Scaly-sided Mergansers *Mergus squamatus* on the lower Chongchon River, central Korea

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In autumn 2003, the lower Chongchon River in central Korea supported at least 40 Scaly-sided Mergansers *Mergus squamatus*, significantly exceeding previous published estimates of the DPR Korean population. This is a non-breeding concentration of global significance (on currently available information) for this threatened species. Information is presented upon numbers present, sex ratio and behaviour from mid-October (when the birds were found) until late November (when observations ceased). Supplementary observations from March 2004 and autumn 2004, indicating regular use of the site, are also presented. Conservation issues related to the species at the site are reviewed.

Key Words: threatened species, discovery, conservation, moult, human disturbance

Introduction

The Scaly-sided Merganser *Mergus squamatus* breeds only in parts of the Russian Far East, northeast China and northern Korea and winters across a much larger area of central and eastern China, and reportedly within the breeding range in the Russian Far East. Smaller numbers of non-breeders visit Japan, Taiwan and southern Korea, with a few records from Southeast Asia (BirdLife International 2001; Chong & Morishita 1996; Delacour & Jabouille 1931; Delacour *et al*. 1928; He Fen-Qi *et al*. 2002; Hughes & Hunter 1994; Round & Verbelen 1997). With evidence from both China and Russia of significant declines (Bocharnikov & Shibnev 1994; Jia Shaobo *et al*. 2003; Mikhailov & Shibnev 1998; Zhao Zhengjie *et al*. 1994a), the species is internationally red-listed as Globally Threatened: Endangered (Threatened Waterfowl Specialist Group 2003), although, at least in parts of Russia, the population is now increasing, perhaps substantially (Shokhrin & Solovieva 2003). This may reflect the cessation of timber-rafting (see Surmach & Zaykin 1994). BirdLife International (2001) estimated the total population to be below 4,000 birds, although Shokhrin & Solovieva (2003) speculated that it may exceed 10,000.

Bird survey work in northern Korea has been limited (Tomek 1999–2002) and there are only a few internationally published records of Scaly-sided Merganser: two at Musan on 16 April 1912, one at Janghungri on 29 March 1958, and three birds at Mayang Reservoir in May 1986 and 20 September 1989, where breeders are said to arrive in April. There are also reports (but no dates or numbers) from the lower Orangchon River and Lake Samjiyon (Austin 1948; BirdLife International 2001; Chong & Morishita 1996; Fiebig 1993–1995; MKN & KUT 1987; Tomek 1999–2002; Won Hong Koo 1963). These areas all lie in the northernmost two provinces of Korea, Hamgyong North and Ryanggang. A study Museum of Korean Nature and Korea University in Tokyo (1987) (hereafter referenced as MKN & KUT) implied that the species also occurs in Chagang Province; the Amnok River, which forms the border between Korea (Chagang) and China, is, in its middle and lower reaches, an important wintering area for the species (Zhao Zhengjie *et al*. 1994b). Records from southern Korea so far indicate a small wintering population, and MKN & KUT (1987) stated that the species is 'extremely rare' in northern Korea; but BirdLife International (2001, p. 532) speculated that it may prove to have been under-recorded across the peninsula. Indeed, the known global population outside the breeding season cannot account for the known number of breeders (BirdLife International 2001; He Fen-Qi *et al*. 2002), so undiscovered wintering and passage areas must exist.

Methods

During autumn 2003, Scaly-sided Mergansers were recorded on nine days on the lower Chongchon River, Pyongan North – Pyongan South Provinces (*c*. 39°40' N, 125°40' E – 40°02' N, 126°12' E), while the authors were driving between Pyongyang and the town of Hyangsan (**Table 1**). The road crosses the Chongchon near its

Table 1: Sightings of Scaly-sided Mergansers on the Chongchon River, central Korea, autumn 2003, March 2004 and autumn 2004.

Date	Location*	Number of birds§	Notes
2003			
15 Oct	24 km	22 (2:20)	
28 Oct	15 km	36 (3:33)	
31 Oct	7 km	28 (4:24)	
4 Nov	38 km	12 (2:10)	Flushed upstream, distance unclear.
4 Nov	15 km	9 (2:7)	Assumed different group from above.
12 Nov	41 km	12 (4:8)	2:4 of them flushed upstream, distance unclear.
12 Nov	15 km	6 (1:5)	Assumed different group from above.
14 Nov	41 km	8 (2:6)	
19 Nov	41 km	10 (3:7)	Not flushed.
19 Nov	15 km	14 (4:10)	Assumed different group from above.
24 Nov	41 km	4 (1:3)	Flushed upstream, probably soon settled.
24 Nov	36 km	7 (1:6)	Assumed different group from above; not flushed.
24 Nov	16 km	4 (1:3)	Assumed different from above; loafing, seemed well settled.
24 Nov	14 km	1 (0:1)	Certainly different from group 2-km distant.
26 Nov	24 km	3 (1:2)	
2004			
11 Mar	11 km	9 (3:6)	
15 Mar	32 km	2 (1:1)	Not flushed.
15 Mar	20 km	2 (1:1)	Assumed different pair from above.
15 Mar	14 km	11 (6:5)	Assumed different group from above two.
20 Mar	41 km	2 (1:1)	Flying downstream, very low over water.
20 Mar	16 km	2 (1:1)	Soon after above pair, and assumed different.
20 Mar	14 km	6 (3:3)	Certainly different from above pair.
28 Oct	43 km	14 (4:10)	
28 Oct	40 km	4 (0:4)	Perhaps forming one dispersed flock with the above.
28 Oct	15 km	2 (0:2)	Assumed different from above birds.
4 Nov	45 km	8 (2:6)	
4 Nov	41 km	8 (0:8)	Certainly different from above birds.
4 Nov	40 km	1 (0:1)	Perhaps straggled individual from above flock.
4 Nov	26 km	2 (1:1)	Certainly different from above birds.
4 Nov	16 km	4 (2:2)	Certainly different from above birds.

Notes:
*Location figures are distances from Hyangsan according to road signs, and include the 2 km from where the road leaves the river and runs directly into Hyangsan town.
§The number of birds is given as 'total number (number of adult males: number of redheads)'. An adult is in its second winter or older; a redhead is a female or first-winter male.

mouth (at the Anju bridge), and 70 km south of Hyangsan, but the river cannot be seen from the road until 45 (road) km south of Hyangsan. Scaly-sided Mergansers were found the length of this stretch, which lies largely in Gujang County; the upper few kilometres are in Hyangsan County, and the lower few in Yongbyon County. The length of the river is about 10–20% more than the length of the road, because of meanders. Effectiveness of coverage was calculated by estimating, for each half-kilometre of road, whether a typical group of mergansers would have been detected on all (score 3), > half (score 2), < half (score 1) or none (score 0) of the adjacent water surface. Only half the river (score 135, of a maximum of 270) was estimated to be in view when driving towards Hyangsan, and about an eighth when returning. The totals in **Table 2** hence presumably underestimate the total population on this stretch of the Chongchon River.

Results and Discussion

At least 40 birds used the river during the autumn: the maximum count of adult males was seven, and of 'redheads' (females and first-winter males), 33 (**Table 2**). The date of first sighting, 15 October, might not indicate arrival, because the journey that the authors made the previous week (7 October) was made in the dark. The last journey was made on 26 November, and Scaly-sided Mergansers were still present. Indeed, they might winter at the site: although almost all the river is iced over from mid-December to February, small patches in the fast-flowing freshwater reaches remain open. It is unlikely that large numbers winter on the Chongchon because the unfrozen stretches do not exceed 200 m across: although the Amnok River supports wintering birds and is significantly to the north, lengthy stretches do not freeze because power station discharge warms the water.

A visit in March 2004 again found Scaly-sided Mergansers on this stretch of the Chongchon. On 3 March, most of the river was still frozen over, and the open stretches supported many people. No ducks were seen. By 11 March, almost all the ice had melted, and Scaly-sided Mergansers were found then and on both subsequent journeys (**Tables 1 and 3**). As in autumn, birds used almost the length of the surveyed river, but total counts were lower (no overlap: autumn minimum 16, spring maximum 15). It is unlikely that birds were present in any significant numbers, if at all, along this section of the Chongchon during May–July 2003 and September 2003, because the river was checked frequently during these months (for Mandarin Ducks *Aix galericulata*) and no mergansers were found.

Although there was no clear trend in total number of birds present across the autumn, a directional change in sex ratio (increase in proportion of adult males) suggested a changing population and hence probably a total number of birds exceeding the minimum of 40. The increase in observed males did not reflect completion of moult; all adult males were in full breeding plumage even in mid-October, which accords with data in Kolomiitsev (1995). In October, each day's sightings involved only a single

Table 2: Summary counts of Scaly-sided Mergansers and Goosanders on the Chongchon River, central Korea, autumn 2003.

Date	29 Sep	15 Oct	22 Oct	28 Oct	31 Oct	4 Nov	12 Nov	14 Nov	19 Nov	24 Nov	26 Nov
Direction[1]	→Hy	→Hy	→Hy	→Hy	→Py	→Hy	→Hy	→Py	→Hy	→Hy	→Py
Total Ms[2]	0	22	0	36	*28*	21	18	*8*	24	16	3
n groups[3]	0	1	0	1	*1*	2	2	*1*	2	4	1
Mean g.s.[4]	-	22	-	36	*28*	10.5	9	*8*	12	4	3
Total male[5]	0	2	0	3	*4*	4	7	*2*	7	3	1
% male[6]	-	9	-	8	*14*	19	28	*25*	41	19	33
Total Mm[7]	0	0	0	0	*0*	3	7	*0*	13	9	24

All daylight trips from Pyongyang to Hyangsan are included from 29 September (two weeks before the first observation of Scaly-sided Merganser) until 26 November (end of survey period).

[1]Direction of car travel. Approximately half the river can be scanned from the road when travelling from Pyongyang to Hyangsan (→Hy), but only an eighth when travelling from Hyangsan to Pyongyang (→Py). Figures from the latter are in italics, because counts (number of individuals, of males and of groups) are not comparable with those from journeys to Hyangsan. They are included here because group sizes and sex ratio estimates are presumed to be comparable.

[2]Total count of Scaly-sided Mergansers.

[3]Number of groups of Scaly-sided Mergansers.

[4]Mean group size of Scaly-sided Mergansers.

[5]Total of Scaly-sided Mergansers in adult male plumage.

[6]Percentage of Scaly-sided Mergansers in adult male plumage.

[7]Total Mm: Total count of Goosanders over the same stretch of river.

Table 3: Summary counts of Scaly-sided Mergansers and Goosanders on the Chongchon River, central Korea, in 2004.

Date	3 Mar	11 Mar	15 Mar	20 Mar	28 Oct	4 Nov
Direction[1]	→Hy	→Py	→Hy	→Hy	→Hy	→Hy
Total Ms[2]	0	9	15	10	20	23
n groups[3]	0	1	3	3	3	5
Mean g.s.[4]	-	9	5	3.3	6.7	4.6
Total male[5]	0	3	8	5	4	5
% male[6]	-	33	53	50	20	22
Total Mm[7]	0	3	7	3	*3*	4

All trips from Pyongyang to Hyangsan made in the daylight are included from 3 March (the first check) until 20 March (the last spring check), as are both the autumn 2004 trips.

large flock, whereas in November up to four, smaller, flocks were found per day (**Table 2**). In Russia, the largest flocks (15–20) occur in October (Bocharnikov & Shibnev 1994). In the breeding grounds in the Changbaishan of China, groups exceeding ten were only seen during migration (Zhao Zhengjie & Pao Zhengjie 1998). In spring (**Tables 1 and 3),** the proportion of males was higher than in early autumn, birds were more dispersed (three groups on both journeys, typically 1–2 in early autumn), and mean group size was smaller than in autumn. Indeed most (four of seven) groups consisted of pairs (seen only once in autumn), and even in the largest group found, 11 birds, two pairs were clearly moving somewhat separately from each other and from the remaining seven birds. No trace, however, was seen of active courting.

A site total of 40, probably rather more, is a significant non-breeding concentration of this species (0.4–1% of the estimated world population), especially because during winter Scaly-sided Mergansers are generally believed to occur in highly dispersed small groups (e.g. He Fen-Qi *et al*. 2002; Zhao Zhengjie *et al*. 1994a). The largest concentrations so far known are both in China: over 100 birds in winter along 10 km of the Xinjiang River, northeastern Jiangxi Province; and up to 76 on migration (April and September) at Xiaobei Lake (near Ning'an in the Chiangbaishan mountains), southeastern Heilongjiang (He Fen-Qi *et al*. 2002; Li Wenfa *et al*. 1998).

All Scaly-sided Mergansers were on stretches of river with many boulders and cobbles projecting from the water. Water-surface width in these stretches was generally 20–60 m, exceptionally 100 m. There was no adjacent forest; Zhao Zhengjie and Pao Zhengjie (1998) also found birds to use "larger rivers without wooded banks" from October to March. Feeding birds were in fast flowing water, usually with 'white-water' around the patches of rocks. Birds interspersed periods of very active feeding in the rushing water with

loafing on boulders (or, occasionally, small sandbars) or in nearby sheltered water. Most of the Chongchon visible in this stretch supports such habitat, although some stretches have few rocks awash (at typical water levels). The concentration of records into only a few stretches (Table 1) probably relates to the fact that towns, footbridges or very heavy human bank-side activity are found on other visible stretches of the river, rather than indicating particularly suitable water conditions.

Goosanders *M. merganser* also use this stretch of the Chongchon, in smaller numbers than of Scaly-sided Mergansers in both autumn and spring (**Tables 2 and 3**). The two species formed mixed groups, although in flocks with several of both species present they tended to segregate slightly.

On the journeys made in the following autumn on 28 October and 4 November 2004, 20 and 23 birds were recorded, respectively (**Tables 1 and 3**). This suggests that birds occur regularly on the Chongchon and that significant numbers winter at undiscovered sites in Korea. It echoes the recent prediction of Moores (2002) that "probably 30–50...winter most years" [in southern Korea], somewhat exceeding the published wintering population in southern Korea (< 10, BirdLife International 2001).

Several factors may threaten Scaly-sided Mergansers on the Chongchon. River flow is controlled by a large barrage in Hyangsan, industry in some riverside towns means that pollution must be at least a risk, and gill-netting is a common practice. Entanglement in fishing nets is a significant problem, in the Russian range at least (Surmach & Zaykin 1994; Yelsukov 1994). Most significant, however, is probably the presence of humans engaging in numerous activities from the collection of stones and sediment to recreation. It is rare to be able to view a significant (1+ km) length of river and not see people beside or in the water in several localities; sometimes, hundreds are in view. Such disturbance is evidently not at high enough levels to prevent birds using the river, but does result in numerous flushings. Disturbance, often from motor boats, is regarded is a major problem in Russia for this species (Mikhailov & Shibnev 1998; Solovieva 2002), but such boats barely use the Chongchon. Birds are most unlikely to be shot, because gun usage is strictly controlled. Equally, because of firm guidelines it is unlikely that fishing with poisons or explosives threatens the birds on the Chongchon, although it does in the nearby Changbaishan in China (Zhao Zhengjie *et al*. 1994a). Finally, habitat alteration through embankment and associated road building may be underway on a significant proportion of potential wintering rivers elsewhere (N. Moores, unpublished data), but there is no sign of this on the Chongchon.

These observations come from only two, consecutive, non-breeding seasons. It is a priority to assess whether birds use the site annually and, hence, merit site-specific conservation measures. Counts of birds through the non-breeding season should be combined with investigations of potential on-site threat factors. Surveys should run from mid-, or even early, September right through the winter and into April. It is also

to seek this species on other large rivers in north and central Korea: most appear superficially similar to the Chongchon in terms of habitat (Kim Chol, unpublished data).

It is also important to search remaining forested rivers in north and central Korea during the breeding season. The Changbaishan Mountains, the major breeding area in China (Zhao Zhengjie *et al*. 1994a), straddle the Korea/China border. Hyangsan itself lies only *c*.250 km south of the Changbaishan, and while the rivers in the immediate vicinity are too heavily disturbed for mergansers to be able to breed, the remoter rivers and streams may still be suitable.

Acknowledgements

These observations were made during the UNDP–GEF Project DRK/00/G35/A/1G/31 'Conservation of biodiversity at Mount Myohyang in the DPR Korea', and we thank the Government of DPR Korea, UNDP and the Wildlife Conservation Society for financial and operational support. Other project staff generously tolerated frequent and sudden vehicle stops during autumn 2003 and in 2004 to check mergansers. Stuart Butchart, Baz Hughes, Nial Moores, Colin Poole and Michael Rank specifically provided information about mergansers.

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