed territorial behaviour, indicating local breeding. By contrast, the number of resident raptors was desperately low: no Shikras and only one record of Crested Serpent Eagles (and these may not be local breeders given the documented occurrence of birds in the non-breeding season in parts of Lao PDR where they do not breed (Duckworth in press). While this may have reflected the appalling survey weather for raptors to some extent, numbers seemed much lower than would have been found in similar habitat in the early-mid 1990s.This is one of a number of Lao sites with high human use surveyed in the 2000s-2010s with low number of resident raptors; they may warrant more conservation attention in Lao PDR. Reflecting the situation with White-shouldered Starling, White-vented Myna numbers have also collapsed in the northern zone of Xe Pian NPA (Duckworth 2008) but are still high in the Xe Champone. Vinous-breasted Starling may even have disappeared from northern Xe Pian NPA (it has certainly declined significantly) since 1992-1993, and has evidently now become very rare in Central Lao PDR; the small numbers recorded, at Nong Souy, may not persist much longer. Based on recent history in northern Xe Pian NPA, numbers of harriers and sturnids may be expected to decline unless effective conservation management is introduced. Such intervention may be problematic given that the precise reasons for decline are unclear.

Observations on threats

Mist-nets (duck mesh): Nong Souy, over seasonally flooded bushland (now dry) (three places); Kout Ken, Ban Kadan, one net. Nong Thongbak, one net.
Bhaet peak lines: Nong Souy, over freshly planted paddy abutting the flooded bushland (two locations). Nong Thongbak, several.
Gunshots: none was heard at any site.
Fire: Nong Souy, one active location on a large mat; many signs of small recent fires. It was too early in the dry season to assess the prevalence of fire.
Dogs: Nong Souy, one duo of boats contained four dogs; the many other boats, none. Dogs accompanying people on foot were ubiquitous.
Mimosa pigra: Nong Souy, abundant. Ban Tansoum, abundant. Ban Kadan, abundant. Nong Thongbak, abundant.
Exotic apple snail: Nong Souy, abundant. Ban Tansoum, not found, so must be rare if present. Ban Kadan, rare in Kout Xelatkadan, with only three egg-masses found; but abundant in fresh paddy near Kout Kenn. Nong Thongbak, abundant.
Pistia: Ban Tansoum, not found, so must be rare if present. Ban Kadan, some.
Water-hyacinth: Nong Souy, common. Ban Tansoum, abundant. Ban Kadan, abundant. Nong Thongbak, abundant.

Specific expansion from the report's main text

Halcyon kingfishers were barely recorded, contradicting the suggestion of a postulated rarity of breeding White-throated Kingfishers in Lao PDR that is obscured by larger numbers of non-breeding visitors. Whatever the reason for the low numbers of this species in the Xe Champone wetlands is, it seems to apply all year. There was one record of Chestnut-headed Bee-eater, a species not found in the wet season. Although popularly perceived as resident, there is increasing evidence for significant long-distance movement in this species in South-east Asia (e.g. Fuchs *et al*. 2008), and it is quite plausibly only a non-breeding visitor to the area. Crake calls, consistent with Ruddy-breasted Crakes (but given the observer's low familiarity with related species' calls, left provisional), were widespread and at as high calling densities as found anywhere in Lao PDR (see, e.g., Duckworth in press). The lack of records of other crake species (excepting White-browed Crake), typical across Lao PDR, might reflect either rarity or elusiveness; the small crakes remain some of the least-understood wetland birds in Lao PDR.

Additional references

Mallalieu, M. 2007. Greater Spotted Eagles *Aquila clanga* in central Thailand. *Forktail* 23: 167–170.

Table 1. Schedule of observations in the Xe Champone area, January 2014.

Date	Site	Type of survey	Timing	Other notes
9 Jan 2014	Nong Souy	Foot-based along the dam, concentrating on areas with swamp vegetation	15h30-18h45 (dark)	Fierce wind depressed bird activity and findability; ameliorated towards dusk
10 Jan 2014	Nong Souy	Boat-based, of the eastern half, concentrating on areas with swamp vegetation	05h30 (dark)-16h00	Fierce wind as above plus prevented access to north-western areas of promising habitat
10 Jan 2014	Nong Souy	Foot-based along the dam, checking various roost concentrations found previous day	16h00-18h40 (dark)	Wind ameliorated after 17h00
11 Jan 2014	Wetland complex E of Ban Tansoum	Boat-based first and last few hours, foot-based to and round Kout Phapheo and the mainstream Xe Champone in interim	05h30-18h45	Wind problematic in afternoon
12 Jan 2014	Wetland complex E of Ban Kadan	Foot-based via Kout Xelatkadan, Nong O and Kout Kenn	06h00 (dawn)-18h30	Fierce wind depressed bird activity and findability; ameliorated towards dusk
13 Jan	Nong	Foot-based, along the dam	05h45-	No problem with wind.

2014	Thongbak		08h15	Heavy vehicle traffic masked bird sounds

In general, days consisted of wandering searching in thick vegetation for the first few hours; scanning of the sky for rising raptors as thermals began forming (typically about 09h30 onwards) and waterbodies for swimmers; a mid-day to early afternoon quiet sit in a shaded area of well-vegetated wetland (not always available); and the last couple of hours wandering searching and/or counting roost flight-lines.

Table 2. Birds observed in the Xe Champone area, January 2014.

ENGLISH NAME	SCIENTIFIC NAME	Nong Souy	Nong Souy	Ban Tansoum	Ban Kadan	Nong Thongbak
		09-Jan-14	10-Jan-14	11-Jan-14	12-Jan-14	13-Jan-14
Lesser Whistling-duck	*Dendrocygna javanica*	300+	330+	100	1 flock	47+
Cotton Pygmy-goose	*Nettapus coromandelianus*		27-29		4	2
Spot-billed Duck	*Anas poecilorhyncha haringtoni*	6+	20-60	8	6	8
Garganey	*Anas querquedula*		4			
Common Kingfisher	*Alcedo atthis*		2	6		2
White-throated Kingfisher	*Halcyon smyrnensis*					2
White-throated/Black-capped Kingfisher	*Halcyon smyrnensis/pileata*			1		
Green Bee-eater	*Merops orientalis*		2+	5+	1+	
Chestnut-headed Bee-eater	*Merops leschenaulti*				1+	
Plaintive Cuckoo	*Cacomantis merulinus*		P			
Greater Coucal	*Centropus sinensis*	P	P	C	P	P
Lesser Coucal	*Centropus bengalensis*	1	2	2		1
Asian Palm Swift	*Cypsiurus balasiensis*	C	C	C	C	P
Asian Barred Owlet	*Glaucidium cuculoides*			C	P	P
Spotted Dove	*Streptopelia chinensis*	1	3	6	1	9
Red Collared Dove	*Streptopelia tranquebarica*	24 roost		90 roost		
Peaceful Dove	*Geopelia striata*	1	1	1	2	1
[Ruddy-breasted] Crake	*Porzana fusca*	3 heard	9 heard	18 heard		1 heard
White-browed Crake	*Porzana cinerea*					1
Purple Swamphen	*Porphyrio porphyrio*		3 (small?) grps			1
Common Moorhen	*Gallinula chloropus*	1	8	3		
Pintail/[Swinhoe's Snipe	*Gallinago stenura/megala*		2			
Common Snipe	*Gallinago gallinago*	1	8			
Unidentified snipe	*Gallinago* sp(p).			1		
Green Sandpiper	*Tringa ochropus*		1			
Wood Sandpiper	*Tringa glareola*		1			
Pheasant-tailed Jacana	*Hydrophasianus chirurgus*		20			7
Little Ringed Plover	*Charadrius dubius jerdoni*			1 ssp.	2	1 ssp. Over

Black-shouldered Kite	*Elanus caeruleus*		2-3	1	1	
Crested Serpent Eagle	*Spilornis cheela*			2 ad		
Eurasian Marsh Harrier	*Circus aeruginosus*	2		1		
Pied Harrier	*Circus melanoleucos*	6		3 roost		
Unidentified harrier	*Circus* sp(p).	26+ roost	24-29 ex roost; 14 roost	2 ex roost		
Eurasian Sparrowhawk	*Accipiter nisus*				1 female	
Grey-faced Buzzard	*Butastur indicus*				2	
Peregrine Falcon	*Falco peregrinus* (Palaearctic)		1			
Little Grebe	*Tachybaptus ruficollis*		2	3	1	4
Unidentified cormorant	*Phalacrocorax* sp.			1		
Little Egret	*Egretta garzetta*	3	20	7	30 ex roost; 12	a few
Grey Heron	*Ardea cinerea*			1		
Purple Heron	*Ardea purpurea*	1	3-10	3+		1
Great Egret	*Casmerodius albus*	4	7	4	1	a few
Intermediate Egret	*Mesophoyx intermedia*		2	1		
Cattle Egret	*Bubulcus ibis*	C roosters to NW	70; common roost	C ex roosters ex NE/ENE; roosters S		a few; 200 ex roost from NW
Pond heron	*Ardeola* sp(p).	60+	30+	30+	8	30
Little Heron	*Butorides striatus*				1	
Black-crowned Night Heron	*Nycticorax nycticorax*		20 dayroost	2		
Yellow Bittern	*Ixobrychus sinensis*		1			
Cinnamon Bittern	*Ixobrychus cinnamomeus*			1		
Brown Shrike	*Lanius cristatus*	C	C	C	C	C
Racket-tailed Treepie	*Crypsirina temia*		1+	4 grps	1 duo	2 grps
Large-billed Crow	*Corvus macrorhynchos*		14 ex roost	1	3	2
Indochinese/Black-winged Cuckooshrike	*Coracina polioptera/melaschistos*			1		
Rosy/Swinhoe's/Ashy Minivet	*Pericrocrotus roseus/cantonensis/divaricatus*		11	C		
Pied Fantail	*Rhipidura javanica*	7	16	10	2	4
Black Drongo	*Dicrurus macrocercus*	200+ roost	150 ex roost	C	C	C
Ashy Drongo	*Dicrurus leucophaeus*				P	
Black-naped Monarch	*Hypothymis azurea*			P	P	

Common Iora	*Aegithina tiphia*				P	
Red-throated Flycatcher	*Ficedula parva*	C		P	P	P
Hill/Tickell's Blue Flycatcher	*Cyornis banyumas/tickelliae*			P	P	[P]
Grey-headed Canary Flycatcher	*Culicicapa ceylonensis*			P	P	P
Siberian Rubythroat	*Luscinia calliope*	C		C	P	P
Bluethroat	*Luscinia svecica*		1			
Oriental Magpie Robin	*Copsychus saularis*		P			
White-rumped Shama	*Copsychus malabaricus*			P	P	
Common Stonechat	*Saxicola torquata*	C	C	C	C	C
White-shouldered Starling	*Sturnus sinensis*	30 roost		1		
Unidentified small starling	*Sturnus* sp(p).	150 roost		25 roost		
Black-collared Starling	*Sturnus nigricollis*	7 roost	17 roost	5 roost	1	1
Vinous-breasted Starling	*Sturnus burmannicus*	6 roost	12 roost			
Common Myna	*Acridotheres tristis*	1			1	
White-vented Myna	*Acridotheres cinereus*	230+ roost	many roost	790+ roost	6 roost	
Barn Swallow	*Hirundo rustica*	100+ roost	300 ex roost	22	4	500+
Red-rumped Swallow	*Hirundo daurica*				[1]	
Black-headed Bulbul	*Pycnonotus atriceps*			P		
Yellow-vented Bulbul	*Pycnonotus goiavier*		2	3	1+	
Streak-eared Bulbul	*Pycnonotus blanfordi*			P	P	P
Zitting Cisticola	*Cisticola juncidis*			1	3	
Rufescent Prinia	*Prinia rufescens*				P	
Grey-breasted Prinia	*Prinia hodgsonii*					6+
Yellow-bellied Prinia	*Prinia flaviventris*			3	5	
Plain Prinia	*Prinia inornata*	C	C	C		P
[Japanese] White-eye	*Zosterops [japonicus]*		P	P	P	
Rusty-rumped Warbler	*Locustella certhiola*		1	C		
Unidentified grasshopper warbler	*Locustella* sp(p).		C			P
Black-browed Reed Warbler	*Acrocephalus bistrigiceps*		1++			
Oriental Reed Warbler	*Acrocephalus orientalis*		6++	1		
Thick-billed Warbler	*Acrocephalus aedon*			P	P	
Common Tailorbird	*Orthotomus sutorius*		P			

Dark-necked Tailorbird	*Orthotomus atrogularis*			P	P	
Dusky Warbler	*Phylloscopus fuscatus*	C	C	C	C	C
Yellow-browed Warbler	*Phylloscopus inornatus*	P	C		C	P
Greenish Warbler	*Phylloscopus trochiloides*			P	P	P
Pale-legged/Sakhalin Leaf Warbler	*Phylloscopus tenellipes/borealoides*			P	P	
Striped Tit Babbler	*Macronous gularis*			C	P	P
Chestnut-capped Babbler	*Timalia pileata*				2 grps	3 grps
Scarlet-backed Flowerpecker	*Dicaeum cruentatum*				P	
Olive-backed Sunbird	*Nectarinia jugularis*			p	C	
House Sparrow	*Passer domesticus*	C; nest				
Plain-backed Sparrow	*Passer flaveolus*	8 roost	9	5	2	1
Eurasian Tree Sparrow	*Passer montanus*	P				
Forest Wagtail	*Dendronanthus indicus*		1			
White Wagtail	*Motacilla alba leucopsis*	1	1 ssp.		1 ssp.	1
Yellow Wagtail	*Motacilla flava*	300+ roost	50 ex roost	3	4	
Richard's Pipit	*Anthus richardi*			P	P	P
Paddyfield Pipit	*Anthus rufulus*	C	P		P	P
Red-throated Pipit	*Anthus cervinus*	4 roost	1			1
White-rumped Munia	*Lonchura striata*			9	13	12
Scaly-breasted Munia	*Lonchura punctulata*	4+	3			
Black-headed Munia	*Lonchura malacca*	5				
Unidentified bunting	*Emberiza* sp(p).		1			

Tables

Table 1. Details of survey sites and effort.

Date	Site	Type of survey	Effort
First survey - late wet-season (2012)			
29 Aug	Nong Souy	Foot and vehicle based observations from the dam.	4.00-6.15 pm
30 Aug	Ban Laonat	Foot based observations of paddy and Houay Makmi reservoir wetland edge close to village.	5.45-7.07 am
30 Aug	Pai Chiao and Ban Tamsoum area	Foot based observations of paddy and wetland edge close to village, boat based observation on P. Chiao between main B. Tamsoum landing area and the dyke.	7.45-11.30 am
31 Aug	Pai Chiao from Ban Tamsoum	Boat based observation on P. Chiao, mainly the northern half.[foot-based observation of riparian forest areas on the Xe Champhone dyke and levee (Kout Mak-Payo area), but no observations in Table 3.]	5.45 am – 1.50 pm
1 Sep	Xe Champhone	Boat based observation from Ban Kengkok to the Kout Mak-Payo area.	6.12-8.00am, 1.45-2.15 pm
1 Sep	Pai Chiao, forest etc.	Foot based observation of P. Chiao northern fringe, the Xe Champhone forested levee and the Houay Makmi reservoir dam.	8.05-1.40am, 3.50-5.45pm
2 Sep	Xe Champhone	Boat based observation between the Kout Mak-Payo and Ban Kadan areas.	1.10-2.45, 4.55-?pm
2 Sep	Xe Champhone levee and forest	Foot-based observation of riparian forest areas on the Xe Champhone dyke and levee (Kout Xehak and Kout Mak-peo areas).	5.45-7.30, ?-12.30pm
2 Sep	Habitat mosaic between the Xe Champhone and the Koutkhen reservoir (B. Kadan area)	Mainly foot based survey of remnant grassland amidst a mosaic of agriculture and secondary scrub forest and wetlands.	2.50-4.50pm
3 Sep	Pai Chiao	Boat based observation on K. Chiao, mainly the southern half.	7.25-2.00pm
3 Sep	Xe Champhone levee and forest	Foot based observation of riparian forest areas on the Xe Champhone dyke and levee (Kout Penoi and southern P. Chiao dam areas).	A couple of hours spread through the later afternoon
3 Sep	Xe Champhone	Boat based observation between the Kout Mak-peo and southern P. Chiao dam areas.	Less than an hour in the later afternoon
4 Sep	Xe Champhone	Boat based observation between the southern P. Chiao dam and Vang Hinnam areas.	7.15-8.30, 11.20-11.50am, 3.10-3.20, 5.30-5.55pm
4 Sep	Various	Early morning observations over P. Chiao from the Xe Champhone dyke. Later, short foot based surveys of two areas primarily in search of grassland habitat, firstly the area between the Xe Champhone and the Houay Talung reservoir, secondly the Thong NongOre area.	1 hr early am, 8.30-11.15am, 3.25-5.25pm
5 Sep	Thong Nong Ore	Foot based observation primarily focused on grassland areas amidst a mosaic of agriculture, forest and wetlands.	6.25-12.15pm
5 Sep	Xe Champhone	Boat based observation between the Nong Lamsakon and Vang Hinnam areas.	5.50-6.20am
6 Sep	Houay Talung reservoir from Ban Dondeng	A combination of boat and foot based observation on and around the Houay Talung reservoir	5.20-12.15pm
6 Sep	Habitat mosaic between the Xe Champhone and	Mainly foot based survey of remnant grassland amidst a mosaic of agriculture and secondary scrub	A few hours late afternoon, but heavy

Date	Site	Type of survey	Effort
	the Koutkhen reservoir (B. Kadan area)	forest and wetlands.	rain
7 Sep	Nong Souy	Boat based observation.	Predawn-2.50pm
7 Sep	Pai Bak	Foot-based observation along a small section of wetland—agriculture edge (Nong Thongbak from Ban Kengkok).	4.45-6.15pm
8 Sep	Ban Laonat	Foot based observations of paddy and Houay Makmi reservoir wetland edge close to village.	5.50-7.00am
Second survey - early wet-season (2013)			
12 June	Nong Souy	Foot and vehicle-based observation along the Nong Souy dyke.	4.05pm-dusk
13 June	Nong Souy	Boat based observation, eastern half.	5.20am-12.40pm
13 June	South of Nong Souy	Foot-based observation in low-intensity agricultural-wetland-scrub mosaic.	3.40-6.25pm
14 June	Nong Souy	Boat based observation, western half.	5.25-12.30pm
14 June	Xe Champhone	Boat based observation from Ban Kengkok to the Kout Mak-Payo area.	3.40-5.30pm
15 June	Pai Chiao	Boat based observation, mainly the central eastern area, and foot-based observation of agricultural fallow and riparian forest areas on the Xe Champhone dyke and levee (Kout Mak-Payo area).	5.15-2.30pm/2.30-4.50pm
15 June	Xe Champhone	Boat based observation between the Kout Mak-Payo area and a short way upstream.	5.15pm-dusk
16 June	Pai Chiao	Boat based observation, southern part.	5.15-10.00am
16 June	Pai Chiao	Foot-based observation from the southern dyke	10.00-3.35pm
16 June	Pai Chiao	Boat based observation, southern part.	3.35-6.35pm
17 June	Pai Chiao	Boat based observation, northern part.	5.25-7.50am
17 June	Pai Chiao	Foot-based observation in the agricultural margin around the northern edge.	8.00-11.25am
17 June	Pai Chiao	Boat based observation.	4.15-6.45pm
18 June	Xe Champhone	Boat based observation between the Kout Mak-Payo area and the Nong Lamsakon area.	5.10-7.15am / 4.55-6.05pm
18 June	Habitat mosaic between the Xe Champhone, the Houay Talung reservoir and Don Kheo	Foot-based observation in the low-intensity agricultural-wetland-grassland-forest mosaic.	7.25-4.50pm
19 June	Xe Champhone	Boat based observation between the Kout Mak-Payo area and the Ban Kadan area.	4.50-6.20am, 10.00-11.00am / 12.55-2.30pm
19 June	Habitat mosaic between the Xe Champhone and the Koutkhen reservoir (B. Kadan area)	Foot-based observation in the low-intensity agricultural-grassland-wetland-scrub mosaic.	6.35-9.15am
19 June	Habitat mosaic between the Xe Champhone and the Koutkhen reservoir (B. Kadan area)	Foot-based observation in the low-intensity agricultural-grassland-wetland-scrub mosaic.	4.00pm-?
20 June	Habitat mosaic between the Xe Champhone and the Koutkhen reservoir (B. Kadan area)	Foot-based observation in the low-intensity agricultural-wetland-scrub mosaic.	5.20-11.45am
21 June	Kout Care	Foot-based observation in the wetland-grassland-floodplain forest mosaic.	5.30-12.00pm, 4.30-5.30pm
22 June	Kout Care	Foot-based observation in the wetland-grassland-floodplain forest mosaic.	c. five hours from late morning

Date	Site	Type of survey	Effort
23 June	Ban Koutsi paddies	Foot-based observation in the low-intensity agricultural-wetland-scrub mosaic between B. Koutsi and Pai Chiao.	7.00-8.20am, 11.15-12.00pm
23 June	Pai Chiao	Boat based observation, southern part.	8.35-11.10am
24 June	Nong Louang	Boat based observation along western edge.	5.40-10.45am, 3.50-?4.30pm
24 June	Northwest of Nong Louang	Foot-based observation in the low-intensity agricultural-wetland-scrub mosaic.	12.15-3.45pm
25 June	Thong Nong Ore	Foot-based observation in the low-intensity agricultural-wetland-scrub mosaic.	7.35-?1.00pm and about 2 hrs in late afternoon
26 June	Xe Champhone	Boat based observation in a stretch with very extensive riparian tall grass upstream of Vang Hinnam.	9.55-11.25am
26 June	Xe Champhone	Boat based observation from Vang Hinnam up the lower Xe Xangxoy.	11.25-3.50pm
26 June	Nong Per-Nong Tamluang	Foot-based observation in the low-intensity agricultural-wetland mosaic.	5.15-6.30pm
27 June	Pai Bak	Boat based observation from the main dam outflow.	5.10-7.35am

Table 2. Birds recorded from the Xe Champhone wetlands.

Bird Species		Survey status	Records from other sources						
ENGLISH NAME	**SCIENTIFIC NAME**		**Bezuijen (2006)**	**JWD N. Louang**	**JWD N. Souy**	**C. Luppi**	**Platt (2012)**	**WCS CT**	**Hist. Sav.**
[Rain Quail	*Coturnix coromandelica]*	**[O]**							
Blue-breasted Quail	*Coturnix chinensis*	**O**							
Red Junglefowl	*Gallus gallus*	**LC**	x						
Green Peafowl	*Pavo muticus*								X
Lesser Whistling-duck	*Dendrocygna javanica*	**A**	x	C	210+	8	x	x	
White-winged Duck	*Cairina scutulata*								UB?
Comb Duck	*Sarkidiornis melanotos*								X
Cotton Pygmy-goose	*Nettapus coromandelianus*	**LC**			9	5-6			
Spot-billed Duck	*Anas poecilorhyncha*	**A**	x	C	70		x		
[Small Buttonquail	*Turnix sylvatica]*	**[P]**							X
Barred Buttonquail	*Turnix suscitator*	**P**							X
1. buttonquail spp.	*Turnix*	**F**		P					
Rufous Woodpecker	*Celeus brachyurus*	**O**							
White-bellied Woodpecker	*Dryocopus javensis*								X
Laced Woodpecker	*Picus vittatus*	**P**							
1. *Picus* woodpecker sp(p).	*Picus*	**LC**							
Lineated Barbet	*Megalaima lineata*	**P**		[P]					
Coppersmith Barbet	*Megalaima haemacephala*	**LC**							
Great Hornbill	*Buceros bicornis*								X
Wreathed Hornbill	*Aceros undulatus*								X
Indian Roller	*Coracias benghalensis*	**O**		P					
Common Kingfisher	*Alcedo atthis*	**SC**	x	C	2		x		
Blue-eared Kingfisher	*Alcedo meninting*	**O**							

Bird Species		Survey status	Records from other sources						
ENGLISH NAME	**SCIENTIFIC NAME**		**Bezuijen (2006)**	**JWD N. Louang**	**JWD N. Souy**	**C. Luppi**	**Platt (2012)**	**WCS CT**	**Hist. Sav.**
1. small kingfisher	*A. atthis / A. meninting*	**SC**							
Stork-billed Kingfisher	*Halcyon capensis*	**O**							
White-throated Kingfisher	*Halcyon smyrnensis*	**SC**	x						
Black-capped Kingfisher	*Halcyon pileata*	**O**		P					
1. White-throated / Black-capped Kingfisher	*Halcyon smyrnensis / pileata*	**SC**		P					
Collared Kingfisher	*Todiramphus chloris*								X!
Pied Kingfisher	*Ceryle rudis*								X
Green Bee-eater	*Merops orientalis*	**LA**			<50	many			
Blue-throated Bee-eater	*Merops viridis*				20				
Blue-tailed Bee-eater	*Merops philippinus*								X
Chestnut-headed Bee-eater	*Merops leschenaulti*		x						
Chestnut-winged Cuckoo	*Clamator coromandus*	**O**							
Plaintive Cuckoo	*Cacomantis merulinus*	**LC**							
Asian Koel	*Eudynamys scolopacea*	**O**							
Green-billed Malkoha	*Phaenicophaeus tristis*		x						
Greater Coucal	*Centropus sinensis*	**C**	x	C		a few			
Lesser Coucal	*Centropus bengalensis*	**LC**	x						
coucal	*Centropus*							x	
Alexandrine Parakeet	*Psittacula eupatria*								X
Grey-headed Parakeet	*Psittacula finschii*			P					
Blossom-headed Parakeet	*Psittacula roseata*	**O**							X
Red-breasted Parakeet	*Psittacula alexandri*	**LC**	x	LC					
swiftlet sp(p).	*Collocalia*	**P**	x						
Brown-backed Needletail	*Hirundapus giganteus*	**O**		P					
1. needletail sp(p).	*Hirundapus*	**O**							

Bird Species		Survey status	Records from other sources						
ENGLISH NAME	**SCIENTIFIC NAME**		**Bezuijen (2006)**	**JWD N. Louang**	**JWD N. Souy**	**C. Luppi**	**Platt (2012)**	**WCS CT**	**Hist. Sav.**
Asian Palm Swift	*Cypsiurus balasiensis*	**LC**		C					
Fork-tailed Swift	*Apus pacificus*	**O**							
Barn Owl	*Tyto alba*								X
Collared Scops Owl	*Otus bakkamoena*	**P-O?**	x						
Brown Fish Owl	*Ketupa zeylonensis*								X
Asian Barred Owlet	*Glaucidium cuculoides*	**P**	x	P					
Large-tailed Nightjar	*Caprimulgus macrurus*	**O (single record)**	x						
Savanna Nightjar	*Caprimulgus affinis*								X
Spotted Dove	*Streptopelia chinensis*	**C**	x	C					
Red Collared Dove	*Streptopelia tranquebarica*	**LA**		P	51				X
1. *Streptopelia* dove spp.	*Streptopelia*	**C**							
Peaceful Dove	*Geopelia striata*	**C**		P (single H)					
1. dove spp.	*Streptopelia / Geopelia*	**A**							
Yellow-footed Green Pigeon	*Treron phoenicoptera*								X
Green Imperial Pigeon	*Ducula aenea*								X
Sarus Crane	*Grus antigone*								X
Slaty-breasted Rail	*Gallirallus striatus*								X
White-breasted Waterhen	*Amaurornis phoenicurus*	**SLC**	x	P				x	
White-browed crake	*Porzana cinerea*	**LC?**			9	7-9			
Ruddy-breasted Crake	*Porzana fusca*							x	
Watercock	*Gallicrex cinerea*	**LC**			2	8		x	X
Purple Swamphen	*Porphyrio porphyrio*	**VLC**							X
Common Moorhen	*Gallinula chloropus*		x	P	13		[H]	x	
[Pintail Snipe	*Gallinago stenura]*	**[SLC]**		[P]					

Bird Species		Survey status	Records from other sources						
ENGLISH NAME	**SCIENTIFIC NAME**		**Bezuijen (2006)**	**JWD N. Louang**	**JWD N. Souy**	**C. Luppi**	**Platt (2012)**	**WCS CT**	**Hist. Sav.**
Common Snipe	*Gallinago gallinago*			P					
1. snipe sp(p).	*Gallinago*	**SLC**							
Common Greenshank	*Tringa nebularia*	**[P]**		P					
Green Sandpiper	*Tringa ochropus*	**P**	x	P					
Wood Sandpiper	*Tringa glareola*	**P**							
Common Sandpiper	*Actitis hypoleucos*	**P**		C			x		
Greater Painted-snipe	*Rostratula benghalensis*				5				X
Pheasant-tailed Jacana	*Hydrophasianus chirurgus*	**O**			33				
Bronze-winged Jacana	*Metopidius indicus*	**O**				2			X
Great Thick-knee	*Esacus recurvirostris*								X!
Black-winged Stilt	*Himantopus himantopus*	**P**							
Pacific Golden Plover	*Pluvialis fulva*	**P**		P					
Little Ringed Plover	*Charadrius dubius*	**P**		LC					
River Lapwing	*Vanellus duvaucelii*	**O**							X
Grey-headed Lapwing	*Vanellus cinereus*				9		x		
Red-wattled Lapwing	*Vanellus indicus*	**O**	x						
Oriental Pratincole	*Glareola maldivarum*	**O**							
'Herring-type' gull	*Larus* aff. *L. argentatus*			P					
River Tern	*Sterna aurantia*								X!
Black-bellied Tern	*Sterna acuticauda*								X!
Whiskered Tern	*Chlidonias hybridus*	**P**			7				
1. marsh tern sp(p).	*Chlidonias*	**LC**							
Osprey	*Pandion haliaetus*	**O (single June record)**							
[Oriental Honey-buzzard	*Pernis ptilorhyncus]*			[P]					
Black-shouldered Kite	*Elanus caeruleus*	**LC**		P	1		x		

Bird Species		Survey status	Records from other sources						
ENGLISH NAME	**SCIENTIFIC NAME**		**Bezuijen (2006)**	**JWD N. Louang**	**JWD N. Souy**	**C. Luppi**	**Platt (2012)**	**WCS CT**	**Hist. Sav.**
Black Kite	*Milvus migrans*								[X]
Brahminy Kite	*Haliastur indus*	**L**		LC					X
Lesser Fish Eagle	*Icthyophaga humilis*								X
Grey-headed Fish Eagle	*Ichthyophaga ichthyaetus*								[X]
White-rumped Vulture	*Gyps bengalensis*								X
Long-billed Vulture	*Gyps indicus*								X
Red-headed Vulture	*Sarcogyps calvus*								X
Eurasian Marsh Harrier	*Circus aeruginosus*		x						
Pied Harrier	*Circus melanoleucos*		x		[1]				
1. harrier spp.	*Circus*				6				
Shikra	*Accipiter badius*	**O**	x	P					
1. small sparrowhawk	*Accipiter*			P					
Rufous-winged Buzzard	*Butastur liventer*								X
spotted eagle	*Aquila*								X
White-rumped Falcon	*Polihierax insignis*								X
Common Kestrel	*Falco tinnunculus*			P					
2. Peregrine Falcon	*Falco peregrinus*	**O**							
Little Grebe	*Tachybaptus ruficollis*	**LC**					x		
Darter	*Anhinga melanogaster*	**LC**					x		X
Little Cormorant	*Phalacrocorax niger*	**LO**							NB
Indian Cormorant	*Phalacrocorax fuscicollis*	**LO**							
1. cormorant sp.	*P. niger / P. fuscicollis*	**O**	x						
Little Egret	*Egretta garzetta*	**SC**	x	C	2		x		
Grey Heron	*Ardea cinerea*			C			x		X
Purple Heron	*Ardea purpurea*	**LF**			5 (inc. A. and Imm.)			x	X
Great Egret	*Casmerodius albus*	**LC**	x	P	5		x		

Bird Species		Survey status	Records from other sources						
ENGLISH NAME	**SCIENTIFIC NAME**		**Bezuijen (2006)**	**JWD N. Louang**	**JWD N. Souy**	**C. Luppi**	**Platt (2012)**	**WCS CT**	**Hist. Sav.**
1. large heron spp.	*Ardea / Casmerodius*	**O**							
Intermediate Egret	*Mesophoyx intermedia*	**SLF**			5				
Cattle Egret	*Bubulcus ibis*	**LC**		C	220+		x		
1. egret spp.		**SC**			140				
3. Chinese Pond Heron	*Ardeola bacchus*	**SA**	x	C	78+		x	x	
Little Heron	*Butorides striatus*	**SLC**							
Black-crowned Night Heron	*Nycticorax nycticorax*	**O**			5+			x	
Yellow Bittern	*Ixobrychus sinensis*	**VLC**			2				
Cinnamon Bittern	*Ixobrychus cinnamomeus*	**LC**			19	6-7	x	[x]	
Black Bittern	*Dupetor flavicollis*	**LC**			11	1			
Black-headed Ibis	*Threskiornis melanocephalus*								NB
Black Ibis(White-shouldered Ibis)	*Pseudibis papillosa* davsoni								X
Giant Ibis	*Pseudibis gigantea*								X
Spot-billed Pelican	*Pelecanus philippensis*								[NB]
Painted Stork	*Mycteria leucocephala*								X
Asian Openbill	*Anastomus oscitans*	**LC**					x		
Woolly-necked Stork	*Ciconia episcopus*								X
Black-necked Stork	*Ephippiorhynchus asiaticus*								UB?
Lesser Adjutant	*Leptoptilos javanicus*								UB?
stork sp.	*Mycteria / Anastomus /Ciconia*					3			
Brown Shrike	*Lanius cristatus*	**SC**		P					
Burmese Shrike	*Lanius collurioides*	**SLO**							
Red-billed Blue Magpie	*Urocissa erythrorhyncha*	**O**							
Racket-tailed Treepie	*Crypsirina temia*	**LC**	x		3g				

Bird Species		Survey status	Records from other sources						
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Large-billed Crow	*Corvus macrorhynchos*	**C**		C	13		x	x	
Ashy Woodswallow	*Artamus fuscus*			P					
Black-naped / Slender-billed Oriole	*Oriolus chinensis / tenuirostris*			C					
[Ashy Minivet	*Pericrocrotus divaricatus]*			[P]					
Rosy / Swinhoe's / Ashy Minivet	*Pericrocrotus roseus / cantonensis / divaricatus*			C					
Pied Fantail	*Rhipidura javanica*	**LC**				c.6			
Black Drongo	*Dicrurus macrocercus*	**SLF**	x	C					
Bronzed Drongo	*Dicrurus aeneus*		x						
Spangled Drongo	*Dicrurus hottentottus*		x	P					
Greater Racket-tailed Drongo	*Dicrurus paradiseus*	**LC**	x						
Black-naped Monarch	*Hypothymis azurea*	**LC**		P					
Common Iora	*Aegithina tiphia*	**C?**							
Great Iora	*Aegithina lafresnayei*	**P**							
Eurasian Blackbird	*Turdus merula*			P					
Asian Brown Flycatcher	*Muscicapa dauurica*	**P**		C					
Red-throated Flycatcher	*Ficedula parva*			C					
White-tailed Flycatcher	*Cyornis concretus*		x						
Blue-throated Flycatcher	*Cyornis rubeculoides*		x						
1. blue flycatcher sp(p).	*Cyornis*	**LC**		P					
Grey-headed Canary Flycatcher	*Culicicapa ceylonensis*		x	C					
Oriental Magpie Robin	*Copsychus saularis*	**C?**	x						
White-rumped Shama	*Copsychus malabaricus*	**LC**	x						
Common Stonechat	*Saxicola torquata*		x	C					
Pied Bushchat	*Saxicola caprata*	**LF**		P		1			

Bird Species		Survey status	Records from other sources						
ENGLISH NAME	**SCIENTIFIC NAME**		**Bezuijen (2006)**	**JWD N. Louang**	**JWD N. Souy**	**C. Luppi**	**Platt (2012)**	**WCS CT**	**Hist. Sav.**
[Purple-backed Starling	*Sturnus sturninus]*				[1]				
White-shouldered Starling	*Sturnus sinensis*	**[O]**			9+				
1. small starling sp(p).	*Sturnus*				26				
Black-collared Starling	*Sturnus nigricollis*	**C**	x	C	63++		x		
Vinous-breasted Starling	*Sturnus burmannicus*	**S?O**							X
Common Myna	*Acridotheres tristis*	**LC**		C					
4. White-vented Myna	*Acridotheres cinereus*	**C**	x		200++		x		
1. myna / large starling spp.	*Sturnus / Acridotheres*	**C**							
Golden-crested Myna	*Ampeliceps coronatus*								X
Hill Myna	*Gracula religiosa*			P					X
[Sand Martin	*Riparia riparia]*				[14]				
Plain Martin	*Riparia paludicola*								X
Barn Swallow	*Hirundo rustica*	**SC**	x	C		many			
[Red-rumped Swallow	*Hirundo daurica]*			[P]					
1. Red-rumped / Striated Swallow	*Hirundo daurica / striolata*		x						
[house martin	*Delichon*								
Black-headed Bulbul	*Pycnonotus atriceps*	**LP**							
Sooty-headed Bulbul	*Pycnonotus aurigaster*			P					
Stripe-throated Bulbul	*Pycnonotus finlaysoni*	**LC?**							
Yellow-vented Bulbul	*Pycnonotus goiavier*	**LC**							
Streak-eared Bulbul	*Pycnonotus blanfordi*	**LC**		C					
Zitting Cisticola	*Cisticola juncidis*	**LC**							
Bright-headed Cisticola	*Cisticola exilis*	**LC**			lots each day	1			
Rufescent Prinia	*Prinia rufescens*	**LC**							
Grey-breasted Prinia	*Prinia hodgsonii*	**LP**							
Yellow-bellied Prinia	*Prinia flaviventris*	**LA**							

Bird Species		Survey status	Records from other sources						
ENGLISH NAME	**SCIENTIFIC NAME**		**Bezuijen (2006)**	**JWD N. Louang**	**JWD N. Souy**	**C. Luppi**	**Platt (2012)**	**WCS CT**	**Hist. Sav.**
Plain Prinia	*Prinia inornata*	**LA**		P		2			
white-eye sp(p).	*Zosterops*		x	P					
Asian Stubtail	*Urosphena squameiceps*		x						
Black-browed Reed Warbler	*Acrocephalus bistrigiceps*				18++				
Oriental Reed Warbler	*Acrocephalus orientalis*			P					
Thick-billed Warbler	*Acrocephalus aedon*			P					
Common Tailorbird	*Orthotomus sutorius*	**C**		P		present			
Dark-necked Tailorbird	*Orthotomus atrogularis*	**C**	x						
Dusky Warbler	*Phylloscopus fuscatus*		x	C					
1. Dusky / Radde's Warbler	*Phylloscopus fuscatus / P. schwarzi*	**O**							
Yellow-browed Warbler	*Phylloscopus inornatus*		x	C					
Greenish Warbler	*Phylloscopus trochiloides*			P					
Pale-legged / Sakhalin Leaf Warbler	*Phylloscopus tenellipes / borealoides*			P					
White-crested Laughingthrush	*Garrulax leucolophus*		x						
1. laughingthrush sp.	*Garrulax*			P					
Puff-throated Babbler	*Pellorneum ruficeps*	**LC**	x						
Striped Tit Babbler	*Macronous gularis*	**LA**	x	P					
Chestnut-capped Babbler	*Timalia pileata*	**LC**			[2]				
Yellow-eyed Babbler	*Chrysomma sinense*								X
Australasian Bushlark	*Mirafra javanica*								X
Rufous-winged Bushlark	*Mirafra assamica*								X
Australasian Bushlark / Oriental Skylark	*Mirafra javanica / Alauda gulgula*(single record)	**O?**							

Bird Species		Survey status	Records from other sources						
ENGLISH NAME	**SCIENTIFIC NAME**		**Bezuijen (2006)**	**JWD N. Louang**	**JWD N. Souy**	**C. Luppi**	**Platt (2012)**	**WCS CT**	**Hist. Sav.**
Scarlet-backed Flowerpecker	*Dicaeum cruentatum*	**C?**		P					
Brown-throated Sunbird	*Anthreptes malacensis*	**P**							
Olive-backed Sunbird	*Nectarinia jugularis*	**P**		P		1			
House Sparrow	*Passer domesticus*	**LC**	x	P					
Plain-backed Sparrow	*Passer flaveolus*	**LC**		P					
Eurasian Tree Sparrow	*Passer montanus*	**LC**		C					
Forest Wagtail	*Dendronanthus indicus*			P					
White Wagtail	*Motacilla alba leucopsis*			C					
[White Wagtail	*Motacilla alba ocularis]*			[P]					
Yellow Wagtail	*Motacilla flava*	**O**		P					
Richard's Pipit	*Anthus richardi*		x	P					
Paddyfield Pipit	*Anthus rufulus*	**LC**		P					
Olive-backed Pipit	*Anthus hodgsoni*			P					
Red-throated Pipit	*Anthus cervinus*			C					
Streaked Weaver									X
Baya Weaver	*Ploceus philippinus*	**LF**			61				
1. weaver sp(p).	*Ploceus*	**LC**							
5. sparrow / weaver spp.	*Passer / Ploceus*	**C**							
[Red Avadavat	*Amandava amandava]*	**[O]**							
White-rumped Munia	*Lonchura striata*	**O**							
Scaly-breasted Munia	*Lonchura punctulata*	**LC-F**	x	P		20			
Black-headed Munia	*Lonchura malacca*	**LO**			8	3-4			
1. munia / [avadavat] spp.	*Lonchura / [Amandava]*	**LC**							
Yellow-breasted Bunting	*Emberiza aureola*		x						

Notes

Sources. Records from different sources are given different columns. ‘Survey status’ = species status based on records from the current survey only (see status codes below). ‘JWD Nong Louang’ = species status recorded by Duckworth (2007) (status codes similar to those used for the current survey results). ‘JWD Nong Souy’ = observations from four days of survey in April 2007 (Dersu 2008, J. W. Duckworth *in litt.* 2013), numbers are the combined total for the four days. ‘C. Luppi’ = records from Nong Souy (C. Luppi *in litt.* to J. W. Duckworth 2013), numbers refer to the number of individuals recorded. Hist. Sav. = Savannakhet historical status, species recorded by David-Beaulieu (1949–1950; see also Dickinson 1970, Duckworth 2009); this is not a comprehensive list of species recorded by this author.

Provisional records are in square brackets. Where a species name is in square brackets, this indicates that all records from the surveys were provisional as were all those in other sources here traced.

Abundance and status codes: A= abundant (found many times a day); 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 = localised distribution within the site (V = very, found only at one or two sites); S = seasonal (occurrence is seasonal and during the June survey the species was either only occasional or absent); [...] = record is provisionally identified.

Savannakhet historical status: X = records consistent with probable local breeding; X! = records consistent with probable breeding in Savannakhet, but probably not in the Xe Champhon wetlands; UB? = records leave breeding status uncertain; NB = records suggest only a non-breeding visitor.

1. Includes only birds not identified to species.
2. Full masked, dark plumaged bird(s) of presumed resident race.
3. Many birds recorded were certainly this species, as were also many of the birds recorded by J. W. Duckworth *in litt.* (2013) at Nong Souy, and Duckworth (2007) at Nong Louang, although many were also not identified to species.
4. Crested Myna *A. cristatellus* may have been overlooked and included in the counts of this species.
5. Count does not include birds certainly identified as weavers.

Table 3. Counts of target species from the survey

3a. Counts of target species from survey carried out in August and September 2012

Survey site		Nong Souy	Ban Laonat	Ban Tamsum / Pai Chiao	Pai Chiao	Xe Champhone	Pai Chiao, forest etc.	Xe Champhone	Pai Chiao forest etc.	Ban Kadan grassland	Pai Chiao	Xe Champhone + forest	Xe Champhone	Various	Thong NongOre	Xe Champhone	Ban Dongdeng	Ban Kadan grassland	Nong Souy	Pai Bak--Kengkot	Ban Laonat
Date		29 Aug	30 Aug		31 Aug	1 Sept		2 Spet			3 Sept		4 Sept		5 Sept		6 Sept		7 Sept		8 Sept
ENGLISH NAME	*SCIENTIFIC NAME*																				
[Rain Quail	*Coturnix coromandelica]*																				
Blue-breasted Quail	*Coturnix chinensis*																				
Red Junglefowl	*Gallus gallus*																				
Lesser Whistling-duck	*Dendrocygna javanica*	12			14, [4]		2		[+]		17-29			12 / 2	9+		5+		44 / 5-6	4+	
Cotton Pygmy-goose	*Nettapus coromandelianus*																		1		
Spot-billed Duck	*Anas poecilorhyncha*	3	7	7-9	10, [3]		6	1			10-17			19-22	21+ / 9-13		6		24-56		
[Small Buttonquail	*Turnix sylvatica]*																				
Barred Buttonquail	*Turnix suscitator*																				
1. buttonquail spp.	*Turnix*																				
Common Kingfisher	*Alcedo atthis*	4		1	9		2		[1]	2	[5]						3, [4]		[2]		1
Blue-eared Kingfisher	*Alcedo meninting*								1								[2]				
1. small kingfisher	*A. atthis / A. meninting*																				
Stork-billed Kingfisher	*Halcyon capensis*			[1H]	[2H]		H				[4H]			1, H							
White-throated Kingfisher	*Halcyon smyrnensis*				2, [4]	3, [1]	[2+]	1, [1]	[1]		6	1		1	1		7		1		1
Black-capped Kingfisher	*Halcyon pileata*												1								
Green Bee-eater	*Merops orientalis*	13+	5+			15+	8+	10+		15+	8+			8+			3+		20+	45+	6+
Plaintive Cuckoo	*Cacomantis merulinus*	1		1	2						6+								1	1	
Asian Koel	*Eudynamys scolopacea*																				
Lesser Coucal	*Centropus bengalensis*																				

Survey site		Nong Souy	Ban Laonat	Ban Tamsum / Pai Chiao	Pai Chiao	Xe Champhone	Pai Chiao, forest etc.	Xe Champhone	Pai Chiao forest etc.	Ban Kadan grassland	Pai Chiao	Xe Champhone + forest	Xe Champhone	Various	Thong NongOre	Xe Champhone	Ban Dongdeng	Ban Kadan grassland	Nong Souy	Pai Bak--Kengkot	Ban Laonat
Date		**29 Aug**	**30 Aug**		**31 Aug**	**1 Sept**		**2 Spet**			**3 Sept**		**4 Sept**		**5 Sept**		**6 Sept**		**7 Sept**		**8 Sept**
ENGLISH NAME	***SCIENTIFIC NAME***																				
Blossom-headed Parakeet	*Psittacula roseata*																				
Red-breasted Parakeet	*Psittacula alexandri*				22+		+	[1]	+		+	+			+, [7]		+				
Spotted Dove	*Streptopelia chinensis*	4, [9+]	4	1	9+	7+, [2]		3+	3+	+	3+, [2+]			10+			many		5		+
Red Collared Dove	*Streptopelia tranquebarica*	[1]			4, [3]					2	1, [6]				2+		6+				2
Peaceful Dove	*Geopelia striata*	5+	2		2	[8]	+			3+									9+	+	3+
1. dove spp.	*Streptopelia / Geopelia*	45+															7		18		
White-breasted Waterhen	*Amaurornis phoenicurus*				3		3+		+										1		
White-browed crake	*Porzana cinerea*	1		[1]															1		
Watercock	*Gallicrex cinerea*	5								1									4		
Purple Swamphen	*Porphyrio porphyrio*																				
Common Moorhen	*Gallinula chloropus*													[c. 25]						[3]	
Pintail Snipe	*Gallinago stenura*			[7]											5+						9
1. snipe sp(p).	*Gallinago*	[15]		2							4				[1]						
Common Greenshank	*Tringa nebularia*																				13
Wood Sandpiper	*Tringa glareola*		3, [3]										1								1
Common Sandpiper	*Actitis hypoleucos*		3																1		
Pheasant-tailed Jacana	*Hydrophasianus chirurgus*																		1		
Bronze-winged Jacana	*Metopidius indicus*														1						
Black-winged Stilt	*Himantopus himantopus*		1		7+														1		
Pacific Golden Plover	*Pluvialis fulva*		3																		
Little Ringed Plover	*Charadrius dubius*		1																		
River Lapwing	*Vanellus duvaucelii*																				
Red-wattled Lapwing	*Vanellus indicus*																				
Oriental Pratincole	*Glareola maldivarum*	[5]																	2		sev.

Survey site		Nong Souy	Ban Laonat	Ban Tamsum / Pai Chiao	Pai Chiao	Xe Champhone	Pai Chiao, forest etc.	Xe Champhone	Pai Chiao forest etc.	Ban Kadan grassland	Pai Chiao	Xe Champhone + forest	Xe Champhone	Various	Thong NongOre	Xe Champhone	Ban Dongdeng	Ban Kadan grassland	Nong Souy	Pai Bak--Kengkot	Ban Laonat
Date		**29 Aug**	**30 Aug**		**31 Aug**	**1 Sept**		**2 Spet**			**3 Sept**		**4 Sept**		**5 Sept**		**6 Sept**		**7 Sept**		**8 Sept**
ENGLISH NAME	***SCIENTIFIC NAME***																				
Whiskered Tern	*Chlidonias hybridus*																				145
1. marsh tern sp(p).	*Chlidonias*	8+		3	1						22										
Osprey	*Pandion haliaetus*													2					2		1
Black-shouldered Kite	*Elanus caeruleus*			1	2+						1		1 (adult)								
Brahminy Kite	*Haliastur indus*			1	1-3		1				3				2						
Shikra	*Accipiter badius*					2															
2. Peregrine Falcon	*Falco peregrinus*														2				3+		
Little Grebe	*Tachybaptus ruficollis*				2								1								
Darter	*Anhinga melanogaster*			1	2						12										
Little Cormorant	*Phalacrocorax niger*																				
Indian Cormorant	*Phalacrocorax fuscicollis*																				
1. cormorant sp.	*P. niger / P. fuscicollis*																				
Little Egret	*Egretta garzetta*	18+, [26]	11		3+, [2]			5+			1				3		[3]		12, [3]		24
Grey Heron	*Ardea cinerea*																				
Purple Heron	*Ardea purpurea*				2-3																
Great Egret	*Casmerodius albus*	3	1	[1]	5+						2						1		16+		
1. large heron spp.	*Ardea / Casmerodius*																				
Intermediate Egret	*Mesophoyx intermedia*	1	2		1											[1]			[1]		
Cattle Egret	*Bubulcus ibis*	1	1		1, [1]	9		5+							24+		1		61+		23
1. egret spp.		93+	17	1	3			15+			29			21+					45+		87
[Chinese] Pond Heron	*Ardeola [bacchus]*	24	52	1	67+	7+		1			15			12	3+	1	1		10	1	47+
[Javan Pond Heron	*Ardeola speciosa]*																				
Little Heron	*Butorides striatus*					1		2					1		1	2					
Black-crowned Night Heron	*Nycticorax nycticorax*																		16+		
Yellow Bittern	*Ixobrychus sinensis*																		11		
Cinnamon Bittern	*Ixobrychus cinnamomeus*	10+	4	8			1				6			1					19	3	4

Survey site		Nong Souy	Ban Laonat	Ban Tamsum / Pai Chiao	Pai Chiao	Xe Champhone	Pai Chiao, forest etc.	Xe Champhone	Pai Chiao forest etc.	Ban Kadan grassland	Pai Chiao	Xe Champhone + forest	Xe Champhone	Various	Thong NongOre	Xe Champhone	Ban Dongdeng	Ban Kadan grassland	Nong Souy	Pai Bak-Kengkot	Ban Laonat
Date		29 Aug	30 Aug		31 Aug	1 Sept		2 Spet			3 Sept		4 Sept		5 Sept		6 Sept		7 Sept		8 Sept
ENGLISH NAME	***SCIENTIFIC NAME***																				
Black Bittern	*Dupetor flavicollis*	5+		4	5		2	1			6			2			1		3		
Asian Openbill	*Anastomus oscitans*			1	7-17	1		16			14-24 / 10	6	1	3		5	1				
Brown Shrike	*Lanius cristatus*		1		6+	1				1					1, [1]				8	1	1
Burmese Shrike	*Lanius collurioides*		1							1											
Red-billed Blue Magpie	*Urocissa erythrorhyncha*																				
Racket-tailed Treepie	*Crypsirina temia*				2	8+	4+			1	3+						3+		+		
Large-billed Crow	*Corvus macrorhynchos*	20+			2	2+	4+		+		3			3+	7-11				5+	4+	1
Black Drongo	*Dicrurus macrocercus*				9	1		4			2								1		2
Pied Bushchat	*Saxicola caprata*	1	2	1						1					1						1
White-shouldered Starling	*Sturnus sinensis*																		[2+]		
Black-collared Starling	*Sturnus nigricollis*	27+	13+	3+	2	9+		3+									2+, [2]	p	4+, [2]	1	5, [7+]
Vinous-breasted Starling	*Sturnus burmannicus*																			1, [10+]	2
Common Myna	*Acridotheres tristis*		6, [5]	4		12				10									10, [2+]	7	5
3.White-vented Myna	*Acridotheres cinereus*	43+	8	12	9	3	3+	+			36+, [3]								36+		15+
1. myna / large starling spp.	*Sturnus / Acridotheres*	46+	4																6+		5+
Barn Swallow	*Hirundo rustica*	26+, [50+]	24+, [25+]	12+	7+		2			50	12+								8+	2+	19+
Northern House Martin	*Delichon urbica*	[+]																			
Zitting Cisticola	*Cisticola juncidis*	3+	3	+															+		many
Bright-headed Cisticola	*Cisticola exilis*																				
Rufescent Prinia	*Prinia rufescens*					+	+										p				
Grey-breasted Prinia	*Prinia hodgsonii*														3+		3+			+	
Yellow-bellied Prinia	*Prinia flaviventris*						+	2+							2+						
Plain Prinia	*Prinia inornata*	+			v. many		many		+	many	+				+		6+			+	sev.
Dusky / Radde's Warbler	*Phylloscopus fuscatus / P. schwarzi*	+																			
Chestnut-capped	*Timalia pileata*																				

Survey site		Nong Souy	Ban Laonat	Ban Tamsum / Pai Chiao	Pai Chiao	Xe Champhone	Pai Chiao, forest etc.	Xe Champhone	Pai Chiao forest etc.	Ban Kadan grassland	Pai Chiao	Xe Champhone + forest	Xe Champhone	Various	Thong NongOre	Xe Champhone	Ban Dongdeng	Ban Kadan grassland	Nong Souy	Pai Bak-Kengkot	Ban Laonat
Date		**29 Aug**	**30 Aug**		**31 Aug**	**1 Sept**		**2 Spet**			**3 Sept**		**4 Sept**		**5 Sept**		**6 Sept**		**7 Sept**		**8 Sept**
ENGLISH NAME	***SCIENTIFIC NAME***																				
Babbler																					
Australasian Bushlark / Oriental Skylark	*Mirafra javanica / Alauda gulgula*																				
House Sparrow	*Passer domesticus*	30+	50																		
Plain-backed Sparrow	*Passer flaveolus*						3+				1, [2]								5+		5+
Eurasian Tree Sparrow	*Passer montanus*		10+																		
Yellow Wagtail	*Motacilla flava*																				1
Paddyfield Pipit	*Anthus rufulus*		3, [1]	1																	sev.
Baya Weaver	*Ploceus philippinus*																				
4. Baya Weaver nest																					
1. weaver sp(p).	*Ploceus*	8, [20]																			
5. sparrow / weaver spp.	*Passer / Ploceus*	40+	7+																15+	62	13+
[Red Avadavat	*Amandava amandava]*														[4+]			[31+]			
White-rumped Munia	*Lonchura striata*																				
Scaly-breasted Munia	*Lonchura punctulata*	15									3								2+	15+	
Black-headed Munia	*Lonchura malacca*																				
1. munia / [avadavat] spp.	*Lonchura / [Amandava]*	10+								3	12								3	2, [2]	3

3b. Counts of target species from survey carried out in June 2013

Survey Site		N. Souy	N. souy	Nong Souy agri-mosaic	N. Souy	Xe Champhone	P. Chiao	Xe Champhone	P. Chiao	P. Chiao dyke	P. Chiao	P. Chiao	P. Chiao paddies	P. Chiao	Xe Champhone, am / pm	Ban Dondeng agri-mosaic	Xe Champhone	Ban Kadan agri-mosaic am	Ban Kadan agri-mosaic, pm	Ban Kadan agri-mosaic	K. Care	K. Care	B. Koutsi paddies	P. Chiao	N. Louang	N. Louang agri-mosaic	Thong NongOre	Xe Champhone grass	Xe Champhone	Nong Per agri-mosaic	Pia Bak
Date		12 June	13 June		14 June		15 June		16 June			17 June			18 June		19 June				20 June	21 June	22 June	23 June		24 June		25 June	26 June			27 June
ENGLISH NAME	SCIENTIFIC NAME																														
[Rain Quail	*Coturnix coromandelica]*															[1]															
Blue-breasted Quail	*Coturnix chinensis*																										2				
Red Junglefowl	*Gallus gallus*														3		5											2	8		
Lesser Whistling-duck	*Dendrocygna javanica*	26-34	45-67 / 15	80+	93-150		23 / 175-200	7	100 - 146	10 +	29-35	13	2	13 / 350-470	21 / 1		2	1	2	2	29 / 19	2	5 / 3	7	12-19		4	3	4	36	6-8
Cotton Pygmy-goose	*Nettapus coromandelianus*	2	10	3	9		19		15-19	6	14			10									2	4	6		4			2	2
Spot-billed Duck	*Anas poecilorhyncha*	4-8	27 / 8	11	22	1	9-19 / 6	3	44-77	2	22	1	10	19								2	1	7-8	9-22		6			14	2
[Small Buttonquail	*Turnix sylvatica]*																									[1]					
Barred Buttonquail	*Turnix suscitator*																		1												
1. buttonquail spp.	*Turnix*															[2]				1 & 1							[2]				
Common Kingfisher	*Alcedo atthis*																														
Blue-eared Kingfisher	*Alcedo meninting*																														
1. small kingfisher	*A. atthis / A. meninting*					1											1														
Stork-billed Kingfisher	*Halcyon capensis*								[H]																		[H]				
White-throated Kingfisher	*Halcyon smyrnensis*														- / 1								[H]		1, [H]						
Black-capped Kingfisher	*Halcyon pileata*																														
Green Bee-eater	*Merops orientalis*	7g	14g	3g	3g	40g	2g		6g	sev. g	3g	8g	3g		v. many					5g			1g	3g		p	4g				9g
Plaintive Cuckoo	*Cacomantis merulinus*	1	1		2		2		2		2		1					p													1
Asian Koel	*Eudynamys scolopacea*															1											1		1		
Lesser Coucal	*Centropus bengalensis*	5+	7+		8		3 / 2		9		5	4			2									3	3			1			
Blossom-headed Parakeet	*Psittacula roseata*																									17+					
Red-breasted Parakeet	*Psittacula alexandri*						60 / +			3+	35	95	3	6	8 / 60 +	1+	14			2+	4		H		174	40	1+/1+	2			
Spotted Dove	*Streptopelia chinensis*	2+		5			10+ / 2		4+, [4]	p	2+	10	6+		15+ / sev.		many		12+					1	10	1+, [1+]	[2]	1	2, [2 3]		5+
Red Collared Dove	*Streptopelia tranquebarica*	3+	5+, [8+]	200			75					56, [30 +]	8					29		- / 43				2		106		[1]	20		
Peaceful Dove	*Geopelia striata*	4	1	8	1		6		14				18					p		5+						2					3

Survey Site		N. Souy	N. souy	Nong Souy agri-mosaic	N. Souy	Xe Champhone	P. Chiao	Xe Champhone	P. Chiao	P. Chiao dyke	P. Chiao	P. Chiao	P. Chiao paddies	P. Chiao	Xe Champhone, am / pm	Ban Dondeng agri-mosaic	Xe Champhone	Ban Kadan agri-mosaic am	Ban Kadan agri-mosaic, pm	Ban Kadan agri-mosaic	K. Care	K. Care	B. Koutsi paddies	P. Chiao	N. Louang	N. Louang agri-mosaic	Thong NongOre	Xe Champhone grass	Xe Champhone	Nong Per agri-mosaic	Pia Bak
Date		12 June	13 June		14 June		15 June		16 June			17 June			18 June		19 June				20 June	21 June	22 June	23 June		24 June		25 June	26 June			27 June
ENGLISH NAME	*SCIENTIFIC NAME*																														
1. dove spp.	*Streptopelia / Geopelia*	23+				3	6					60																			
White-breasted Waterhen	*Amaurornis phoenicurus*	2					1					1		sev. H										H							
White-browed crake	*Porzana cinerea*		1, [1]								2	1		1																	2
Watercock	*Gallicrex cinerea*	8+	6+	4+	3		4		1		7	3	3	8						- / 1				6	2		2			3	
Purple Swamphen	*Porphyrio porphyrio*		18 / 3		26																										7
Common Moorhen	*Gallinula chloropus*																														
Pintail Snipe	*Gallinago stenura*																														
1. snipe sp(p).	*Gallinago*																														
Common Greenshank	*Tringa nebularia*																														
Wood Sandpiper	*Tringa glareola*																														
Common Sandpiper	*Actitis hypoleucos*																														
Pheasant-tailed Jacana	*Hydrophasianus chirurgus*	1			1																										
Bronze-winged Jacana	*Metopidius indicus*																														
Black-winged Stilt	*Himantopus himantopus*																														
Pacific Golden Plover	*Pluvialis fulva*																														
Little Ringed Plover	*Charadrius dubius*																														
River Lapwing	*Vanellus duvaucelii*																												3		
Red-wattled Lapwing	*Vanellus indicus*	[H]																							H / 6			H			
Oriental Pratincole	*Glareola maldivarum*		[3+]		5+																										
Whiskered Tern	*Chlidonias hybridus*				3																										
1. marsh tern sp(p).	*Chlidonias*	20+	3		4+				4-8																						
Osprey	*Pandion haliaetus*														1																
Black-shouldered Kite	*Elanus caeruleus*	1	5	3			1		3		3-4	1		2				1		1			1	2-3			1				
Brahminy Kite	*Haliastur indus*						2 / 3		5	2+	1													2			1(imm.)				
Shikra	*Accipiter badius*																	1											1		
2. Peregrine Falcon	*Falco peregrinus*						1				1																				
Little Grebe	*Tachybaptus ruficollis*				2g		10g		7g		9g	2g		4g										2g			3g				1g
Darter	*Anhinga melanogaster*						27-34		35-37	6	17-33	8	1+	59-72										5-9							

Survey Site		N. Souy	N. souy	Nong Souy agri-mosaic	N. Souy	Xe Champhone	P. Chiao	Xe Champhone	P. Chiao	P. Chiao dyke	P. Chiao	P. Chiao	P. Chiao paddies	P. Chiao	Xe Champhone, am / pm	Ban Dondeng agri-mosaic	Xe Champhone	Ban Kadan agri-mosaic am	Ban Kadan agri-mosaic, pm	Ban Kadan agri-mosaic	K. Care	K. Care	B. Koutsi paddies	P. Chiao	N. Louang	N. Louang agri-mosaic	Thong NongOre	Xe Champhone grass	Xe Champhone	Nong Per agri-mosaic	Pia Bak
Date		12 June	13 June		14 June		15 June		16 June			17 June			18 June		19 June			20 June	21 June	22 June	23 June		24 June		25 June	26 June			27 June
ENGLISH NAME	*SCIENTIFIC NAME*																														
Little Cormorant	*Phalacrocorax niger*						1																								
Indian Cormorant	*Phalacrocorax fuscicollis*						3		1																						
1. cormorant sp.	*P. niger / P. fuscicollis*										1		1																		
Little Egret	*Egretta garzetta*				2						1																				
Grey Heron	*Ardea cinerea*																														
Purple Heron	*Ardea purpurea*						[1]				1		1					1													
Great Egret	*Casmerodius albus*				3 [3]		20 / 3		12-20		7-10	[8]		5			3		2	2				2							[3]
1. large heron spp.	*Ardea / Casmerodius*						1										2														
Intermediate Egret	*Mesophoyx intermedia*				1																										
Cattle Egret	*Bubulcus ibis*		63+		12		4					[20]					1	8						4			20				55+
1. egret spp.			22		60															1											
[Chinese] Pond Heron	*Ardeola [bacchus]*																														
[Javan Pond Heron	*Ardeola speciosa]*																			1											
Little Heron	*Butorides striatus*																1														
Black-crowned Night Heron	*Nycticorax nycticorax*																														
Yellow Bittern	*Ixobrychus sinensis*	1+	24	1	13		1																								
Cinnamon Bittern	*Ixobrychus cinnamomeus*	6+	30+	8	32+		14		9		13	3	3				2		1					5	1	1	p				10, [2]
Black Bittern	*Dupetor flavicollis*	2+	9	4	2+	1	2	1	7		2	14	3		- / 1		2		1		[1]		1	2			p				2
Asian Openbill	*Anastomus oscitans*						17-33 / 34	37	12		117	2	2	44	3 / 1		63			71				10							
Brown Shrike	*Lanius cristatus*																														
Burmese Shrike	*Lanius collurioides*																									1					

Survey site		N. Souy	N. souy	Nong Souy agri-mosaic	N. Souy	Xe Champhone	P. Chiao	Xe Champhone	P. Chiao	P. Chiao dyke	P. Chiao	P. Chiao	P. Chiao paddies	P. Chiao	Xe Champhone, am / pm	Ban Dondeng agri-mosaic	Xe Champhone	Ban Kadan agri-mosaic am	Ban Kadan agri-mosaic, pm	Ban Kadan agri-mosaic	K. Care	K. Care	B. Koutsi paddies	P. Chiao	N. Louang	N. Louang agri-mosaic	Thong NongOre	Xe Champhone grass	Xe Champhone	Nong Per agri-mosaic	Pia Bak
Date		12 June	13 June		14 June		15 June		16 June			17 June			18 June		19 June			20 June	21 June	22 June	23 June		24 June		25 June	26 June			27 June
ENGLISH NAME	*SCIENTIFIC NAME*																														
Red-billed Blue Magpie	*Urocissa erythrorhyncha*																										1g				
Racket-tailed Treepie	*Crypsirina temia*	2g				5g	7g / 4g	sev . g		sev . g	5g		1g		1g / sev. g	1g		p			p				p			1g			2g
Large-billed Crow	*Corvus macrorhynchos*	10	1	3		2	1 / 1 / 1	5		1+	5		3		4	3+ / 2		1		4+					3	2+	1 / 3	2	6+ / 19		3+
Black Drongo	*Dicrurus macrocercus*																														
Pied Bushchat	*Saxicola caprata*		1																								3				
White-shouldered Starling	*Sturnus sinensis*																														
Black-collared Starling	*Sturnus nigricollis*	5+	7+ [4+]	p	3		20 / p		13		1	1	4			2	3 [3]			2				1	3	5	1				
Vinous-breasted Starling	*Sturnus burmannicus*																														
Common Myna	*Acridotheres tristis*	1+	1 / 9		5+	5														2				6		3+	1+		1	1	
3. White-vented Myna	*Acridotheres cinereus*	[18]	[4] / 2		12	1	15+ / 6	7	50	4+	7	8	10		10, [2] / 2		8		8						2						
1. myna / large starling spp.	*Sturnus / Acridotheres*	3+					20+					1				p	12			7+	2				2+				3+	14	
Barn Swallow	*Hirundo rustica*		6 [1]		2+, [2]																										

Survey site		N. Souy	N. souy	Nong Souy agri-mosaic	N. Souy	Xe Champhone	P. Chiao	Xe Champhone	P. Chiao	P. Chiao dyke	P. Chiao	P. Chiao	P. Chiao paddies	P. Chiao	Xe Champhone, am / pm	Ban Dondeng agri-mosaic	Xe Champhone	Ban Kadan agri-mosaic am	Ban Kadan agri-mosaic, pm	Ban Kadan agri-mosaic	K. Care	K. Care	B. Koutsi paddies	P. Chiao	N. Louang	N. Louang agri-mosaic	Thong NongOre	Xe Champhone grass	Xe Champhone	Nong Per agri-mosaic	Pia Bak
Date		12 June	13 June		14 June		15 June		16 June			17 June			18 June		19 June			20 June	21 June	22 June	23 June		24 June		25 June	26 June			27 June
ENGLISH NAME	*SCIENTIFIC NAME*																														
Northern House Martin	*Delichon urbica*																														
Zitting Cisticola	*Cisticola juncidis*			4			2		2, [2]		3		6							1				2		1	1			1	1
Bright-headed Cisticola	*Cisticola exilis*		3		8		12		10		6+	6				many		many		11 / sev.	many		p	11			3	2		3	2
Rufescent Prinia	*Prinia rufescens*															many		sev.		8+	p						4				
Grey-breasted Prinia	*Prinia hodgsonii*																			[+]											
Yellow-bellied Prinia	*Prinia flaviventris*						p		p				8			p / many		many		6 / many	many			1	1	p	6			p	
Plain Prinia	*Prinia inornata*	3+	15 +		8	[1]	20 / 2		29		12	28	9			p		many		6			p	13	1	1	5	4		3	13
Dusky / Radde's Warbler	*Phylloscopus fuscatus / P. schwarzi*																														
Chestnut-capped Babbler	*Timalia pileata*		1g				1g			1 g					3g		- / 1g	2g	6g	3g / 1g								3g			
Australasian Bushlark / Oriental Skylark	*Mirafra javanica / Alauda gulgula*															2															
House Sparrow	*Passer domesticus*																														
Plain-backed Sparrow	*Passer flaveolus*		6+	3	2		6 / 4		1		2+	1+	8+					many		4g											1
Eurasian Tree Sparrow	*Passer montanus*																														
Yellow Wagtail	*Motacilla flava*																														
Paddyfield Pipit	*Anthus rufulus*	1	4+										2			2				5+					2+	p				3+	3
Baya Weaver	*Ploceus philippinus*						- / 3+	2		2 +					1+	7+												5+			
4. Baya Weaver nest		4		1+				3 / 1							- / 3	2+															
1. weaver sp(p).	*Ploceus*	2	7+	9			8 / 17		1		1+				- / 2+																
5. sparrow / weaver spp.	*Passer / Ploceus*	50+	22						7		8	[14]	20 +											7			4 +				35 +
[Red Avadavat	*Amandava amandava]*																														
White-rumped Munia	*Lonchura striata*			3														4+, [2]			1+										
Scaly-breasted Munia	*Lonchura punctulata*			102			1+													3+			3			2+	1 +			4+	3+
Black-headed Munia	*Lonchura malacca*		[1]				2		2																						
1. munia / [avadavat] spp.	*Lonchura / [Amandava]*	7	5															12+												3	15 0+

Notes:

Sites are the same as those listed in Table 1.

1. Includes only birds not identified to species.
2. Full masked, dark plumaged bird(s) of presumed resident race.
3. Crested Myna *A. cristatellus* may have been overlooked and included in the counts of this species.
4. Count is only for nests observed.
5. Count does not include birds certainly identified as weavers.

Codes: + = 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; g = group, and signifies that the count is the number of 'groups' observed, used only for those species having strong grouping tendencies; p = present, but not counted; (v.) many = (very) many individuals recorded but not counted; sev. = several individuals recorded but not counted; / = 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.

Table 4. Species not recently recorded from the Xe Champhone wetlands that at least historically may have formerly bred regularly.

ENGLISH NAME	***SCIENTIFIC NAME***
Green Peafowl	*Pavo muticus*
White-winged Duck	*Cairina scutulata*
Comb Duck	*Sarkidiornis melanotos*
Collared Kingfisher	*Todiramphus chloris*
Pied Kingfisher	*Ceryle rudis*
Blue-tailed Bee-eater	*Merops philippinus*
Barn Owl	*Tyto alba*
Grass Owl	*Tyto capensis*
Brown Fish Owl	*Ketupa zeylonensis*
Tawny Fish Owl	*Ketupa flavipes*
Buffy Fish Owl	*Ketupa ketupu*
Spotted Wood Owl	*Strix seloputo*
Indian Nightjar	*Caprimulgus asiaticus*
Savanna Nightjar	*Caprimulgus affinis*
Sarus Crane	*Grus antigone*
Masked Finfoot	*Heliopais personata*
Eurasian Thick-knee	*Burhinus oedicnemus*
River Tern	*Sterna aurantia*
Black-bellied Tern	*Sterna acuticauda*
Black Kite	*Milvus migrans*
White-bellied Sea Eagle	*Haliaeetus leucogaster*
Lesser Fish Eagle	*Icthyophaga humilis*
Grey-headed Fish Eagle	*Ichthyophaga ichthyaetus*

ENGLISH NAME	***SCIENTIFIC NAME***
White-rumped Vulture	*Gyps bengalensis*
1. Slender-billed Vulture	*Gyps tenuirostris*
Red-headed Vulture	*Sarcogyps calvus*
Great Cormorant	*Phalacrocorax carbo*
Glossy Ibis	*Plegadis falcinellus*
Black-headed Ibis	*Threskiornis melanocephalus*
2. White-shouldered Ibis	*Pseudibis davisoni*
Giant Ibis	*Pseudibis gigantea*
Spot-billed Pelican	*Pelecanus philippensis*
Painted Stork	*Mycteria leucocephala*
Woolly-necked Stork	*Ciconia episcopus*
Black-necked Stork	*Ephippiorhynchus asiaticus*
Lesser Adjutant	*Leptoptilos javanicus*
Greater Adjutant	*Leptoptilos dubius*
Long-tailed Shrike	*Lanius schach*
Chestnut-tailed Starling	*Sturnus malabaricus*
Asian Pied Starling	*Sturnus contra*
Plain Martin	*Riparia paludicola*
Striated Grassbird	*Megalurus palustris*
Rufous-rumped Grassbird	*Graminicola bengalensis*
Yellow-eyed Babbler	*Chrysomma sinense*
Streaked Weaver	*Ploceus manyar*
Asian Golden Weaver	*Ploceus hypoxanthus*

Notes:

The table lists only those species thought to have a strong association with wetlands or in a small number of cases open country habitat including agricultural lands. Specifically species with a forest association, including those characteristic of Deciduous Dipterocarp Forest and not showing any particular close affinity with wetlands or localised open habitat niches are not included. It should be noted however than many forest species have clearly been extirpated. Notable absences (in the sense of species whose status it was difficult to predict prior to the survey) from the forest bird communities found during the surveys included hornbills, White-bellied Woodpecker *Dryocopus javensis*, Black-headed Woodpecker *Picus erythropygius*, Great Slaty Woodpecker *Mulleripicus pulverulentus*, Chestnut-headed Bee-eater *Merops leschenaultia*, green pigeons *Treron*, and Hill Myna *Gracula religiosa*.

1. Called Long-billed Vulture *Gyps indicus* by Inskipp et al. (1996).
2. Called Black Ibis *Pseudibis papillosa* in Inskipp et al. (1996).

Table 5. Localities mentioned in the text.

Map name	Name in local use	Other names, spelling variations	Notes
Villages and districts			
B. Bungxang	Ban Bungxang		
B. Dondeng (B. Hang)	Ban Dondeng		
B. Dongboun	Ban Dongboun	Ban Dong Boun, Ban Dong Boone (Platt 2012)	
B. Dongmuang	Ban Dongmuang		
B. Dongsavang-Thong	?		
B. Donyanong	Ban Don		
B. Kadan	Ban Kadan		
B. Kengkok	Ban Kengkok	Keng Kok (Platt 2012)	
B. Kengpoun	Ban Kengpoun		
B. Koutsi	Ban Kouthe		
B. Lahanam	Ban Lahanam		
B. Laonat	Ban Laonat		
B. Sagnek-Nua	Ban Nonglouang		
B. Tansoum	Ban Tansoum	Tan Soun Village (Platt 2012)	
B. Xakhun-Nua	Ban Sac-kun		
M. Champhone	Muang Champhone		
[no name]	Muang Samkhon		
[no name]	Muang Xounabouli		
Wetlands (including rivers)			
[no name]	Bung Sangha Claridge (1996)		
[no name]	Don Kheo		East of Houay Talung
[no name]	Hong Sumhong		
[H. Makmi]	Houay Makmi		Houay Makmi reservoir
[no name]	Houay Talung		Houay Talung reservoir
Nong Datphon	Dan Pun		
[no name]	Kout Care		
Kout Hi	?		
Kout Bakkok	Kout Kok (Bezuijen et al. 2006, 2013)	Kout Koke (Bezuijen et al. 2006, 2013); Kout Koke oxbow lake (Platt 2012)	
Kout Koang	Kout Koang Gnai	Kout Kouang Gnai, Kout Kouang Ngai (Bezuijen et al. 2006, 2013); Kout Kouang oxbow lake (Platt 2012)	
[no name]	Kout Mak-peo	Kout Mak-payo, Kout Mak Peo, Mark Peo (Bezuijen et al. 2006, 2013); Kout Mark Peo oxbow lake, [Kout Mapelle?] (Platt 2012)	
[no name]	Kout Noy(Bezuijen et al. 2006, 2013)		

Map name	Name in local use	Other names, spelling variations	Notes
[no name]	Kout Penoi	Kout Phinoy (Bezuijen et al. 2006, 2013), Kout Penoi oxbow lake (Platt 2012)	
[no name]	Kout Tao (Bezuijen et al. 2006, 2013)		
[no name]	Kout Xehak	Kout Xehat, [Xe Hat, Xe Hack] (Bezuijen et al. 2006, 2013),	
[no name]	Kout Xelat Kadan	Xelat Kadan 'lake' (Platt 2012)	
[no name]	Nong Arr		Part of Nong Koutkhen
Nong Deun	?		
[Nong Koutkhen]	Nong Koutkhen	Kout Kaen (Bezuijen et al. 2006, 2013, Platt 2012)	Koutkhen reservoir
[no name]	Nong Lamsakon		
Nong Louang	Nong Louang		
N. Meyairlang	Nong Meyairlang		Part of Pai Bak
Nong Mong	Nong Mong		
Nong Peng	Nong Pa-lan		
[no name]	Nong Per / Nong Tamluang		
[no name]	Nong Pooheye		
[no name]	Nong Poohhong-Khangseng		
[Houay Souy (Agk N.)]	Nong Souy		Nong Souy reservoir
[Nong Thongbak]	Pai Bak	Buk lake (Platt 2012)	Pai Bak reservoir
[H. Chiao]	Pai Chee-oo [Kout Chiao, Nong Chiao]	Pai Cheo reservoir (Bezuijen et al. 2006, 2013); Kout Jiek (Platt 2012); [Houay Chiao (Claridge 1996)]	Pai Chiao reservoir
[no name]	Pai Sainongtum reservoir		
[no name]	Thong NongOre		Also includes Nong Pen
[no name]	Vang Hinnam		
Xe Banghiang	Xe Banghiang		
Xe Champhone	Xe Champon		
Xe Noy	?		
Xe Xangxoy	Xe Samsoy		

Notes:

Brackets ([..]) indicate that the named wetland feature on the maps is not directly equivalent to the wetland feature present at the time of the survey. A question mark indicates that the local name was not established during the survey.

Maps

Figure 1. Current Ramsar site location and boundaries.

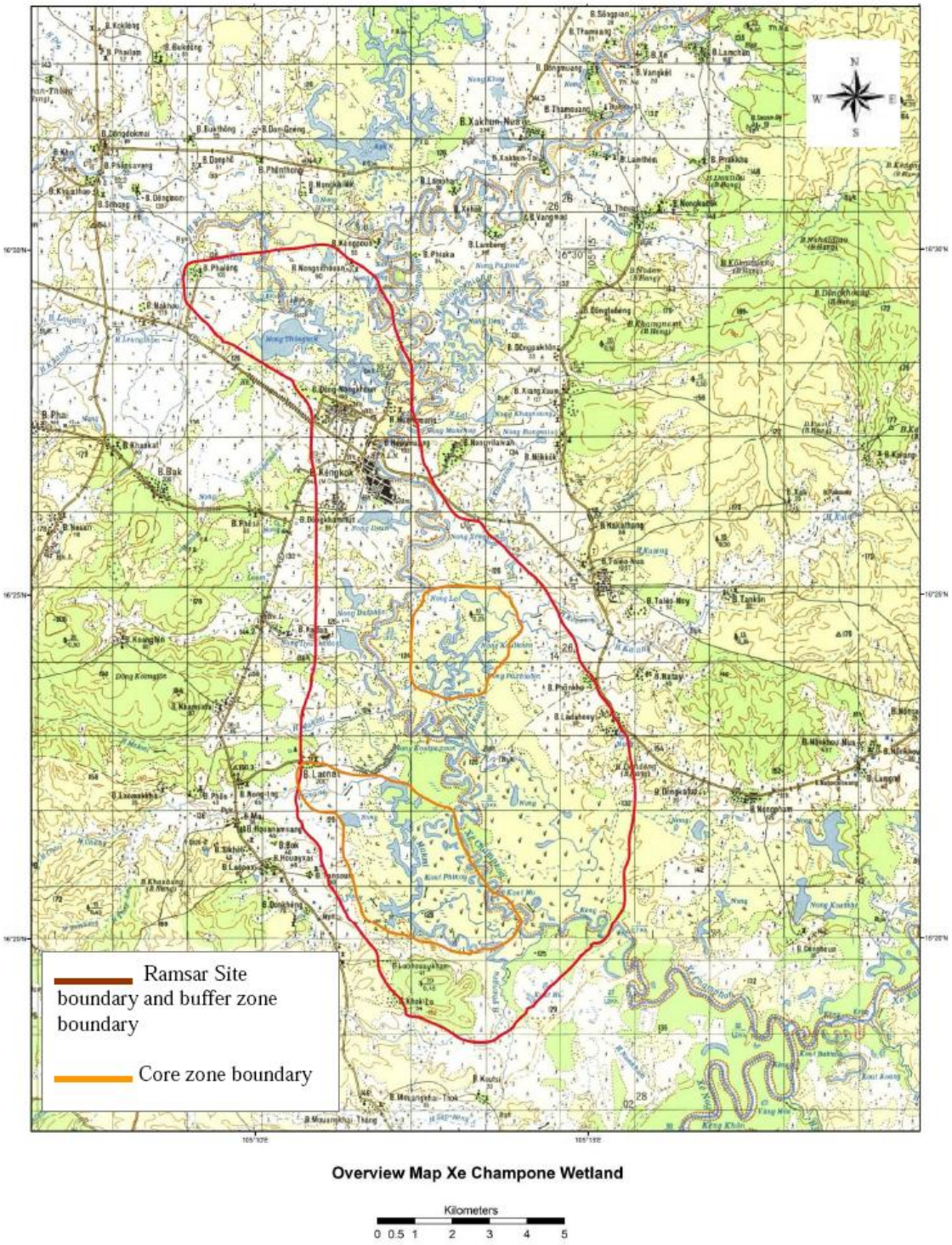


Figure 2. Survey routes.

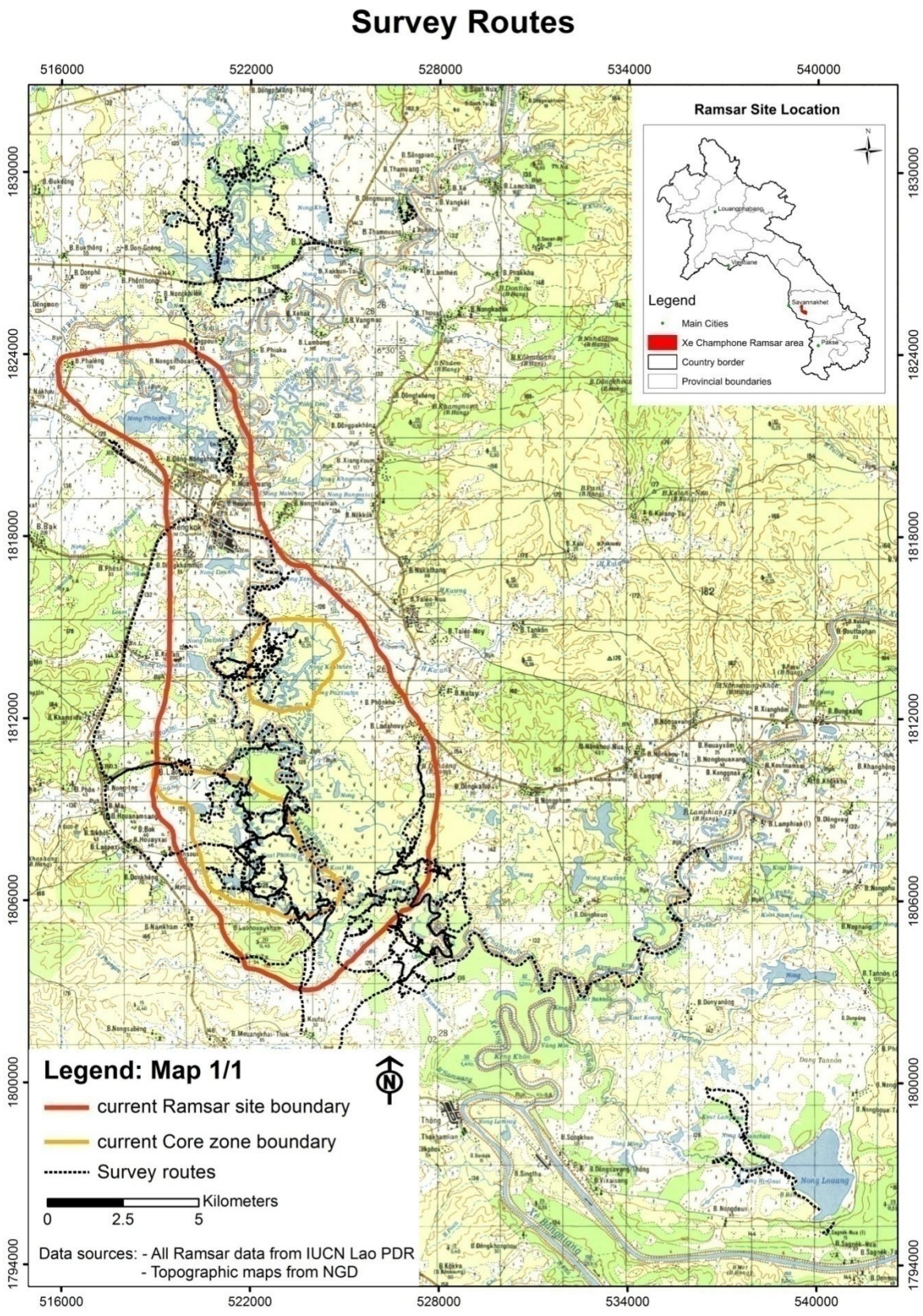
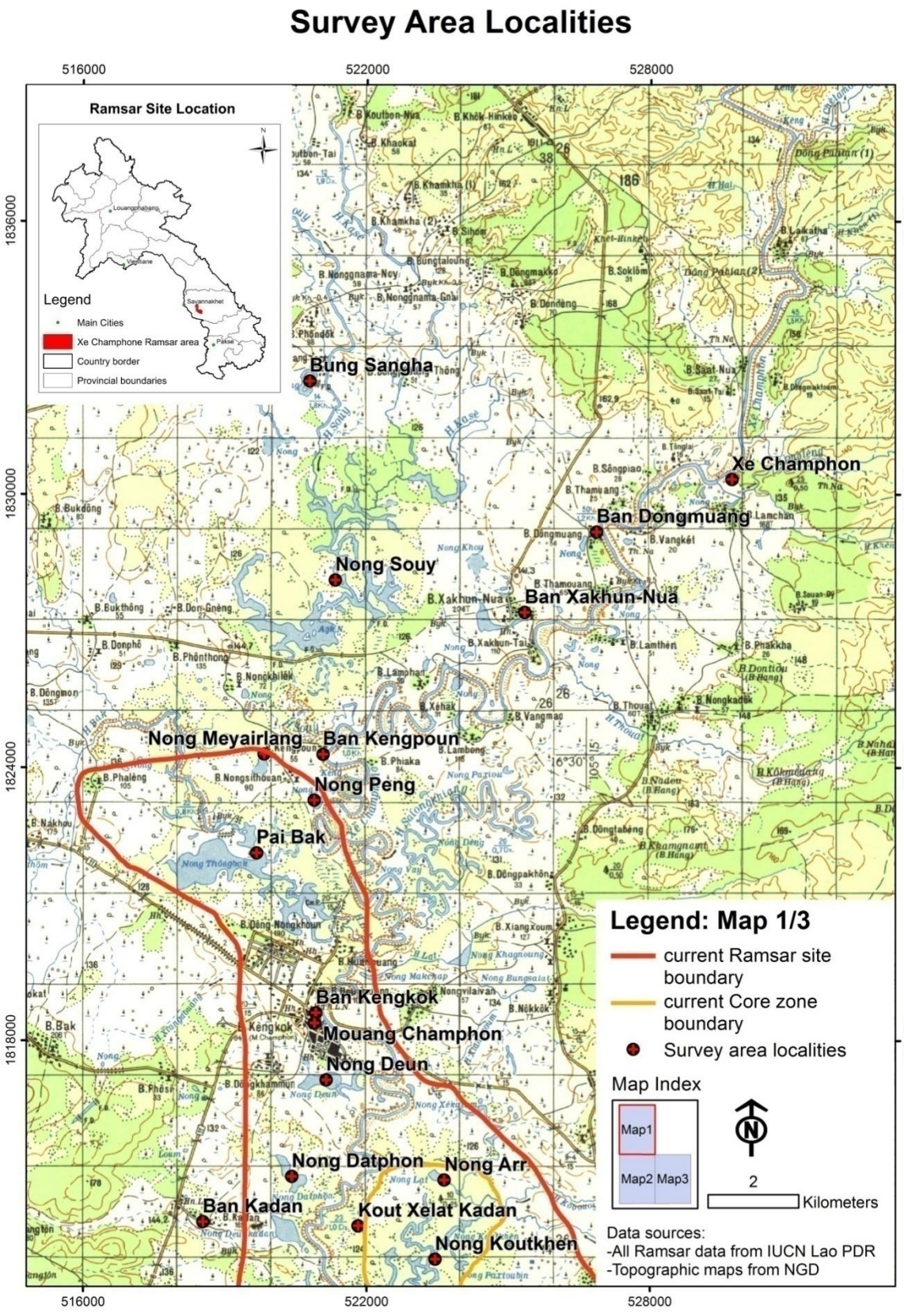
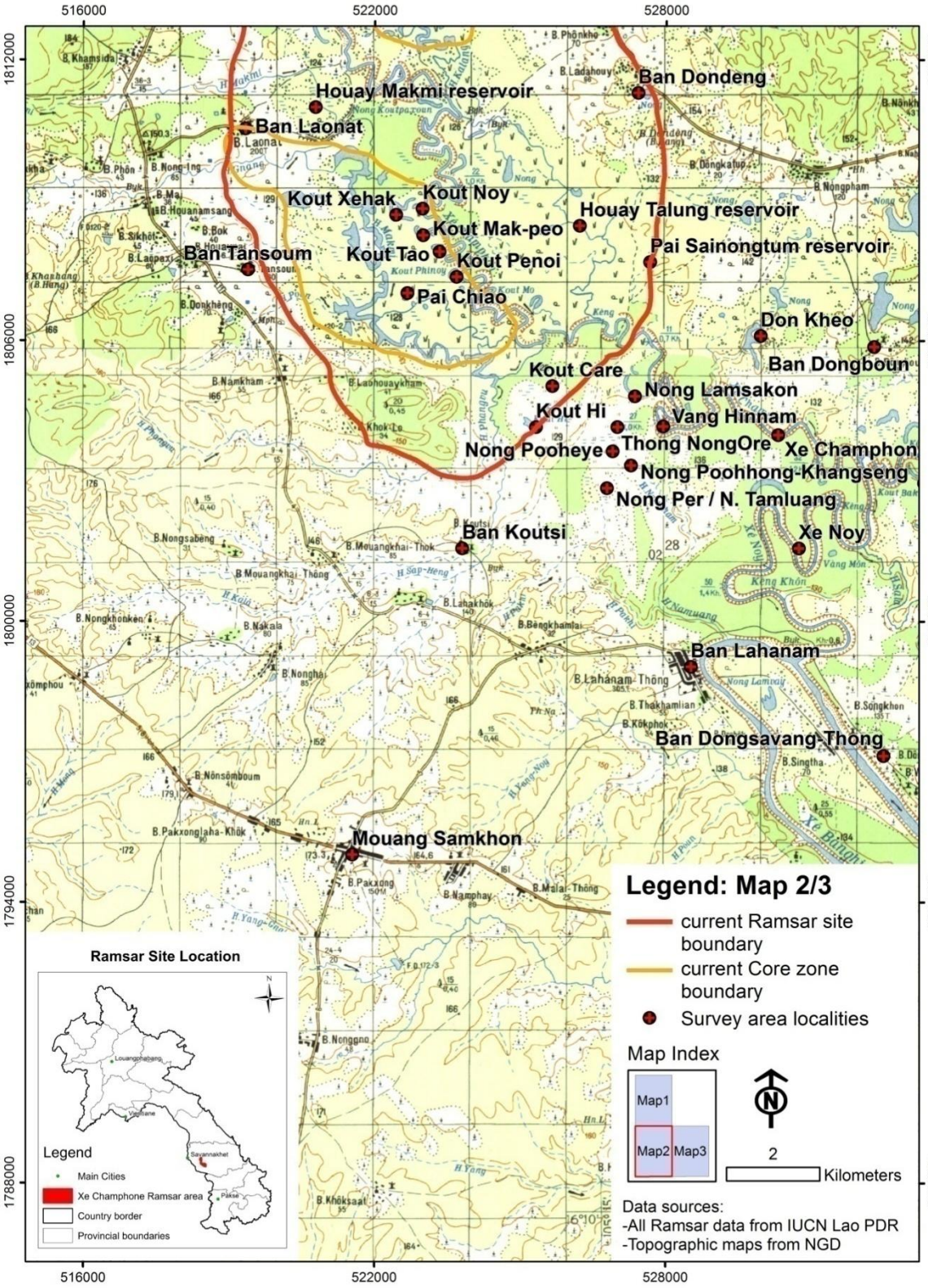


Figure 3. Survey area localities.



Survey Area Localities



Survey Area Localities

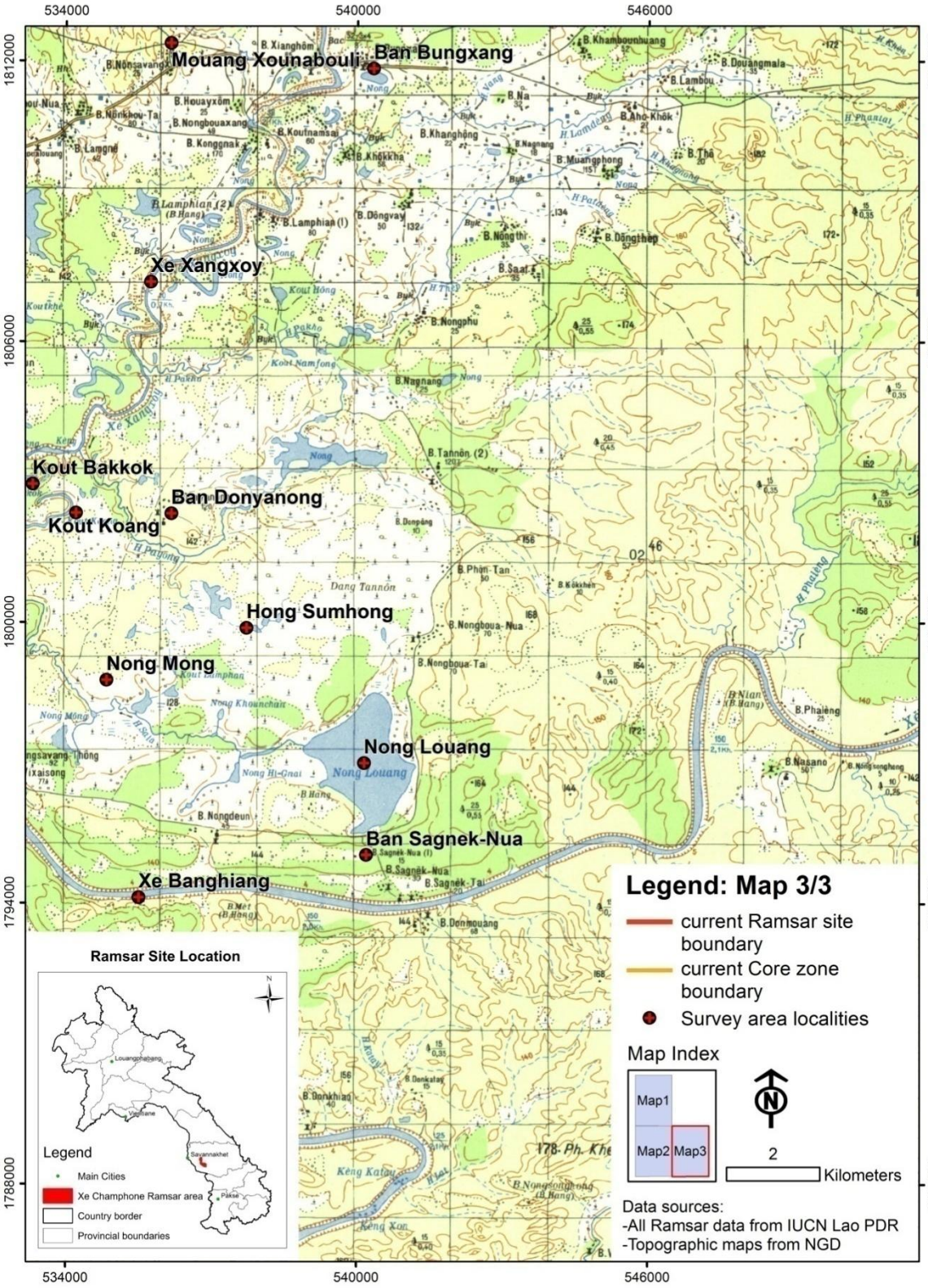
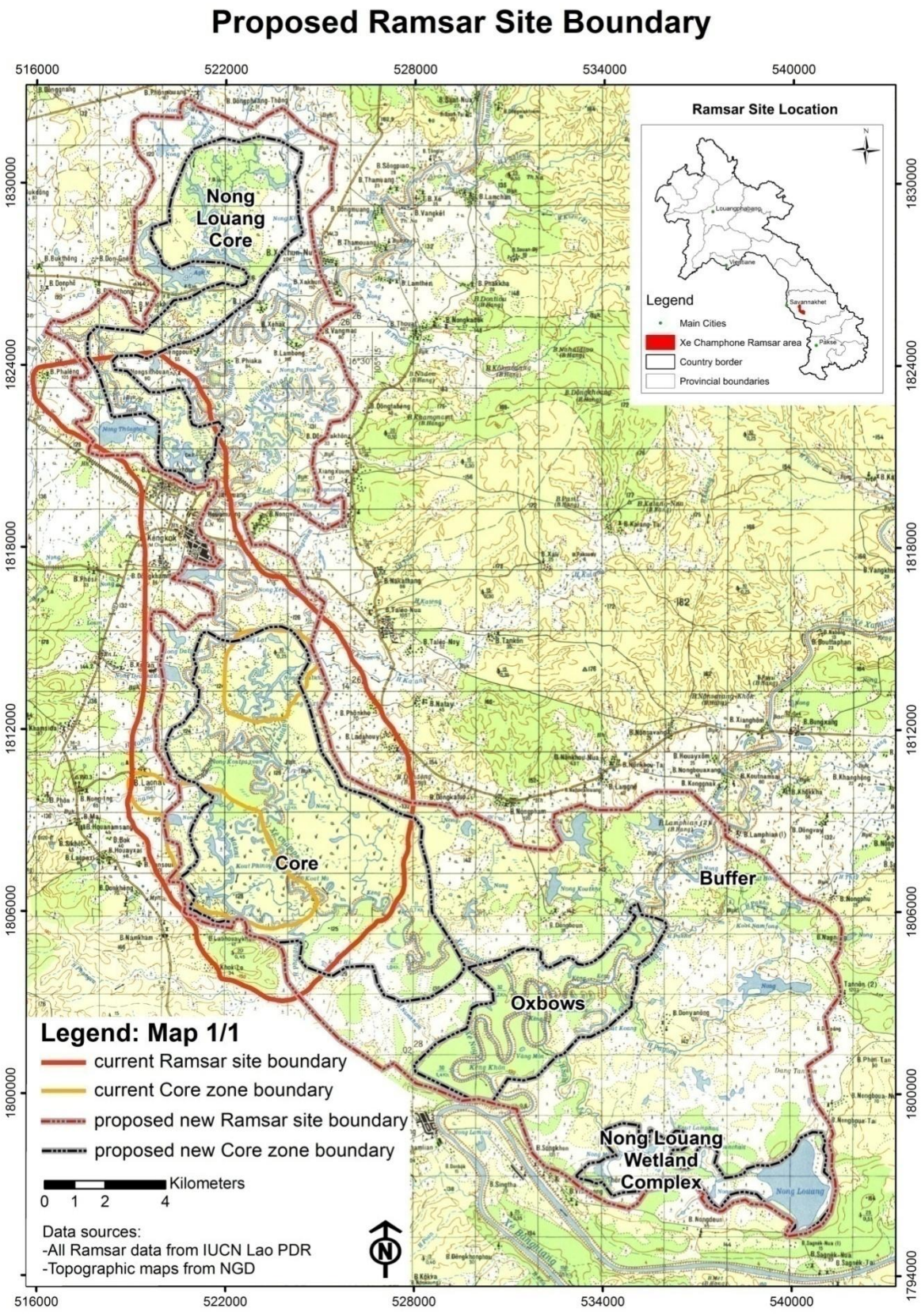


Figure 4. Proposed new Ramsar site boundary and core areas.



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