

Status and distribution of the endangered Baer's Pochard *Aythya baeri* in Bangladesh

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Continued declines in the now endangered Baer's Pochard *Aythya baeri* imply that this species may well be entering a downward spiral towards global extinction. Knowledge of the drivers of this decline remain fairly anecdotal and even basic data on population trends are hard to come by given the species's similarity to other diving ducks. We conducted a review of past records of Baer's Pochard in Bangladesh, given concerns over the reliability of some past counts, to determine the true magnitude of recent declines, and also present counts from targeted surveys in Bangladesh in the 2010–2011 winter in addition to some basic autecological data. We conclude that several of the high counts from the period 1990–2005 may have been in error, but even accounting for these, the population has declined nationally by 99% in just two decades.

INTRODUCTION

Baer's Pochard *Aythya baeri* is a globally threatened diving duck which breeds in Russia and north-eastern China and winters mainly in eastern and southern mainland China, India, Bangladesh and Myanmar. It was uplisted from Vulnerable to Endangered on the IUCN Red List in 2008 in response to evidence of a drastic decline in numbers at known wintering grounds. The principal drivers of this decline are suspected to be habitat loss and degradation plus over-hunting; the most recent global population estimate totalled just 5,000 individuals. It is now absent or rare over much of its former wintering grounds. For example, Thailand held as many as 426 individuals in the late 1980s but now only plays host to single-figure counts each winter (BirdLife International 2011). BirdLife International (2011) estimated the wintering population of Baer's Pochard in Bangladesh and India to be of the order of 1,000–2,000 individuals; however, recent counts from both the countries suggest that this is a significant overestimate of at least one order of magnitude, with a maximum of only c.100 individuals in the last five years. The earlier estimate of 1,000–2,000 is probably based on counts from the 1990s and early 2000s, some of which are of questionable reliability (Li *et al.* 2009). Given the apparent significance of Bangladesh for this species and a sharp population decline in its wintering areas, we reviewed all past records and counts of the species. In addition, SUC conducted a survey of the wintering population of Baer's Pochard in Bangladesh in 2010–2011 that spans a wider spatial and temporal range than previous surveys and complements recent data from Asian Waterbird Censuses (Li *et al.* 2009).

METHODS

Review of records

In addition to compiling and reviewing past published records of Baer's Pochards, five senior birdwatchers in Bangladesh were contacted for unpublished records of this species, with counts also obtained from monitoring of a key site—Hakaluki Haor—and information obtained on the reliability of past Asian Waterbird Census (AWC) records. We compiled all records of Baer's Pochard from Bangladesh based on both published literature and unpublished observations. It is important to note that Baer's Pochard is often difficult to separate from the sympatrically wintering Ferruginous Duck *Aythya nyroca* and Tufted Duck *A. fuligula* (Grimmett *et al.* 1998, BirdLife International 2001), depending on expertise of the observer, viewing conditions and quality of optical equipment. In order to assess the reliability of old records, previous surveyors were contacted for Baer's Pochard

survey methodology, field descriptions and in rare cases photographic documentation. We treated older records as reliable if the observers were known to be experienced surveyors with previous experience of identifying this species. Some AWC records were treated as unreliable if experienced observers, listed as present, were subsequently found not to have participated in the counts.

Waterfowl surveys

SUC undertook waterfowl surveys in two haors, Hakaluki and Tangar, which are large depressions in north-east Bangladesh that are deeply flooded in the wet season and retain water in several beels (shallow waterbodies) in the dry season; historically the majority of Baer's Pochard sightings in Bangladesh have been located at these haors. A total of 18 beels were thoroughly surveyed for Baer's Pochard and other globally threatened or Near Threatened species such as Ferruginous Duck, Falcated Duck *Anas falcata* and Baikal Teal *A. formosa* between December 2010 and February 2011. Additional sites which had previously hosted Baer's Pochards such as Muhuri Dam, Hail Haor and some parts of the Jamuna River were also surveyed. At least two observers conducted surveys together at each site to minimise counting and identification errors. Surveys were conducted both on foot and by boat. Counts were repeated twice on all occasions and the maximum numbers are presented here. Observations were made using 10×42 binoculars and 25–50× spotting scopes.

Behavioural observations

SUC selected three male Baer's Pochards to investigate their diurnal time-activity budget, since males were easier to separate while foraging within mixed flocks than females. These three individuals were observed for c.180 minutes between 08h00 and 14h00 over two days. Behaviour categories were established for four main activities: *foraging* (diving, up-ending), *resting* (floating motionless on the water with eyes open or sleeping), *preening* and *swimming* (moving from one place to another). In each flock-scan, all birds in the flock were checked from a rowing-boat for Baer's Pochard, working systematically from one side of the flock to the other using a spotting scope. In addition, a GPS unit was used to measure distance between the foraging site and the lakeshore. Water depths were determined using a measuring tape attached to a bamboo stick.

RESULTS

Globally threatened waterfowl surveys in the 2010–2011 winter

During the winter 2010–2011 a minimum total of five Baer's Pochards were recorded by this survey, comprising four individuals

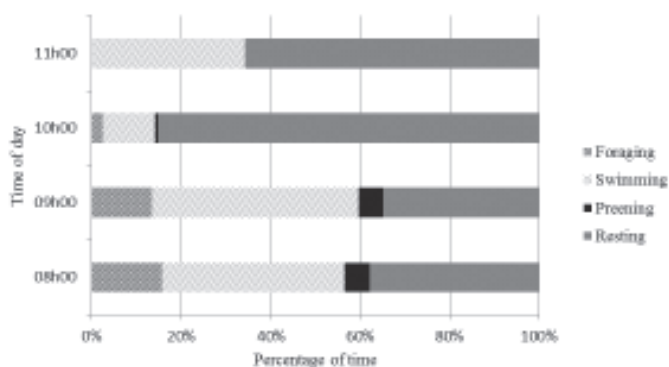
Table 1. Abundance of internationally significant waterfowl counted between December 2010 and February 2011 during a search for Baer's Pochard in selected key wetlands.

Site name	Coordinates	Survey dates	Baer's Pochard	Ferruginous Duck	Falcated Duck	Baikal Teal	No of individuals recorded	No of species recorded
			<i>Aythya baeri</i> (EN)	<i>Aythya nyroca</i> (NT)	<i>Anas falcata</i> (NT)	<i>Anas formosa</i> (VU)		
Chatla Beel (Hakaluki Haor)	24.3812°N 92.5195°E	22/12/2010	–	46	2	–	1,270	20
Hawa-banna Beel (Hakaluki Haor)	24.3745°N 92.1573°E	23/12/2010	–	52	4	–	640	13
Foot Beel (Hakaluki Haor)	24.3733°N 92.1471°E	23/12/2010	–	12	–	–	1,655	9
Hingajur Beel (Hakaluki Haor)	24.3733°N 92.1471°E	24/12/2010	–	1,450	–	–	1,780	11
Haor Khal Beel (Hakaluki Haor)	24.4038°N 92.2543°E	25/12/2010	–	70	2	–	6,400	16
Knna Muina	25.0432°N 91.5547°E	19/02/2011	–	270	2	–	788	13
Rowa Beel (Tanguar Haor)	25.0839°N 91.5412°E	20/02/2011	1	248	–	–	1,800	8
Rupaboi Beel (Tanguar Haor)	25.0732°N 91.4424°E	21/02/2011	–	220	2	–	430	4
Hatirgata Beel (Tanguar Haor)	25.0844°N 91.3423°E	22/02/2011	4	120	5	1	9,000	12
Muhuri Dam	22.5050°N 91.2820°E	10/01/2011	–	28	–	–	1,290	10

(three males and one female) at Hatirgata Beel and one female at Rowa Beel, both in Tanguar Haor (Table 1). The four individuals (2% of the total number of waterfowl counted in the flock) at Hatirgata Beel were c.200 m from the shoreline at 1.88 m water depth, within a mixed flock of 166 Red-crested Pochard *Netta rufina* (83%), ten Gadwall *Anas strepera* (5%), eight Ferruginous Duck *Aythya nyroca* (4%), six Common Teal *Anas crecca* (3%) and six Common Pochard *Aythya ferina* (3%). The single individual at Rowa Beel was seen c.25 m from the shoreline at 1.26 m water depth and was not accompanied by other waterfowl. In addition, in this winter four individuals were recorded at Pashua Beel during the regular mid-January waterbird census (E. Haque pers. comm. 2011), and in Hakaluki Haor seven were seen at Haor Khal and one male in Nagoa-Loribari during a census of the haor in mid-February, giving a total of 17 Baer's Pochard for the country (it is unlikely that there was duplication in the counts given the close dates and distances between sites). Three other globally threatened waterfowl species (Table 1) were recorded including the third national record of Baikal Teal and 17 Falcated Duck, which is the highest count since 1993 in Bangladesh (Thompson *et al.* 1993, Thompson & Johnson 2003).

Baer's Pochard diurnal time-activity budget

The activity budget data indicated (Figure 1) that Baer's Pochard spent most of its time between 08h00 and 14h00 resting (58%) and swimming (32%), and considerably less time in foraging (7.4%) and preening (2.6%). Baer's Pochards were actively foraging and swimming during the early hours of the day, mostly prior to 10h00 and primarily stationary (either resting or preening) after 10h30. Certainly, this information is insufficient to draw a firm conclusion on the overall diurnal activity pattern of the Baer's Pochard, and further detailed observations are needed.

Figure 1. Diurnal time-activity budgets of Baer's Pochard at Tanguar Haor, Bangladesh, observed for c.180 minutes between 08h00 and 14h00 over two days in February 2011.

Review of records since 1990

We were able to trace 59 reports of Baer's Pochards from Bangladesh in the period 1990–2011, of which 40 records are previously unpublished in detail (including observations from 2011), although aggregate Asian Waterbird Census (AWC) counts have been used in analyses of threat status of this species. Table 2 lists all records known to us. Of these we consider 50 of the 59 records (85%) to be reliable using the criteria outlined above. We consider that the AWC published counts highlighted below and in Table 2 should be treated as inconclusive, and the current national AWC coordinator is of the same opinion (E. Haque pers. comm. 2011). The counts deemed unproven comprise: 510 individuals from Hakaluki Haor and Pasua Beel in 1995; 3,010 individuals mostly from Pashua, Tanguar and Hakaluki Haors in 1996; and 3,580 individuals from Tanguar Haor, Pashua Beel and Khana Muair Beel of Sylhet division (Li *et al.* 2009) in 2001. These AWC records (D. Li *in litt.* 2007) also included names of experienced but non-participatory observers, so there was potentially a dearth of experience within the survey team in 1996 and 2001; hence some of the highest counts of this species which might have played a key role in the current global population estimate (5,000 mature individuals) (BirdLife International 2011) are considered potentially unreliable.

Based on Table 2 the peak numbers recorded in a winter were about 700 in January–February 1992 and about 1,700 in January–February 1993 (the high estimates at three sites in 1993 are considered reasonable, as very large numbers of duck were present in the haors that winter), and just under 900 in 1994. Between 1995 and 2000 the true status is confused by the unreliable counts and some gaps in coverage of key wetlands. After the last larger count of 70 at Tanguar Haor in 2001 the most important site has been Hakaluki Haor, where an average of about 10 birds has been recorded in each of the last four winters. Table 3 summarises the annual totals and peak counts each year for the two wetland systems most regularly used by Baer's Pochard—Tanguar and Hakaluki Haors—and also indicates those years for which data are unavailable or unreliable. The average annual count was about 660 during 1991–1995, is unknown during 1996–2000, was 99 during 2001–2005 and has been only 6 during 2006–2010.

DISCUSSION

Population decline

Records of just five individuals during the targeted survey, an additional 12 individuals during regular surveys in the winter 2010–2011, plus our review of past records, indicate that the wintering population of Baer's Pochard in Bangladesh has undergone a decline of about 90% in the last ten years, and of 99% since the early 1990s even after discounting the highest counts that are considered

Table 2. Sightings and claims of Baer's Pochard in Bangladesh between 1900 and 2011

Site (name and district)	Year	Month	Day	Number	Observer/ Reference
Zoo Lake, Dhaka	1990	Jan	2	4	AWC
Peelkhana Lake, Dhaka	1990	Jan	5	3	AWC
Shibaloy, Kamalapur, Bhumiheen Chars, Dhaka	1990	Jan	12	3	AWC
Zoo Lake, Dhaka	1991	Jan	4	3	AWC
Peelkhana Lake, Dhaka	1991	Jan	5	2	AWC
Shibaloy, Kamalapur, Bhumiheen Chars, Dhaka	1991	Jan	6	3	AWC
Hakaluki Haor (Chatla & Pingla Beels), Moulavi Bazar	1992	Feb	19	5	D.A. Scott & A. Khan in FAP 6 (1995) (in table prepared by S.M.A. Rashid but not listed in the text written by D.A. Scott)
Tanguar-Rauar Beel, Sunamganj	1992	Mar	2	1	D.A. Scott & S.M.A. Rashid in FAP 6 (1995)
Banuar Haor, Sunamganj	1992	Mar	2	4	S.M.A. Rashid & A. Khan in FAP 6 (1995)
Matian Haor (Palair Beel), Sunamganj	1992	Mar	3	20	D.A. Scott in FAP 6 (1995)
Tanguar Haor (Pana Beel), Sunamganj	1992	Mar	3	660	D.A. Scott & S.M.A. Rashid in FAP 6 (1995)
Pashua Beel, Sunamganj	1992	Mar	4	2	D.A. Scott & S.M.A. Rashid in FAP 6 (1995)
Tanguar Haor (Pana Beel), Sunamganj	1992	Mar	23	6	S.M.A. Rashid & A. Khan in FAP 6 1995
Pashua Beel, Sunamganj	1993	Jan	27	600	S.M.A. Rashid & A. Khan in FAP 6 (1995)
Tanguar Haor, Sunamganj	1993	Jan	27	112	P.Thompson in Thompson <i>et al.</i> 1993
Hakaluki Haor (Haorkhal), Moulavi Bazar	1993	Jan	30	300	S.M.A. Rashid in FAP 6 1995
Hakaluki Haor (Chatla & Pingla Beels), Moulavi Bazar	1993	Feb	1	700	S.M.A. Rashid in FAP 6 (1995)
Hail Haor (fish ponds), Moulavi Bazar	1993	Oct	24	2	S.M.A. Rashid in FAP 6 (1995)
Hakaluki Haor (Haorkhal), Moulavi Bazar	1993	Nov	1	2	S.M.A. Rashid & A. Khan in FAP 6 (1995)
Tanguar Haor, Sunamganj	1994	Jan	14	600	AWC
Banuar Haor, Sunamganj	1994	Jan	14	4	AWC
Pashua Beel, Sunamganj	1994	Jan	15	175	AWC
Shanir Haor, Sunamganj	1994	Jan	15	10	AWC
Medol Haor, Sylhet	1994	Jan	18	10	AWC
Bara Haor, Sylhet	1994	Jan	18	20	AWC
Hakaluki Haor, Moulavi Bazar	1994	Jan	20	70	AWC
Zoo Lake, Dhaka	1994	Feb	11	1	P.Thompson pers. obs.
Hakaluki Haor, Moulavi Bazar	1995	Jan	15	500	AWC – not considered reliable
Pashua Beel, Sunamganj	1995	Jan	15	20	AWC – not considered reliable
Hakaluki Haor, Moulavi Bazar	1996	Jan	19	800	AWC – not considered reliable
Pashua Beel, Sunamganj	1996	Jan	20	1,000	AWC – not considered reliable
Shanir Haor, Sunamganj	1996	Jan	20	10	AWC – not considered reliable
Tanguar Haor, Sunamganj	1996	Jan	21	1,200	AWC – not considered reliable
Tanguar Haor (Pana Beel), Sunamganj	1996	Feb	18	2	D Johnson, R. Halder, P.Thompson, – P.Thompson <i>in litt.</i> 2011
Banua Beel, Matian Haor, Sunamganj	1996	Feb	20	30	D Johnson, R. Halder, P.Thompson, – P.Thompson <i>in litt.</i> 2011
Muhuri Dam, Feni	1999	Jan	29	4	P.Thompson, E., Haque, R. Halder, W.J. Collis, – P.Thompson <i>in litt.</i> 2011
Khana Muia Beel	2001	Jan	20	1,000	AWC – not considered reliable
Pashua Beel, Sunamganj	2001	Jan	20	80	AWC – not considered reliable
Tangua Haor Complex Sunamganj	2001	Jan	21	2,500	AWC – not considered reliable
Tanguar Haor (Pana Beel), Sunamganj	2001	Feb	20	4	AWC
Tangua Haor, Sunamganj	2001	Feb	24–25	70	E. U. Haque in P.Thompson and Johnson, D.2003
Jamuna River, Gaibanda	2002	Jan	25	28	E. U. Haque in P.Thompson and Johnson, D.2003
Pashua Beel, Sunamganj	2002	Feb	22	24	AWC
Tanguar Haor, Sunamganj	2002	Feb	23	95	AWC
Khana Muia Beel	2002	Feb	23	6	AWC
Tanguar Haor, Sunamganj	2003	Feb	14	30	AWC
Shanir Haor, Sunamganj	2004	Jan	11	2	AWC
Tanguar Haor (Rowa Beel), Sunamganj	2004	Jan	12	17	AWC
Tanguar Haor, Sunamganj	2004	Jan	12	6	AWC
Muhuri Dam, Feni	2005	Jan	2	12	AWC
Chatidhara (Chatidhora) Beel, Sylhet	2005	Jan	28	2	AWC
Tanguar Haor, Sunamganj	2005	Jan	31	202	AWC
Hail Haor (Baikka Beel), Moulavi Bazar	2008	Feb	17	2	E.U. Haque and P.Thompson – P.Thompson <i>in litt.</i> 2011
Hakaluki Haor, Moulavi Bazar	2008	Feb	?	10	UNDP via P.Thompson <i>in litt.</i> 2011
Hakaluki Haor, Moulavi Bazar	2009	Feb	?	14	E. U. Haque <i>in litt.</i> 2009
Hakaluki Haor, Moulavi Bazar	2010	Feb	?	3	UNDP via P.Thompson <i>in litt.</i> 2011
Hakaluki Haor, Moulavi Bazar	2011	Feb	20–21	8	P.Thompson, E.U. Haque <i>in litt.</i> 2011
Pashua Beel, Sunamganj	2011	Jan	?	4	E.U. Haque <i>in litt.</i>
Tanguar Haor, Sunamganj	2011	Jan	20–22	5	S.U. Chowdhury (this paper)

Table 3. Total and highest annual counts of Baer's Pochard in Bangladesh and two main sites.

Year	Totalsightings	Tanguar complex (peak)	Hakaluki complex (peak)
[1990]	10	NS	NS
1991	8	NS	0
1992	698	660	5
1993	1,716	112	1,000
1994	890	600	70
1995	0	0	NA
[1996]	32	NA	NA
[1997]	0	NS	NS
[1998]	0	NS	NS
[1999]	4	NS	NS
[2000]	0	NS	NS
2001	74	70	NS
2002	151	95	NS
2003	30	30	0
2004	25	23	0
2005	216	202	0
2006	0	0	0
2007	0	0	0
2008	12	0	10
2009	14	0	14
2010	3	0	3
2011	17	5	8

¹ NS – Not Surveyed, NA – Not Accepted.

² Year with square brackets indicate no count or no acceptable count from either of main sites.

unreliable (Table 2). Without historical data we cannot refute the potential hypothesis that these early high counts may have been a temporary phenomenon involving displacement of birds from other wintering areas, but we consider this unlikely given that other potential wetland sites were also covered by the AWC, at least within Bangladesh. Moreover, there are few if any unsurveyed sites to which birds might have relocated. Globally, between the period 1998 and 2008, a sharp decline (50–70%) has occurred, leaving an estimated current global population of just 5,000 mature individuals. Considering no double-counting between sites, an estimated c.1,000 Baer's Pochards were recorded between late 2010 and early 2011 in the wintering grounds, comprising 760 individuals at Wuchang Hu, Anhui province, eastern China, which appears to be the largest known current population of this species (M. Barter *in litt.* 2010); 152 in four sites of Hubei province, central China (J. Lie *in litt.* 2011) and 1 in Deobali Jalah, Assam, India (P. Baruah pers. comm. 2011).

Current threats in Bangladesh

The lowlands of north-east Bangladesh formerly provided a wide variety of habitats for waterbirds; shallow wetlands, seasonally flooded grasslands and swamp forest were ubiquitous just a century ago, but substantial areas have now been converted to agricultural use (BirdLife International 2004). Illegal hunting of waterfowl using poisoned baits (Alpha-Chloralose in boiled rice) in the two major wetland complexes has proved to be a significant problem, particularly at Hakaluki Haor with c.500 ducks poisoned in one recent incident (*The Daily Star* 2010). The Northern Pintail *Anas acuta* is the commonest victim of the poisoned baits, but Ferruginous Ducks were also reported to be killed (*The Daily Star* 2009). Although no evidence was found of trapping or poisoning of Baer's Pochard in recent years, hunting is still likely to be a significant threat. Changes in attitudes and practices amongst people who presently poison or trap ducks, and the enforcement of laws, including an end to all use of poisoned baits, are urgently needed for future protection of all waterfowl, globally threatened or otherwise, in Bangladesh.

Human presence may also cause indirect effects through disturbance. At Tanguar Haor fishing boats regularly pass through

most parts of the wetland. As these boats approach closer the ducks abandon where they are feeding or loafing due to the interruption (Muzaffar 2004). This might reduce the foraging efficiency of migratory ducks, considering that the ducks are tolerant of boats only if they are over 30 m from the foraging or roosting spot (Muzaffar 2004). Recent management changes at Tanguar Haor (a Ramsar site) have set rules to permit fishing by local people, but have yet to zone the wetland effectively to provide disturbance-free areas for wildlife. The resultant widespread small-scale fishing may cause more disturbance than the traditional previous practice of mass fishing of large areas once every three years. Moreover, unsustainable fishing practices pose a huge threat to the haor ecosystem and biodiversity as a whole (BirdLife International 2004, Muzaffar 2004).

Time-activity budgets have been used extensively elsewhere to provide valuable information on duck habitat use and wintering strategies. However, knowledge of the behavioural ecology of diving ducks (Aythyini) is lagging far behind that of dabbling ducks (Anatini) (Houhamdi & Samraou 2008). Our observations suggest that Baer's Pochards actively forage between 08h00 and 10h00 at 1.26–1.88 m water depth; recently arrived individuals on the breeding grounds were reported as foraging actively between 08h00–09h00 and diving to depths of 0.5–2.0 m for c.40 seconds at Xianghai Nature Reserve in China (Gao Jihong *et al.* 1992b). Further studies on the behavioural ecology of wintering diving ducks including the Baer's Pochard are important for sound evidence-based conservation planning decisions regarding sustainable wetland management practices in Bangladesh.

CONCLUSION

This consolidation of both past and recent surveys confirms a dramatic reduction in the wintering population of Baer's Pochards in Bangladesh, and indicates that the global population may be substantially lower than previously thought. A thorough remote-sensing analysis is required to identify potential suitable wetland habitats to be targeted by future surveys for Baer's Pochard in north-east India and Bangladesh. Further studies are needed to determine the potential negative effects on wintering waterfowl of current fishing practices, synthetic agrochemical run-off, and disturbance caused by intensive human activities. Urgent measures must be taken to reduce the pressure of hunting, especially at key wintering sites. Both Hakaluki and Tanguar Haors are recognised as Important Bird Areas and are both considered nationally Ecologically Critical Areas, and the latter also a Ramsar site (BirdLife International 2004). Although both haors have been the subject of recent projects aimed at establishing conservation and wise use through co-management involving local communities, this has not been reflected in recovery of wintering waterfowl populations. Additionally, it is reported that wetland management plans have not been properly implemented in either of these internationally important sites (Muzaffar 2004). In order to maintain a healthy wetland ecosystem to support both human use and biodiversity, appropriate conservation-based wetland management plans and better governance are required.

ACKNOWLEDGEMENTS

SUC is grateful to the British Ecological Society for funding this survey (Application number: 2776 / 3471). ACL would like to thank CAPES – Coordenação de Aperfeiçoamento de Pessoal de Nível Superior for funding support. SUC is thankful to Ronald Halder and Farhad A. Pavel for their support in the field. We thank Enam Ul Haque for information on past waterbird counts under the AWC.

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