Information Sheet on EAA Flyway Network Sites (SIS) – 2013 version

Available for download from http://www.eaaflyway.net/the-flyway/flyway-site-network/

Categories approved by Second Meeting of the Partners of the East Asian-Australasian Flyway Partnership in Beijing, China 13-14 November 2007 - Report (Minutes) Agenda Item 3.13

Notes for compilers:

1. The management body intending to nominate a site for inclusion in the East Asian - Australasian Flyway Site Network is requested to complete a Site Information Sheet. The Site Information Sheet will provide the basic information of the site and detail how the site meets the criteria for inclusion in the Flyway Site Network. When there is a new nomination or an SIS update, the following sections with an asterisk (*), from Questions 1-14 and Question 30, must be filled or updated at least so that it can justify the international importance of the habitat for migratory waterbirds.

2. The Site Information Sheet is based on the Ramsar Information Sheet. If the site proposed for the Flyway Site Network is an existing Ramsar site then the documentation process can be simplified.

3. Once completed, the Site Information Sheet (and accompanying map(s)) should be submitted to the Flyway Partnership Secretariat. Compilers should provide an electronic (MS Word) copy of the Information Sheet and, where possible, digital versions (e.g. shapefile) of all maps.

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1. Name and contact details of the compiler of this form*:

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Full name, Institution/agency, and address of the person(s) who compiled the SIS, together with any telephone and fax numbers and e-mail address.

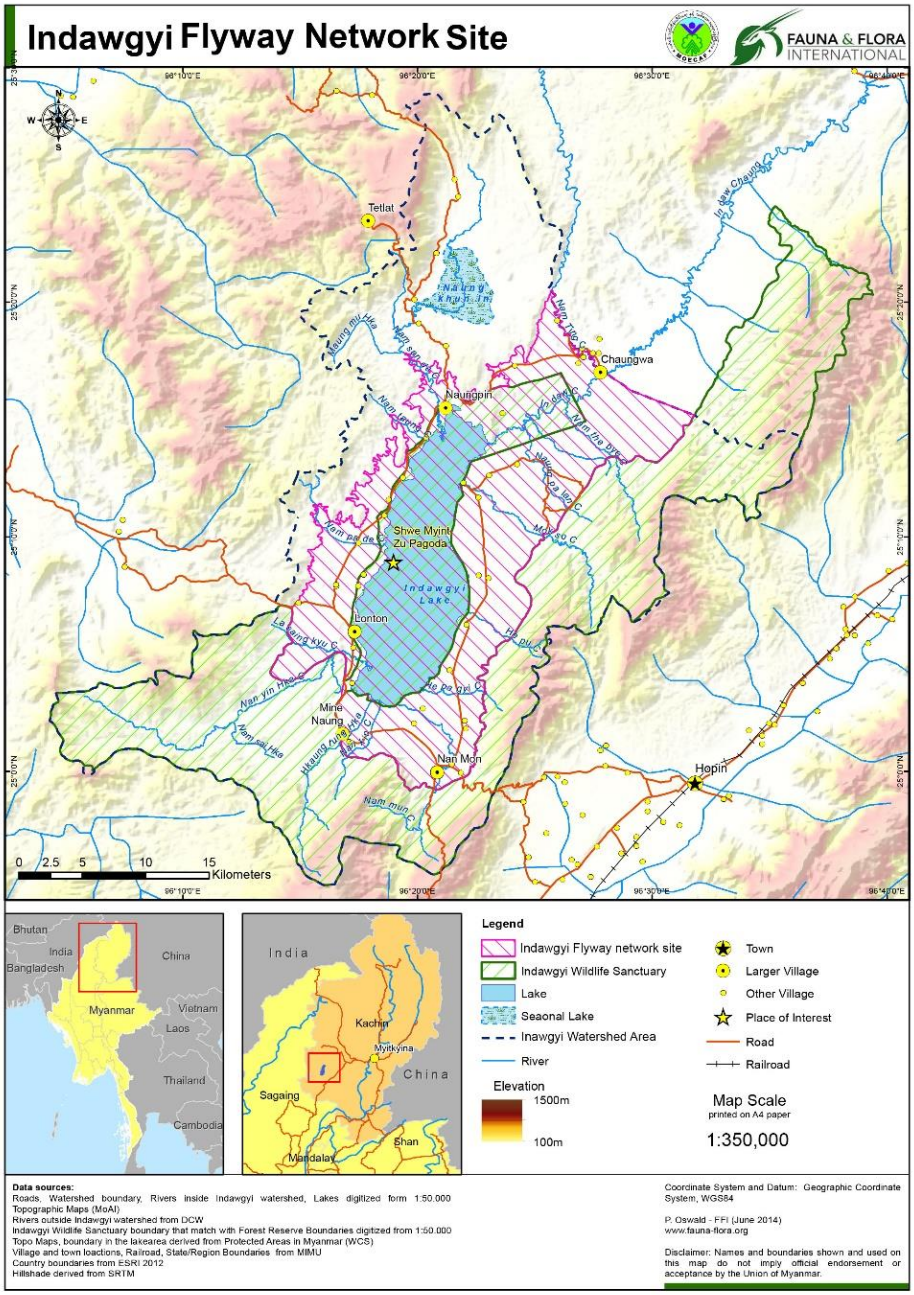
2. Date this sheet was completed*:
14 December 2014

3. Country*:
Republic of the Union of Myanmar

4. Name of the Flyway Network site*:
Indawgyi Wildlife Sanctuary

5. Map of site*:

Map of Indawgyi proposed Flyway Network Site



6. Geographical coordinates* (latitude/longitude, in decimal degrees):

Provide the coordinates of the approximate centre of the site and/or the limits of the site. If the site is composed of more than one separate area, provide coordinates for each of these areas.

- North-eastern point (Chaung Wa village): N25°17' E96°27'
- South-western point (southern extent of Indawgyi lake): N25°03' E96°19'

7. Elevation*: (in metres: average and/or maximum & minimum)

The surface of Indawgyi Lake is approximately 175 m asl, with the edges of the wetland rising to around 200 m asl. The lake depth along its longest (north-south) axis varies from 16 to 22m. Nang Kwin and the surrounding wetland lie at about 190masl. The depth of this lake is unknown.

8. Area*:

The total area of the site, in hectares. If the areas of discrete site units are known, please also list each of these together with the names (or labels) used to identify and differentiate these units.

The total area of the proposed site is 49,326ha, within which the lake itself covers approximately 25,899ha.

9. General overview of the site*:

A brief (two sentences) summary of the site, mentioning principal physical and ecological functions, and its importance for migratory waterbirds.

Indawgyi lake is natural freshwater lake that is approximately 24 km in length, and up to 10 km in width, being orientated north to south. The lake basin has extensive shallow areas but reaches up to 22 m deep towards the eastern side. It is fed by three main streams and at least five secondary streams, mostly draining hills to the south-west, south and east which form the catchment component of the Indawgyi Lake Wildlife Sanctuary, and a the Nang Kwin Lake and wetland to the far north-west of the lake. The main outflow is the Indaw Chaung (= River) to the north, which eventually drains into the Ayeyarwaddy (= Irrawaddy) River to the north east. The Indaw Chaung flows through seasonally inundated herbaceous marsh and agricultural land, primarily wet rice paddy.

A human population of approximately 30,000 lives in 16 villages situated in the lake basin, and survive through a mixture of rice farming between the lake and surrounding hills, and fishing. Rice agriculture in the lake basin appears to maintain habitat for Sarus Crane and several other key species. Tourism is little developed at Indawgyi as yet, but a steady stream of visitors comes to enjoy the scenic beauty, and an annual festival at the Swe Myint Zu Pagoda attracts several tens of thousands of mostly Burmese Buddhists. The whole site holds at least 20,000 migratory and resident waterbirds on a regular basis and a large number of migratory waterbirds, and provides habitat for a number of nationally and globally important freshwater species including fish and turtles, though these are not yet well studied.

10. Justification of Flyway Site Network criteria*:

Please provide waterbird count information (with year of latest count) that demonstrates that the site meets the criteria of the Flyway Site Network (Annex 1). That is:

- it regularly supports > 20 000 migratory waterbirds; or,
- it regularly supports > 1 % of the individuals in a population of one species or subspecies of migratory waterbird; or,
- it supports appreciable numbers of an endangered or vulnerable population of migratory waterbird
- it is a “staging site” supporting > 5 000 waterbirds, or > 0.25% of a population stage at the site.

A listing of the populations of migratory waterbirds covered by the East Asian – Australasian Flyway Partnership and the 1% thresholds is attached (Annex 3).

The "staging site" criterion is particularly difficult to apply and application of this should be discussed with the Secretariat. Also note that some species have several populations that are very difficult to distinguish in the field.

A2 (A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.)

Several globally important bird species are associated with the proposed Site, including [note: numbers are not regionally or globally significant]:

- Slender-billed Vulture *Gyps tenuirostris* (Critically Endangered); infrequently recorded
- White-rumped Vulture *Gyps bangalensis* (Critically Endangered); infrequently recorded
- Lesser Adjutant *Leptoptilos javanicus* (Vulnerable); occasional records of several individuals (<10)
- Wood Snipe *Gallinago nemoricola* (Vulnerable); occasional records of individuals
- Pallas's Fish Eagle *Haliaeetus leucoryphus* (Vulnerable); regularly recorded in low numbers (<10)
- Rufous-necked Hornbill *Aceros nipalensis* (Vulnerable); most recent record in 2011

A5 (A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.)

The total number of waterbird population in winter is likely to exceed 20,000 birds (Davies et al 2004). We have compiled 14 of the available count datasets, covering 11 years between 1997 and 2013 Table 1). These data indicate combined waterbird populations of over 20,000 in six years. The average count is 18,662, but we suspect that the average is below the threshold due to counts that have not been able to cover the whole site. Indeed to our knowledge no full census of the proposed site has yet been achieved, as it would require at least three count teams travelling in separate boats, and preferable five independent teams doing synchronised counting.

Table 1. Waterbird count data for the proposed site

Yr	Indawgyi lake	Indawgyi river[(1)]	Sub-total	Source[(2)]
1997	23,113		23,113	WI (2013)
2000	19,081		19,081	WI (2013)
2001	14,926		14,926	WI (2013)
2002	31,485		31,485	WI (2013)
2003	12,922		12,922	WI (2013)
2003			13,550	Davies et al 2004
2004	19,095	1821	20,916	WI (2013)
2005	18,184		18,184	WI (2013)
2006	18,670	2389	21,059[(3)]	WI (2013)
2007	12,094	1501	13,595	WI (2013)
2007			13,034	MBNS (2008)
2012			24,336	MCDP 2012

2013	13,252		13,252	IWC

(1) Only the section of the river between the lake and just north of Chaung Wa village

(2) International Waterbird Census data was provided by Wetlands International in October 2013 (WI 2013).

(3) This data seems to have also been from the 22-30 December 2005 count reported in MBNS (2006). However that source returns a slightly higher population total of 21,818 individual waterbirds.

A6 (A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbirds.)

There are 17 sets of waterbird census data available for Indawgyi, covering 11 years between 1997 and 2013, eight of them since 2006 (Appendix I). From these data, eleven species were recorded at least once in numbers that exceed the 1% flyway criterion from WPE5, four of them on only one occasion. Species which have been recorded at the site in numbers over the 1% threshold on two or more counts on or after winter 2005/2006 are: Common Crane *Grus grus* (five counts over four years), Tufted Duck *Aythya fuligula* (two years), Ferruginous Duck *Aythya nyroca* (one year) and Ruddy Shelduck *Tadorna ferruginea* (one year). The latter two species have however seen significant declines since the last record above the WPE5 1% threshold, as recorded in the 2006 census (WI 2013).

There is less robust documented evidence that Sarus Crane *Grus antigone* meets this criterion. However, it is regularly observed by sanctuary staff and on the ten occasions it has been included in census results since 2001, Sarus Crane has exceeded the 1% threshold of six individuals on five of them. Given it is globally Vulnerable, the proposed site does seem to be significant for this flyway population.

11. Wetland Types*:

List the wetland types present (see Annex 2). List the wetland types in order of their area in the Flyway Network site, starting with the wetland type with the largest area.

O, Tp, M, U, Ts, W

12. Jurisdiction*:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Ministry of Agriculture/Dept. of Environment, etc.

- **Lake:** The Lake is managed by the Nature and Wildlife Conservation Division of the Forest Department of the Ministry of Environmental Conservation and Forestry. The Fisheries Department has overlapping jurisdiction over the fish resources within the Wildlife Sanctuary. It is fully responsible for the fish in streams within the proposed site that lie outside the wildlife sanctuary.
- **Catchment:** The Nature and Wildlife Conservation Division (NWCD) of the Forest Department manage both the lake and its catchment. The southern and eastern ridges of the catchment are protected under reserved forests: Nanyinkha Resrved Forest, Mainnaung Reserved Forest, Indawgyi Reserved Forest, Nanmun Reserved Forest and Mokso Reserved Forest.

- Other departments are involved to a lesser degree; Department of Agriculture, Department of Irrigation, Department of Hotels and Tourism Development, General Administration Department, Village authorities, Buddhist Sanhga, Myanmar Police Force, Military.

13. Management authority*:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide the title and/or name and email address/phone number of the person or persons in this office with direct responsibility for managing the wetland.

Park Warden Office, Indawgyi Lake Wildlife Sanctuary, Mohnyin Town, Kachin State, Myanmar.
Phone: +95 74 60 396

14. Bibliographical references*:

A list of key technical references relevant to the wetland, including management plans, major scientific reports, and bibliographies, if such exist. Please list Web site addresses dedicated to the site or which prominently feature the site, and include the date that the Web site was most recently updated. When a large body of published material is available about the site, only the most important references need be cited, with priority being given to recent literature containing extensive bibliographies.

Davies, J., Sebastian , A.C. and Chan, S. (Eds)(2004). A Wetland Inventory for Myanmar. Ministry of Environment, Japan

Forest Department (2012). National Biodiversity Strategy and Action Plan, Ministry of Environmental Conservation and Forestry, Naypyidaw

Government of the Union of Myanmar (2004). Notification for the establishment of Inle Lake Wildlife Sanctuary (*Amet kyawnha sa*) No.39/2004, Ministry of Forestry, Naypyidaw

IUCN (2012). IUCN Red List of Threatened Species. Version 2012.1 <www.iucnredlist.org>. Downloaded March 2012

MacKinnon, J., WCMC (Ed) (1997). Protected Areas Systems Review of the Indo-Malayan Realm. Prepared by the Asian Bureau for Conservation (ABC) in collaboration with The World Conservation Monitoring Centre (WCMC). World Bank, Washington

Maung Khin (1948). Fisheries in Burma. Superintendent of Government Printing and Stationery, Rangoon, Government of the Union of Burma.

MBNS [Myanmar Bird and Nature Society] (2006). Field Feathers 2006-1. MBNS, Yangon

MBNS [Myanmar Bird and Nature Society] (2008). Field Feathers 2008. MBNS, Yangon

Prashad, B. & Mukerji, D.D. (1929). The fish of the Indawgyi Lake and the streams of Myitkyina District (Upper Burma), Records of the Indian Museum XXXI 161-224

Prashad, B. (1930). Pelycypoda of the Indawgyi Lake and of its connected freshwater areas in the Myitkyina District, Upper Burma. Records of the Indian Museum XXXII 247-255.

Thiri Daewe Aung, Saw Moses, Frank Momberg, Ngwe Lwin, Aung Moe, Htay Win and Mark E Grindley (2012). Report on Waterbird Census: Indawgyi Lake,

Kachin State (6 – 10 February 2012). Report No.19, Myanmar Conservation and Development

Program. Biodiversity and Nature Conservation Association (BANCA), Fauna and Flora International (FFI) and People Resources and Conservation Foundation (PRCF), Yangon.

U Myint Shwe and Grindley, M E (2012). Preliminary Turtle Conservation Status, Indawgyi Lake, Kachin State, 21 to 30 March 2012. Report No. 18 of the Myanmar Conservation and Development Program, a joint project of the Forest Department, Biodiversity and Nature Conservation Association (BANCA), Fauna and Flora International (FFI), and the People Resources and Conservation Foundation (PRCF). BANCA, Yangon

U Thein Aung and U Thet Htun (2001) Migratory Waterbirds and Wetland Habitats in Myanmar. Nature and Wildlife Conservation Division, Forest Department, Myanmar.

van der Ven, J. (2001) Myanmar Expedition 2001 Report. Unpublished

15. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

The proposed site comprises the Indawgyi basin, a N-S elongated basin with flat plains immediately surrounding the lake composed of alluvium brought down by rivers and streams draining the surrounding ridges.

The maximum north-south length of the lake is 23.8 km, from south to Nyaungbin in the north, and maximum width is c.10 km. The lake basin is slightly asymmetrical, with greater depths and steeper sides to the east. The depth along the long axis of the lake varies between 15.88 to 22.19 m.

There are many inflows to the lake from the surrounding ridges. The major ones in terms of volume are: Nanyinkha Chaung which flows into the southwest area of the lake and which has formed an extensive delta of marsh and floating vegetation; Namsanda Chaung in the northwest south of Nyaungbin; and Nammu Chuang from the southeast. Other inflows are: Namtaungsal Chaung Nammelaung Chaung, Nammale Chaung, Khagyi Chaung and Namtame Chaung.

Water quality is generally good, with a mean transparency of 3.45 m (n=13) and dissolved oxygen concentration at 1 m depth of 4.71 mg/l (n =15; both from January 2003, Davies *et al.*, 2004).

16. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, and climate (including climate type).

The immediate edges of the lake are occupied with gentle slopes mostly converted to wet rice agriculture, which is also included within the proposed site. Beyond the proposed boundary are surrounded by ridges which are uniform running along the eastern side of the lake, rising to 1,175 m ASL. The hills to the west and south are more extensive and irregular and rise to 1,180 m ASL in the west and 1,500 m ASL in the south.

The main streams entering the lake emanate from these hills to the east, south and southwest of the site, with lower slopes in the northwest also draining into the lake. The main outflow of Indaw Chang is in the northeast.

The climate is monsoonal. Average annual rainfall at Myitkyina 1961-1990: 2,196 mm. There is a dry season from November to including April. The driest months are December and January whilst the wettest months are June, July and August. Days are usually sunny during the dry season, whilst mist is common in the lake basin in the morning in the cool season, which depresses temperatures somewhat.

The total area of the catchment is approximately 83,000 ha.

17. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

During the wet season, the lake probably expands appreciably to flood the low-lying areas surrounding the lake basin. It probably provides groundwater discharge and flood control functions. Trapping of sediment entering the lake from areas of artisanal gold mining to the southwest of the proposed RAMSAR site is potentially a valuable function.

18. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Flyway Network site, and the ecosystem services of the site and the benefits derived from them.

Lake habitats include: Open water, herbaceous marsh, floating mats, limited emergent beds and extensive areas of submerged macrophytes.

Due to the relatively high transparency of the water (c. 3.5 m), there are extensive beds of submerged and floating leaved macrophytes. In addition, there are extensive areas of herbaceous marsh grading into floating mats in certain parts, especially at the north end between Nyaungbin and the IndawgyiChaung outflow, at the southern end and around the major Nanyinkha Chaung inflow. The floating mats are dominated by *Salvinia*, *Eichhornia*, *Polygonum* and grasses. Beds of emergents are relatively few. The submerged macrophytes are dominated by *Vallisneria*, with *Ceratophyllum* being common. Around the drying margins of the lake, *Barringtonia* is common which presumably gets inundated in the wet season.

The seasonally inundated and waterlogged plains that surround the lake were probably covered by herbaceous marsh and scrub swamp and swamp forest/woodland, but have been mostly converted to rice fields. Exceptions are the herbaceous marsh areas that undergo more prolonged inundation closer to the open water of the lake, and in the region of Nang Kwin Lake. Native vegetation in the surrounding catchment is moist broadleaf forest with many teak (*Tectona grandis*) individuals, although the teak forest has been cyclically logged by the government for over 100 years. Although the ridges are still mostly forested, there is significant degradation from collection of firewood and other materials, and some shifting cultivation.

19. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the SIS.*
(Please add here the species which do not come under sec no 14)

There is a rich and abundant aquatic macrophyte flora which is vital for the maintenance of biodiversity of [Indawgyi] lake and for fish spawning, nursery and feeding areas." (Davies et al 2004, p.227).

20. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 10. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the SIS.*
(Please add here the species which do not come under sec no 14)

The proposed site is most notable for its fish diversity. In the most extensive survey of the fishes to date, Prashad & Mukerji (1929) recorded 43 species of fish from the lake alone, or 64 species including inflowing streams and marshy areas. Three of these species were initially suspected to be endemic to the lake but later discovered in other localities. The fish fauna is diverse apparently without any introductions of alien species thus far. One Myanmar endemic, *Gudusia variegata* was recorded from the lake by Davies et al (2004), who suggest four endemic species may be present. Further surveys are being planned.

Five species of globally threatened turtle have been recorded from Indawgyi lake and its margins based on interviews and field surveys in 2012 (U Myint Shwe and Grindley 2012):

- **Endangered:** Yellow Tortoise *Indotestudo elongate*, Asian Giant Tortoise *Manouria emys*, Myanmar Peacock Softshell Turtle *Nilssonia Formosa*.
- **Vulnerable:** Myanmar Box Turtle *Cuora amboinensis lineate*, Asiatic Softshell Turtle *Amyda cartilaginea*

Grasslands in the northeast of the proposed site also support a population of globally Endangered Hog Deer *Axis porcinus* of unknown size (Ngwe Lwin 2012).

There are also several globally important bird species that are associated with the proposed site, including [note: unless otherwise stated, numbers are not regionally or globally significant]:

- Lesser Adjutant (*Leptoptilos javanicus*) (Vulnerable); occasional records of several individuals (<10)
- Wood Snipe (*Gallinago nemoricola*) (Vulnerable); occasional records of individuals
- Falcated Duck (*Anas falcata*) (Near Threatened); only recorded twice (2003, 2012)
- Ferruginous Duck (*Aythya nyroca*) (Near Threatened); A total of 750 individuals were recorded during the February 2012 waterbird census
- Pallas's Fish Eagle (*Haliaeetus leucoryphus*) (Vulnerable); regularly recorded in low numbers (<10)

- Rufous-necked Hornbill (*Aceros nipalensis*) (Vulnerable); most recent record in 2011
- Slender-billed Vulture (*Gyps tenuirostris*) (Critically Endangered); infrequently recorded
- White-rumped Vulture (*Gyps bangalensis*) (Critically Endangered); infrequently recorded

21. Social, economic and cultural values:

a) Describe if the site has any general social, economic and/or cultural values e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values:

The proposed site is home to around 30 villages organised into 11 village tracts, with a combined population of about 7,700 households, or slightly under 50,000 people. Most of the resident population practices wet rice agriculture and due to the rich alluvial deposits in the lower Indawgyi basin the area is a net rice exporter. A smaller but significant number of households (number unknown) are at least partly dependent on fish from the lake as a source of protein or income, with many being primarily fishing households. There is relatively little wage labour or off-farm options for income generation besides fishing and the resident population is thus almost entirely supported from the proposed site (except in firewood needs).

The resident population is primarily Buddhist and many temples are located around the lake, most significantly the Shwe Myint Zu Pagoda on the west side and connected by a semi-submerged causeway. The temple is location of an annual one-week festival and religious pilgrimage which can draw over 100,000 people. In addition, the Shwe Taung pagoda lies on the top of the hill at the point where the Indaw Chaung meets the lake and is an important cultural icon.

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? (Double-click the checkbox to check and choose "Checked" under "Default Value" from "Check Box Form Field Options" window)

If yes, tick the box ☑ and describe this importance under one or more of the following categories:

I. Sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland: ☐
II. Sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland: ☐
III. Sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples: ☒
IV. Sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland: ☐

Human occupation and use of the proposed site brings significant cultural values linked to its conservation and ecological functioning:

- Low-impact agriculture and free grazing of cattle help maintain a mixed mosaic habitat containing wallows and waterholes that provide food to cranes, storks and ibises
- Domestic livestock provide important food source for globally Critically Endangered vultures (and Himalayan Griffon)
- Cattle may also help maintain waterbird-friendly lake margins in some areas
- Artisanal fishing practices and organised community fisheries management help maintain the lake ecosystem and avoid the "necessity" for species introductions seen elsewhere in Myanmar

22. Land tenure/ownership:

a) Within the Flyway Network site:

Under the 2008 constitution, all land in Myanmar is owned by the state, and used under licence, eg, through land use or community forestry certificates. Most of the proposed FNS is classified as agricultural land and is in theory eligible for land use certification, though the degree to which certification has been achieved is unknown

Some areas – mostly degraded secondary forests on the border of the Wildlife Sanctuary watershed forests – are regarded as "unclassified forests". In theory, prospective users may apply for the right to cultivate in unclassified forests but due to administrative hurdles and high taxes this has not yet happened at the site. The right to manage unclassified forests may also be granted to communities under Community Forest arrangements, and to date eight communities are in the process of applying for a total of under 200 hectares, though this is likely to grow. However, at present most of the "unclassified forest" within the proposed site are either uncultivated or are cultivated illegally (whether seasonally or permanently).

b) In the surrounding area:

Most of the watershed of the proposed FNS to the south and east is within the wildlife sanctuary and currently only subject to very limited encroachment in the lowest slopes. In the northwest and north (and further to the south and west) are extensive reserve forests, which have been managed for state logging since at least the late 19th Century. Since 1995 the government has allowed community use under 30 year Community Forestry licenses but none have so far been awarded in the area. Thus all forested hills surrounding the proposed site are under state control.

23. Current land (including water) use:

a) Within the Flyway Network site:

Most of the Indawgyi basin is under permanent agriculture with very few trees, or is degraded secondary forest (see above). Some natural grass/scrublands remain in the northeast that have been modified through fire to reduce the chance of uncontrollable natural fire and regenerate grazing. The multiple water courses in this landscape are not significantly modified but are devoid of most natural forest cover. There are a mixture of perennial fruit and shade/ornamental trees around the approximately 30 villages near the proposed site.

No households are resident on or in the lake, but many depend on it. Indawgyi lake and many marginal areas fall within the wildlife sanctuary, in theory

prohibiting most use. However the two relevant authorities – Ministry of Environmental Conservation and Forestry, and Ministry of Fisheries – are tolerant to low levels of artisanal net and line fishing, which are in theory controlled through a licensing system. Some community groups are also being supported by a local NGO, Friends of Wildlife, to establish organised community fisheries groups. In the absence of any legal framework for community fisheries however, they may only be able to register as production cooperatives. At present these arrangements are thus only an interim alternative to formalised resource tenure.

b) In the surroundings/catchment:

The surrounding catchment is mostly slightly to severely degraded semi-evergreen and mixed deciduous forest, with remnants of the former teak forest in lower/drier areas, particularly in the south. Water courses within the catchment are largely unmodified, though the accompanying forest is disproportionately disturbed due to relative ease of access and desirability of trees in the watercourses for firewood.

24. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

a) Within the Flyway Network site:

- A growing use of pesticides and artificial fertiliser is probably affecting water quality within the lake and may lead to bioaccumulation and eutrophication. However there is currently no regular water quality monitoring and only a limited baseline on water transparency and dissolved oxygen from 2003 exists (Davies *et al.*, 2004).
- Hydraulic gold mining along streams in the southwest of the sanctuary (outside of the proposed site) has been an ongoing threat to the lake for over ten years, primarily through increased sedimentation and use of mercury. The scale of the impact on the biological of human values of the site has not yet been fully evaluated.
- Overfishing is potentially a threat; anecdotal evidence points to a decline in catches of commercial species, though this has not yet been documented across all fishing communities. A local NGO, Friends of Wildlife, has some fish catch monitoring data from 2011 and 2012.
- Two "tourism development zones" have been proposed within the past five years and if developed without adopting suitable safeguards they could significantly increase tourist traffic on the lake, demand for fish and wildlife, and demand for energy (the area is currently not electrified). Waste management problems are also a possibility.

b) in the surrounding area:

- The harvest of large, old-growth dipterocarp tree species for firewood is believed to be the single largest threat to the forests in the proposed FNS catchment. We estimate that average annual household consumption is equivalent to just under 1 m^3 of solid wood per year, with a market value of about 54,000 MMK (= 50 USD). This equates to 7,059 m^3 per year demand for the whole Indawgyi basin, or around 2,350 mature trees, or many juvenile growths. Only two or three species are being targeted.
- The reserve forests surrounding the Indawgyi basin (including those within the wildlife sanctuary) were previously subject to state logging primarily for teak, and those remaining teak trees are either too small or of unsuitable quality for the international market; it is not currently clear whether logging will occur at the end of the next 30-year rotation, in around 2030.
- Logging for construction timber is a secondary threat but no hard data exists on the scale and intensity of logging. Elephants are sometimes used, of which there are six registered as resident working animals in the proposed FNS.
- Shifting hill agriculture is illegal inside the watershed reserved forests surrounding the proposed FNS, though some low level encroachment has occurred for years, giving a mosaic of degraded natural forest. In 2013 at least five households cleared approximately 10 ha of new land near Nam Mon village. This is being investigated by the sanctuary staff and will be monitored in the future.

25. Conservation measures taken:

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Flyway Network site:

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

- Indawgyi Lake is the core component of Indawgyi Lake Wildlife Sanctuary, established on 30 January 1985 by the Ministry of Environmental Conservation and Forestry under the Myanmar “Protection of Wildlife and Conservation of Natural Areas Law” (SLORC 1994). The watershed forest components of the sanctuary are not within the proposed Flyway Network site.
- Nawng Kwe lake was proposed as a possible extension to the sanctuary by the former warden circa 2005. However there is no information currently available on its functions or values, and the proposed extension is not currently being considered by the Ministry of Environmental Conservation and Forestry. It may be an important component of the larger wetland in the Indawgyi lake basin, but it has not been included within the proposed site at this time.
- Indawgyi Lake Wildlife Sanctuary became an ASEAN Heritage Park on 18 December 2003, under the authority of the ASEAN Centre for Biodiversity (ACB).
- The site has been nominated as a Ramsar Site to the Ramsar Convention on November 2014.
- The site was shortlisted as a potential Man and Biosphere Reserve nomination during a stakeholder consultation hosted by the Ministry of Environmental Conservation and Forestry and the international conservation NGO and Fauna and Flora International in February 2013.
- The site was shortlisted as a tentative World Heritage Site under the guidance of IUCN and following stakeholder consultations in late 2013.

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate, see Annex 3):

Ia ☐; Ib ☐; II ☐; III ☐; IV ☒; V ☐; VI ☐; N/A ☐

c) Does an officially approved management plan exist; and is it being implemented?:

If yes, is it being implemented?: If no, is one being planned?

The Site is being managed by the annual operational plan which was developed in line with the functions of the park warden office outlined in the Law. No comprehensive management plan have been adopted. In November 2014, the draft management plan for the Wildlife Sanctuary had been developed and still waiting for the approval from the Government.

d) Describe any other current management practices:

- Indawgyi Lake Wildlife Sanctuary has a staff of 14 (four of whom are temporary or contract staff) and they operate basic management functions from five sub-stations at the sanctuary. The headquarters is in Mohnyin, the township capital about three hours drive from the lake. Main activities include:
    - *Ad hoc* patrols, in response to reports of illegal activities
    - Monthly patrols in logging hotspots
    - Awareness raising at the annual Shwe Myint Zu pagoda festival and other events as instructed by the ministry, or where additional funding is available
    - Surveys of encroachments or as directed by the ministry
    - Regular waterbird census conducted by park staff
- Community fisheries are operating on Indawgyi lake by eight local communities in collaboration with the wildlife sanctuary and department of fisheries. No-fishing zones and a range of regulations have been established and marked, and some enforcement is taking place. Support is provided by the local NGO Friends of Wildlife.
- Community forestry is being undertaken in eight community Forest User Groups that are in the process of applying to certify a total of <200 hectares
- Annual Asian Waterbird Census is conducted with the support of a number of outside agencies, most recently by Fauna and Flora International (in 2012/2 and 2013/4 seasons)

26. Conservation measures proposed but not yet implemented:
e.g. management plan in preparation; official proposal as a legally protected area, etc.

- With the support of NGO partners, primarily Fauna and Flora International and Friends of Wildlife, a participatory management plan is envisaged over in 2015-2016. This will initially target the sanctuary but will hopefully be extended to the FNS if the application is successful.
- A cessation of gold mining is planned but for political reasons is proving difficult to enact. There is however now very high level interest in seeing the mining stop. Plans for the peaceful relocation of gold mining households will need to be drawn up.
- Further expansion of community forestry and community fisheries is planned under projects held by Fauna and Flora International and Friends of Wildlife and funded until at least 2015.
- A stakeholder workshop in November 2013 sought to improve coordination in management of the lake basin for environmental, economic and social sustainability. It involved over 100 representatives from local communities, farmer and fisher groups, government agencies, private individuals and business. The main result was an agreement to establish 11 village-tract level stakeholder bodies that would report to one overarching committee; following submission of the report to the Ministry of Environmental Conservation and Forestry then a plan of implementation plan will be prepared and technical and financial support will be sought.

27. Current scientific research and facilities:
e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

- Fish surveys have been conducted in early 2014 with the support of Fauna and Flora International (FFI); intended to examine the conservation status and needs of endemic fish. A total of 68 fish species are recorded during the survey.
- Ongoing fish catch (landing site) monitoring undertaken by community fisheries groups with support from Friends of Wildlife.
- Community patrolling on the lake and in forest areas is generating data on resource use patterns; conducted with support from Friends of Wildlife and Fauna and Flora International, respectively.
- Monitoring of Hoolock Gibbon underway; population density estimates were made in five locations in 2010 and will be resurveyed every three to five years.

28. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:
e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

- A visitors centre has been established at the main entrance to the Indawgyi basin at Nam Mon village, although has yet to be supplied with interpretation materials.
- Inn Chit Thu Community Ecotourism Group was formed in late 2013 with support from Fauna and Flora International, and provides biological and cultural

information to visitors staying in Lonton village (currently the only place foreigners can stay without special permission).

- The wildlife sanctuary and local groups, including NGOs and projects, conduct awareness raising at the annual Shwe Myint Zu pagoda festival, which can receive over 100,000 visitors.
- To date, awareness and extension activities have been conducted by local and international NGOs, particularly on gibbons, fish, waterbirds and forestry issues.

29. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Recreational opportunities include hiking or bike tours along the road around the lake or diesel-engined boat excursions. Most tourists probably came for the adventure of a relatively remote location, but some birdwatchers also visited for the winter migration. A community based tourism group was established offering a range of guided and unguided visitor experiences, including kayak tours, mountain bike tours and nature/culture treks.

Tourism numbers to Indawgyi have been low in recent years; 34 in 2011, 17 in 2012 and 39 in 2013, reflecting previous political difficulties. However, Myanmar is now opening up and the broadened range of activities at the site is likely to attract more visitors, with numbers projected to rise to 500 in the 2013/14 season and potentially double that the year after (MCDP 2013). More activities should also increase the average stay, which is currently only two nights.

30. Threats*

Which of the following threats is present historically – when the threat stopped but the effects are still there (H), currently (C) or potentially (P)?

	Historically	Currently	Potentially
Residential and commercial development			
housing and urban areas	☑	☑	☐
commercial and industrial areas	☐	☐	☐
tourism and recreation areas	☐	☐	☑
Agriculture and aquaculture			
annual and perennial non-timber crops	☐	☑	☐
wood and pulp plantations	☐	☑	☐
livestock farming and ranching	☐	☑	☐
marine and freshwater aquaculture	☐	☐	☑
Energy production and mining			
oil and gas drilling	☐	☐	☐

mining and quarrying	☐	☑	☐
renewable energy	☐	☐	☐
Transportation and service corridors			
roads and railroads	☐	☑	☐
utility and service lines	☐	☑	☐
shipping lanes	☐	☐	☐
flight paths	☐	☐	☑
Biological resource use			
hunting and collecting terrestrial animals	☐	☑	☐
gathering terrestrial plants	☐	☑	☐
logging and wood harvesting	☐	☑	☐
fishing and harvesting aquatic resources	☐	☑	☐
Human intrusions and disturbance			
recreational activities	☐	☑	☐
war, civil unrest and military exercises	☐	☑	☐
work and other activities	☐	☐	☐
Natural system modifications			
fire and fire suppression	☐	☑	☐
dams and water management/use	☐	☑	☐
other ecosystem modifications	☐	☐	☐
Invasive and other problematic species and genes			
invasive non-native/alien species	☐	☑	☐
problematic native species	☐	☐	☐
introduced genetic material	☐	☐	☐
Pollution			
household sewage and urban waste water	☐	☑	☐
industrial and military effluents	☐	☐	☑
agricultural and forestry effluents	☐	☑	☐

garbage and solid waste	☐	☑	☐
air-borne pollutants	☐	☐	☑
excess energy	☐	☐	☐
Geological events			
volcanoes	☐	☐	☐
earthquakes/tsunamis	☐	☐	☑
avalanches/landslides	☐	☐	☑
Climate change and severe weather			
habitat shifting and alteration	☐	☐	☐
droughts	☐	☐	☑
temperature extremes	☐	☐	☐
storms and flooding	☐	☐	☐

Please write here any additional threats and comments/queries you have on the threats.

Some forest planting has occurred inside the proposed site to reduce demand for fuelwood from the watershed forest; site selection did not consider the impact of the land use change on the values of the site, but will in future. Overall however the impact of this planting will be expected to be positive on the values of the site.

Livestock raising is widespread, particularly pigs and chickens. Oxen and buffalo are both used for draft and graze freely when not working; this probably contributes to the suitability of the paddy for some bird species in the dry season through the maintenance through use of wallows/ waterholes, although this cannot currently be confirmed. Large bovid probably also offer an significant source of food to vultures. Thus overall livestock raising may not be a 'threat' to the values of the Ramsar site.

There is no mining inside the site, but small-scale hydraulic gold mining with chemical separation occurs in the western part of the catchment, and is leading to extensive siltation at the Mainaw Chaung inlet and probably elsewhere, based on the sediment accumulation in front of the dyke that leads to Shwe Myint Zu Pagoda. Associated mercury accumulation in the lake seems likely but is undocumented at present.

A strong growth in tourism over the coming years is expected and tourism development has already been mooted. Harnessing the potential of tourism while avoiding unsuitable development and managing impacts are priorities for the sanctuary management, local government and other stakeholders.

Annex 1: Criteria for the inclusion of sites in the Flyway Site Network

(From the Partnership Text)

To be considered for inclusion in the Flyway Site Network, this Partnership adopts the following criteria:

a. Convention on Wetlands (Ramsar, Iran, 1971) criteria for internationally important sites for migratory waterbirds. That is:
   - Criterion 2: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.
   - Criterion 5: A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.
   - Criterion 6: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

b. The staging criteria as applied under the Asia - Pacific Migratory Waterbird Conservation Strategy. That is:
   i. A staging site should be considered internationally important if it regularly supports 0.25% of individuals in a population of one species or subspecies of waterbirds on migration.
   ii. A staging site should be considered internationally important if it regularly supports 5,000 or more waterbirds at one time during migration.

c. Under exceptional circumstances a site can be nominated if it supports migratory waterbirds at a level or stage of their life cycle important to the maintenance of flyway populations. Justification of such nominations will be considered by the Partnership on a case by case basis.

Annex 2: Ramsar Classification System for Wetland Type

The codes are based upon the Ramsar Classification System for Wetland Type as approved by Recommendation 4.7 and amended by Resolutions VI.5 and VII.11 of the Conference of the Contracting Parties. The categories listed herein are intended to provide only a very broad framework to aid rapid identification of the main wetland habitats represented at each site.

To assist in identification of the correct Wetland Types to list in section 19 of the RIS, the Secretariat has provided below tabulations for Marine/Coastal Wetlands and Inland Wetlands of some of the characteristics of each Wetland Type.

Marine/Coastal Wetlands

A -- **Permanent shallow marine waters** in most cases less than six metres deep at low tide; includes sea bays and straits.
B -- **Marine subtidal aquatic beds**; includes kelp beds, sea-grass beds, tropical marine meadows.
C -- **Coral reefs**.
D -- **Rocky marine shores**; includes rocky offshore islands, sea cliffs.
E -- **Sand, shingle or pebble shores**; includes sand bars, spits and sandy islets; includes dune systems and humid dune slacks.
F -- **Estuarine waters**; permanent water of estuaries and estuarine systems of deltas.
G -- **Intertidal mud, sand or salt flats**.
H -- **Intertidal marshes**; includes salt marshes, salt meadows, saltings, raised salt marshes; includes tidal brackish and freshwater marshes.
I -- **Intertidal forested wetlands**; includes mangrove swamps, nipah swamps and tidal freshwater swamp forests.
J -- **Coastal brackish/saline lagoons**; brackish to saline lagoons with at least one relatively narrow connection to the sea.
K -- **Coastal freshwater lagoons**; includes freshwater delta lagoons.
Zk(a) – **Karst and other subterranean hydrological systems**, marine/coastal

Inland Wetlands

L -- **Permanent inland deltas**.
M -- **Permanent rivers/streams/creeks**; includes waterfalls.
N -- **Seasonal/intermittent/irregular rivers/streams/creeks**.
O -- **Permanent freshwater lakes** (over 8 ha); includes large oxbow lakes.
P -- **Seasonal/intermittent freshwater lakes** (over 8 ha); includes floodplain lakes.
Q -- **Permanent saline/brackish/alkaline lakes**.
R -- **Seasonal/intermittent saline/brackish/alkaline lakes and flats**.
Sp -- **Permanent saline/brackish/alkaline marshes/pools**.
Ss -- **Seasonal/intermittent saline/brackish/alkaline marshes/pools**.
Tp -- **Permanent freshwater marshes/pools**; ponds (below 8 ha), marshes and swamps on inorganic soils; with emergent vegetation water-logged for at least most of the growing season.
Ts -- **Seasonal/intermittent freshwater marshes/pools on inorganic soils**; includes sloughs, potholes, seasonally flooded meadows, sedge marshes.
U -- **Non-forested peatlands**; includes shrub or open bogs, swamps, fens.
Va -- **Alpine wetlands**; includes alpine meadows, temporary waters from snowmelt.
Vt -- **Tundra wetlands**; includes tundra pools, temporary waters from snowmelt.
W -- **Shrub-dominated wetlands**; shrub swamps, shrub-dominated freshwater marshes, shrub carr, alder thicket on inorganic soils.
Xf -- **Freshwater, tree-dominated wetlands**; includes freshwater swamp forests, seasonally flooded forests, wooded swamps on inorganic soils.
Xp -- **Forested peatlands**; peatswamp forests.
Y -- **Freshwater springs; oases**.
Zg -- **Geothermal wetlands**
Zk(b) – **Karst and other subterranean hydrological systems**, inland

Note: "**floodplain**" is a broad term used to refer to one or more wetland types, which may include examples from the R, Ss, Ts, W, Xf, Xp, or other wetland types. Some examples of floodplain wetlands are seasonally

inundated grassland (including natural wet meadows), shrublands, woodlands and forests. Floodplain wetlands are not listed as a specific wetland type herein.

Human-made wetlands

1 -- **Aquaculture** (e.g., fish/shrimp) **ponds**
2 -- **Ponds**; includes farm ponds, stock ponds, small tanks; (generally below 8 ha).
3 -- **Irrigated land**; includes irrigation channels and rice fields.
4 -- **Seasonally flooded agricultural land** (including intensively managed or grazed wet meadow or pasture).
5 -- **Salt exploitation sites**; salt pans, salines, etc.
6 -- **Water storage areas**; reservoirs/barrages/dams/impoundments (generally over 8 ha).
7 -- **Excavations**; gravel/brick/clay pits; borrow pits, mining pools.
8 -- **Wastewater treatment areas**; sewage farms, settling ponds, oxidation basins, etc.
9 -- **Canals and drainage channels, ditches.**
Zk(c) -- **Karst and other subterranean hydrological systems**, human-made

Annex 3: IUCN Protected Areas Categories System

IUCN protected area management categories classify protected areas according to their management objectives. The categories are recognised by international bodies such as the United Nations and by many national governments as the global standard for defining and recording protected areas and as such are increasingly being incorporated into government legislation.

Ia Strict Nature Reserve
Category Ia are strictly protected areas set aside to protect biodiversity and also possibly geological/geomorphical features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values.

Ib Wilderness Area
Category Ib protected areas are usually large unmodified or slightly modified areas, retaining their natural character and influence without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.

II National Park
Category II protected areas are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible, spiritual, scientific, educational, recreational, and visitor opportunities.

III Natural Monument or Feature
Category III protected areas are set aside to protect a specific natural monument, which can be a landform, sea mount, submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove. They are generally quite small protected areas and often have high visitor value.

IV Habitat/Species Management Area
Category IV protected areas aim to protect particular species or habitats and management reflects this priority. Many Category IV protected areas will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category.

V Protected Landscape/ Seascape
A protected area where the interaction of people and nature over time has produced an area of distinct charcter with significant, ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.

VI Protected area with sustainable use of natural resources
Category VI protected areas conserve ecosystems and habitats together with associated cultural values and traditional natural resource management systems.

Appendix 1: Count numbers for species qualifying for the 1% flyway population criteria (Criterion 6)

Common Name	IUCN (2012)	1997	2000	2001	2002	2003	22 Jan 2003	2004	2005	13-18 Sep 2005	7-15 Nov 2005	2006	2007	7-14 Jan 2007	6-10 Feb 2012	2013	1% Criterion
		WI[1] (nd)	WI[1] (nd)	WI[1] (nd)	WI[1] (nd)	WI[1] (nd)	Davies *et al.* (2004)	WI[1] (nd)	WI[1] (nd)	MBNS (2006)	MBNS (2006)	WI[1] (nd)	WI[1] (nd)	MBNS (2008)	Thiri Daewe Aung et al. (2013)	WI[1] (nd)	WI (2012)
Spot-billed Pelican	NT		4	1		20	47		4			5	4	4	14		45
Little Cormorant		50	804	437	711	1000	609	899	637	7	309	474	679	669	869	280	1000
Oriental Dater	NT	20	30	18	23	69	71	92	34	7		74	51	40	159		100
Black Stork						3			3						1		1
Glossy Ibis								20	7			10	42	42	416	84	250
Ruddy Shelduck		500	312	300	154	348	+	265	411		146	970	223	150	358	180	500
Ferruginous Duck	NT	2000	1720	1178	3158	606	809	1010	1170		41	2383	822	822	750	344	1000
Tufted Duck			615	855	2035	1538	1626	1820	2133		1442	3275[2]	1364	1364	2804	16	2400
Sarus Crane	VU			7	12	3	8?	14	5		6		2	2	2		6
Common Crane			220	16		30	+	645	24		13	97[3]	90	>100	120		10
Brown-headed Gull		500	616	263	132	269	647	229	173	1	58	843	386	339	1884	610	1400

[1] Waterbird Census data is collected during a mid-winter count, usually in January (or possibly February) of the stated year.
[2] The 2006 waterbird census count data (WI 2013) appears to be from the 22-30 December 2005 count reported in MBNS (2006). However, MBNS (2006) gives 3291 Tufted Duck at this time.
[3] Reported as 893 Common Crane in MBNS (2006).

Notes

Common Name	Scientific Name	Common Name	Scientific Name
Spot-billed Pelican	*Pelecanus philippensis*	Ruddy Shelduck	*Tadorna ferruginea*
Little Cormorant	*Phalacrocorax niger*	Ferruginous Duck (Pochard)	*Aythya nyroca*
Oriental Dater	*Anhinga melanogaster*	Tufted Duck	*Aythya fuligula*
Black Stork	*Ciconia nigra*	Sarus Crane	*Grus antigone*
Glossy Ibis	*Plegadis falcinellus*	Common Crane	*Grus grus*
Brown-headed Gull	*Larus brunnicephalus*		