

Small Grant Summary Report on the Project, “Improving the Conservation Status of the Scaly-sided Merganser in the Republic of Korea” (2022)



Report for EAAFP by Nial Moores, Director of Birds Korea and IUCN SSC Threatened Waterfowl Specialist Group, December 2022 (with minor edits in February 2023)

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Executive Summary

- The Scaly-sided Merganser *Mergus squamatus* is a globally Endangered, easily-disturbed species of duck which is confined to East Asia and which is ecologically dependent on healthy, fish-rich, and rather fast-flowing rivers for its survival;
- Tracking studies suggest that a potentially large number of Scaly-sided Merganser migrate across the Korean Peninsula between breeding and wintering areas; and the species also over-winters in the Republic of Korea (ROK). The ROK is therefore one of only four Principal Range States of the species, with substantial responsibility for conservation of this species and its habitats;
- Proper assessments of numbers and of population trends in the ROK require more research;
- Research confirms that the national Winter Bird Census conducted under the auspices of the Ministry of Environment is insufficient for counting this species;
- Birds Korea is an active member of the Scaly-sided Merganser Task Force within the East Asian-Australasian Flyway Partnership (EAAFP);
- National surveys conducted by Birds Korea in early 2012 and 2014 found 140-149 and 149 Scaly-sided Mergansers respectively. Our national mid-winter survey in 2022 found 175;
- We are unaware of any research prior to 2021 focused on the migration phenology of the species in the ROK;
- The EAAFP Small Grant of 4,000 USD in 2022 was used by Birds Korea to fund our own work on the species, and to supplement related projects which were funded primarily by Yeoncheon County and the Hanns Seidel Foundation (Korea office);
- During 2022, activities for the Scaly-sided Merganser conducted by Birds Korea and supported directly or indirectly, in part or in whole, by this small grant included: additional counts of the species along the Imjin River in Yeoncheon County, to build research capacity and to improve understanding of migration phenology; reports submitted to Yeoncheon County identifying threats to the species and potential mitigation responses; meetings with Yeoncheon County in preparation for possible designation of the Imjin River as a Flyway Network Site focused on the species; a national winter survey in February covering 16 rivers; additional counts along the Namhan and selected stretches of the Nam and Umcheon Rivers to help with assessing migration strategy; co-ordination with HSF of a small workshop on the Scaly-sided Merganser in November, participated in by local activists working for the conservation of several rivers used by the species (Imjin, Seomjin, Nam & Umcheon and Mangyeong); production of an awareness-raising pamphlet on the species for distribution in 2023; preparation of this report; and preparation for a collaborative scientific paper to be written in 2023.
- Observations made in 2022 extend the dates of presence in the ROK known to us, with the latest record in spring along the Imjin River on April 12th; and the earliest returning individual in autumn on October 8th on the Nam and Umcheon Rivers;
- Survey of three rivers alone in November 2022 recorded 215 Scaly-sided Merganser. This count is higher than any previous national count of the species, and suggests that the species likely peaks in abundance in the ROK in November, when staging and over-wintering birds overlap in timing;
- The evidence to date suggests that the majority of wintering Scaly-sided Merganser have arrived at key rivers by mid-November, remaining within these river-systems until March or early April, with local distribution influenced strongly by construction activities and extent of freezing;
- Rivers which typically freeze over each winter do not support large numbers of Scaly-sided Merganser in the mid-winter period. However, like the Imjin River, such rivers might still be important or internationally important for the species during the main migration periods.

1. Background Information

The Scaly-sided Merganser *Mergus squamatus* is an easily-disturbed, migratory and globally Endangered duck species confined to East Asia and to the East Asian-Australasian Flyway. The world population has been estimated at 3,600-6,800 individuals (Scaly-sided Merganser Task Force) with a 1% threshold of 45 individuals (Wetlands International 2022). The species breeds along rivers, especially in Far Eastern Russia and North-eastern China and the vast majority are also dependent on unpolluted, less disturbed, and fast-flowing rivers during migration across the Korean Peninsula and in winter, especially in eastern China and to a lesser extent the Korean Peninsula (Solovyeva et al. 2012; Liu et al. 2014; Moores & Kim 2014; Solovyeva et al. 2017; Moores 2021; BirdLife International 2022; Moores et al. 2022).

In the past 15 years there has been substantial research done and conservation actions taken on the breeding grounds within Far Eastern Russia and the People’s Republic of China (PR China) and within the main wintering areas for the species within PR China, including a major citizen science initiative conducting single-species surveys in winter which involved more than 2,000 birdwatchers (Zeng et al. 2018).

Progress on the Korean Peninsula has been far less substantial. To the best of our knowledge, there has been only a handful of observations of Scaly-sided Merganser in the DPR Korea in recent decades (e.g., Duckworth & Kim 2005) and there has only been one mid-winter survey focused on the species, which failed to find any Scaly-sided Merganser including along stretches of a river where substantial numbers were recorded in 2003 and 2004 (Duckworth & Kim 2005; Moores 2019).

In the Republic of Korea (ROK), the species is assessed as Nationally Endangered (NIBR 2019) and has been designated as a National Natural Monument (NBC 2018). To the best of our knowledge there has been no formal national survey of the species led by government bodies. Instead, the formal national status appears to be based largely or entirely on counts made during the national Winter Bird Census (from here-on, “Census”) (see Figure 1).

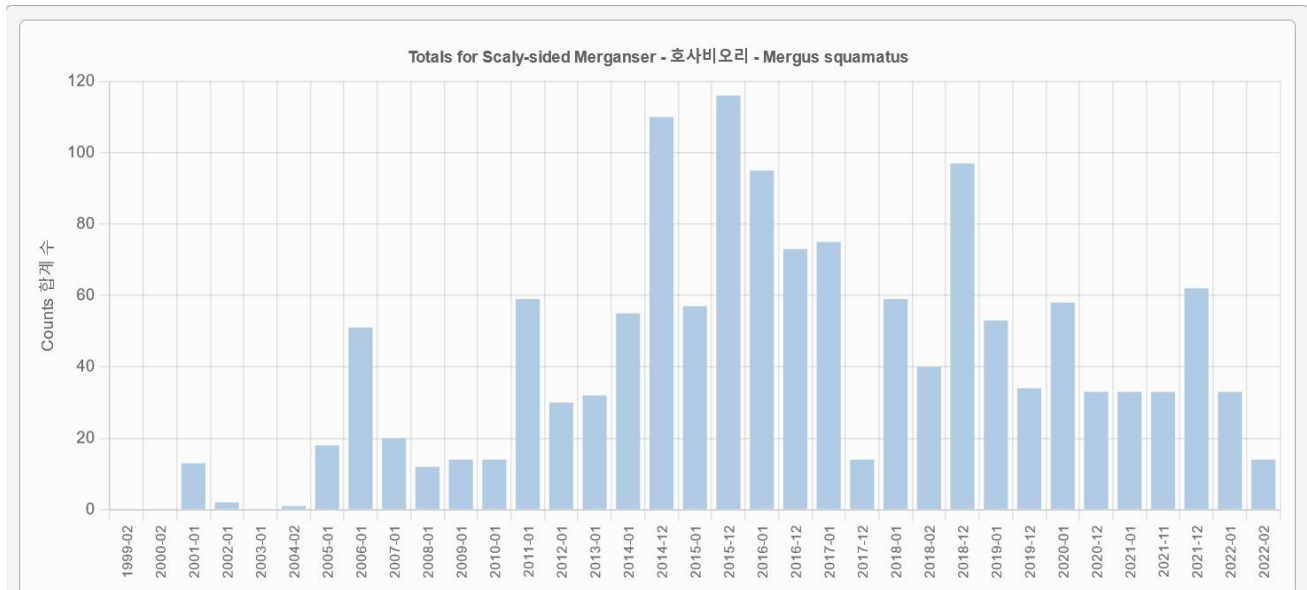


Figure 1. Census counts of Scaly-sided Merganser in the ROK by year and month (MOE 1999-2022; database by Andreas Kim at: <https://www.andreas-kim.de/AKG/MoE/MoE.html>)

The Census is conducted under the auspices of the Ministry of Environment (MOE 1999-2022) and started in 1999 with single-day counts of all birds (individuals and species) at 69 sites conducted once that winter. Subsequently, the number of sites covered by the Census increased rapidly through until the mid-2010s, with 200 or more sites covered from 2014 to the present, and two or even three counts now made each year. The census recorded a mean of only 13 Scaly-sided Merganser each January or February between 2000 and 2009 (range 0-59) (Moores & Kim 2014), increasing to an annual mean of 55 individuals over the ten most recent Januarys (Kim 2022).

Moores & Kim (2014), in their small grant report for the EAAFP which was shared with the EAAFP Secretariat and which was provided to some officials within the Ministry of Environment, concluded that the Census was insufficient to capture the majority of wintering Scaly-sided Merganser in the ROK, and recommended an additional singles-species winter survey. This conclusion was reached on the basis of a series of observations at a number of sites and on the results of Birds Korea national winter surveys in 2012 and 2014, both of which found between 140 and 149 overwintering individuals, compared with Census counts of 30 in January 2012 and of 55 in January 2014 (MOE Census 2012, 2014). Moores & Kim (2014) also recommended an expansion of survey effort during southward and northward migration periods, primarily in November and March, because research using tracked birds indicates many Scaly-sided Mergansers are likely moving across the Korean Peninsula between breeding and wintering areas during migration (Solovyeva et al. 2012; Liu et al. 2014). Prior to research led by Birds Korea in the Yeoncheon Imjin Biosphere Reserve in 2021, to the best of our knowledge, no research focused on the migration period had been conducted in the ROK to improve understanding of the migration phenology of the species. As such, the importance of some sites in the ROK and of the ROK as a whole to the Scaly-sided Merganser likely continues to be substantially under-estimated, with little or no consideration given to the species in river-related development proposals made by either central or local government bodies. Remarkably, while many new cycling paths, hiking trails, camping sites and other developments have been approved and constructed along rivers, including in areas known to support the species (even including sites covered by the Census), there appears to have been no conservation measures focused on the species taken at any site nationwide; and prior to 2022 there had not been any kind of workshop on the species within the ROK, or any attempt to initiate a citizen science network for the species.

As in other range states, in the ROK Scaly-sided Mergansers usually feed in shallow, fast-flowing rivers, often near to riffles which remain unfrozen even in mid-winter. The species prefers areas with shingle beds (often mixed with sand) and rocks, often in “hill country” close to forested bluffs or low cliffs; and tends to avoid stretches with substrates which are almost entirely sandy; and river stretches with very slow flows (Moores & Kim 2014; Moores 2021; unpublished research). This means that many river stretches are not suitable for the Scaly-sided Merganser. Instead, the species is concentrated in a few key areas within preferred river systems – making the species highly vulnerable to changes within those key areas.

Within the ROK, disturbance appears to be the single most important factor influencing whether birds can use apparently suitable habitat. Birds generally prefer to keep >250m distant from people and >300m from boats, and very few (if any) individuals winter or stage on narrow rivers with hiking trails or cycleways, or with busy roads on both sides of the river. Few individuals are tolerant of built-up areas, unless the rivers have a width of > 200m. In contrast, larger concentrations of Scaly-sided Mergansers tend to be in suitable areas of habitat which are less disturbed, either because the rivers are wide enough to allow birds to swim away from threats; or because such rivers are hard to access and have low levels of disturbance (Moores & Kim 2014; Moores 2021; Moores et al. 2022).

Because of a combination of interrelated factors, river stretches with Scaly-sided Mergansers often support other riverine species of national and international conservation concern, including e.g., nesting Long-billed Plovers *Charadrius placidus*, River Otters *Lutra lutra*, and at least along the Imjin River Nationally Vulnerable *Chinemys reevesii* and *Pelodiscus sinensis*, two locally-distributed species of freshwater turtle. Further research will likely also identify / confirm the importance of several river stretches to both Scaly-sided Merganser and e.g., nationally or globally threatened fish and invertebrate species. Regular occurrence of the Scaly-sided Merganser can therefore be used to help identify priority sites for conservation; and development proposals affecting preferred stretches of river should be halted if they are considered likely to impact these species, in accordance with the Principles set out in the National Biodiversity Strategy (2019-2023).

2. Research to improve understanding of the status of Scaly-sided Mergansers in the ROK

The Small Grant was requested by Birds Korea in order to help us work to improve conservation opportunities for the species, through increasing research effort and through expanding interest in the species. One of the four clearly-listed objectives was: “Improved understanding of the status of the Scaly-sided Mergansers in winter and during the main southward migration period in the ROK (contributing to KRA 1.1, KRA 3.1, KRA 3.2 & KRA 3.3.1).”

2.1.1 Number of wintering Scaly-sided Merganser in the ROK

The main overwintering period in the ROK falls between mid-December and mid-February. This is based on the combination of dates of tracked birds moving between breeding and wintering areas (Solovyeva et al. 2012; Liu et al. 2014), and on repeat surveys of birds along the Imjin River in 2021 and 2022 (see below) and the Nam River (especially in 2010 / 2011). Mid-winter single-species surveys of Scaly-sided Mergansers conducted along known and suspected rivers supporting the species by Birds Korea in early January 2012 and again in early February 2014 found 140-149 and 149 Scaly-sided Merganser respectively (Moore & Kim 2014, Table 1).

In 2022, between February 11th and 21st, ten people contributed counts to the Birds Korea national survey, covering a total of 324.9 km of 16 rivers and streams, with an additional ~50km of frozen river viewed from a moving car (these sites with additional rivers covered in previous surveys are shown in Figure 2 and in Table 1).

A total of 175 Scaly-sided Mergansers were counted (compared with only 14 counted by the Census on February 18th and 19th 2022). The most important rivers for the species were again the Nam (70) and Namhan (55), both exceeding the 1% of population threshold of 45 individuals set by Wetlands International (2022), identifying both rivers as internationally important as defined by the Ramsar Convention (Ramsar 2022).

Based on presentations at the Scaly-sided Merganser workshop in November 2022, it seems likely that at least some individuals were missed along the Seomjin and Umcheon Rivers in the mid-winter survey, as we did not cover upstream areas often used by the species. In addition, based on the small number of minor sites found by birdwatchers and bird photographers since 2014 it seems likely that a few more still-unknown rivers and streams might also hold additional birds.



Figure 2. Selected rivers and streams in the ROK covered in Birds Korea national surveys of Scaly-sided Mergansers in either 2012, 2014 or 2022

Based on the above, probably c. 200 (perhaps up to a maximum of 250) Scaly-sided Merganser currently over-winter in the ROK, possibly with more birds present in milder than colder winters. This number is modestly higher than the coarse estimate of 150 to 200 over-wintering birds nationwide made by Moores (2013) and repeated in Solovyeva et al. (2017) on the basis of the 2012 national survey.

Table 1. Counts of Scaly-sided Merganser (“SSME”) by river and by year, with an indication of dates and length of rivers which were surveyed, and the names of counters in the 2022 survey.

River	Number of SSME 2022	Length of river surveyed (in km)	Survey date(s): February 2022	Counters in February 2022	Number of SSME 2014 and km of river (from Moores & Kim 2014)	Number of SSME 2012 (from Moores & Kim 2014)
Bukhan R.	8	30	18th	Nial Moores, Baek Seung-Kwang, Lee Su-Young & Bernhard Seliger with Jang Ryang in Imjin	23 (13km)	20
Imjin R.	5	44	11 th and 14th		0 (18km)	-
Hantan R.	-	-	-		0 (10.6km)	-
Soyang R.	1	3.8	17th		-	-
Han R.	7	5	15th		-	-
Gyeongancheon	0	11	15th		-	-
Seom R.	7	7.5	17th		0 (7.7km)	-
Namhan R.	55	~50	16th		90 (39.4km)	42-45
Chungjucheon	1	10.6	17th		-	-
Upper Nakdong R./ Banpyeon Stream	0	53	12th	Peter Thwaites	1 (3km / 5.2km)	10
Nakdong R. various	-	-	-	-	0 (50.5km)	-
Geum R.	5	2	20th	Jean-Jacques Strydom	2 (25.3km)	0
Mangyeung R.	2	~1	14th	Taek Geun Im	-	-
Jiseokcheon	6	15	19th	Andrew Hughes	6 (1.7km)	16-22
Yeongdeok Oshipcheon	-	-	-	-	0 (2km)	0
Hyeongsan R.	-	-	-	-	2 (25km)	0
Yeongsan R	-	-	-	-	0 (7km)	-
Umcheon R. / Nam R.	70	8 / 28	21st	Nial Moores & Park Meena	13 (23km)	36
Boseongcheon	0	8	20th	Nial Moores & Park Meena	4 (9.7km)	13
Seomjin R.	8	48	20th	Nial Moores & Park Meena	8 (14.6km)	3
Total	175	324.9km			149 (252.7km)	140-149

2.2 Population Trend in wintering individuals

A second of four objectives set out in the Small Grant application was: “Opportunity for the first time to compare counts made in three different winters, to suggest a possible national-level population trend between 2012 / 2014 and 2022 (contributing to KRA 3.2.1)”

The national winter survey in 2022 recorded 26 more over-wintering Scaly-sided Merganser than in 2014: an increase of 17%. However, it is important to note that the construction of new roads and cycleways

along many of the rivers made several previously inaccessible stretches (strongly preferred by this species) much more accessible, including along very wide stretches which still support the species. Moreover, the survey in 2022 covered a greater length of river and stream (72km or c. 28% more than in 2014); was conducted on more dates; and also benefitted from improved knowledge of the species, based on previous surveys and also on the “discovery” of some additional count-sites since 2014. These were comprised of one site with four birds far upstream on the Bukhan River and five on the Imjin River “discovered” during greatly increased research activity in 2021; seven on the Han River (at Paldang), first found to support the species in the mid-2010s; and two on the Mangyeong River and five on the Geum River that were only included in the survey total because of an appeal made for records through social media and the Birds Korea blog. Omission of these additional 23 individuals would suggest a similar number of birds counted in all three surveys in 2012, 2014 and 2022, despite a substantial increase in survey effort and knowledge of the species.

Importantly, our research confirms that some sites that used to support the species regularly no longer do so, including the Upper Nakdong River and Banpyeon Stream in Andong Gun and the Boseong Stream, a tributary of the Seomjin River. Both areas have been substantially degraded in the past decade by construction and river works, as have many rivers which were not surveyed prior to their degradation. Several river stretches are also now clearly less important than a decade ago, including parts of the Bukhan River (Figure 4) and Jiseokcheon, again following major river works – including new cycle lanes constructed on top of or within riverside bunds at both sites.



Figures 3 and 4. In addition to new dams and dredging, parks and “resorts”, recent river works have included the construction of 100s of km of cycle lanes. Fig. 3 (on left) is a central government map of major cycle lanes (from the internet); Fig. 4 (on right) shows a cycle lane along the Bukhan River, in an area which used to but no longer supports Scaly-sided Merganser in winter (February 2022).

Indeed, the only river with a marked increase in Scaly-sided Mergansers between 2014 and 2022 was the Nam River. However, the low count of 13 made during the 2014 survey was attributed at that time to ongoing construction within key stretches of river (Moore & Kim 2014); 56 were recorded along the Nam River during repeat surveys of selected river stretches between late 2010 and April 10th 2011; and 61 were counted at only ten count points along the river on January 31st 2015 (Moore & Kim 2014; Loghry 2015). In February 2022, there was relatively little such construction along several key stretches (though major construction activities nonetheless included river dredging, bank reinforcement and road construction along the river side at several count sites); and the survey also covered a greater area than in previous years.

Based on observations made of Scaly-sided Mergansers on the Umcheon River, a major but rather narrow tributary of the Nam River which was included in the Birds Korea survey for the first time in 2022, individuals likely move between different sections of the Umcheon and Nam, dependent on the extent of river ice and on disturbance levels. The number counted in 2022 on the Nam and Umcheon rivers, while nine higher than the highest count on the Nam river that we know about, might simply be higher because of the greater length of river surveyed and because of some movement between the two rivers.

More research and analysis are required. However, in combination the numbers of Scaly-sided Merganser over-wintering in the ROK appear either to be stable or are more likely falling – due, it can be reasonably suggested - to ongoing habitat degradation, including a massive increase in disturbance at river stretches which were previously suitable for the species.

2.3 Northward Migration

Geolocator data, although limited in scale, suggest that northward migration through the ROK is likely to be at its peak in mid-March (Solovyeva et al. 2012; Liu et al. 2014).

In 2022, in addition to the national survey on over-wintering Scaly-sided Mergansers, research was also conducted along the Imjin River as part of our ongoing project in the Yeoncheon Imjin River Biosphere Reserve; and supplemental counts were also made along the Nam River and the Namhan River (funded by the EAAFP small grant)

During the northward migration period, counts were made on 25 dates in 2022 along the Imjin River between February 8th and April 20th (Figure 5).

In addition to total numbers, we also counted adult males, looked for immature males, and identified likely pairs.

As no adult males were seen in early-mid February, it is possible to state that northward migration started between mid-February and March 1st, when the first adult male was seen. Numbers built fairly rapidly after that, peaking on March 11th to remain fairly stable until March 16th, a period during which 19-20 likely pairs were present each survey of preferred stretches of river; and a date also with the peak count of adult males (25 out of a total of 48 counted). Subsequently numbers fell and rose in a series of small steps until April 2nd, when numbers fell rapidly. Several smaller peaks from late March were comprised largely of female types (either adult females or immatures), e.g., an increase of 13 between March 31st and April 2nd appeared to be comprised entirely of female-types. The last adult male was seen on April 2nd, and many of the birds seen after this date were considered to be immatures. No Scaly-sided Mergansers were seen on April 14th or subsequently.

Assuming that some birds remained for several weeks, simple addition of differences between peaks during the six-week northward migration suggests that probably ~ 79 Scaly-sided Merganser used the Imjin River in 2022, with some birds likely present only for a few days.

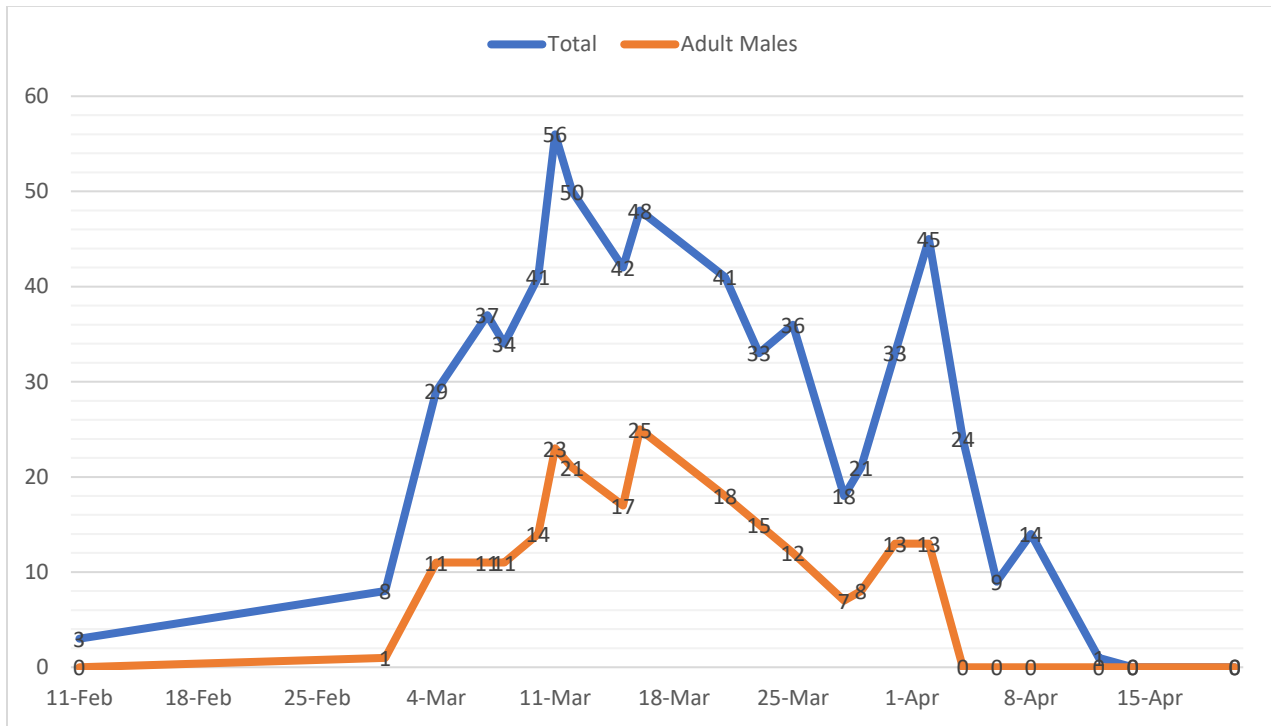


Figure 5. Number of Scaly-sided Merganser (total and of adult males) counted on 25 dates during northward migration 2022, Imjin River. On dates with minimum and maximum estimates, the median is shown.

A supplemental count was also conducted along the Nam and Umcheon rivers on April 1st. A total of 27-28 Scaly-sided Merganser were counted, including one adult male, two distant adult or advanced Second Calendar-year males, and 12-13 better seen Second Calendar-year males. Although more research is required, it seems likely that broadly similar dates of northward migration are shared by birds along both the Imjin and Nam Rivers, with a large proportion of early-arriving and early-departing birds adult males and pairs; and a large proportion of later migrating birds unpaired females and Second Calendar-years.

2.4. Southward Migration

Geolocator data suggest that southward migration through the ROK is likely to start in October and to peak in November (Solovyeva et al. 2012; Liu et al. 2014). Counts along the Imjin River in 2021 suggest that southward migration likely peaks in mid-November, with some birds remaining for several weeks, and others for one day or less (Moore 2021). Although birds had previously been observed along the Nam and Umcheon Rivers in late October, an adult male was photographed there by Choi Sangdu on October 8th – the earliest record on southward migration in the ROK known to us.

In November 2021, counts made on five dates along the Imjin River (7th, 8th, 9th, 11th and 12th) found a one day-peak of 144 Scaly-sided Merganser on the 12th, with strong evidence of turnover, and a likely

presence of up to 198 individuals within this six-day period (Moore 2021) – almost 4% of the global population. These counts therefore meet the threshold set by Ramsar Convention criteria for identifying the Imjin River as an internationally important wetland. The next count, on December 8th 2021, found 24; with this number falling further through the month as river stretches started to freeze.

In November 2022, due to logistical issues, count effort along the Imjin River was less intensive than in 2021. However, 96-97 Scaly-sided Merganser were counted during an all-river count on 9th. In addition, supported by the EAAFP small grant, counts were also made along the Namhan River on 10th and the Nam River on 14th. A total of 215 Scaly-sided Merganser were counted during these three days of survey – a third higher than any of the three Birds Korea mid-winter surveys in 2012, 2014 and 2022; and almost double the highest number recorded by the Census in any year.

Remarkably, although substantially larger numbers of Scaly-sided Merganser were counted along the Imjin in November than in February, the numbers of Scaly-sided Merganser counted along the Namhan and Nam-Umcheon Rivers were almost the same both months (Figure 6). In addition, the number of adult males at both rivers was also similar between counts, with 27 along the Namhan River in February and 30 in November; and 31 adult males along the Nam-Umcheon River in February and 32 in November.

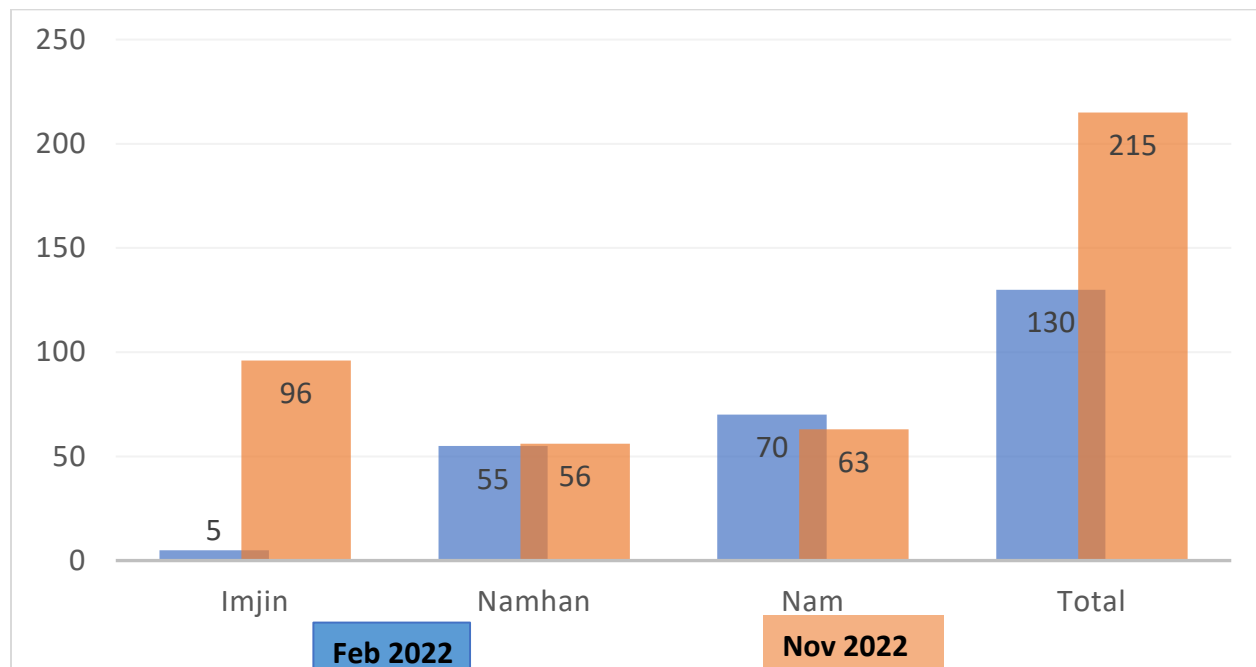


Figure 6. Single day counts of Scaly-sided Mergansers made along the Imjin, Namhan and Nam-Umcheon rivers in February 2022 (as part of the national winter survey) and in mid-November 2022.

More research is required, but it seems likely that many of the Scaly-sided Merganser present in November along the Namhan and Nam and Umcheon rivers also over-winter there, perhaps because large stretches of river remain free of ice in all but the most severe winters. At the very least, migration of the species through these rivers is less evident than through the Imjin River, where almost all of the river freezes over for several months.

The research in 2022 confirms the need for single-species survey along rivers in November, in order to identify additional potentially important river stretches for the species. Because migration turnover might be higher on rivers further north in the ROK, at a similar latitude to the Imjin River it seems especially helpful to survey additional stretches close to the inner border region of Korea, including the Bukhan River and smaller rivers in Gangwon Province, including in Yanggu and Inje counties.

In addition, we recommend that surveys of potentially important rivers (including smaller rivers near to the east coast) should also be conducted in late October-mid-November – a period with the highest counts of Scaly-sided Merganser along the Chongchon River in the DPRK, c. 200-250 km to the northwest of the Imjin River (Duckworth and Kim 2005). Small numbers have also been recorded during active southward migration in late October (including in flight over the sea off Baengyeong Island in 2019); and it is possible that substantial numbers could move through smaller sites which have not been surveyed for the species (again, because they are frozen in mid-winter when the Census and Birds Korea national surveys have been undertaken).

Finally, the seasonal pattern of records of Scaly-sided Merganser along the Imjin River (peak numbers apparently in mid-November and mid-March and absence or near absence in mid-winter) seems reasonably compatible with observations made along the Chongchon River (DPRK), where at least 40 were seen in autumn of 2003 and in spring and autumn of 2004. Duckworth and Kim (2005) were unable to survey the river in the mid-winter period, and noted that the river largely freezes over at that time. In early 2019, a team from the Scaly-sided Merganser Task Force together with representatives from the Ministry of Land and Environmental Protection and researchers from the State Academy of Sciences, surveyed along some of the same stretches of the Chongchon River and additional river-stretches in western DPRK. Almost all river stretches were frozen, and no Scaly-sided Mergansers were found (Moore 2019). Based on observations along the Imjin River, it seems worthwhile to conduct further survey along the Chongchon River timed during the two main migration periods.

3. Awareness-raising

The first and fourth of four objectives listed in the application for the small grant were, “To use work in Yeoncheon County and at additional sites in 2022 to help generate awareness of the conservation needs of the species in Yeoncheon, in the ROK and on the Korean Peninsula, with a special focus on wintering and staging birds”; and, “To use this enhanced research effort in 2022 to call for the conservation of key sites in the ROK and on the Korean Peninsula through in-person and online meetings at multiple sites; and if additional funding can be found, through a Post-COVID international symposium to be held in the ROK, with input from Russian Federation, PR China and if possible, from the DPRK.”

The combination of existing projects (including the work under contract to Yeoncheon County and project components supported by the Hanns Seidel Foundation Korea office) together with the small grant and activities led by Birds Korea members have supported a substantial growth in local and national interest in the Scaly-sided Merganser in 2022. Although there was no opportunity to organise an international symposium focused on the species (due to a combination of geopolitical issues and COVID restrictions), examples of work in 2022 aimed at fulfilling those two objectives included:

- 1) A visit in February by staff from the HSF and EAAFP Secretariat, to see Scaly-sided Mergansers on the Imjin River, followed by a meeting with the County Mayor (Figure 7); and participation by both organisations again in November in a “Conservation Tourism” weekend, organised by Birds

Korea and supported by Yeoncheon County, also focused in large part on the conservation needs of the Scaly-sided Merganser;

- 2) A series of workshops on environmental issues in February given to religious leaders based next to the Nam River in February, which included slides on the Scaly-sided Merganser;
- 3) Production of two reports in March and again in December (Moore et al. 2022), for Yeoncheon County, detailing threats to the species and possible solutions;
- 4) Together with members of Birds Korea Yeoncheon, a guided visit to key stretches of the Imjin River with Dr Yoo Miyeon, Manager of the Yeoncheon Imjin River Biosphere Reserve on March 11th (Figure 8), followed by meetings with the EAAFP Secretariat in November to discuss possible designation of part of the Imjin River as a Flyway Network Site for the species;
- 5) Organisation of the first Scaly-sided Merganser workshop in the ROK in Suncheon on November 21st. Supported by funding from the HSF, the event was small but meaningful, with input from local activists from the Imjin-Hantan (Figure 9), Umcheon and Nam, Seomjin and Mangyeung rivers, all working to conserve “their” rivers, with input too from Dr Yoo Miyeon and the EAAFP;
- 6) Presentation by the author at an international meeting organised by Yeoncheon County and representatives of UNESCO for managers of Internationally Designated Areas on September 1st in Yeoncheon County and again at a Flyway meeting in Incheon and a major seminar held in the County (Figure 10), both on November 23rd, with all three presentations introducing Scaly-sided Mergansers, threats to their habitats, and possible conservation responses tied to the Sustainable Development Goals;



Figure 7. Meeting with Yeoncheon County officials, including the mayor, to discuss Scaly-sided Merganser conservation (February 11th)



Figure 8. Dr Yoo Miyeon (left) at a key river stretch for Scaly-sided Mergansers, guided by Birds Korea Yeoncheon (March 11th).



Figure 9. Yeoncheon Birds Korea Director Baek Seung-Kwang presenting to the Scaly-sided Merganser workshop (November 21st)

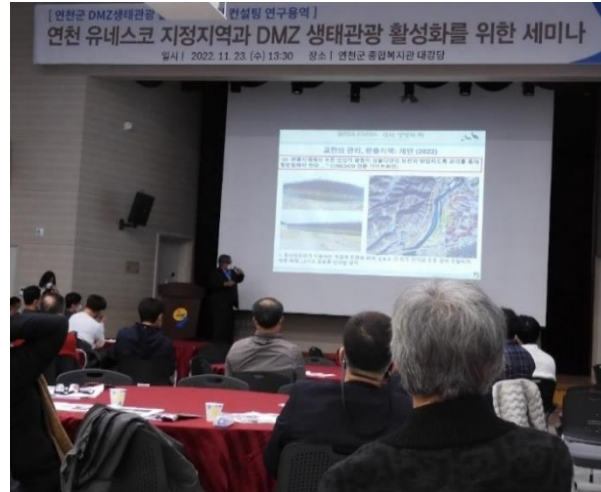


Figure 10. Birds Korea Director (the author) explains about threats to the Scaly-sided Merganser along the Imjin River at a seminar in Yeoncheon County (November 23rd).

Unfortunately, we were unable to conduct meetings with officials from K-Water or from local governments responsible for river biodiversity conservation outside of Yeoncheon County.

Instead, we are currently developing an education leaflet with English language and Korean language versions (funded by the HSF and in part by the small Grant) to distribute early in 2023, as part of planned meetings within the ROK; and perhaps for use at the EAAFP MOP. We have also held initial, informal discussions with the HSF (Korea office) about possible meetings for local government officials and K-Water in 2023; and have also proposed that Yeoncheon County could use a planned international conference on the biosphere reserve in 2023 to include a substantial focus on the Scaly-sided Merganser.

Use of the small grant

Funding of 18 million won (14,175 USD) was provided by Yeoncheon County to fund research in Yeoncheon County in 2022; to attend meetings; and to produce reports that can be used to advise or influence development decisions, including it is proposed the erection of screens along sensitive stretches of rivers in order to reduce disturbance in 2023. Yeoncheon County also provided a total of 2,015 USD to support research work by members of Yeoncheon Birds Korea, with some (but not all) of that research effort invested in surveying Scaly-sided Mergansers. Yeoncheon County also generously supported a “Conservation Tourism” weekend in late November; and provided funding for some training days and other related events.

In addition, more than 5,000 USD was provided by the Hanns Seidel Foundation (Korea office) to support conservation work for the Scaly-sided Merganser in 2022, including several dates of survey for the national Birds Korea survey in February (with costs and per diems provided for Dr Nial Moores, Mr Baek-Seung-Kwang and Ms Lee Su-Young); support for a workshop on the Scaly-sided Merganser on November 21st; and for translation and publication of an English-language and Korea-language pamphlet on the Scaly-sided Merganser (in December, for publication in early 2023).

The funding provided by Yeoncheon County, the Hanns Seidel Foundation and the EAAFP small grant meant that survey work focussed on Scaly-sided Merganser was conducted on more than 35 dates in Yeoncheon in 2022, with >80 “people-dates” (two “people dates” = either one person surveying on two dates, or one person surveying on two dates). By our calculation, thirty-four of these “people-dates” were not covered by any funds from either Yeoncheon County or the Hanns Seidel Foundation; as were two meetings to discuss the work.

We used the EAAFP small grant to cover most of these additional 34 “people dates” of survey in Yeoncheon (funding was not available to cover all dates); and nine “people dates” of survey elsewhere. These dates were essential for building up identification and counting skills within Yeoncheon County (one of the outputs listed in the small grant application); for building understanding of the ecological requirements of and threats to the species; and for improving understanding of migration strategies (also one of the outputs). The increased count data and observations of disturbance made during these additional survey dates appear to have been influential on Yeoncheon County officials (another one of the outputs).

More specifically, the small grant provided fuel costs, food and for most dates per diem funding (at 50 USD per day) for 34 “people-dates” of survey along the Imjin River by between 1-4 researchers on each date, with some surveys conducted by Mr Baek Seung-Kwang alone; some dates by Ms Lee Su-Young and Mr Jang Ryang; and on most dates by all three together (on two dates also joined by Ms Lee Soojin). The small grant was also used to cover fuel costs for Mr Baek Seung-Kwang and Ms Lee Su-Young, in Yeoncheon; and fuel and road toll costs (from Yeoncheon-Namhan-Cheonan-Yeoncheon, as paid for that day by NM) and train costs to Dr Nial Moores, and per diems (of 50 USD per person) to all three persons for one-day of survey along the Namhan River in November. In addition, the small grant was used to cover travel costs, one night of accommodation, and per diems for Ms Park Meena and Dr Nial Moores for survey of the Boseong Stream, Seomjin River and Umcheon and Nam rivers in February; and of the Nam and Umcheon rivers on April 1st and again in mid-November. This report, with four days (out of the ~7 actually used) paid for through this small grant, outlines the value of the data generated during these dates of survey in building a clearer picture of the over-wintering population and the migration strategy of the species in the ROK. The surveys at these additional sites were also important for informing the discussion on population trend; and for engaging with local activists working for the Umcheon, Nam and Seomjin rivers.

The EAAFP small grant, while not being able to cover all time and expenses incurred, nonetheless provided truly vital funding to enable most of the work objectives relevant to Scaly-sided Mergansers that we set-out in early 2022 to be met during the year. For which, we thank the EAAFP Secretariat.

References

- BirdLife International. 2022. Species Factsheet *Mergus squamatus*.
- Birds Korea. 2012. Birds Korea Survey: 140+ Scaly-sided Merganser nationwide! Accessed in December 2022 at: <http://www.birdskoreablog.org/?p=3110>
- Duckworth, J. & Kim C. 2005. Scaly-sided Mergansers *Mergus squamatus* on the lower Chongchon River, central Korea. *Wildfowl* (2005) 55: 135-144.
- Kim, A. 2022. MoE Winterbird Censuses - Species totals per Mid-Winter - with statistical information. Scaly-sided Merganser. Accessed in December 2022 at: <https://www.andreas-kim.de/AKG/MoE/MoE-Wintercensuses-Stats-Jan.html>
- Liu D-P., Li C-Q., Zhang G-G., Lu J., and Chen G. 2014. Satellite Tracking of Scaly-Sided Merganser (*Mergus squamatus*) Breeding in Lesser Xingan Mountains, China. *Waterbirds* 37(4), 432-438, (1 December 2014). <https://doi.org/10.1675/063.037.0411>
- Loghry, J. 2015. Scaly-sided Merganser Survey, January 31. Accessed in December 2022 at: <http://www.birdskoreablog.org/?p=14233>
- Ministry of Environment Winter Bird Census. 1999-2022. Accessed through the database constructed by Andreas Kim at: <https://www.andreas-kim.de/AKG/MoE/MoE.html>
- Moore, N. 2013. Scaly-sided Merganser in the Republic of Korea. Accessed in December 2022 at: http://www.birdskorea.org/Birds/Key_Species/BK-KS-Scaly-sided-Merganser.shtml
- Moore, N. 2019. Internal Report: River and Bird Survey, West DPRK, January 26th-February 1st 2019. A summary report for the Hanns Seidel Foundation (Korea office)
- Moore N. & A. Kim. 2014. Birds Korea Scaly-sided Merganser *Mergus squamatus* Survey, January 2014. Birds Korea Report prepared for the EAAFP, June 2014.
- Moore, N., Baek S-K., Lee S-Y., Jang R. & Park M-N. 2022. Yeoncheon Imjin River Biosphere Reserve: Summary Report of Research Findings and Recommendations (2022)
- NBC. 2018. National Biodiversity Center Biodiversity Statistics of Korea 2017. 11-1480592-000983-10 [in Korean].
- NIBR 2019. Red Data Book Republic of Korea. Volume 1: Birds. Published by the National Institute of Biological Resources, Ministry of Environment, Republic of Korea. ISBN: 11-1480592-001649-01
- Solovyeva, D. V., Afanasiev, V., Fox, J. W Shokrin, V. & Fox, A. D. 2012. Use of geolocators reveals previously unknown Chinese and Korean scaly-sided merganser wintering sites. *Endang Species Res* 17: 217-225.
- Solovyeva, D.V., P.A. Cranswick & B. Hughes. 2017. International Single Species Action Plan for the Conservation of the Scaly-sided Merganser *Mergus squamatus*. CMS Technical Series No. #, EAAFP Technical Series.
- Wetlands International. 2022. Waterbird Populations Portal. Retrieved from wpp.wetlands.org in December 2022.

Zeng Q., Wei Qian & Lei G. 2018. Contribution of citizen science towards cryptic species census: “many eyes” define wintering range of the Scaly-sided Merganser in mainland China. *Avian Res* (2018) 9:6