

Status of Birds 2014



Birds Korea Report on Bird Population Trends and Conservation Status in the Republic of Korea

Prepared for the Convention on Biological Diversity Twelfth Conference of the Parties, ROK, October 6-17 2014



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Back cover illustration:

Oriental Stork *Ciconia boyciana*, © Robin Newlin



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Part 1: Introduction

Key Messages of the Report

- By the end of April 2014, 535 bird species had been adequately documented in the ROK
- 365 of these species are considered “regularly occurring”, either historically or in the present century
- 87% of regularly occurring and all irregularly occurring species are migratory
- Two of the 365 species are Globally Critically Endangered (with one of these presumed Globally Extinct), seven are Globally Endangered, and 19 are Globally Vulnerable
- Five regularly occurring species were lost to the regular avifauna between 1910 and 1999
- At least 103 species have declined substantially during the present century
- Half of all regularly occurring species still have an unknown trend
- On present knowledge, 126 species are identified as “Highest” and “High” Conservation Priorities
- Some progress has been made in recent decades, especially in reforestation, afforestation and the reduction of hunting
- However, habitat loss and degradation is the main driver of decline for many of the species in decline, including birds of Grassland-type and Open Habitat and most especially waterbirds
- Three-quarters of the nation’s tidal-flats have been reclaimed and most natural freshwater wetlands have been degraded or lost
- A third of all waterbird species are in decline, and more than a third still have an unknown trend (and might be declining)
- Improved research in and especially conservation of Freshwater and Intertidal Wetland remains the most urgent priority
- An improvement in knowledge by itself will not be enough: policies and laws need strengthening

Premise

Status of Birds, 2014 is based on the following assumptions (many of which are made explicit in the texts of the Millennium Development Goals and of the Convention on Biological Diversity, "CBD", and the Ramsar Convention):

1. Conservation of biodiversity is an essential component of sustainable development and provides multiple benefits to people and to nations.
2. Biodiversity incorporates categories at a range of scales from genes to ecosystems. However, the category of species underpins much of ecology and conservation.
3. Through the Aichi Targets, the Convention on Biological Diversity commits nations to take steps to reduce biodiversity loss and decline within the present decade.
4. Decision-makers urgently need best information on which species and habitats are most in decline if they are to identify conservation priorities and develop the most appropriate responses at the national and regional level by 2020.
5. As a group, birds are better-known and easier to research than any other comparable group of organisms.
6. Birds are excellent indicators of ecosystem diversity, health and change.
7. Indicators based on bird data have proven to be useful for tracking progress in addressing the biodiversity crisis.
8. Research and strategies developed to conserve avian biodiversity often have value for the conservation of other biodiversity too.
9. In the ROK there are few large-scale bird or habitat monitoring programs yet in place and recent assessments of bird status have only covered a minority of bird species.
10. There is very little published research conducted in the ROK or within the wider region focused on identifying changes in bird populations or in habitats, and the information which is available often appears inconsistent or contradictory.
11. The conservation and research community (GO, NGO and academe) in the ROK and elsewhere urgently needs to share and publish best information on population trends in bird species (and other species groups).
12. This information needs to be presented clearly, with a high-level of consistency and compatibility with existing conservation initiatives and literature, making it easily accessible and intelligible to a range of stakeholders and decision-makers.
13. Improved knowledge of and consensus on population trends and threats to biodiversity at the national and regional level will support the conservation work of national and international organizations, the conservation conventions and decision-makers.
14. Information generated and shared at this time can always be improved by further research.
15. Conscious of responsibilities for avoiding environmental degradation enshrined in domestic legislation (see Part 4) and in light of the anticipated role of the Precautionary Principle in policy-making post-2015, Birds Korea believes that well-supported information that is presented now should be sufficient to inform decision-makers and to influence the ROK's policies positively and in the immediate future.

Abstract

The Aichi Biodiversity Targets (the “Aichi Targets”) provide important targets and deadlines for conservation action within the present decade. Meeting these targets requires an understanding of the present status of biodiversity at the national and global level. Bird species and their habitats are an important component of the biodiversity of the Republic of Korea (ROK). However, in the ROK, as in many parts of East Asia, there has been only a short history of bird survey and monitoring. Easily accessible information on national and regional population trends of many species is lacking, and several recent assessments of species and their habitats lack adequate detail, contain inconsistencies or are presented in ways that limit their usefulness.

Birds Korea therefore conducted research (including extensive literature review, fieldwork and analysis) to identify bird population trends in the ROK over two overlapping time-scales, historical (1910-1999) and recent (1990-2014). Using a range of published and unpublished materials, we assessed the status and population trends of all of the nation’s 365 regularly-occurring bird species, and identified historical or recent population trends in 258 species. We found (substantial) historical declines in 120 species and recent decrease in 103 species. A total of 44 species decreased during both time-periods and an additional five regularly occurring species were found to be lost to the national avifauna since 1910. One of these species is now presumed to be extinct globally. One endemic subspecies also became extinct during the Twentieth Century. During the same time-frames, there was historical increase in 61 species and recent increase detected in 77 species, including in four Globally Threatened species and three recent colonists.

To improve accessibility and ease of understanding of these changes in population and national status, we divided all 365 species into four major categories, including a Red List (Highest Priority species) and an Amber List (High Priority Species). These categories and the criteria for them follow an approach used successfully outside of the region. Species with estimated declines of >50% since 1990 and / or which are Globally Threatened and / or which meet other clearly-defined criteria were placed on the Red List (n=53) and those which are globally Near Threatened and / or which have declined between 25% and 49% since 1990 and / or which meet other specific criteria were placed on the Amber List (n=73). The majority of Red-Listed (60%) and a substantial proportion (43%) of Amber-Listed species are waterbirds (as defined by the Ramsar Convention). The need for improved conservation of intertidal and freshwater wetland is clearly identified through this process.

The information and data on birds in the ROK are not yet as robust as those gathered through large-scale monitoring programs that have already been conducted for several decades in some other regions. Our assessments are also not at present endorsed by bodies in the ROK responsible for developing the formal national Red List in accordance with IUCN criteria. However, these initial assessments can be revised at regular intervals, to improve their accuracy and to help assess progress; and the accompanying information and recommendations in this report can also be used to help build scientific consensus and public awareness. In consideration of existing conservation obligations and time-frames, and in light of the precautionary principle, we therefore believe that presentation of best information in this way should be of great value to researchers and decision-makers in their efforts to fulfill national and regional conservation obligations including the Aichi Targets by 2020.

Part 2: “Status of Birds, 2014” and the Aichi Biodiversity Targets

Birds Korea

Birds Korea is a specialized, fully-independent Korean NGO dedicated to the conservation of birds and their habitats in Korea and the wider Yellow Sea Eco-region. Founded in 2004, our work in the Republic of Korea (ROK) includes research, education and planning.

During the past decade, we have built an extensive archive of records (“Birds Korea Archives”) of both common and rarely-recorded bird species (captured on our websites and organized through our Year Reviews); we have conducted multiple targeted surveys of migrant landbirds, seabirds-at-sea, shorebirds and selected threatened waterbirds; we have conducted an extensive review of both Korean-language and English-language literature; and we have analyzed data generated by government bodies, including constructing an online database of count data generated by the annual ROK Winter Bird Census conducted under the auspices of the Ministry of Environment (MOE Census 1999-2013).

Based on the information and data available to us we have developed an authoritative national bird checklist for the ROK (in Korean and English), with fully-updated editions published online in 2007, 2009, 2013 and 2014. Every species and subspecies on the Checklist is assigned status codes indicating their seasonality and abundance. Species in Categories One and Two of the Birds Korea Checklist are listed in the Appendix of this report.

We have also developed an approach for identifying long-term and recent population change at the species-level in addition to species’ susceptibility to decline (Moore 2012).

As part of our research, we have also surveyed and described dozens of important sites within all the main habitat types in the ROK, in many cases recording changes to these sites that have taken place during the past decade. We also conducted the first independent analysis of remaining tidal-flat area nationwide (Birds Korea 2010), with our estimate later validated by subsequent research, for example MacKinnon *et al.* (2012) and apparently MOE (2012a).

To help support decision-makers and progress towards fulfillment of the Aichi Targets (especially Targets 5, 12 and 19), we continue to make our research freely available online and in publications, including this report *Status of Birds, 2014*.



Birds Korea fieldwork: surveying shorebirds and Intertidal Wetland.



Baikal Teal *Anas formosa*: the emblem of Birds Korea, and a symbol of the conservation challenge (see p.18).

The Republic of Korea: a nation of change

The ROK is a heavily-developed nation. Located largely between 33°-38°N and 125°-132°E, the ROK has a human population of >50 million (World Bank 2013), and one of the highest population densities of any nation worldwide (estimated at 484 people / km² by 2011: United Nations 2014). All habitats and almost all areas have been heavily impacted by human activities over a range of time-scales.

Some 10,000 years before present, sea-level rise led to the present geomorphology of the Yellow Sea, creating thousands of small islands, bays and extensive tidal-flats (Koh 1999), and ~8,000 years before present approximately 89% of the land area was forested (Worldwatch Institute 2010). For several millennia the majority of Korea's bird species would have been ecologically-dependent on primary forest, floodplain wetland, tidal-flats and islands. Agriculture started on the Korean Peninsula approximately 6,800 years before present (initially growing millet, then rice and soybean), with the first artificial reservoirs and irrigation channels dating from about 3,000 years before present (Crawford & Lee 2003). By the beginning of the Twentieth Century, Anderson (1907) found the once-forested landscape near Seoul to be "small cultivated valleys, and barren, dry, and much eroded hills". Large areas of natural floodplain wetland had been converted to rice-agriculture.

In 1910, Korea was formally annexed by Japan. An estimated 17.4 million people were living on the Korean Peninsula at that time, with low population growth because of high mortality (Kim 1994). The 35 years of occupation that Korea then suffered also saw widespread bird-hunting (Austin 1948), the further loss of three-quarters of the Korean Peninsula's remaining forest (in Lee & Miller-Rushing 2014); and an increase in freshwater wetland and tidal-flat reclamation for the development of rice (Koh 1999).

Occupation was followed soon after by war that divided the Korean Peninsula into the northern DPRK and the southern ROK. Post-1953, the ROK experienced rapid agricultural intensification and modernization, moving from an agrarian society using cattle-plows to an industrial society (Kim 1994), with among the highest pesticide use per hectare in the world through to the end of the 1990s (in Moores 2012).



Typical Agricultural Landscape in the 1950s (Haenam, 1951).



Typical Agricultural Landscape in the present century (Seosan, 2013).

During the Twentieth Century, through until at least the early 1970s, the main drivers of bird population decline in the ROK identified in the ornithological literature were hunting and deforestation. Hunting caused massive reductions in the populations of some species, including wintering Red-crowned *Grus japonensis* and White-naped Cranes *Grus vipio* (Austin 1948). In the late 1940s, it even led to the local extirpation of the often abundant Common Pheasant *Phasianus colchius* (Wolfe 1950). Several authors, including Austin (1948), also identified forest loss as a major driver of decline, writing that the Tristram's Woodpecker *Dryocopus javensis richardi* was then “facing extinction with the needless and ruthless wasting of the little tree cover still remaining in that over-populated land”. Two decades later, writing in a country much-changed even since Austin's day, Gore & Won (1971) wrote, “the dangers to (Korea's) wildlife are those invariably associated with advanced industrial nations: the destruction of habitat by expanding industrial complexes, highways, refuse dumps etc., and the indiscriminate killing for pleasure by an increasingly wealthy community...Probably the main cause for concern today is indiscriminate shooting of all species, particularly passerines in and around towns and villages.”

Gore & Won (1971) also described, more positively, the first steps for conservation taken by the Korean Commission for the Conservation of Nature and Natural Resources. And in subsequent decades, with the growth of a large number of organisations (both GO and NGO) dedicated to environmental conservation, illegal hunting and bird-trapping have been reduced greatly in scale. Artificial feeding programs, combined with a reduction in persecution, have also led to some recovery in the overwintering crane population (MOE Census 1999-2014).

Starting in the 1970s too, extensive reforestation and afforestation efforts have also been undertaken (FAO 2012). While the area of forest continues to fall, forest volume has increased substantially in the past few decades (ROK 2009), and >60% of the ROK is now forested (see pp. 27-30).



White-naped Crane *Grus vipio*.



Cheorwon County, 2013. As a result of artificial feeding programs and lack of persecution, this area now supports an increasing number of wintering White-naped and Red-Crowned Cranes.

During the late Twentieth Century, legislation of potential importance to the conservation of biodiversity included the Natural Park Act (1980), the Framework Act on Environment Policy (1990), the Water Quality and Aquatic Ecosystem Conservation Act (1990), the Natural Environment Conservation Act (1991), the Environmental Impact Assessment Act (1993) and the Wetlands Conservation Act (1999). Many of these acts were passed during a period of rapid democratization (from the late 1980s), with its rapid growth in the role and influence of civil society, helping to increase public support for conservation through improved information-sharing and transparency in decision-making. The same period also saw increased engagement by the ROK with international conservation agreements.

Since 2000, several new research bodies have also been established, including the National Institute of Biological Resources (NIBR) and the National Institute for Environmental Research (NIER), both within the national Ministry of Environment. Numerous wetland centres and eco-centres have also been constructed, and the National Institute of Ecology was opened in 2013. And by 2009, 80% of people nationwide agreed that "in planning development projects, environmental conservation should take precedence over economic gains" (Hwang 2009).

However, despite the many gains in conservation infrastructure and public awareness, much of the progress towards *in situ* conservation of biodiversity has stalled. According to the 2010 Environmental Performance Index (EPI), the ROK ranked 94th overall among 163 countries studied – the lowest among OECD members (Emerson *et al.* 2010) – falling further still to 108th in the biodiversity and habitat category in the 2014 EPI (ROK 2014).

Massive infrastructure projects, including the Saemangeum reclamation (with seawall closure in 2006) and the Four Rivers project (mostly constructed between 2009 and 2011), permitted in part by special laws, have resulted in large declines in many bird species and other biodiversity in only the past ten years (Moores *et al.* 2008; Birds Korea 2010; MacKinnon *et al.* 2012; Moores 2012; Birds Korea 2014; Conklin *et al.* 2014), in addition to causing negative social and economic impacts. The combined impacts on the nation's birdlife too of pollution, invasive alien species and climate change in addition to extensive habitat loss still remains poorly-researched.



Many wetlands nationwide are still being lost or degraded.

Towards Meeting Aichi Biodiversity Targets 5, 12 and 19

i) Target 5: Habitat Loss, Degradation and Fragmentation

“By 2020, the rate of loss of all natural habitats... is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced” (CBD 2014)

In order to reduce the rate of habitat loss and degradation by 2020, it is necessary first to define the main habitat types; next, to estimate the area and quality of those habitats; and then to determine their rate of loss and degradation.

Although ROK (2014) identifies “habitat loss from rapid urbanization and industrialization” as a major threat to biodiversity, there are inconsistencies in the classification of habitats (e.g. of “wetlands”) and in the area of several major habitat types provided in ROK (2009, 2014). Many of the inconsistencies appear to stem from differences in time-frames and sources, and are apparent between the text and figures and even within figures (e.g. on p. 15 of ROK 2014). There are also remarkably few analyses of habitats, including of their importance to species and of trends in their area and quality, in other domestic conservation literature that we have been able to access.

We therefore make the assumption that the most important habitat types for avian biodiversity conservation in the ROK are: those that support endemic species and subspecies; those that support a substantial proportion of the world’s or region’s population of a species or group of species; and those that support Globally Threatened species.



Qelpartensis subspecies of **White-backed Woodpecker**
Dendrocopos leucotos: endemic to Jeju Island.



Internationally important concentration of Globally Vulnerable **Great Knot** *Calidris tenuirostris*, Geum Estuary.

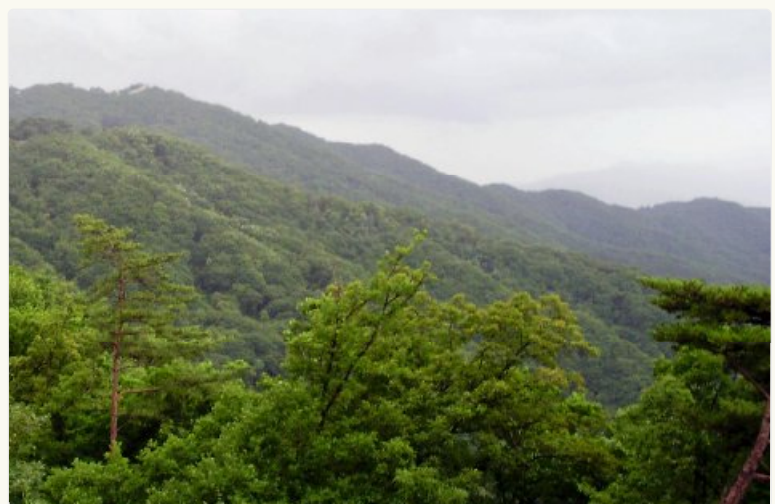
The ROK has undergone and continues to undergo rapid large-scale habitat change. There are few, if any, areas of wilderness or natural habitat unaffected by human activities. Nonetheless, the Ministry of Environment has identified 2,177 Korean-endemic species. None of these are birds, however and endemic subspecies are not assessed in the Korean Red List (NIBR 2011, 2012).

Five major (overlapping) habitat-types support all of the ROK's Globally Threatened bird species, endemic subspecies and internationally important concentrations. These are Forest; Grassland-type and Open Habitat; Freshwater Wetland; Intertidal Wetland; and Marine.

Forest (as defined by the CBD) covered most of the Korean Peninsula until a few hundred years ago and supports a substantial proportion of the ROK's bird species including the endemic Tristram's Woodpecker (perhaps extirpated in the ROK but surviving in the DPRK), two endemic subspecies of White-backed Woodpecker *Dendrocopos leucotos*, and one Globally Threatened species (Fairy Pitta *Pitta nympha*).

Grassland-type and Open Habitat (see pp. 31-35) supports many endemic plant species; formerly supported one Globally Vulnerable species in winter (Great Bustard *Otis tarda*); still supports Globally Endangered Yellow-breasted Bunting *Emberiza aureola* during migration; and on offshore islands, supports a substantial number of breeding Globally Vulnerable Styan's Grasshopper Warbler *Locustella pleskei*.

Freshwater Wetland and Intertidal Wetland (as defined by the Ramsar Convention) both support Ramsar-defined internationally important concentrations of large numbers of waterbird species and the majority of the ROK's Globally Threatened species, including the Globally Endangered Scaly-sided Merganser *Mergus squamatus* in winter on rivers; and the Globally Critically Endangered Spoon-billed Sandpiper *Eurynorhynchus pygmeus* on tidal-flats during migration.



Forest now covers more than 60% of the national land area.



Black-faced Spoonbill *Platelea minor*.

Marine habitat in this report includes rocky shores and small islands as well as inshore waters and open sea. Globally Endangered Black-faced Spoonbill *Platelea minor* (a species that feeds in Intertidal Wetlands) breeds locally on small islands in the northwest, while Globally Vulnerable Crested Murrelet *Synthliboramphus wumizusume* and the majority of the world's breeding population of the Globally Near Threatened Swinhoe's Storm Petrel *Oceanodroma monorhis* (Birds Korea 2010) breed on islands in the southwest and east and feed in open sea areas. Inshore waters along all three coasts also support large numbers of wintering loons, grebes, sea-ducks and gulls.

In addition, these five major habitat-types have existed (in one form or another) in Korea for millennia, and they support the majority of endemic non-avian species in the present century.

As there appears to be inadequate information with which to determine accurately the rate of habitat loss and degradation in most of these habitats, we make the additional assumption that declines in species that are ecologically-dependent on a given habitat are primarily the result of loss or degradation of that habitat, unless other more important drivers of decline can also be identified. Similarly, we assume that an increase in species dependent upon a certain habitat type will be at least in part due to improvements in quality or area of that habitat type.



All habitats, whether arable, intertidal or marine, are strongly influenced by and also support human activities.

In this way, declines in a large number of species that are ecologically-dependent on e.g. Freshwater Wetland are used by us to indicate continuing loss and degradation of that habitat type.

Although drivers of decline are often complex, we note here that the connection between the health of bird populations and the health of their habitats is made explicit by Ramsar Convention literature and is also implicit in the Aichi Targets.

ii) Target 12: Threatened Species

“By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained” (CBD 2014)

Best information on the Global and National Conservation Status of bird species is essential for the conservation community and decision-makers alike if Aichi Target 12 is to be met.

BirdLife International (“BirdLife”) maintains a checklist of all bird species, and is the source for the Global Conservation Status (“GCS”) of bird species listed by the IUCN, with many of these assessments based on a combination of rigorous science and less rigorous (but still highly-valuable) expert opinion. BirdLife’s Global Conservation Status assessments are therefore used throughout this report and in all Birds Korea materials. However, we found multiple information gaps and errors in BirdLife factsheets during reviews in 2010, 2012 and 2014. BirdLife’s country profile for South Korea (the ROK) is especially deeply flawed. As of August 2014, it still listed only 363 species while >535 have now been adequately documented; it included at least three species that have not been recorded in the ROK (including the Globally Near Threatened Black-footed Albatross *Phoebastria nigripes*); it omitted species like Great Bustard which formerly occurred quite commonly in Korea; and it omitted many more that still occur regularly (e.g. Pacific Loon *Gavia pacifica*, Radde’s Warbler *Phylloscopus schwarzi* and Red-billed Starling *Spodiopsar sericeus*). Without extensive revision, BirdLife’s country-level assessment clearly cannot be used as intended by the conservation community or decision-makers in the ROK to “track success in achieving the 2020 Targets” (BirdLife International 2014b).

The Ministry of Environment has published at least two formal National Red Lists that include birds: NIBR (2011) and NIBR (2012). Both NIBR (2011) and NIBR (2012) reviewed the same 95 species, and provided identical assessments, identifying at the national level three species as Regionally Extinct, one as Nationally Critically Endangered, 18 as Nationally Endangered, 36 as Nationally Vulnerable, eight as Nationally Near Threatened, 28 as Nationally of Least Concern and one as Not Applicable (see National Conservation Status, “NCS”, columns in Tables 3,4,6,7,10 and 11). These assessments provide valuable information on a number of species, and are incorporated into this report. However, their scope is limited as they cover less than a third of species considered by Birds Korea to occur regularly in the ROK. Moreover, they omit several species that are Globally Threatened and Near Threatened (including the Globally Vulnerable Great Knot *Calidris tenuirostris*). Several of the species accounts also seem at odds with information available elsewhere in the public domain. For example, NIBR (2011) assessed Crested Lark *Galerida cristata* as Nationally Vulnerable, with a national population estimate of 1,000 mature individuals. This is even though the MOE Census (1999-2014) recorded this species only once nationwide (a single bird in 2007), and there are no records of Crested Lark in the Birds Korea Archives from 2009 to August 2014. It appears possible that this species, represented in Korea by the regionally endemic subspecies *coreensis*, was nationally extirpated during the last decade.



Crested Lark *Galerida cristata*

- “Very common” Wolfe (1950)
- “Fairly common” Gore & Won (1971)
- Nationally “Vulnerable” NIBR (2011)
- 2014: Nationally Extirpated?

The last sight records nationwide known to Birds Korea were in 2008.

iii) Target 19: Knowledge of Status and Trends

“By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied”

(CBD 2014)

For this report, we reviewed several approaches used to assess the national (and global) status of species and their population trends. We selected *Birds of Conservation Concern* (Easton *et al.* 2009) and *The State of the UK’s Birds 2011* (Easton *et al.* 2011) as offering the best model for capturing and sharing information on status and population trends in the ROK in line with Aichi Target 19.

Easton *et al.* (2009, 2011) bring together best information on bird species in the UK, organizing them into three main categories. Species of highest conservation concern are Red-Listed; those of moderate concern are Amber-Listed; and those of least concern are Green-listed. These three categories have

clear and strictly-applied criteria, including the rate of population decline, both historical (defined as between 1800 and 1995) and more recent and long-term (defined as over the past 25 years); the rarity of the species in the UK; and its Global Conservation Status. The UK Red and Amber Lists therefore contain several still-abundant but fast-declining species, including the Red-Listed Eurasian Skylark *Alauda arvensis* (with a population in the UK of 1,785,000 breeding pairs in 2000) and the Amber-Listed Dunnock *Prunella modularis* (with a population of 2,163,000 breeding pairs in the UK in 2000), in addition to species with small national or global populations. The use of these three categories helps the authors to rank a diverse assemblage of species and to identify conservation priorities. It enables groups of fast-declining species to be assessed together by habitat and migratory status, helping in the identification of drivers of decline. The colour codes are also eye-catching and simple to understand, making an otherwise overwhelming amount of information more intelligible and useful. Moreover, changes in the numbers of species on each of the three lists between years can also be used as an effective way to capture the success or failure of conservation interventions, and to track national success in meeting the Aichi Targets.

For our assessments, we needed to modify these criteria and establish more appropriate time-frames. There are only a few accounts of bird species recorded in the southern part of the Korean Peninsula from the Nineteenth Century. However, according to Austin (1948) ornithological activity increased substantially from the 1910s. During that decade, a flock of several thousand Crested Ibis *Nipponia nippon*, a species of Freshwater Wetland, were found near the Geum River and Crested Shelduck *Tadorna cristata*, “Formerly believed to be common” (and now listed as Globally Critically Endangered and likely extinct) were collected both in the Geum Estuary and near Busan. For this report, we therefore took 1910 as the start of our review period.

There are still no large-scale, long-term nationwide monitoring programs in place (Moores 2012), and the first major research on shorebirds was conducted only in the late 1980s (Long *et al.* 1988) and on wintering ducks in the 1990s (Kim *et al.* 1996). The MOE Winter Census, the nation’s largest bird survey effort, started in 1999 and in 2014 covered 195 sites, and in-depth research started on migrant landbirds only in the 2000s (see Moores 2012).

For most of the period between 1910 and 1990 (even until 2000) there are therefore no count data for the majority of species with which to determine population trends. Instead, there are subjective descriptions of abundance and distribution for species given in Austin (1948) and Gore & Won (1971), and notations of abundance given by Won (1996, 2000). In recognition of the urgent demands of the Aichi Targets, Moores (2012) investigated sources of bias and then converted these subjective descriptions into Abundance Numbers, allowing for comparisons of status and the easier detection of substantial changes in abundance and distribution in a large number of species between 1910 and 2000. This method is also used for this report.

Status of Birds, 2014 therefore assesses, for the first time in the ROK, both Historical Population Trends (from 1910-1999) and more Recent Long-Term Population Trends (1990-2014). It focuses on the 365 species that are considered to be the most regular in occurrence, either historically and / or more recently. As five regularly occurring species have already been lost to the national avifauna since 1910, an additional Grey List also needed to be created.

Because of the challenges of organizing information in this way, it is clear that further research could lead to the inclusion of a few additional species and the exclusion of others as regularly occurring species, as well as the confirmation of suspected population trends leading to a small number of species being placed differently on the lists. We welcome information and discussion to this end.

Part 3: Conservation Priorities

We amended criteria developed by Easton *et al.* (2009) to organize all 365 most regularly occurring species in the ROK into four lists: Grey, Red, Amber and Green (see Table 1). Detailed explanations of the criteria and commentary on selected species are also provided below, and in the section on habitats. Colour listing of all 365 species is also included in the Birds Korea 2014 Checklist in the Appendix.

Table 1: Overview of Birds Korea's Grey, Red, Amber and Green Lists.

| List | Level of Priority | Main Criteria | Number of Species |
|--------------|-------------------------------|--------------------------------------------------------------------------------------------------------|-------------------|
| Grey | "Already Extirpated" | No record since 1980 | 5 |
| Red | Highest Conservation Priority | Globally Threatened; Severe Population Decline | 53 |
| Amber | High Conservation Priority | Globally Near Threatened; Nationally Threatened; International Importance; Moderate Population Decline | 73 |
| Green | Lower Conservation Priority | Meet none of the criteria for Grey-, Red-, or Amber-Listing | 234 |

Grey List: Already Extirpated / No Longer Regular

- (1) NE: Nationally Extirpated. Species lost to the ROK with no adequately-documented records since 1980.
- (2) RE: Regionally Extinct. Species described as Regionally Extinct in NIBR (2011, 2012) without evidence of records since 1980.
- (3) NRO: No longer Regularly Occurring. Species that were historically regular in the ROK that since 1990 have only occurred irregularly (less than annually or <25 records).

The Grey List contains five species lost to the regularly occurring national avifauna since 1910: Crested Shelduck, last recorded in 1916 and classified as Globally Critically Endangered (BirdLife International 2014a) and Regionally Extinct (NIBR 2011, 2012); Crested Ibis, formerly a non-breeding winter visitor, last recorded in 1979 and classified as Globally Endangered (BirdLife International 2014a) and Regionally Extinct (NIBR 2011, 2012); Great Bustard, a non-breeding Globally Vulnerable winter visitor, wintering south to Busan, last recorded in 1976 when one was "collected" (Park 2002); Eurasian Collared Dove *Streptopelia decaocto*, formerly regular in winter, now scarcely annual; and Crested Kingfisher *Megaceryle lugubris*, with a "number of old records" before 1917 (Gore & Won 1971) and again in 1949 and 1958 (Park 2014) but none subsequently. It seems likely that one more "crested" species will also soon be Grey-Listed: Crested Lark.

Two of the species are endemic to East Asia (Crested Shelduck and Crested Ibis). The Crested Shelduck is widely considered to be Globally Extinct, with no confirmed record since 1964 (BirdLife International 2014a). The Crested Ibis is the focus of sustained conservation efforts in both China and Japan.

- In China, seven Crested Ibis were found in 1981. In subsequent decades, *in situ* and *ex situ* conservation programs have resulted in an increase of population to at least 600 in the wild, with 500 additional captive-bred birds held in several protection centres (Yu X-P *et al.* 2009).

- In Japan, Crested Ibis was apparently locally abundant during the Edo Period (1603-1867) (Mie 2012), but was very quickly reduced in number subsequently (Brazil 1991). The last wild birds were taken into captivity in 1980-1981. After several decades of research, habitat management (including incentives to reduce the use of pesticides: Mie 2012), the import of captive birds from China, and a captive breeding program, ten Crested Ibis were released back into the wild on Sado Island in 2008 (Upo Crested Ibis 2014). In 2012, after repeated reintroductions of captive-bred birds, chicks born in the wild were fledged successfully for the first time (Mie 2012).
- In the ROK, the species was a winter visitor and migrant (Austin 1948, Gore & Won 1971, Won 2000, Park 2002, NIBR 2011, Upo Crested Ibis 2014), with migration dates supporting the assumption that birds wintering in Korea bred in the Russian Far East. There were no records of birds in the summer months (Park 2002, NIBR 2011), even though the species was well-known and easy to shoot (in Austin 1948, Gore & Won 1971). Nonetheless, efforts are now underway to introduce captive-bred birds from China into the wild at Upo Ramsar site (BirdLife International 2014a, ROK 2014, Upo Crested Ibis 2014). Proponents are also considering future introduction at Upo of Red-Crowned Crane (Upo Crested Ibis 2014), another species with no historical breeding records in the ROK (Austin 1948, Park 2002, NIBR 2011). Upo is an increasingly degraded and highly-disturbed inland Wetland Conservation Area, with a Freshwater Wetland area of <500ha, set in an area of intensive arable agriculture. Due to concerns over the birds' welfare and the non-adoption of IUCN guidance on restoration, the proposed introduction has been criticized by several domestic experts and conservation organizations, including Birds Korea, and apparently privately by some international conservation organisations.



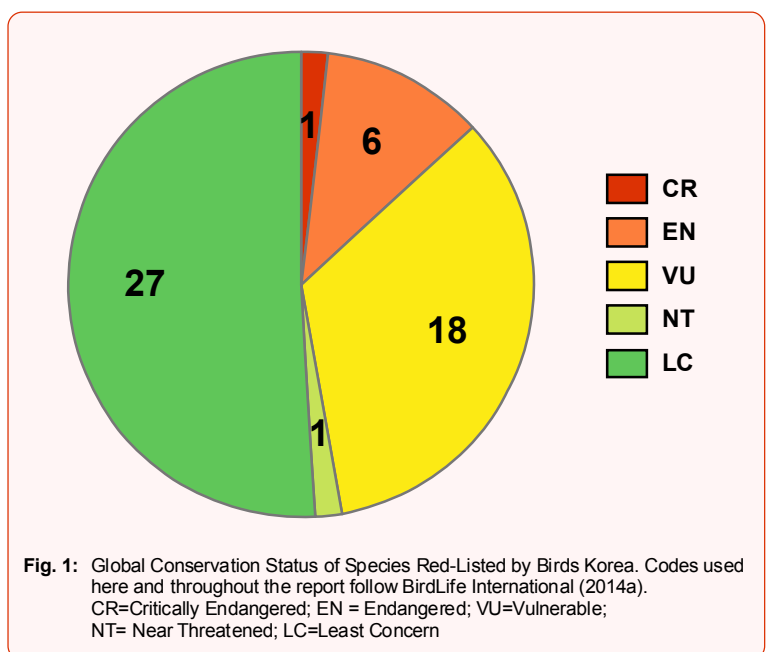
Banner promoting the introduction of Crested Ibis at Upo Ramsar site (2008). Conservation science needs to inform policy if the Aichi Targets are to be met.

Red List: Highest Conservation Priority

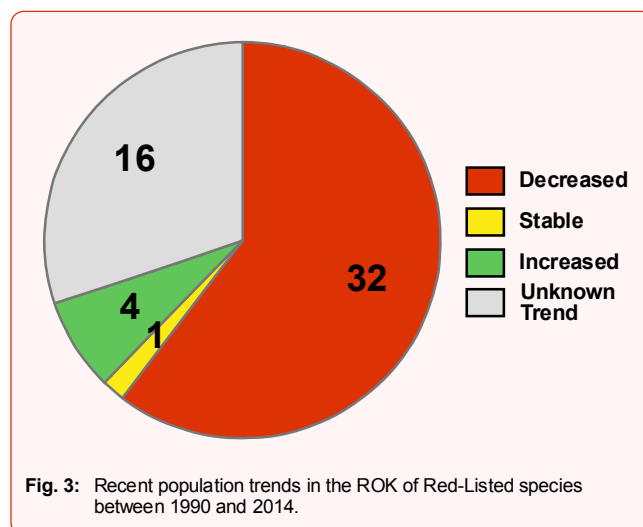
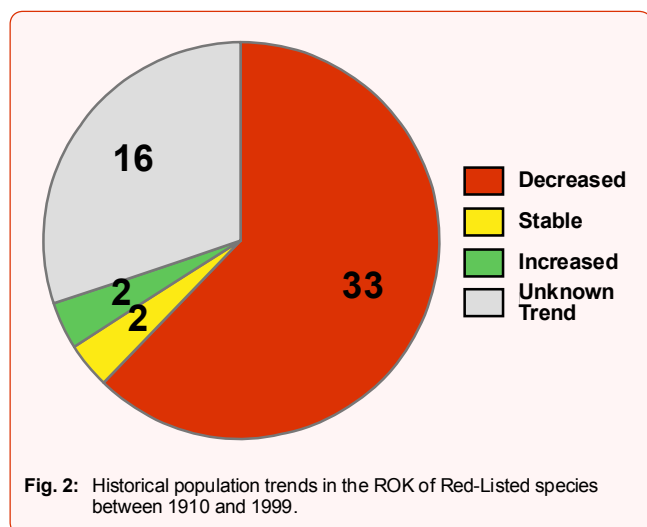
- (1) GCS: Very poor Global Conservation Status. Listed by BirdLife International (2014a) as Globally Threatened (Critically Endangered, Endangered or Vulnerable).
- (2) TNS: Threatened National Conservation Status. Listed by NIBR (2011, 2012) as Nationally Critically Endangered or Endangered.
- (3) HDS: Historical Decline Severe in the ROK between 1910 and 1999 with no or only limited evidence of recovery by 2009. This decline should be indicated by a reduction of two or more in Abundance Numbers (Moore 2012).
- (4) BDS: Breeding Population Decline Severe. Either extirpation of scarce breeding species; or decline of 50% or more in breeding population since 1990; and / or an obvious contraction of breeding range so that a species which was once comparatively widespread in the Twentieth Century is now believed to have the majority of its national population confined to ten or fewer breeding locations.
- (5) NBS: Recent Non-Breeding Population Decline Severe. A decline of 50% or more since 1990 or 25% or more since 2000 for those species with "most" of the population suspected to be either passage migrant or winter visitors. In the absence of robust data, species with a High Decrease Susceptibility Index score (see Moore 2012) are prioritised.
- (6) GFI: Species of Global or Flyway Population Importance, with >50% of the Global or Flyway Population confined to the ROK, showing evidence of decline, either historical with no recovery, or recent, since 1990.

Approximately half of the species Red-Listed by Birds Korea are Globally Threatened (Fig. 1), and many of these are also assessed as Nationally Threatened by NIBR (2011, 2012). Globally Threatened species Red-Listed by Birds Korea include:

- Globally Endangered / Nationally Vulnerable Black-faced Spoonbill, with the majority of the world population now known to breed in the ROK (Birds Korea 2010);
- Globally and Nationally Vulnerable Hooded Crane *Grus monacha*, with an increasing overwintering population (reaching 925 in 2013 / 2014: MOE Census 2014) and perhaps the majority of the world population staging in the ROK during migration;
- Globally and Nationally Endangered Scaly-sided Merganser, with 140-149 present in recent winters in the ROK (Moore & Kim 2014b), and an unknown number also present during migration (Solovyeva *in lit.* 2010, Kim 2014).



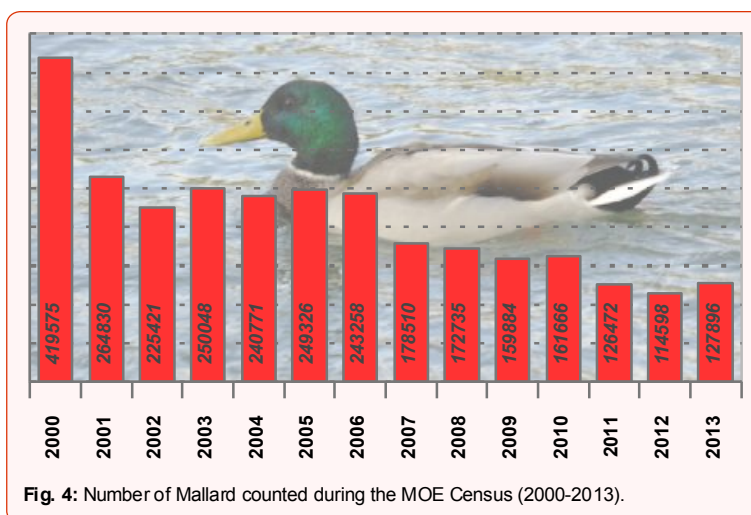
Birds Korea also Red-Lists 27 species assessed as Globally of Least Concern by BirdLife International (2014a) because of severe declines in their ROK population. Trends of all Red-Listed species are shown in Figures 2 and 3.



Examples include:

- **Mallard** *Anas platyrhynchos*.

NIBR (2010) indicates a decline in Mallard of 81% over 15 years, and the MOE Census (2000-2013) shows a halving in mean counts between 2002-2004 and 2011-2013, despite increased observer coverage, with an underlying decline of c. 80% at those sites which were counted every year between 2000 and 2013 (Fig. 4).



- **Hill Pigeon** *Columba rupestris*.

This species was historically widespread but became locally-distributed by the 1990s. Now, it is nearly-extirpated nationwide and declining rapidly in the last known main site, with a national population of probably fewer than 10-20 individuals. Although assessed as Least Concern by NIBR (2011, 2012) this seems likely due to confusion with the much more abundant Feral Pigeon *Columba livia* var. *domestica*.

- **Chinese Sparrowhawk** *Accipiter soloensis*.

Wolfe (1950) wrote that in spring there were "one or more of these hawks in nearly every patch of woods around the inland valleys ". Although NIBR (2011, 2012) classify this species as Nationally Vulnerable, Moores (2012), suggests a decline of between 60% and 90% recorded at two migration hotspots between 2002-2007 and 2010-2011. There has also been a substantial reduction in numbers counted migrating annually across the Korea Strait from the ROK to Japan by Japanese members of the Asian Raptor Network (with a decrease reported online of >40% in September means between 2001-2005 and 2008-2012). Birds Korea Archives also suggest this species is much less widespread as a breeder now in the ROK than in 1999 / 2000.

One species of Least Concern is Red-Listed under the Global / Flyway Importance criterion:

- **Baikal Teal *Anas formosa*.**

Breeding in Russia and wintering in East Asia, this species was assessed, until recently, as Globally Vulnerable by BirdLife on the basis of massive declines during the Twentieth century. It had a known population of only 20,000-40,000 individuals in the 1980s. The importance of the ROK to the conservation of this species increased rapidly through the 1990s and into the present century as its population recovered substantially, likely because of the increased availability of new

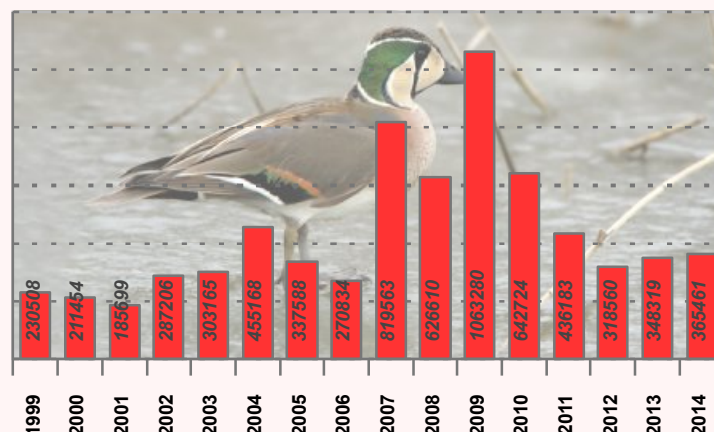


Fig. 5: Number of Baikal Teal counted during the MOE Census (1999-2014).

feeding areas and safe roost sites created by reclamation (Moores 2005). In the present century, the ROK has supported >90% of the global population of Baikal Teal in winter, most found in huge single-species flocks. It is the most abundant species recorded by the MOE Census, with a peak of >1,060,000 in 2009. However, the number wintering in the ROK, while still large, has declined >50% subsequently, with <400,000 recorded in 2012, 2013 and 2014 (MOE Census 1999-2014, Fig. 5). We consider the increase through the 1990s to 2009 and its subsequent decrease to be genuine, as the “missing 600,000” have not been found in the ROK despite search effort outside of the MOE Census, or in China and Japan, in spite of regular search effort in both countries (starting recently in the former, and long-established in the latter nation). Disturbance has increased at many of the sites depended upon by the species in the ROK (especially since 2009, with the start of construction for the Four Rivers project) and there has been an increase in chronic outbreaks of Highly Pathogenic Avian Influenza since 2006. However, the suddenness of the crash in number, the near-lack of dead or infected birds found in the ROK and the relatively stable counts in subsequent winters suggest that a large part of the population died between 2009 and 2010, perhaps through hunting during migration when the species still forms massive concentrations.



Baikal Teal form huge concentrations during migration and in winter, increasing their vulnerability to disturbance, disease and hunting.

Amber List: High Conservation Priority

- (1) PCS: Poor Global Conservation Status. Listed by BirdLife International (2014a) as Globally Near Threatened.
- (2) NCS: Poor National Conservation Status. Listed by NIBR (2011, 2012) as Nationally Vulnerable or Near Threatened. Applied when species are believed to have undergone historical declines or to be undergoing declines nationally / globally; especially in species with a small global population (of <100,000) and / or High Decrease Susceptibility (Moore 2012). Species showing evidence of recent increase since 1990, that also have large or increasing global populations and that are not considered to be Highly Susceptible to Decline were not Amber-Listed even if assessed as Nationally Vulnerable or Near Threatened by NIBR (2011, 2012).
- (3) HDR: Long-term Historical Decline (as evidenced by a change in Abundance Numbers and / or analysis in Moore 2012), with evidence of only partial recent recovery or a less obvious recent decline.
- (4) BDM: Breeding Population Decline Moderate. Either (a) decline of 25-49% in a large or moderately large National Breeding Population (of > c.1000 breeding pairs) since 1990; or (b) contraction of the breeding range so that a species considered as a common and widespread breeder in the second half of the Twentieth Century is now considered to be only a very local breeding species; or (c) extirpation of an always-small breeding population; or (d) decline of one or two in Abundance Numbers between 2000 and 2009 (Moore 2012). In the absence of robust data, presence at only 10-100 breeding sites of formerly more widespread species and / or species identified as having a High Decrease Susceptibility Index Score are prioritized.
- (5) NBM: Recent, Non-Breeding Population Decline Moderate. A recent decline of 25-49% in the Non-breeding (i.e. passage and winter) Population since 1990 suspected. In the absence of robust data, species with a High Decrease Susceptibility Index Score are prioritized; species with 10% or more of suspected global population found in the ROK with the species believed to be in decline or likely to be in decline, are also prioritized.
- (6) RCP: Regional Conservation Priority. Species presently with >30% of the Flyway or Subspecies Population (in accordance with Wetlands International 2014) or >20% of the Global Population (as defined by BirdLife International 2014a) that do not show a strong positive trend from 1910 to the present.

Birds Korea's Amber List includes 13 species assessed as Globally Near Threatened by BirdLife International (2014a) and 22 species assessed as Nationally Threatened or Near Threatened by NIBR (2011, 2012). NIBR (2011, 2012) assessed as Nationally Threatened several raptor and owl species that suffered persecution during the Twentieth Century and have yet to recover their population even though they appear to have increased in recent years.

Examples include:

- **Northern Goshawk** *Accipiter gentilis*.

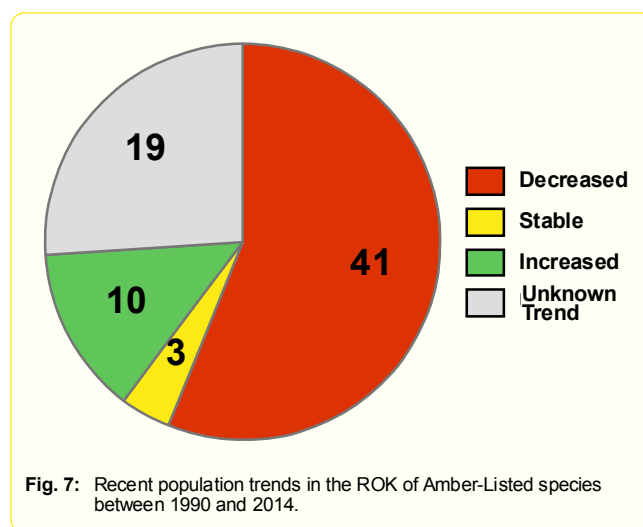
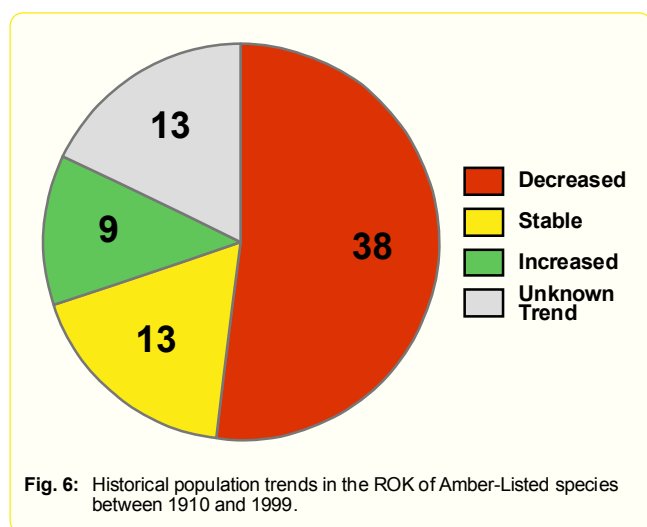
This species breeds in Forest, but the larger migrant and wintering population often uses more open habitats, including rice-fields and small rivers. In the nineteenth century and earlier, the Northern Goshawk was a widespread breeder (perhaps especially in northern provinces). Because of nest-robbing, so that young could be trained for falconry or exported to Japan, the species became much rarer through to the 1930s (Duckworth & Moore 2008), after which degradation of forest probably confined the species to a few remote sites or even led to its extirpation as a breeding species. In the present century, breeding pairs have again been found and the NIBR (2011) classify this species as

Nationally Vulnerable, stating that "The number breeding in Korea is so small that it needs special protection". With reduced persecution and an increase in quality of breeding habitat, the Northern Goshawk should continue to recover its breeding population. MOE Census (2002-2013) data are very thin, but suggest that the wintering population might also be increasing.

- **Eurasian Eagle-owl *Bubo bubo*.**

NIBR (2011) assess this species of Forests as Nationally Vulnerable and state that "Korean populations have declined since 1970, as a result of habitat loss and degradation." Anecdotal evidence suggests that thanks to a reduction in persecution, the species is now undergoing recovery, with several pairs even breeding close to centres of human population.

Fourteen species are Amber-Listed by Birds Korea primarily because of Historical Declines, and 21 for Recent Declines (Fig. 6 and 7).



Examples of species showing a recent decline include:

- **Eastern Spot-billed Duck *Anas zonorhyncha*.**

NIBR (2010) data suggest a severe decline of 58% in 16 years (presumably including breeding and wintering birds). The MOE Census (1999-2013) covers a larger area and all main sites for the species, though only in winter. Although the pattern suggested by total annual counts is obscured by the addition of new count sites, these data also indicate a strong underlying decline in the wintering population. There has been a decline of >50% at those sites which were counted in all years between 1999 and 2013, but almost no change at the same sites between 2002 and 2013. It is therefore unclear whether the very high counts during the first few years of the MOE Census were due to a much higher population then than now or due to the inexperience of survey teams at some sites. If the underlying rate of decline continues (or can be shown to have been similar through the 1990s), then Eastern Spot-billed Duck should be Red-Listed.

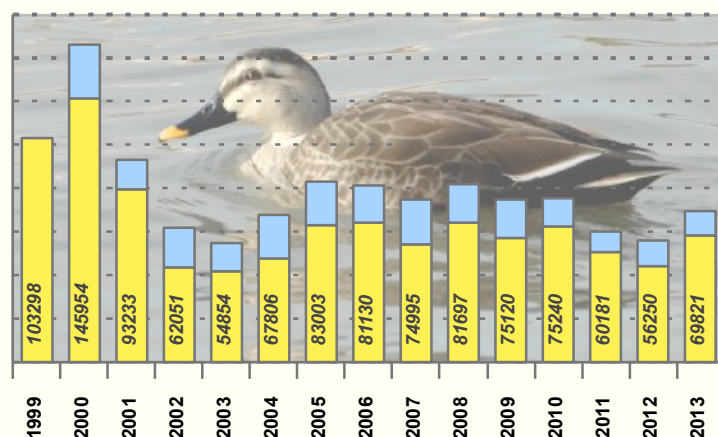


Fig. 8: Number of Eastern Spot-billed Duck counted during the MOE Census (1999-2013), with yellow indicating numbers at sites counted in all 15 years of the Census, and blue indicating numbers at additional sites.

- **Eurasian Wigeon** *Anas penelope*.

This species has undergone a recent rapid decline. NIBR (2010) shows a decline of 55% over 6 years and the MOE Census (1999-2013) counts show a decline from >20,000 in 1999 to <8,000 as the mean of annual counts between 2011 and 2013. However, it is not known whether the exceptional count in 1999 (the first year of the MOE Census) was due in large part to the inexperience of survey teams, especially as Park (2002) does not include any similarly high counts from earlier in the 1990s. The species apparently decreased strongly, including at sites counted in all winters, started to recover and then decreased again (see Fig. 9). Hence the species is Amber-listed at this time, and should be Red-Listed if the rate of decline seen during the 2000s continues.

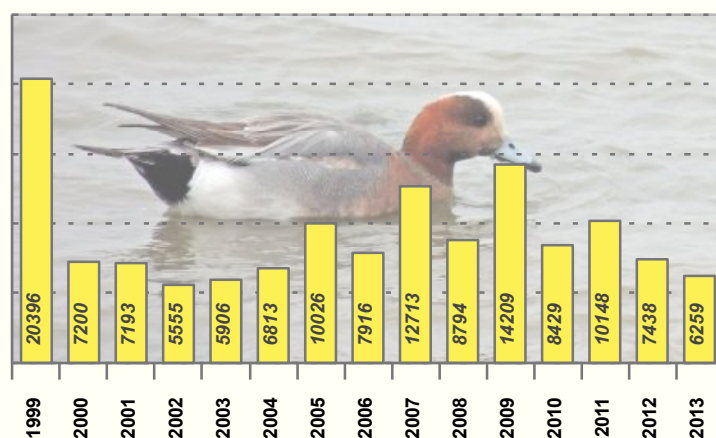


Fig. 9: Number of Eurasian Wigeon counted during the MOE Census (1999-2013).

Only three species are presently primarily Amber-Listed under the Regional Conservation Priority criterion, with all three also believed to have undergone Long-term Historical Decline at the regional population level: Taiga Bean Goose *Anser fabalis*, Tundra Bean Goose *Anser serrirostris* and Greater White-fronted Goose *Anser albifrons*. As Syroechkovskiy (2006) states, after undergoing severe declines, “most of the populations of even ‘common’ geese in eastern Asia are now at such low levels that they would immediately be given threatened status if they inhabited Europe or North America.”

The difficult to identify “Bean Goose” species pair provides an especially useful example of the challenges faced in interpreting available information in order to develop assessments of trend necessary to meet the Aichi Targets within this region.

- Both Taiga Bean and Tundra Bean Goose breed in northern Russia and in this region winter in eastern Asia (China, Korea and Japan).
- Although treated as two species by Gill & Donsker (2014) and thence by Birds Korea, they are still treated as one species, “Bean Goose”, by BirdLife International (2014a), NIBR (2011, 2012) and the MOE Census (1999-2014); and as one species with five recognizable populations in East Asia by Wetlands International (2014).
- Wetlands International (2014) assesses all five East Asian populations of “Bean Goose” as decreasing. Taxon *serrirostris* has a total population of 82,200-156,800 and *middendorffii* of 13,000-35,000.



Amber-listed **Tundra Bean Goose** *Anser serrirostris*; a species that in the ROK usually feeds in dry rice-fields.

- Approximately 150,000 “Bean Goose” overwinter in eastern China (Cao *et al.* 2008), and an unknown proportion of these migrate through the ROK. In addition, 60,000-80,000 “Bean Goose” are recorded annually in the ROK by the mid-winter MOE Census, with occasionally large numbers of unidentified geese (either “Bean Goose” or Greater White-fronted Goose) also reported.
- BirdLife International (2014a) lists “Bean Goose” as decreasing, and classify it as Least Concern because there has not been a >30% decline in global population over three generations. NIBR (2011) also assess “Bean Goose” as Least Concern because it has a large global population and because of its increase in Korea over the past decade.
- However, Syroechkovskiy (2006) suggested that “as recently as 200-300 years ago” the size of goose populations in eastern Asia was many times greater than during the present century adding too that “in recent decades most goose populations in eastern Asia have undergone very rapid declines and several are now at critically low levels...” The main population of *serrirostris* declined from c. 240,000 in the mid-1980s to only c. 60,000 in the period 2000-2002. Present numbers of “Bean Geese” in this region are therefore much lower now than historically, especially if the start of the Nineteenth century baseline as used by Easton *et al.* (2009) is adopted.
- If *middendorffii* which is more or less confined to East Asia in winter was listed as a separate species (as proposed by Ruokonen *et al.* 2008), then it would likely be assessed as Globally Vulnerable, because it has declined substantially (probably more than 30% in three generations).
- At least since 2000, the overwintering population of “Bean Goose” (especially Tundra Bean) has increased substantially in the ROK. There was an almost 60% increase in means of MOE Census counts between 2002-2004 and 2011-2013, although the peak of 86,051 counted in 2005 has not been matched subsequently (MOE Census 1999-2014). Some of this increase could be due to displacement from other areas (e.g. China).
- Birds Korea estimates that <10,000 *middendorffii* and at least 60,000-70,000 *serrirostris* have wintered in the ROK in recent years, with an unknown number also passing through Korea on migration. The ROK therefore supports probably >40% of the two non-Japanese populations of *middendorffii* and perhaps >40% of *serrirostris*.
- The ROK is therefore of great importance for the conservation of both Taiga Bean and Tundra Bean Goose. Although their numbers can fluctuate greatly due to annual fluctuations in breeding success, numbers of both of these (and of Greater White-fronted Goose) would need to increase massively to recover their regional population, even to the level of the mid-1980s.



Amber-listed **Taiga Bean Goose** *Anser fabalis middendorffii*,
a species that in the ROK usually feeds on aquatic vegetation in shallow lakes, wet rice-fields and sometimes mud-flats.

Green List: Lower Conservation Priority

- (1) LCN: Lower Conservation Concern at the National Level, because either (a) has a moderately large (10,000-99,999) National Population and has increased over the longer term (as indicated by Abundance Numbers: see Moores 2012); and / or has a moderately large population and has increased by >25% since 2000; or (b) the species has a Large National Population (>100,000: i.e. Birds Korea Checklist abundance code 1), with a population trend that is insufficient to warrant Red- or Amber-Listing.
- (2) ISP: Increasing Strongly, even though the National Population is very small to moderate in size, consisting of between 50-10,000 individuals annually.
- (3) WPK: Relatively Widespread but Poorly-Known Trend. Species is believed to have a National Population of 1,000-99,999, with a trend since 1990 that is too poorly known or weak to trigger Amber-Listing or to classify as LCN or ISP.
- (4) MWT: Modest national Population (<1000 individuals annually), showing a Weak Trend, that since 2000 is not known to be strongly increasing or strongly decreasing.
- (5) DES: Declines indicated, but data inadequate for Amber-Listing.

A total of 234 species are Green-Listed by Birds Korea at this time. The population trends of many of these species are too poorly-known at present to identify them as Highest or High Conservation Priorities (or to Red-List them through strict application of IUCN criteria), even though many of them are believed to have declined substantially. Two species Green-Listed by Birds Korea were assessed by NIBR (2011, 2012) as Nationally Vulnerable (Whooper Swan *Cygnus cygnus* and Black Woodpecker *Dryocopus martius*) and two as Nationally Near Threatened (Red-necked Grebe *Podiceps grisegena* and Amur Falcon *Falco amurensis*). However, these assessments by NIBR appear to be unsupported by evidence of either Historical or Recent Decline. Birds Korea archives instead suggest that all four species are increasingly recorded (due perhaps in part to an increase in observer activity and improvements in access to the coastal zone and islands: Moores 2012) and are also likely increasing. For example, Whooper Swan has increased this century (MOE Census 2000-2014); and Gore & Won (1971) considered Red-necked Grebe to be common but “usually seen singly or in twos or threes, never in large flocks”. The MOE Census (2010), however, recorded 1,627 Red-necked Grebe, most off the Gangwon coast, where the species is now often found in flocks of several hundred.

Some species have shown a strongly increasing trend, both during the second half of the Twentieth Century and recently. Several of these are small to medium-sized species that are tolerant of disturbed forest with their centre of distribution to the south and east of Korea, suggesting that their range expansion has been encouraged by the warming climate on the Korean Peninsula.

Examples strongly-increasing species include:

- **Yellow-bellied Tit** *Pardaliparus venustulus*.
Described as “endemic to wooded areas of SE China and Northeast China” (Brazil 2009), Yellow-bellied Tit was first recorded in the ROK in 2005 (Moores 2007). Although still very uncommon, this species is becoming widespread as a migrant and winter visitor, with probably 100s present in the ROK in the winter of 2013 / 2014. It is also likely to prove to be a breeding species, with singing



Yellow-bellied Tit *Pardaliparus venustulus*.

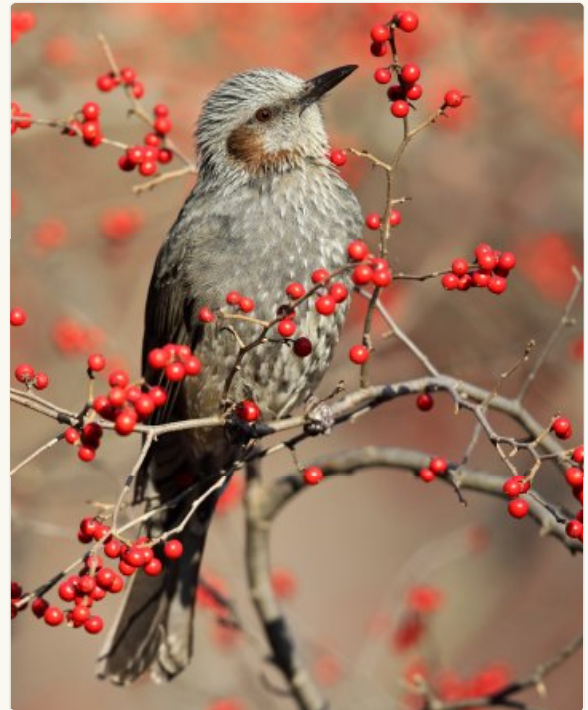
birds noted into late May (Birds Korea Archives). The species is at present undergoing an extremely rapid range expansion in parts of China, with national first records in Japan and Russia also in the past 10 years.

- **Brown-eared Bulbul** *Hypsipetes amaurotis*.

As summarised by Duckworth & Moores (2008), the Brown-eared Bulbul was summering at least locally in parts of the ROK in the 1930s, becoming more widespread during the 1950s–1960s, and is now common, even locally abundant, all year in both the ROK and the DPRK south of c. 40° N. The species is most numerous in broadleaved evergreen forest and wooded parkland; scarce in higher upland areas; and absent in areas without trees. The long-term increasing trend from at least the middle of the Twentieth century is continuing in the ROK. NIBR (2010) data indicate that the species has increased 31% in the past 16 years in 406 randomly-selected quadrats; and MOE Census (2002-2013) data also show a threefold increase in mean counts between 2002-2005 and 2011-2013, although some of this increase is due to an increase in the number of count sites.

- **Light-Vented Bulbul** *Pycnonotus sinensis*.

First recorded in the ROK in 2002, this species was first found breeding in 2004 (Moores 2007) and has now colonised many offshore islands along the west coast between 34° N and 38° N. On Baekryeong Island in the northwest, probably ~50 territories were occupied in 2013 and 2014. Since 2010, it has also started to colonise the mainland in the southeast, with six territories found in only one day of survey in mid-July 2014 (Birds Korea Archives).



Brown-eared Bulbul *Hypsipetes amaurotis*.



Light-vented Bulbul *Pycnonotus sinensis*.

Thirty-eight of the Green-Listed species are considered likely to have decreased substantially, but either at rates as yet unsupported by evidence considered sufficient for Red- or Amber-Listing or not within the present century. Most of these are non-breeders, so are not covered by Red and Amber List criteria for breeding range contraction. The Chestnut Bunting *Emberiza rutila*, for example, was considered abundant during southward migration by Gore & Won (1971), with tens of thousands banded in a small area of millet fields near Seoul. In recent years, flocks have seldom been recorded on the mainland. However, it remains occasionally numerous on offshore islands, especially during northward migration, and there is no clear evidence that the species has declined during the present century. Others, like Short-eared Owl *Asio flammeus*, are now so scarcely-recorded that they are likely to be lost to the national avifauna within a few decades if their gradual population decline continues.

Population Trends and Conservation Status by Major Habitat

The ROK has a land area of 10,003,300ha (ROK 2014), an increase in area of 103,300ha since 2009 (ROK 2009), presumably largely by tidal-flat reclamation. It forms the southern half of a peninsula c.250-300km west-east. Projecting out from the eastern Asian mainland, the ROK has a mountainous spine and is surrounded by sea on three sides: the shallow West or Yellow Sea, separating the ROK from China; the South Sea or Korean Strait, separating the ROK from Japan; and the deeper East Sea off the east coast, separating the ROK from Japan and Russia. There are 3,217 “confirmed” islands (ROK 2014). Winters are typically cold and dry and summers warm and wet, though there are substantial differences in local climate north-south and even west-east (Lee & Miller-Rushing 2014), affecting bird distribution (Moore 2012). As a result of the interplay between geography and climate, most of the nation’s 365 regularly occurring species are migratory.

The majority of species are ecologically-dependent on one of the five major bird habitats (Forest; Grassland-type and Open Habitat; Freshwater Wetland; Intertidal Wetland; Marine); though a substantial proportion are ecologically-dependent on more than one of these habitats (and are therefore included in more than one habitat section below). These main habitats together comprise c. 78-92% of national land area (Table 2, Figs. 10-11), with the remainder comprised of 1.94% bare land and 6.6% “Urbanisation area” (MOE 2012a, in ROK 2014). An additional 44,383,800ha of maritime area is under the ROK’s jurisdiction (ROK 2014), containing the majority of Marine Habitat.

Simple calculation of area based on statements within ROK (2014) confirms that some of the information is either contradictory (perhaps because e.g. agricultural reservoirs and infrastructure are included in agricultural land in some assessments and not in others?) or is out-of-date, including e.g. the remaining area of intertidal wetland, as evidenced by undated repetition of statements on area and distribution combined with the additional land area acquired between MOE (2009) and ROK (2014).

Table 2: Major habitat types in the ROK and examples of their suggested minimum and maximum area found in recent publications, including the fourth and fifth national reports to the CBD.

| Habitat Type | Includes | Minimum Area | Maximum Area | Sources |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Forest | All forest types including plantations | 6,142,026 ha 61.4% ¹⁾ | 6,402,112ha 64% ²⁾ | ¹⁾ p. 15, ROK (2014) ²⁾ p. 13, ROK (2014) |
| Grassland-type | Grassland, dry arable land | 285,094ha 2.85% ¹⁾ | 1,100,363ha 11% ²⁾ | ¹⁾ p. 15, ROK (2014): grassland only ²⁾ Including arable land |
| Freshwater Wetland | Presumed to include lakes, rivers, reservoirs; here excl. rice-fields | 354,100ha 3.54% | 354,100ha 3.54% | “Inland wetland” (p.1, ROK 2009) |
| Rice-field | Rice-fields (included in Freshwater Wetland in this report, in accordance with Ramsar Classification system and e.g. Ramsar Resolution X.31) | 960,000ha 9.6% ¹⁾ 1,070,000ha 10.7% ²⁾ | 1,429,671ha 14.29% ³⁾ | ¹⁾ FAO (2012) ²⁾ p. 13, ROK 2014 ³⁾ p. 15, ROK 2014; rice-field calculated as 60% of agricultural land |
| Intertidal Wetland | “coastal wetlands” (p. 12, ROK 2014) = “tidal-flats” = wetland (identical area & distribution in MOE 2012b). Negligible area of intertidal wetland that is not tidal-flat (Park <i>et al.</i> 2008) | ~110,000ha 1.1% ¹⁾ 113,000ha 1.1% ²⁾ | 248,940ha 2.49% ³⁾ | ¹⁾ Birds Korea (2010); Moore (2012); ²⁾ “wetland” in MOE (2012a), p. 15 ROK (2014) ³⁾ MOE (2012b), ROK (2014) |
| Marine | All sea under jurisdiction of ROK | 44,383,800ha | 44,383,800ha | ROK (2014) |
| Other | “Urbanization” and bare land | 8.10% | 8.10% | p. 15, ROK (2014) |
| Total % of National Area (excluding sea) | | 86.5% | 103.42% | |

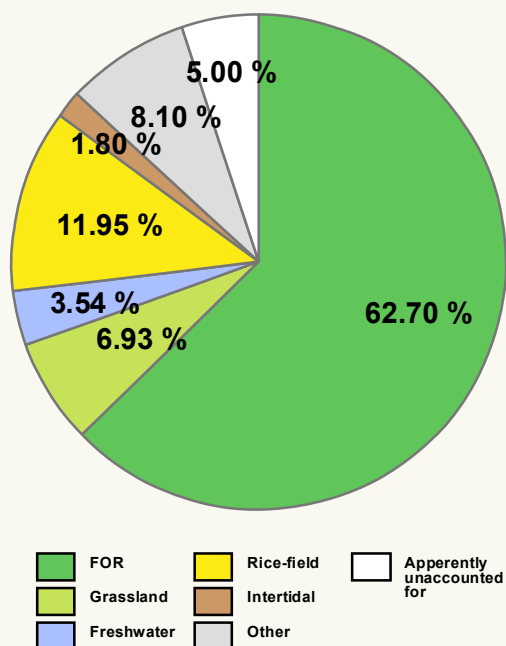


Fig. 10: Approximate area of major habitat types, based on the median value of the minimum and maximum values in Table 2.

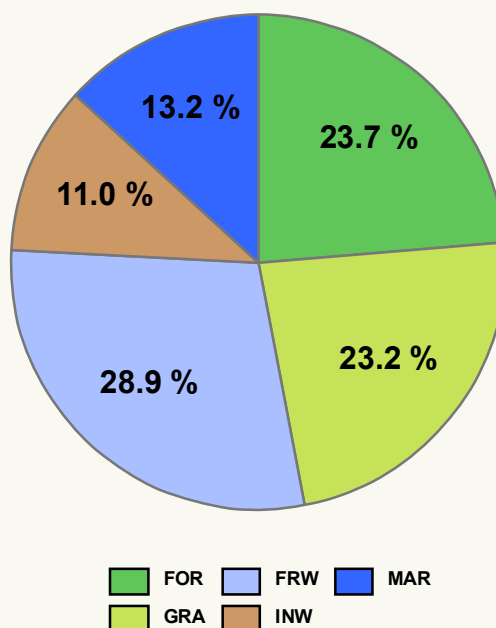


Fig. 11: Percentage of regularly occurring species ecologically-dependent on the five main habitats (FOR=Forest; GRA= Grassland-type and Open Habitat; FRW=Freshwater Wetland; INW=Intertidal Wetland; MAR=Marine Habitat).

Birds and Their Habitats

Geography and centuries of intensive human-use mean that many sites and areas contain elements of more than one main habitat. Importantly too, like people, many bird species also depend on more than just one habitat or one site. Meeting the Aichi Targets requires initiatives and policies that respond to ecological requirements of threatened species, while resolving complex issues of jurisdiction and use.



The Globally Vulnerable / Red-Listed **Chinese Egret** *Egretta eulophotes* breeds on small islands (contained in Marine Habitat) and feeds on tidal-flat (Intertidal Wetland).



The Globally Endangered / Red-Listed **Yellow-breasted Bunting** feeds in dry grassy areas (Grassland-type and Open Habitat), and often also feeds and roosts in reedbeds (Freshwater Wetland).



1. Forest



Amber-Listed **Black Paradise Flycatcher** *Terpsiphone atrocaudata*,

Forest in the ROK can be divided into five major types ranging from subalpine conifer, close to the peak of several mountains, including Seorak Mountain in the northeast, down to subtropical broadleaved evergreen forest in the south, especially on islands and in the coastal zone (Lee & Miller-Rushing 2014). As a result of the warming climate, the northern distribution limit of many broadleaved evergreen tree species in the ROK, especially in the west, has moved north by 14-74 km since 1941 (Yu & Lee 2009). Broadleaved evergreen woodland is now found north to 35°N, more locally to 37°N in the far northwest, and several species dependent on this forest type appear to be extending their range northward too.



Lowland broadleaved evergreen forest, Gageo Island, in the far southwest.

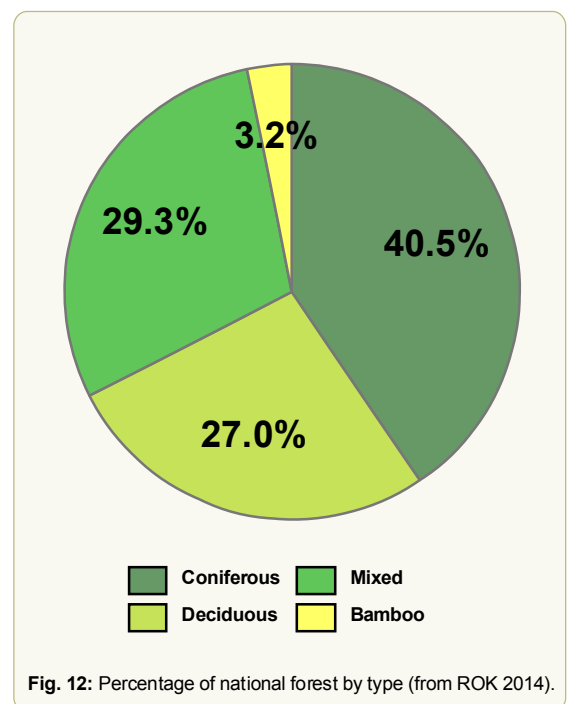


Upper limit of subalpine forest, Seorak Mountain, in the far northeast.

Forest area nationwide totaled 6,394,000ha in 2005 (FAO 2012) and 6,369,000ha in 2010 (ROK 2014), with a loss of c. 243,000ha between 1970 and 2010 (FAO 2012). According to ROK (2014), 2,581,000ha is coniferous, 1,719,000ha is deciduous and 1,865,000ha is mixed, with bamboo groves covering 204,000ha (Fig. 12).

Approximately 2,200,000 ha of this forest has been described as low-quality, secondary regrowth monoculture (in Moores 2012), and under 30 years of age (ROK 2014). However, 4,142,000ha of forest is now older than 30 years of age, and during the past forty years, forest volume has also increased greatly (ROK 2009, FAO 2012). There are now extensive areas of mature secondary forest with a rich understory, especially in upland areas.

Forest area used to be lost mainly to agricultural land, construction, industry and infrastructural development. More recently, forest area has declined as a result of road-building, house construction and golf courses. However, marginal agricultural lands and abandoned grasslands within forest areas have undergone natural regeneration, slowing the annual rate of forest area loss. Although forest area is projected to decline until the mid-2010s, it is predicted to increase again, to 6,382,000ha in 2020 (FAO 2012).



Approximately 95 of the nation's 365 regularly occurring bird species are ecologically dependent on Forest, including 19 of the ROK's 27 sedentary species. Seven Forest species are Red-Listed, 20 are Amber-Listed and none are yet Grey-Listed by Birds Korea (Table 3).

Most numerous species of forest include the Green-Listed Japanese Pygmy Woodpecker *Dendrocopos kizuki*, Great Spotted Woodpecker *Dendrocopos major*, Eurasian Jay *Garrulus glandarius*, Coal Tit *Periparus ater*, Varied Tit *Sittiparus varius*, Marsh Tit *Poecile palustris*, Eastern Great Tit *Parus minor*,

Long-tailed Tit *Aegithalos caudatus* and Brown-eared Bulbul, all of which are largely resident. Although these widespread species can be found in coniferous forest, only Coal Tit appears to prefer this forest type, with the remainder more typical of mixed and deciduous forest.

Forests in the ROK support the nation's only endemic bird taxa. One of these, the Red-Listed Tristram's Woodpecker, is either a Korean-endemic subspecies of White-bellied Woodpecker, or a full species *Dryocopus richardi*. Although found in mountain forest, it likely preferred large trees in mature forest in lowland areas. It was last recorded in Japan in 1920 (Brazil 1991) and is considered Regionally Extinct in the ROK by NIBR (2012), with no publicly-published record since 1989 (NIBR 2011). However, it is rumored still to survive at one location in the ROK (Birds Korea Archives) and in four or five areas within the DPRK (DPRK 2002), with a total population of only a dozen pairs, mostly concentrated in the southwest (Tomek 1999).

There are three subspecies of the more widespread Green-Listed White-backed Woodpecker in the ROK, with *leucotos* on the mainland and two endemic to islands: *takahashii* on Ulleung Island and *quelpartensis* on Jeju Island. The endemic *bedfordi* subspecies of Eurasian Nuthatch *Sitta europaea* also occurred in forest on Jeju Island, but there have been no reports in recent decades and it is presumed extinct.

While most of the nation's forest supports resident and migratory bird species typical of mainland East Asia, subtropical broadleaved evergreen forest close to the south coast and on southern islands has a breeding bird community closer to that of forests in parts of southern Japan. Several islands in the southwest, along the south coast and in the East Sea support small breeding populations of the Globally Near Threatened / Amber-Listed Black Wood Pigeon *Columba janthina* (Birds Korea 2010) while Green-Listed Japanese Bush Warbler *Horornis diphone* and Japanese White-eye *Zosterops japonicus* are much more widespread and can occur locally at very high densities. Both of these latter species also occupy different vegetation communities further north, with Japanese White-eye now breeding north to Seoul and Japanese Bush Warbler occupying cold temperate forest and even the subalpine zone in central ROK (Park 2014). Broadleaved evergreen and warm temperate forest also supports the majority of the ROK's breeding population of the Globally Vulnerable / Red-Listed Fairy Pitta *Pitta nympha* and Globally Near Threatened / Amber-Listed Black Paradise Flycatcher *Terpsiphone atrocaudata*.

- Research in 2009 found 64 Fairy Pitta at 32 sites on Jeju Island, and an additional 11 individuals (including 5 juveniles in 3 nests) in Hampyeong County, Jeollanam Province (Kim *et al.* 2010), with this species also now known to breed east to Busan and occasionally north to Seoul (Edelsten *et al.* 2013, Birds Korea Archives).
- Black Paradise Flycatcher is also increasingly recorded in the ROK, with recent breeding confirmed north to at least 35°N. A survey of Jeju Island found a total of 124 individuals in 2010, all between 80 and 1100masl, with most concentrated at around 500masl. Research suggests that habitat there is being lost to infrastructural development, and that the species is also threatened by unregulated bird photography and eco-tourism (Kim *et al.* 2010).



Red-listed Fairy Pitta *Pitta nympha*.

At the other extreme, a cluster of mountain peaks in the northeast reaches a maximum of c. 1700m on Seorak Mountain, with a rapid transition from central temperate zone forest to subalpine conifer. Forest here supports several bird species at the presumed southern limit of their breeding range, including Green-Listed Pallas's Leaf Warbler *Phylloscopus proregulus* (from c.800-1500masl) and Two-barred Warbler *Phylloscopus plumbeitarsus* (from c.1100-1500 or 1600masl: Birds Korea Archives, Ogura in Robson 2013).

Throughout the ROK, the maturation of replanted forest and the warming climate (with milder winters and wetter summers) have led to substantial population increases in some species, perhaps especially in those with the centre of their distribution to the warmer south and east of the ROK. The Green-Listed Varied Tit, for example, was considered as "rare" by Wolfe (1950) but "common" by Won (2000). During the present century, there has been a six-fold increase in numbers recorded by the MOE Census between 2002 and 2013.

Table 3: Red- and Amber-Listed Species of Forest Habitat.

| Species | Scientific name | Rationale (see p.16, 19) | Trend Historical | Trend Recent | GCS | NCS |
|------------------------------|---------------------------------|-----------------------------|---------------------|-----------------|-----|-----|
| Mandarin Duck | <i>Aix galericulata</i> | GFI, NBS | DEC | DEC | LC | LC |
| Ural Owl | <i>Strix uralensis</i> | TNS | UNK | UNK | LC | EN |
| Tristram's Woodpecker | <i>Dryocopus javensis</i> | HDS | DEC | NA | LC | RE |
| Fairy Pitta | <i>Pitta nympha</i> | GCS | DEC | UNK | VU | VU |
| Black-naped Oriole | <i>Oriolus chinensis</i> | BDS, NBS | INC | DEC | LC | NO |
| Eastern Crowned Warbler | <i>Phylloscopus coronatus</i> | NBS | STA | DEC | LC | NO |
| Common Redpoll | <i>Acanthis flammea</i> | HDS | DEC | DEC | LC | NO |
| Crested Honey Buzzard | <i>Pernis ptilorhynchus</i> | NCS | STA | UNK | LC | VU |
| Japanese Sparrowhawk | <i>Accipiter gularis</i> | NCS | DEC | DEC | LC | VU |
| Eurasian Sparrowhawk | <i>Accipiter nisus</i> | NCS | STA | DEC | LC | VU |
| Northern Goshawk | <i>Accipiter gentilis</i> | NCS | DEC | STA | LC | VU |
| Grey-faced Buzzard | <i>Butastur indicus</i> | HDR | DEC | UNK | LC | LC |
| Black Wood Pigeon | <i>Columba janthina</i> | PCS, NCS | UNK | UNK | NT | VU |
| Eurasian Eagle-Owl | <i>Bubo bubo</i> | NCS | DEC | STA | LC | VU |
| Eastern Tawny Owl | <i>Strix (nivicolum) ma</i> | NCS | UNK | DEC | NR? | VU |
| Long-eared Owl | <i>Asio otus</i> | NBM | DEC | DEC | LC | LC |
| Grey-capped Pygmy Woodpecker | <i>Dendrocopos canicapillus</i> | HDR | DEC | INC | LC | NO |
| Ashy Minivet | <i>Pericrocotus divaricatus</i> | NBM | DEC | DEC | LC | NO |
| Black Paradise Flycatcher | <i>Terpsiphone atrocaudata</i> | PCS, NCS | INC | INC | NT | VU |
| Pale-legged Leaf Warbler | <i>Phylloscopus tenellipes</i> | NBM | STA | DEC | LC | NO |
| Eurasian Treecreeper | <i>Certhia familiaris</i> | HDR | DEC | UNK | LC | NO |
| Grey-streaked Flycatcher | <i>Muscicapa griseisticta</i> | NBM | DEC | DEC | LC | NO |
| Asian Brown Flycatcher | <i>Muscicapa latirostris</i> | NBM | DEC | DEC | LC | NO |
| Siberian Blue Robin | <i>Larvivora cyane</i> | NBM | DEC | DEC | LC | NO |
| Mugimaki Flycatcher | <i>Ficedula mugimaki</i> | NBM | DEC | DEC | LC | NO |
| Forest Wagtail | <i>Dendronanthus indicus</i> | BDM | DEC | DEC | LC | NO |
| Chinese Grosbeak | <i>Eophona migratoria</i> | HDR | DEC | DEC | LC | LC |

Note: in this table and subsequently, GCS = Global Conservation Status as assessed by BirdLife International (2014a), with NR indicating Not Recognised as a valid taxon by BirdLife; NCS = National Conservation Status as assessed by NIBR (2011, 2012), with NA= Not Applicable and NO= Not yet Assessed

2. Grassland-type and Open Habitat



Green-listed **Stejneger's Stonechat** *Saxicola stejnegeri*.

Grassland-type and Open Habitat encompasses a broad range of ecological niches used by a diverse group of species that are dependent upon vegetated areas that are neither forest nor wetland. In this report, it includes “grassland” (c. 285,000ha or almost 3% of national area: ROK 2014), arable land, forest edge and more open scrubby areas, with scattered trees; recently-reclaimed and still fallow land, with patches of reed and other grasses; some parks; and other more open areas. It excludes rice-fields (which are covered under Freshwater Wetland in accordance with the Ramsar Convention), “bare areas” (as often found in urban areas) and mature bamboo groves (which are covered under Forest because of their associated bird communities).



Haenam County, 1951. “Thinly forested hills...Lowland cleared and agricultural land” was an extensive habitat until the 1970s.

It is likely that this habitat type increased in area for several centuries with agricultural expansion and deforestation through until the 1950s at least. Wolfe (1950) wrote of “open woods, checkered with small areas of wet grass which supported an abundant frog population” near to Seoul. Two decades later, Gore & Won (1971) stated that “Thinly forested hills and lowland woods...accounts for probably a quarter of the available habitat” nationwide, supporting “common” species (rare as breeders in the present century) that included Brown Shrike *Lanius cristatus*, Chinese Grosbeak *Eophona migratoria* and Chestnut-eared Bunting *Emberiza fucata*; while “Lowland cleared and agricultural land” covered much of the west and central regions, with Stejneger’s Stonechat *Saxicola stejnegeri* and Crested Lark (now nearly nationally-extirpated), both common in drier areas.

Since the 1970s, there has been a massive decline in area of thinly-wooded open land (perhaps of >90%) due primarily to reforestation, afforestation and also agricultural intensification and industrial and infrastructural development. Arable land too is farmed even more intensively than in the time of Gore & Won (1971), with bare fields, separated by thin strips of cropped vegetation, and rows of vegetables covered in plastic sheeting now typical in many parts of the country.



The recently-reclaimed Mangyeung Estuary, Saemangeum (2013).

FAO (2012) predicts that the further conversion of marginal agricultural and grassland to forests will increase gradually through to 2020. At present, most extensive areas of Grassland-type and Open Habitat in lowland areas are the result of large-scale reclamations, existing only in the decade or so between seawall closure and major infrastructural development as presently found within much of Saemangeum.

Nonetheless, approximately 88 of the ROK's 365 regularly occurring bird species depend on Grassland-type and Open Habitat, with a further four Forest species often also found along the forest-edge and in more shrubby areas. Ecologically-dependent species include the Globally Vulnerable / Red-Listed Styan's Grasshopper Warbler (which breeds in grassland-type habitats on offshore islands and much more rarely in estuaries: Birds Korea 2010); several raptors (including the Globally Vulnerable / Red-Listed Eastern Imperial Eagle and the Nationally Endangered / Red-Listed Golden Eagle); and several passerine groups including larks and buntings. Based on the description in Gore & Won (1971) of "millions" of buntings each autumn in millet fields, and on migration strategies outlined in Moores (2012) it seems likely that the ROK used to support a substantial proportion of the world's Chestnut Bunting *Emberiza rutila* during southward migration. This species, now rather uncommon on the mainland, remains Green-Listed however, as it remains unclear how such huge numbers were estimated beyond the account of almost 65,000 banded in the same area between 1964 and 1969. To date, we have also been unable to trace other accounts (in the ROK or in adjacent countries) that describe severe declines in this species.

Most numerous species of this habitat-type include Amber-Listed Common Pheasant, Green-Listed Oriental Turtle Dove *Streptopelia orientalis*, Green-Listed Azure-winged Magpie *Cyanopica cyanus*, Green-Listed Eurasian Magpie *Pica pica serica*, Green-Listed Large-billed Crow *Corvus macrorhynchos*, Red-Listed Barn Swallow *Hirundo rustica*, Green-Listed Vinous-throated Parrotbill *Sinosuthora webbiana*, Green-Listed Daurian Redstart *Phoenicurus aureus* and Green-Listed Eurasian Tree Sparrow *Passer montanus*.

A very few species, including the Green-Listed Far Eastern Cisticola, the distinctive eastern (sub-) species of Zitting Cisticola *Cisticola (juncidis) brunniceps*, have increased and spread northward in recent decades.

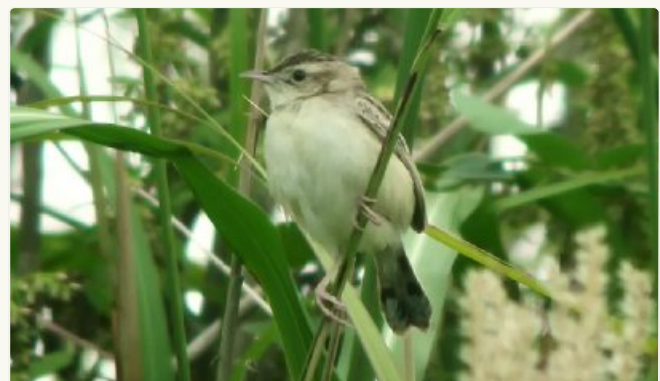
However, many species that are dependent upon this habitat type have decreased markedly, either historically or more recently, and are Grey-Listed (2), Red-Listed (10) or Amber-Listed (14) (Table 4).

These include:

- **Barn Swallow *Hirundo rustica*.**

Although not assessed by NIBR (2011, 2012), this species is Red-Listed by Birds Korea because of overwhelming evidence of severe long-term decrease, some of which is anecdotal (summarized in Moores 2012), much of which is now supported by recent research (NIBR 2010, Lee *et al.* 2011) including:

- i) The disappearance of massive roosts of 100,000+ birds from the 1960s and 1970s, validated by multiple authors (Park 2002), when few roosts are now known to hold more than a few hundred or at most low thousands of birds;
- ii) The disappearance of the phenomenon noted on Gageo Island and other offshore islands until at least the 1970s and 1980s of thousands of dead migrant Barn Swallows during spring storms (Birds Korea Archives);



Green-listed Far Eastern Cisticola *Cisticola (juncidis) brunniceps*.

- iii) The small numbers nesting in rural areas during the present decade compared with the description of its abundance around “all the villages” by Wolfe (1950), borne out both by Birds Korea Archives and other research projects, including NIBR (2010) which found a decline of 27% between 2000 and 2010;
- iv) The increasingly late arrival to nesting areas during the present century, including at 53 regularly-monitored observation stations, with later arrival assessed as being the result of “severe reductions of more than 99% in what were formerly very large populations” by Lee *et al.* (2011).



Red-listed Barn Swallow *Hirundo rustica*.

- **Rustic Bunting** *Emberiza rustica*.

Although not assessed by NIBR (2011, 2012) this species is Amber-Listed because of large declines in the second half of the Twentieth Century. Austin (1948) described the Rustic Bunting as abundant, and near Seoul he “found it by far the commonest of the wintering small birds...From December through March flocks numbering upwards of 500 birds lived among the weeds”. Gore & Won (1971) also found it “Present in the lowlands in very large numbers” with a total of 59,705 ringed, mostly in one area, between 1964 and 1968. At the very end of the Twentieth Century, however, the MOE Census (1999) found a total of fewer than 300 Rustic Bunting spread across more than 50 sites nationwide. During the present century, MOE Census data suggest that a modest recovery is taking place with 4,391 Rustic Bunting recorded at 195 sites nationwide in 2014. About a third of the increase in number is due to the addition of new census count areas, but counts at those sites covered every year since 2000 also more than doubled between 2000 and 2013 (see Fig. 13). Unlike Chestnut Bunting, the late Twentieth Century decline of Rustic Bunting was strongly evident too in the DPRK and at bird banding stations in Japan (Moores 2012), including a decline of c.90% in the number banded at Otayama between 1973 and 1996 (Komeda & Ueki 2002).

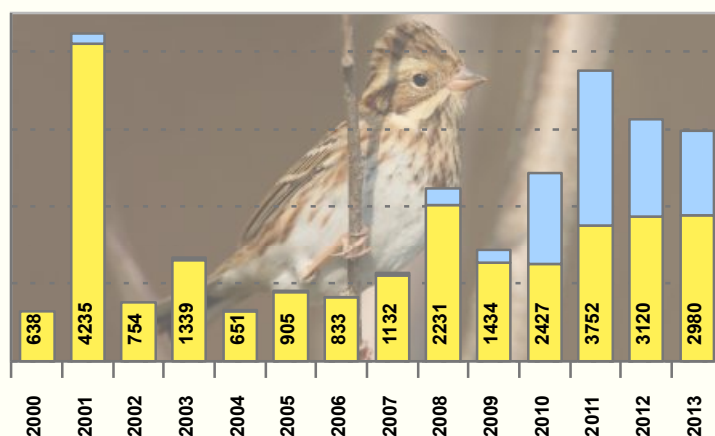


Fig. 13: Number of Rustic Bunting counted by the MOE Census (2000-2013), with yellow indicating, numbers at sites counted in all 14 years of the Census, and blue indicating numbers at additional sites.

Seventeen Green-Listed species are also assessed as having declined markedly, but because of potential bias (see Moores 2012), the data at present are inadequate to confirm the extent and severity of their decline.

These include:

- **Eurasian Tree Sparrow** *Passer montanus*.

Cumming (1933) wrote that the Eurasian Tree Sparrow was “easily the commonest bird in Korea...found around the villages all the way from seaside to the remotest mountain valleys, ubiquitous and assured”. During the present century, the species still remains one of the more numerous small landbird species in urban areas and in agricultural landscapes. However, anecdotal evidence of recent decline and loss as a breeding species from some localities is supported by analysis of data in NIBR (2010) which indicates a decline of 49% in the past 15 years and of 80% since 1988 in 406 randomly-selected quadrats. However, this trend is contradicted by count data from the MOE census (2000-2013), which instead suggests a doubling in number at those sites counted every year between 2000 and 2013. As the species is largely sedentary, this suggests either that there has been a severe decline followed by some recovery, or that the data are affected by unknown sources of bias (see Moores 2012).



Green-listed **Eurasian Tree Sparrow** *Passer montanus*.

Table 4: Grey-, Red- and Amber-Listed Species of Grassland-type and Open Habitat.

| Species | Scientific name | Rationale (see p.16, 19) | Trend Historical | Trend Recent | GCS | NCS |
|-----------------------------|-------------------------------|-----------------------------|---------------------|-----------------|-----|-----|
| Eurasian Collared Dove | <i>Streptopelia decaocto</i> | NRO | DEC | NA | LC | NO |
| Golden Eagle | <i>Aquila chrysaetos</i> | TNS, BDS | DEC | UNK | LC | EN |
| Chinese Sparrowhawk | <i>Accipiter soloensis</i> | NBS | DEC | DEC | LC | VU |
| Black Kite | <i>Milvus migrans</i> | BDS, NBS | DEC | DEC | LC | VU |
| Yellow-legged Buttonquail | <i>Turnix tanki</i> | HDS | UNK | DEC | LC | NO |
| Hill Pigeon | <i>Columba rupestris</i> | HDR, BDS | DEC | DEC | LC | LC |
| Brown Shrike | <i>Lanius cristatus</i> | HDS | DEC | DEC | LC | LC |
| Crested Lark | <i>Galerida cristata</i> | HDS, BDS | DEC | DEC | LC | VU |
| Barn Swallow | <i>Hirundo rustica</i> | HDS, BDS, NBS | DEC | DEC | LC | NO |
| Styan's Grasshopper Warbler | <i>Locustella pleskei</i> | GCS, GFI | DEC | UNK | VU | VU |
| Yellow Bunting | <i>Emberiza sulphurata</i> | GCS | UNK | UNK | VU | VU |
| Japanese Quail | <i>Coturnix japonica</i> | PCS, NBM | STA | DEC | NT | NO |
| Common Pheasant | <i>Phasianus colchicus</i> | BDM | INC | UNK | LC | NO |
| Cinereous Vulture | <i>Aegypius monachus</i> | PCS, NCS | INC | INC | NT | VU |
| Merlin | <i>Falco columbarius</i> | NCS | DEC | UNK | LC | NT |
| Carrion Crow | <i>Corvus corone</i> | HDR | DEC | DEC | LC | NO |
| Eurasian Skylark | <i>Alauda arvensis</i> | BDM | DEC | DEC | LC | LC |
| • Far Eastern Skylark | • <i>Alauda japonica</i> | BDM | DEC | UNK | LC | NO |
| Grey-streaked Flycatcher | <i>Muscicapa griseisticta</i> | NBM | DEC | DEC | LC | NO |
| White Wagtail | <i>Motacilla alba</i> | HDR | DEC | UNK | LC | NO |
| Chinese Grosbeak | <i>Eophona migratoria</i> | HDR | DEC | DEC | LC | LC |
| Meadow Bunting | <i>Emberiza cioides</i> | HDR | DEC | DEC | LC | NO |
| Rustic Bunting | <i>Emberiza rustica</i> | HDR | DEC | INC | LC | NO |

3. Freshwater Wetland



Red-listed **Scaly-sided Merganser** *Mergus squamatus*,

ROK (2009) states, without additional detail, that there are 354,100ha of inland wetland in the ROK. These wetlands are likely to be comprised almost entirely of reservoirs and stretches of river. There are also an additional ~1 million hectares of rice-fields (FAO 2012, ROK 2014), also classified as wetland under the Ramsar Convention Classification System for Wetland Type. Due to the ROK's climate, there is typically only one rice-harvest per year, and most rice-fields are dry between October and April and flooded only during the summer months. Together with associated agricultural reservoirs and drainage systems, such rice-field areas are nonetheless used by many species of waterbird as suboptimal replacements for natural floodplain wetland. Newly-created reclamation areas, with extensive shallow wet marsh and little disturbance, typically support even greater waterbird diversity than older rice-field areas, with a shift in species composition and the loss of some larger waterbird species as the area becomes increasingly cultivated and as infrastructure is developed (Birds Korea Archives).



With appropriate management (as here at Junam Reservoir), rice-fields can support large numbers of Freshwater Wetland waterbirds.

Historically, much of the low-lying land in the west and south-east of the peninsula would have been floodplain wetland, formed by the nation's four major rivers: the Han, the Geum and Yeongsan rivers, all of which flow to the west; and the Nakdong, the nation's longest river at 506km, which flows southeastward into the Korean Strait. As two-thirds of the annual precipitation typically falls between July-September and <10% in the winter (KWRC 2004), both the rivers and their floodplains would have experienced substantial seasonal fluctuation in water levels and area of open water.

Following centuries of river-engineering and conversion of natural freshwater wetland to rice-field and other uses (Crawford & Lee 2003), the ROK now has only a few relict areas of willow-dominated riparian wetland (many of which were removed or degraded during the Four Rivers project between 2009 and 2011) and a few small natural or near-natural floodplain lakes, including Upo Ramsar site, with three seasonally-shallow lakes totaling <490ha in area. With an increase in the rate and extent of tidal-flat reclamation, there are also several recently-formed and extensive areas of rice-field with large reclamation lakes close to the west coast, away from historical floodplain areas, that at present are of high international importance to waterbirds.

In addition to the loss of natural floodplain wetland, the main channels of the ROK's four major rivers and almost all smaller rivers have also been greatly modified. For much of their length, the rivers flow through artificial banks and bunds; dredging has affected many stretches; and there are multiple dams (Moore *et al.* 2010). By 2002, there were already 18,000 dams and reservoirs, including 1,206 large dams, almost all of which had been built since 1945, with 747 of these within the river basins of the four major rivers and the nation's fifth largest river, the Seomjin (KWRC 2004). An additional 16 dams were built across the four main rivers as part of the Four Rivers project, even though both ROK (2009) and ROK (2014) acknowledge that the ecosystem of rivers and streams is "facing significant degradation resulting from...construction of dams, artificial rerouting...dredging...building of dykes and reservoirs."



Most rivers have been greatly modified, with artificial banks and dams. Here, the Han River at and below the Paldang Dam.

Despite the acknowledgement of likely negative impacts of river engineering projects on biodiversity (including several endemic fish species and other biota), both MOE (2012b) and ROK (2014) do not provide any formal assessment of the impacts on avian biodiversity of the Four Rivers project or of other major infrastructural developments on freshwater wetlands in recent years; nor do they provide any details on population declines of any bird species. However, bird species of Freshwater Habitat are better-surveyed in the ROK than those of any other main habitat type. There has been research focused on wintering cranes since at least the 1970s and 1980s (Won 1981, Meine & Archibald 1996); nationwide survey of Anatidae on major water-bodies since at least the mid-1990s (Kim *et al.* 1996); focused research on Oriental Stork *Ciconia boyciana* and its habitat requirements during this century (Kim 2009); and annual coverage of (almost) all of the main freshwater sites for waterbirds nationwide (MOE Census 1999-2014).

Approximately 101 regularly occurring species are ecologically dependent on Freshwater Wetland (including rice-fields and reedbeds), with a further 17 species using freshwater and intertidal areas regularly. Of this total, four are Globally Endangered and seven are Globally Vulnerable. Three species of this habitat type are Grey-Listed (Crested Ibis, Great Bustard and Crested Kingfisher); 26 are Red-Listed (comprised of 22 waterbird and four landbird species); and 25 are Amber-Listed (Tables 6 and 7).

The majority of Globally Threatened species (including the Globally Endangered / Red-Listed Red-Crowned Crane, the Globally Vulnerable / Red-Listed White-naped Crane and the Globally Endangered / Red-Listed Oriental Stork) are strongly associated with floodplain-replacement habitat. Only one Globally Endangered species is fully ecologically-dependent on rivers in the ROK: the Red-Listed Scaly-sided Merganser.

- Survey by Birds Korea in 2012 found 140-149 Scaly-sided Merganser nationwide, compared with 30 found by the MOE Census (2012). Birds Korea increased survey effort in 2014, surveying 330km of potentially-suitable river and stream contained within 16 different river systems. We found a total of 149 Scaly-sided Merganser on nine different rivers and streams, compared with 55 found by the MOE Census (2014). We counted the vast majority (90) along 30km of just one river. Although analysis is still ongoing, Scaly-sided Merganser appeared, as in previous surveys, to prefer medium or large-sized rivers. Approximately 63% were recorded on rivers 150-250m wide (Fig. 14), especially where there were



Stretch of river with Scaly-sided Mergansers during both the 2012 and 2014 Birds Korea surveys.

stretches of fast-flowing water for feeding that were close to undisturbed boulders or gravel- or sand-spits used for roosting. Most avoided stretches comprised largely of slow-moving, deep water and none were found on stretches with an urban matrix on either side of the river. Fewer birds were found on rivers that had been affected by construction (Moore & Kim 2014b). Although survey has been inadequate to detect its population trend in the ROK, this species is likely to have declined substantially during the present century.

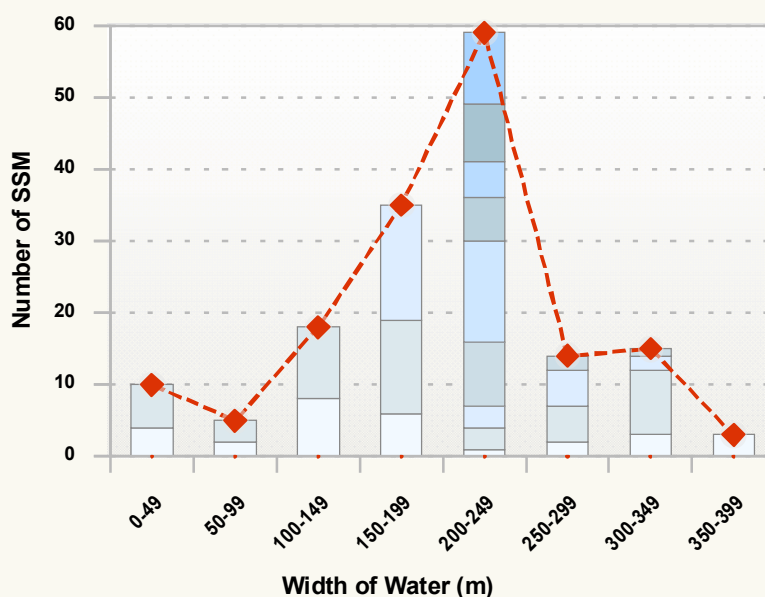


Fig. 14: Number of Scaly-sided Merganser (flocks and Individuals) recorded by the 2014 Survey, arranged by river width.

Survey effort by Birds Korea on single species and habitats, such as the Scaly-sided Merganser and rivers, suggests that the MOE Census is of limited value for assessing species that are more difficult to identify or that are easy to overlook during rapid survey-efforts.

Nonetheless, MOE Census data, published in annual reports, help to provide the most high-profile and up-to-date assessment of the abundance and distribution of most of the nation's wintering waterbirds. With some "cleaning" the data can be used to identify conservation priorities and to support the designation of internationally important freshwater wetlands based on Ramsar criteria. However, the annual reports themselves contain little analysis. Although referred to within some of the species descriptions, population trends revealed by the MOE Census data appear not to have been used in species selection or assessment during the development of the formal Red List of birds (NIBR 2011, 2012). Birds Korea therefore constructed a database of MOE Census data, allowing us to confirm that:

- At least 14 species of Anatidae that depend on Freshwater Habitat are in decline in the ROK. These include the Globally Vulnerable / Red-Listed Swan Goose *Anser cygnoides*, with a severe decline in the number of staging birds, and the 2,546 apparently recorded by the MOE Census in 1999 falling drastically to between only 3 and 88 in all subsequent years; the Red-Listed Mallard (see Fig. 4 on p. 17); and the Red-Listed Mandarin Duck.
- The **Mandarin Duck** *Aix galericulata* is assessed as Globally of Least Concern (BirdLife International 2014a) and Nationally of Least Concern by NIBR (2011, 2012). This is even though Wetlands International (2014) assesses the Korean population as a discrete declining population of only 3,000-4,000 birds. The decline at the level of population suggested by Wetlands International (2014) and at the species-level by BirdLife International (2014a) is supported by MOE Census data



Red-listed Mandarin Duck *Aix galericulata*.

which show a decrease of >25% in mean counts between 2002-2004 and 2011-2013, especially at those sites counted in all years (Fig. 15). MOE Census counts in 1999 and 2000 (of 1,754 and 2,288 birds respectively) were also much higher than in most subsequent years. Moreover, the winter roost of 2,550 present at one site in Jeju in early 1999 (Oh & Chae 1999) is no longer extant. Peak numbers at this roost had fallen to 820 by 2000 / 2001 and total numbers on Jeju Island fell from 3,389 in 1999 / 2000 to 2,267 in 2000 / 2001 (Kim 2001). Less than 1,000 have been recorded in any year on Jeju Island in subsequent winters by the MOE Census (1999-2014).

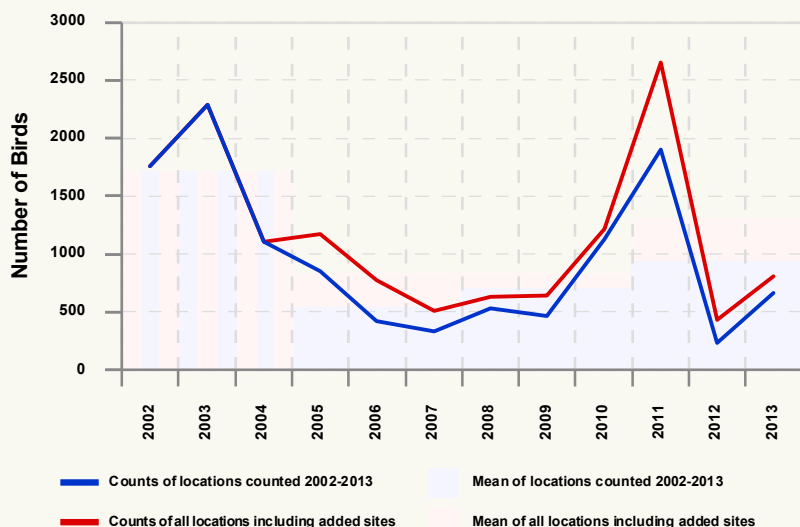


Fig. 15: Number of Mandarin Duck counted during the MOE Census (2002-2013).

- MOE Census data also confirm that large reservoirs constructed by damming the main river course tend to be poor for waterbirds, with low species diversity and low densities of waterbirds, including only 0.6 waterbirds / ha on Paldang Lake and 0.3 waterbirds / ha on Andong Lake. Waterbird densities tend to be much higher on more natural stretches of rivers, with 6.4 waterbirds / ha on one stretch of the Nakdong River (in Moores *et al.* 2010, based on MOE Census 2008 data).
- MOE Census data provide strong evidence too that the Four Rivers project (2009-2011) caused large-scale declines in waterbirds at the site-level. The Gumi-Haepyeong stretch of the Nakdong River was internationally important for staging Globally Vulnerable / Red-Listed Hooded Crane and in some years wintering waterbirds before Four Rivers' construction. It supported a mean of 14,133 birds during the three years pre-construction (2006-2008); a mean of 6,547 birds between 2009 and 2011; and a mean of 6,543 birds in the three years post-construction (2012-2014). The degradation of the site caused a decline of >50% in birds supported by the site with no evidence to date of recovery post-construction.
- Furthermore, MOE Census data provide strong evidence that the Four Rivers project caused large-scale declines in waterbirds at the national (and likely population) level. Nationwide, there was a peak of almost 1.7 million Anatidae in 2009, most dependent on freshwater habitats, falling to <800,000 in 2012 and c.865,000 in 2014. The total number of waterbirds wintering in the ROK therefore decreased rapidly coincident with the Four Rivers project, with these declines

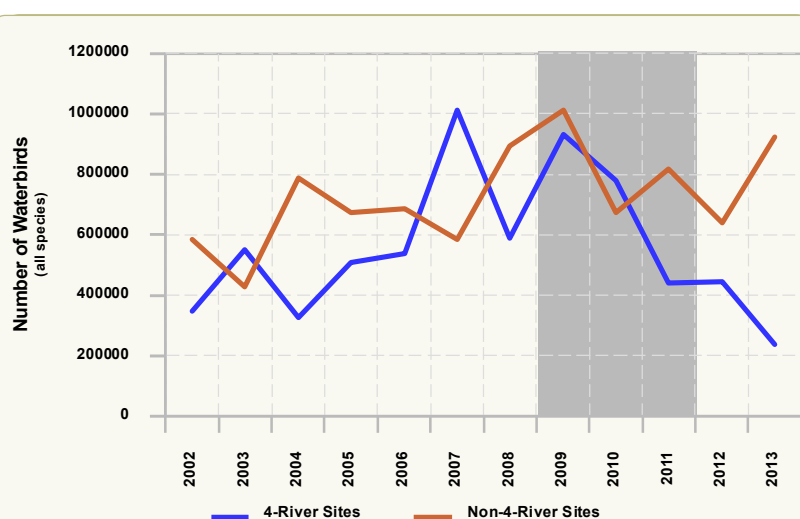


Fig. 16: Counts are from the MOE Census (2002-2013). The blue line shows annual counts of waterbirds at the 48 MOE Census sites considered likely to be most affected between 2009 and 2011 by the 4-Rivers Project (sites listed on pp. 16-17 of Moores *et al.* 2010). Brown line shows annual counts of waterbirds at the remaining 149 sites, likely unaffected by the 4-Rivers Project.

found across a range of species. Of particular note, these declines did not take place at a similar rate at all sites covered by the MOE Census. Rather, there has been a severe decline in the group of 48 sites predicted by Moores *et al.* (2010) to be most likely affected by Four Rivers construction and a much more modest decrease at the remaining sites as a group (Fig. 16).

- In 2014, 21 species of freshwater waterbird were recorded by the MOE Census in numbers nationwide that exceed the 1% of population given in Wetlands International (2014). These are listed in order of national abundance in Table 5.

Table 5: Species of waterbird that are most-dependent on Freshwater Wetland habitat in the ROK, in which >1% of their relevant population was recorded during the MOE Census (2014), listed in order of abundance.

| Species | GCS | List | Total Number counted (MOE Census 2014) | 1% Criterion (WI 2014) | % of Population in ROK (2014) |
|------------------------------------|-----|-------|----------------------------------------|------------------------|-------------------------------|
| Baikal Teal | LC | Red | 365,461 | 7,100 | >90% ¹⁾ |
| Mallard | LC | Red | 154,920 | 15,000 | 11.0 % |
| Greater White-fronted Goose | LC | Amber | 85,594 | 840 | >100% |
| "Bean Goose" ²⁾ | LC | Amber | 73,081 | 1,200 | 61.0 % |
| Eastern Spot-billed Duck | LC | Amber | 67,730 | 11,300 | 6.0 % |
| Common Pochard | LC | Amber | 23,621 | 3,000 | 8.0 % |
| Eurasian Teal | LC | Green | 14,234 | 7,700 | 2.0 % |
| Common Merganser | LC | Green | 10,901 | 710 | 15.0 % |
| Great Crested Grebe | LC | Green | 10,275 | 350 | 29.0 % |
| Eurasian Wigeon | LC | Amber | 8,399 | 7,100 | 1.0 % |
| Northern Pintail | LC | Red | 7,477 | 2,400 | 3.0 % |
| Tufted Duck | LC | Green | 7,264 | 2,400 | 3.0 % |
| Great Cormorant | LC | Green | 6,115 | 1,000 | 6.0 % |
| Whooper Swan | LC | Green | 5,857 | 600 | 10.0 % |
| Falcated Duck | NT | Amber | 4,317 | 830 | 5.0 % |
| White-naped Crane | VU | Red | 2,645 | 45 | 59.0 % |
| Ruddy Shelduck | LC | Red | 2,120 | 710 | 3.0 % |
| Mandarin Duck | LC | Red | 1,278 | 35 | 36.0 % |
| Red-Crowned Crane | EN | Red | 966 | 10 | 96.0 % |
| Hooded Crane | VU | Red | 925 | 110 | 9.0 % |

Counts are from Table 2, p. 219 of MOE Census (2014). Percentage Criterion is from Wetlands International (2014) and relates only to the population relevant to Korea. For the ROK, % figure is either rounded-up or rounded-down.

¹⁾ In Baikal Teal, the decline since 2009 has not yet been incorporated by Wetlands International (2014).

²⁾ "Bean Goose" is not separated at the species-level by the MOE Census and the % criterion was based on a sum of relevant mainland East Asian populations of *middendorffii* and *serrirostris*.

- Despite massive declines in waterbirds since 2009, five freshwater wetlands surveyed during the MOE Census in 2014 still supported concentrations of more than 20,000 waterbirds; and at least 27 count sites supported 1% or more of one or more populations of waterbirds. Based on MOE Census data, most of these sites have supported similar or larger numbers of waterbirds in previous winters. They therefore meet criteria identifying them as internationally important in accordance with the Ramsar Convention. However, only one of these sites (one of the three small lakes at Upo) is designated as a Ramsar site.

Table 6: Grey- and Red-Listed Species of Freshwater Wetland.

| Species | Scientific name | Rationale (see p.16, 19) | Trend Historical | Trend Recent | GCS | NCS |
|----------------------------|-------------------------------|-----------------------------|---------------------|-----------------|-----|-----|
| Crested Ibis | <i>Nipponia nippon</i> | GCS | DEC | NA | EN | RE |
| Great Bustard | <i>Otis tarda</i> | GCS, TNS | DEC | NA | VU | EN |
| Crested Kingfisher | <i>Megaceryle lugubris</i> | NRO | DEC | NA | LC | NO |
| Swan Goose | <i>Anser cygnoides</i> | GCS, NCS, NBS | DEC | DEC | VU | EN |
| Lesser White-fronted Goose | <i>Anser erythropus</i> | GCS, NCS | UNK | UNK | VU | VU |
| Mute Swan | <i>Cygnus olor</i> | TNS, NBS | DEC | DEC | LC | EN |
| Tundra Swan | <i>Cygnus columbianus</i> | NBS | DEC | DEC | LC | VU |
| Ruddy Shelduck | <i>Tadoma ferruginea</i> | NBS | DEC | DEC | LC | NO |
| Mandarin Duck | <i>Aix galericulata</i> | GFI, NBS | DEC | DEC | LC | LC |
| Mallard | <i>Anas platyrhynchos</i> | NBS | INC | DEC | LC | NO |
| Northern Pintail | <i>Anas acuta</i> | NBS | UNK | DEC | LC | NO |
| Baikal Teal | <i>Anas formosa</i> | GFI | DEC | UNK | LC | LC |
| Scaly-sided Merganser | <i>Mergus squamatus</i> | GCS, TNS | UNK | UNK | EN | EN |
| Black Stork | <i>Ciconia nigra</i> | TNS | STA | UNK | LC | EN |
| Oriental Stork | <i>Ciconia boyciana</i> | GCS, TNS, HDS, NBS | DEC | DEC | EN | EN |
| Greater Spotted Eagle | <i>Clanga clanga</i> | GCS | UNK | UNK | VU | VU |
| Eastern Imperial Eagle | <i>Aquila heliaca</i> | GCS | UNK | UNK | VU | VU |
| Steller's Sea Eagle | <i>Haliaeetus pelagicus</i> | GCS, TNS | DEC | UNK | VU | EN |
| Swinhoe's Rail | <i>Coturnicops exquisitus</i> | GCS, HDS | DEC | UNK | VU | NO |
| Watercock | <i>Gallicrex cinerea</i> | BDS | STA | DEC | LC | VU |
| White-naped Crane | <i>Grus vipio</i> | GCS, TNS | DEC | INC | VU | EN |
| Red-crowned Crane | <i>Grus japonensis</i> | GCS, TNS | DEC | INC | EN | EN |
| Hooded Crane | <i>Grus monacha</i> | GCS | DEC | INC | VU | VU |
| Black-tailed Godwit | <i>Limosa limosa</i> | NBS | UNK | DEC | NT | NO |
| Yellow-breasted Bunting | <i>Emberiza aureola</i> | GCS, NBS | DEC | DEC | EN | VU |



Table 7: Amber-Listed Species of Freshwater Wetland.

| Species | Scientific name | Rationale (see p.16, 19) | Trend Historical | Trend Recent | GCS | NCS |
|-----------------------------|------------------------------|-----------------------------|---------------------|-----------------|-----|-----|
| Taiga Bean Goose | <i>Anser fabalis</i> | RCP | DEC | UNK | NR | LC |
| Tundra Bean Goose | <i>Anser serrirostris</i> | RCP | DEC | INC | NR | NO |
| Greater White-fronted Goose | <i>Anser albifrons</i> | LCN | DEC | INC | LC | NO |
| Falcated Duck | <i>Anas falcata</i> | PCS | STA | DEC | NT | LC |
| Eurasian Wigeon | <i>Anas penelope</i> | NBM | STA | DEC | LC | NO |
| Eastern Spot-billed Duck | <i>Anas zonorhyncha</i> | BDM, NBM | INC | DEC | LC | NO |
| Common Pochard | <i>Aythya ferina</i> | NBM | INC | DEC | LC | NO |
| Common Goldeneye | <i>Bucephala clangula</i> | HDR | UNK | DEC | LC | NO |
| Eurasian Spoonbill | <i>Platalea leucorodia</i> | NCS, NBM | UNK | DEC | LC | VU |
| Eurasian Bittern | <i>Botaurus stellaris</i> | NCS, NBM | STA | DEC | LC | NT |
| Von Schrenck's Bittern | <i>Ixobrychus eurhythmus</i> | NCS, BDM | UNK | DEC | LC | VU |
| Grey Heron | <i>Ardea cinerea</i> | HDR | DEC | UNK | LC | NO |
| Purple Heron | <i>Ardea purpurea</i> | NBM | INC | DEC | LC | NO |
| Great Egret | <i>Ardea alba</i> | HDR | DEC | UNK | LC | NO |
| Western Osprey | <i>Pandion haliaetus</i> | NCS | STA | INC | LC | VU |
| White-tailed Eagle | <i>Haliaeetus albicilla</i> | NCS, BDM | UNK | INC | LC | VU |
| Ruddy-breasted Crake | <i>Porzana fusca</i> | BDM | INC | DEC | LC | LC |
| Band-bellied Crake | <i>Porzana paykullii</i> | PCS, HDR | DEC | UNK | NT | NO |
| Long-billed Plover | <i>Charadrius placidus</i> | NCS | DEC | DEC | LC | VU |
| Solitary Snipe | <i>Gallinago solitaria</i> | NBM | UNK | DEC | LC | NO |
| Spotted Redshank | <i>Tringa erythropus</i> | HDR, NBM | DEC | DEC | LC | NO |
| Sharp-tailed Sandpiper | <i>Calidris acuminata</i> | NBM | DEC | DEC | LC | NO |
| Daurian Jackdaw | <i>Coloeus dauuricus</i> | NBM | DEC | DEC | LC | NO |
| Chestnut-eared Bunting | <i>Emberiza fucata</i> | BDM | DEC | DEC | LC | LC |
| Ochre-rumped Bunting | <i>Emberiza yessoensis</i> | PCS, NCS | STA | UNK | NT | VU |



4. Intertidal Wetland



Red-listed **Spoon-billed Sandpiper** *Eurynorhynchus pygmeus*.

Intertidal Wetland represents little more than 1% of the ROK's land area and yet it supports 30% of the species Red-Listed by Birds Korea.

Along the west coast of the ROK, tidal-range reaches its highest in the northwest, with spring tides peaking at >9m in Incheon. Tidal-range steadily decreases southward, with >4m tidal-range in the southwest near Mokpo, reducing further still along the south coast to reach only ~1.5m in the Nakdong Estuary in the southeast. Tides along the east coast are of <1m.

Historically, even though accretion rates are very slow, the ROK had an estimated 460,000ha of intertidal wetland at lowest tide (Birds Korea 2010). The vast majority was tidal-flat as now, comprised almost entirely of extensive shallow-sloping and unvegetated sand, sand-mud, and mud-silt flats, with salt-marsh grading into reedbed only in highest tidal-flat areas. Because of the shallowness of the Yellow Sea and the large tidal-range, west coast tidal-flats extended seaward for several kilometers in many areas, with complex tidal-flats extending up to 20km at lowest tide out from the inner Dongjin and Mangyeung estuaries (together, known as "Saemangeum"). Along the indented south coast, tidal-flats instead formed in the inner parts of bays.



Historically, tidal-flats lined much of the west and south coasts.



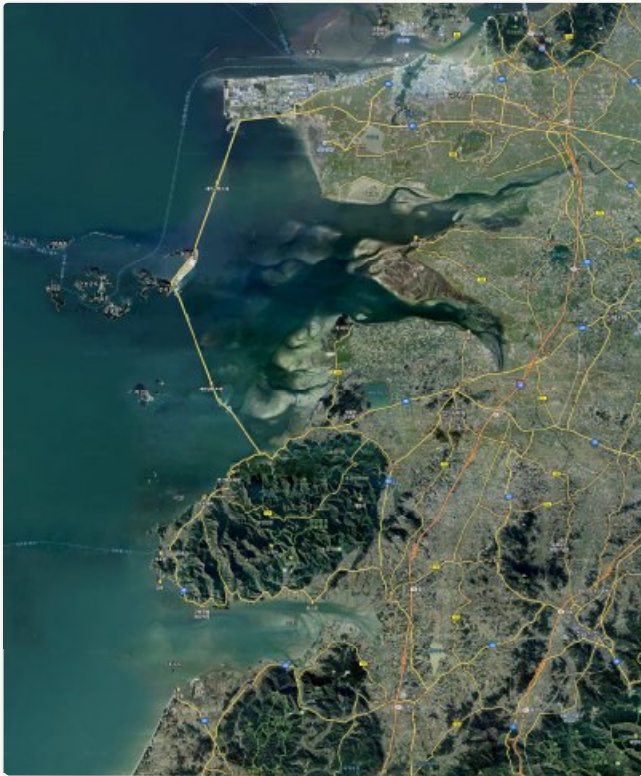
Tidal-flats have long supported both human and bird communities.

Reclamation (conversion of natural wetland into land and artificial wetland by mechanical means) and impoundment (construction of seawalls and sluices to restrict tidal-flow) have substantially reduced the historical area of tidal-flat.

Reclamation in Korea dates back to the 13th Century (Long *et al.* 1988), with an increase in reclamation projects from the 1920s (Koh 1999). By 1964, c.390,500ha of tidal-flat remained (Kim 2010). The rate of reclamation then increased rapidly, and in the early 1980s, a national master-plan (1984-2001) identified 66.5% of the remaining 630,000ha of "coastal wetlands along the west and south coasts" of the ROK as fit for reclamation by 2001 (NEDECO 1985, in Long *et al.* 1988). These 420,000ha of "coastal wetlands" targeted for reclamation were comprised of both tidal-flats (c.320,000-340,000ha) and adjacent shallow sea areas.

Although a few reclamation projects were suspended and a very few cancelled (especially in the late 1990s) most were completed, transforming much of the west and south coast. During the 1990s and 2000s, many of the ROK's internationally important tidal-flats have been partly- or fully-reclaimed, including Yeongjong (the site of the Incheon International airport); Song Do (present home of the East Asian-Australasian Flyway Partnership Secretariat); Asan Bay (reclaimed in a series of projects, many of which are still ongoing); and Namyang Bay and Saemangeum (with seawall closure at both sites in 2006).

Even after the reclamation of many of the nation's most extensive and bio-diverse tidal-flats during the 2000s, ROK (2009), MOE (2012b) and several other publications (including ROK 2014) suggested that almost 250,000ha of tidal-flat (translated interchangeably in various reports as "coastal wetlands" or "mud-flats" or "wetlands") were still extant in the ROK.



The Saemangeum reclamation. Following seawall closure in 2006, there have been massive declines in shorebirds and in the once-thriving fishing and shell-fishing industry. In 2014, most of the area remains desert-like. Opening of sluice gates now could restore some of this system's degraded intertidal wetland.

In 2010, Birds Korea therefore conducted independent analysis of remaining tidal-flat area. We found between 105,000ha and 112,000ha of tidal-flat nationwide (Moore's 2012). This figure corresponds well with expert predictions made in the early 2000s (included those cited in Moore's 2006), which were based on the known area of remaining tidal-flat and the area that was to be affected by ongoing reclamation projects (See Birds Korea 2010 and Moore's 2012 for a detailed explanation of definitions, methods and results).

Subsequent research at the University of Queensland (Australia), based on analysis of Landsat imagery across much of East Asia, found a similarly high rate of loss in the ROK (MacKinnon *et al.* 2012) and a similarly small remaining area of tidal-flat. The area of "wetland" from MOE (2012a) used in Figure 1 (a) on page 15 of ROK (2014) is 1.13% of national area (approximately 113,000ha). This corresponds remarkably well with our 2010 estimate of tidal-flat area.

More than 75% of historical national tidal-flat area has now been lost to reclamation (Birds Korea 2010, Moore's 2012). More than 60% of this loss has taken place in only the past three decades (Moore's 2012, MacKinnon *et al.* 2012).

Ramsar Resolution VII.21 called for the modification of policies on tidal-flats; and paragraph 22 of Ramsar Resolution X.22 included a formal commitment by the ROK to permit no more large-scale reclamation. Since 2010, Aichi Target 5 has also called on contracting parties to at least halve by 2020 the rate of loss of all natural habitats, and where feasible to bring the rate of loss close to zero; and to significantly reduce the degradation and fragmentation of remaining areas.

Nonetheless, large-scale reclamation is still ongoing in the ROK in 2014. Internationally important wetlands are being reclaimed at Song Do in Incheon; and new areas are being reclaimed on Yeongjong, in the area of the proposed Incheon Tidal Power Station, within a core feeding area of the Globally Endangered / Red-Listed Black-faced Spoonbill. Both reclamations are visible from main roads connecting the international airport to the mainland.

Reclamation is also ongoing at the nationally important wetland in Mokpo, and as reclamation can take several decades to convert tidal-flats into dry land, construction of inner dykes and infrastructure is still ongoing at Saemangeum, Namyang Bay and several other internationally-important wetlands, leading directly to the degradation and loss of tens of thousands of hectares of former tidal-flat.

Since 2010, formal proposals include the impoundment of almost 30,000ha of the nation's remaining tidal-flats for tidal power plants in Incheon (Birds Korea 2010, CDM 2011). These proposals appear not to have been fully or publicly cancelled. There are also well-advanced plans to impound c. 7,000ha of tidal-flat in Garolim Bay, also for tidal power production (Shin & Kim 2012). And there are calls once more for reclamation of parts of the Geum Estuary (now the nation's most important shorebird area) for the construction of an industrial area.

If all such proposals proceed, this would lead to the loss or degradation of >30% of remaining tidal-flat area in only a decade. This would be a substantial *acceleration* in the rate of loss of natural tidal-flat area since parties agreed to the Aichi Biodiversity Targets in 2010.

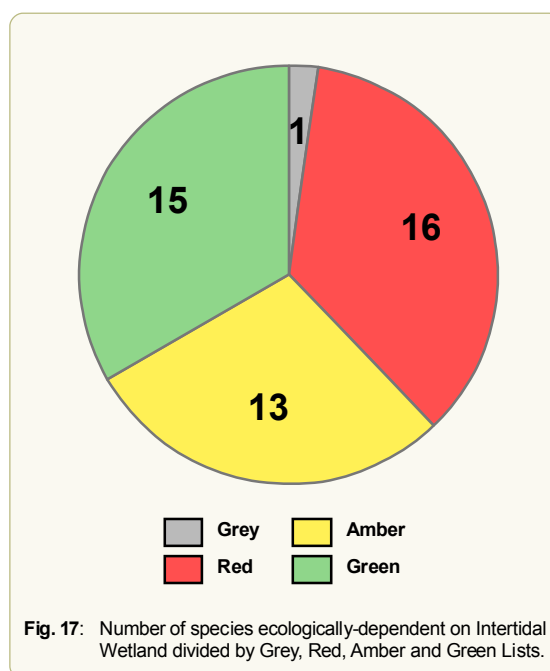
As noted in a situational analysis report for the IUCN, throughout the East Asian-Australasian Flyway and especially here in the Yellow Sea, tidal-flat loss and degradation has already meant that "Fisheries and vital ecological services are collapsing and ecological disasters increasing, with concomitant implications for human livelihoods. Observed rates of decline of waterbird species of 5-9% per year (and up to 26% per year for Critically Endangered Spoon-billed Sandpiper *Eurynorynchus pygmeus*) are among the highest of any ecological system on the planet" (MacKinnon *et al.* 2012).

Tidal-flats in their natural state are vital to fisheries and fishing communities, to several endemic biota, and to the conservation of avian biodiversity in the ROK.

Twenty-seven of the ROK's regularly occurring species are ecologically dependent on Intertidal Wetland, including the Red-Listed Spoon-billed Sandpiper (the nation's only regularly occurring Critically Endangered bird species) and seven other Globally Threatened species. An additional 17 species depend ecologically on both Intertidal and Freshwater Wetland. In total, 16 of these species are Red-Listed, 13 are Amber-Listed, and only 15 are Green-Listed (in several cases because data are insufficient either within the ROK or regionally to trigger Red- or Amber-Listing at this time). One species, the Crested Shelduck, was probably ecologically dependent on estuarine habitats in winter, and is Grey-Listed.

Intertidal Wetland is the only one of the five major habitat types in the ROK supporting more species of Highest and High Conservation Concern (29) than species of Lower Conservation Concern (15), identifying the habitat type itself as a major conservation priority (Fig. 17).

All species that depend ecologically on Intertidal Wetland in the ROK are migratory, and research on birds of intertidal wetland in the ROK has a short history (Moore 2006, 2012). Much of the coast had access restrictions through to the end of the 1980s, and the first major shorebird research initiative was only undertaken in 1988; the first national population estimates of shorebirds were made only in the early 2000s (Barter 2002; Yi 2003); and it was only in the late 2000s that research confirmed that three-quarters of the world's Globally Endangered Black-faced Spoonbill were breeding in the ROK (Lee Ki Sup in Birds Korea 2010).



In addition to breeding Black-faced Spoonbill, Globally Vulnerable / Red-Listed Chinese Egret *Egretta eulophotes* and Globally Vulnerable / Red-Listed Saunders's Gull *Chroicocephalus saundersi*, the ROK also supports 70% of the non-breeding population of the distinctive Amber-Listed Far Eastern Oystercatcher *Haematopus (ostralegus) osculans* (Conklin *et al.* 2014), and a substantial proportion of the Flyway's long-range migrant shorebird population.

There is a paucity of count data from the 1960s to the late 1980s with which to identify historical population trends in shorebirds at the national level. This was a period in which at least 70,000ha of the ROK's tidal-flats were reclaimed and several estuarine barrages were constructed. There are also only limited count data from between 1988 and 1998, a period in which a further 80,000ha of tidal-flat were destroyed (Moores 2012). It seems probable that reclamation on this scale would have caused declines in some shorebird species. In September 1970, pioneering shorebird survey in the Nakdong Estuary found "several hundred" Spoon-billed Sandpiper (Gore & Won 1971). Following construction of the Nakdong Estuary barrage in the 1980s, there have been no comparable counts there of Spoon-billed Sandpiper, with only 1-10 there in any subsequent year, including three in September 2010 (KSN 2011).

Following an increase of survey effort in the mid-late 1990s, Yi (2003), a senior shorebird researcher in the NIER, built upon counts already published by Barter (2002) to provide the first national shorebird population estimates, broken down by site and by species. These informed estimates provide an important baseline against which to measure subsequent changes in population and rates of decline (or increase).

Yi (2003) estimated that in the period 1999-2001 a total of 635,000 shorebirds were staging during northward migration in the ROK, with 535,000 of these in six main areas along the west coast: Ganghwa Island, Yeongjong Island, Namyang Bay, Asan Bay, the Geum Estuary (including Yubu Island) and Saemangeum. During southward migration, the same sites held 388,000 shorebirds, out of a total of 443,000 shorebirds nationwide. This represented 12.7% and 8.7% of the estimated total number of long-range migrant shorebirds on the East Asian-Australasian Flyway (EAAF). Most numerous species included >248,000 Great Knot, 213,000 Dunlin *Calidris alpina* and 39,000 Bar-tailed Godwit *Limosa lapponica* during northward migration; and 108,000 Dunlin, 102,000 Great Knot and >65,000 Kentish Plover *Charadrius alexandrinus* during southward migration.

Shorebird survey conducted with a consistent methodology during the peak of northward migration in 1998 and 2008 covered the key shorebird sites surveyed in 1988 by Long *et al.* (1988), the same six main areas surveyed by Yi (2003), and several additional sites that were also found to be nationally and internationally important for shorebirds (see Fig. 18).

Survey by the Korea Shorebird Network over the peak of southward migration in 2010 also covered all of the same sites (KSN 2011).

Shorebird Sites, May 2008

1. Ganghwa Island
2. Yeongjong Island
3. Song Do
4. Namyang Bay & Teibu
5. Honwon Ri
6. Asan Bay
7. Cheonsu Bay and Rice-fields
8. Geum Estuary
9. Saemangeum
10. Gomso Bay
11. Baeksu
12. Hampyeong Bay & Meian Muan
13. Aphae Island
14. Mokpo Wetland
15. Haenam Hwangsan
16. Suncheon Bay
17. Nakdong Estuary

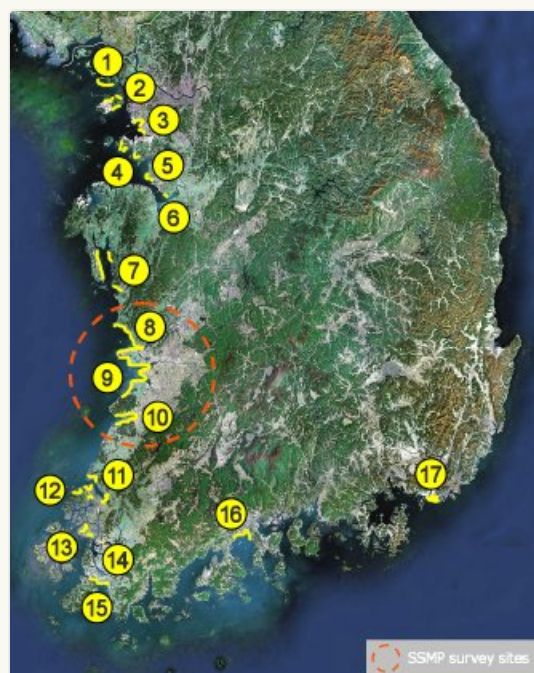


Fig. 18: Location of shorebird sites counted during the national shorebird survey in 2008 (Birds Korea 2010, Moores 2012).

A comparison of counts and estimates in Long *et al.* (1988), Moores (1999), Yi (2003) and KSN (2010) suggests a moderate decline in shorebird numbers between 1988 and 1998 (of c. 20% at selected sites: Moores 2012), and a severe decline between 2000 and 2010. Although different count methods were used by different survey teams, later counts benefited from improved knowledge pre-survey of shorebird sites, and were able to access shorebird roosts by boat.

Available data, while thin, suggest a decline in the total number of shorebirds in tidal-flat areas of the ROK of c.50% on northward migration and of c.75% on southward migration during the 2000s (Tables 8 and 9).

Although comparison of data generated by different methods need to be treated with great caution, it is notable that the estimated severe rate of decline over the decade indicated in Tables 8 and 9 (right) falls within the range of shorebird declines of 5-9% per year at the Flyway and population level cited above by MacKinnon *et al.* (2012).

The Saemangeum Shorebird Monitoring Program (SSMP) identified the Saemangeum reclamation and other reclamation projects as the main driver of decline of shorebirds staging in the ROK in the 2000s. The SSMP was conducted jointly by Birds Korea and the Australasian Wader Studies Group during northward migration in 2006, 2007 and 2008, covering Saemangeum and the adjacent Geum Estuary and Gomso Bay ("The SSMP Study Region"). It was designed in conjunction with the national shorebird survey conducted in 2008 (outlined above) and ongoing shorebird monitoring programs in Australia. Detailed accounts of methods, analysis and results can be found in Rogers *et al.* (2006), Moores *et al.* (2008) and Moores (2012).

Table 8: Estimates of the number of shorebirds staging in Intertidal Wetland in the ROK between 1999 and 2010.

| Period | Northward Migration | Southward Migration | Source |
|-----------|-----------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1999-2003 | 635,000 ¹⁾ | 443,000 ¹⁾ | ¹⁾ Yi (2003), based on incomplete survey of 20 main shorebird sites |
| Mid-2000s | 450,000 ²⁾ | 377,000 ²⁾ | ²⁾ Moores (2006), based on rapid survey of same sites |
| 2008-2010 | 300,000 ³⁾ | 107,000 ⁴⁾ | ³⁾ Moores <i>et al.</i> (2008), Moores (2012), based largely on one-day survey of 17 sites ⁴⁾ KSN (2011), based on one-day survey of the same sites, plus an additional nine minor shorebird sites |

Table 9: Fourteen Intertidal Wetland sites with the highest numbers of shorebirds in May 2008 (Moores 2012), their threat status, and estimates of shorebirds supported by the same sites during northward migration by Yi (2003).

| Shorebird Site | Status / Threat | Estimate 1997-2001 | 2008 |
|-----------------------------|-----------------|--------------------|----------------|
| Geum Estuary | 1,2,3,4,7 | 66,700 | 97,670 |
| Saemangeum Estuarine System | 6 | 316,000 | 39,557 |
| Namyang Bay | 5 | 74,000 | 33,389 |
| Song Do | 1,2,3,5 | N/A | 28,028 |
| Yeongjong Is. | 1,2,3,5 | 46,000 | 24,169 |
| Ganghwa Is. | 1,2,3,4,7 | 29,700 | 11,894 |
| Asan Bay | 1,2,5,7 | 45,000 | 9,570 |
| Aphae Island | 2,4 | N/A | 8,835 |
| Hampyeong & Muan | 2,4 | N/A | 7,279 |
| Suncheon Bay | 1,2,3 | 9,300 | 6,201 |
| Cheonsu Bay | 2,4 | N/A | 5,089 |
| Teibu | 2,3,4 | 7,000 | 2,798 |
| Nakdong Estuary | 1,2,3,5,7 | N/A | 2,525 |
| Baeksu | 3,4 | N/A | 2,249 |
| Total | | 593,700 | 279,253 |

Table adapted from Moores (2006) and Moores (2012).

Note: • In Status / Threat 1= Urbanization; 2=Degradation; 3=Over-exploitation / Disturbance; 4=Already part-reclaimed; 5=Major reclamation or development ongoing; 6=Complete reclamation ongoing; 7=Threatened with further large-scale reclamation or impoundment.
• In Estimate 1997/2001, estimates are from Yi (2003) and N/A denotes that estimates are not available for these sites.

Key findings of the SSMP included:

- The more abundant species staged in the SSMP Study Region for several weeks: it was therefore the launching point for their final migration north to the breeding grounds.
- A decline of almost 130,000 shorebirds within the Saemangeum estuarine system, from 180,000 in 2006 to only 51,560 in 2008.
- A decline of 100,000 shorebirds within the SSMP Study Region as a whole. Based on the sum of peak counts we recorded almost 264,000 shorebirds in 2006 and 164,261 in 2008.
- There were declines of >10% in twelve species in the SSMP Study Region between 2006 and 2008. The largest declines were shown by Great Knot (80%), Black-tailed Godwit *Limosa limosa* (76%), Sharp-tailed Sandpiper *Calidris acuminata* (74%) and Spoon-billed Sandpiper (69%).
- The national survey in May 2008 failed to find evidence of the >90,000 Great Knot “lost” to the SSMP Study Region in 2006 and 2007.
- Research in Australia (yet to be published in full) also indicates a decline in numbers and adult survival of Great Knot after seawall closure at Saemangeum in 2006.
- While there was some evidence of displacement of a minority of shorebirds to adjacent wetlands in 2007 and 2008, there was no evidence to suggest that these two wetlands will support increased numbers of shorebirds long-term. Instead, follow-up survey work by Birds Korea at Saemangeum



SSMP survey work on tidal-flats in the outer part of the Saemangeum estuarine system.

and the Geum Estuary between 2010 and 2013 confirms that further substantial declines in shorebirds have taken place (Birds Korea Archives).

Tidal-flat reclamation in the ROK (and China) is driving declines in shorebirds at the national level and along the EAAF. A 2014 review of shorebirds on the EAAF led by WWF Hong Kong states unambiguously that:

“The EAAF is the most species-rich of the world’s nine major flyways. Unfortunately, the EAAF also has the highest proportion of declining waterbird populations...the main driver of these declines is reduction of the extent and quality of the primary waterbird habitats: coastal and inland wetlands...Shorebirds are especially sensitive to habitat quality and habitat loss... Of 25 populations with known trends, 24 are declining... (however) for most populations (60%) the population trend is unknown...In 13 populations, more than 50% of individuals are thought to depend upon coastal habitats in the Yellow Sea” (Conklin *et al.* 2014).

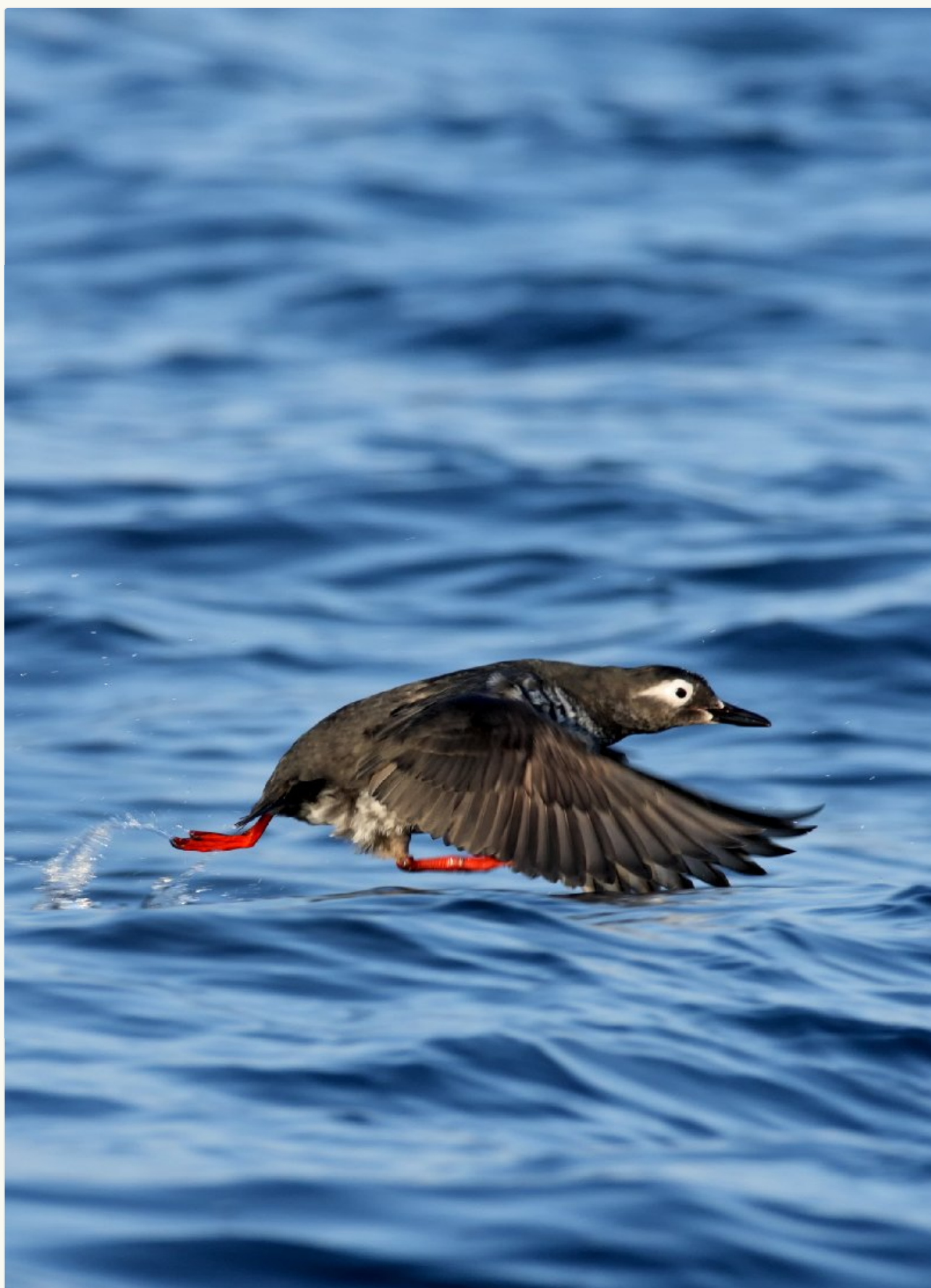
The same review assesses Amber-Listed Mongolian Plover *Charadrius mongolus* (both subspecies) as Regionally Endangered; Green-Listed Bar-tailed Godwit (both subspecies) as Regionally Vulnerable; Red-Listed Red Knot *Calidris canutus* (both subspecies) as Regionally Vulnerable; Green-Listed Whimbrel *Numenius phaeopus* and Grey-tailed Tattler *Tringa brevipes* as Regionally Near Threatened;

Table 10: Grey-, Red- and Amber-Listed Species of Intertidal Wetland.

| Species | Scientific name | Rationale (see p.16, 19) | Trend Historical | Trend Recent | GCS | NCS |
|---------------------------|-------------------------------------------|-----------------------------|---------------------|-----------------|------|-----|
| Crested Shelduck | <i>Tadorna cristata</i> | GCS | DEC | NA | CR | RE |
| Swan Goose | <i>Anser cygnoides</i> | GCS, NCS, NBS | DEC | DEC | VU | EN |
| Brant Goose | <i>Branta bernicla</i> | NCS, NBS | DEC | DEC | LC | VU |
| Oriental Stork | <i>Ciconia boyciana</i> | GCS, TNS, HDS, NBS | DEC | DEC | EN | EN |
| Black-faced Spoonbill | <i>Platalea minor</i> | GCS | DEC | INC | EN | VU |
| Chinese Egret | <i>Egretta eulophotes</i> | GCS, TNS, BDS | DEC | DEC | VU | EN |
| Red-crowned Crane | <i>Grus japonensis</i> | GCS, TNS | DEC | INC | EN | EN |
| Kentish Plover | <i>Charadrius alexandrinus</i> | NBS | UNK | DEC | LC | NO |
| Black-tailed Godwit | <i>Limosa limosa</i> | NBS | UNK | DEC | NT | NO |
| Far Eastern Curlew | <i>Numenius madagascariensis</i> | GCS | DEC | DEC | VU | VU |
| Nordmann's Greenshank | <i>Tringa guttifer</i> | GCS, TNS, NBS | UNK | DEC | EN | EN |
| Ruddy Turnstone | <i>Arenaria interpres</i> | NBS | DEC | DEC | LC | NO |
| Great Knot | <i>Calidris tenuirostris</i> | GCS, NBS | UNK | DEC | VU | NO |
| Red Knot | <i>Calidris canutus</i> | NBS | UNK | DEC | LC | NO |
| Spoon-billed Sandpiper | <i>Eurynorhynchus pygmeus</i> | GCS, TNS, NBS | DEC | DEC | CR | CR |
| Saunders's Gull | <i>Chroicocephalus saundersi</i> | GCS, TNS | UNK | STA | VU | EN |
| Relict Gull | <i>Ichthyaeetus relictus</i> | GCS, TNS, NBS | DEC | DEC | VU | EN |
| Falcated Duck | <i>Anas falcata</i> | PCS | STA | DEC | NT | LC |
| Eurasian Wigeon | <i>Anas penelope</i> | NBM | STA | DEC | LC | NO |
| Grey Heron | <i>Ardea cinerea</i> | HDR | DEC | UNK | LC | NO |
| Great Egret | <i>Ardea alba</i> | HDR | DEC | UNK | LC | NO |
| Western Osprey | <i>Pandion haliaetus</i> | NCS | STA | INC | LC | VU |
| Far Eastern Oystercatcher | • <i>Haematopus (ostralegus) osculans</i> | NCS | UNK | UNK | • LC | VU |
| Grey Plover | <i>Pluvialis squatarola</i> | NBM | DEC | DEC | LC | NO |
| Mongolian Plover | <i>Charadrius mongolus</i> | NBM | STA | DEC | LC | NO |
| Eurasian Curlew | <i>Numenius arquata</i> | PCS | DEC | INC | NT | NO |
| Spotted Redshank | <i>Tringa erythropus</i> | HDR, NBM | DEC | DEC | LC | NO |
| Red-necked Stint | <i>Calidris ruficollis</i> | NBM | UNK | DEC | LC | NO |
| Sharp-tailed Sandpiper | <i>Calidris acuminata</i> | NBM | DEC | DEC | LC | NO |
| Dunlin | <i>Calidris alpina</i> | NBM | INC | DEC | LC | NO |

Red-Listed Ruddy Turnstone *Arenaria interpres* as Regionally Near Threatened; and both Amber-Listed Far Eastern Oystercatcher and Grey Plover *Pluvialis squatarola* as Regionally Near Threatened. All these species are presently listed by BirdLife International (2014a) as Globally of Least Concern.

5. Marine



Green-listed **Spectacled Guillemot** *Cephus carbo*,

Marine Habitat has an area more than four times greater than all the other main bird habitat types combined. It is also the most poorly-surveyed of the five main bird habitats in the ROK, with many information gaps remaining, most especially on the distribution and abundance of seabirds-at-sea. Neither a major review of marine biodiversity by the national Ministry of Maritime Affairs and Fisheries (MOMAF 2006) nor a Yellow Sea review of biodiversity by UNDP-GEF (2007) contain any reference at all to seabirds.

In this report, Marine Habitat is used to describe inshore waters (<2km from shore) and open sea areas (>2km from shore) in all three seas: the Yellow (or West) Sea, with an average depth of 44-55m (Hong *et al.* 1998, Koh 1999), at its deepest reaching only c.100m near Gageo Island and c.120m near the volcanic Jeju Island in the far southwest (Moores 2012); the Korean Strait (or South Sea), at its narrowest only 200km wide between the southeast and northern Kyushu in Japan; and the much larger East Sea (known on some maps as the Sea of Japan), which has a mean depth of 1,350m (NOAA). Marine Habitat also includes small islands and islets less than 50ha in area; and rocky shores directly affected by wave action, both on the mainland and on islands.



Isolated islands in all three seas (including Chilbal Island in the West Sea, left and Dok Island in the East Sea, right) support important colonies of breeding seabirds.

There are 44,383,800ha of marine waters under the jurisdiction of the ROK (ROK 2014); 2,721 uninhabited islands with a mean area of 3ha, most of which are in the Yellow Sea (Kim *et al.* 2009a); and probably several hundred km of rocky shore, the preferred habitat of only two regularly occurring bird species in the ROK, the Green-Listed Pacific Reef Egret *Egretta sacra* and Blue Rock Thrush *Monticola solitarius*.

There is limited understanding of threats to Marine Habitat and its dependent biodiversity. However, all marine areas are exposed to land-based pollution, intensive fisheries and commercial shipping.

- MacKinnon *et al.* (2012) list a series of threats to biodiversity in marine waters in the Yellow Sea, many of which are threats to birdlife in all three seas, including damming of estuaries and reclamation; pollution from agricultural run-off; pollution from industrial sources; oil spills; plastic litter; tidal energy developments; overharvesting; and aquaculture and mariculture.
- UNDP-GEF (2007) reports that the Yellow Sea as a whole has suffered extensive environmental degradation, attributed largely to pollution and unsustainable use, to the extent that it is now in a phase of ecological regime shift, with giant jellyfish and widespread green algae blooms (Sun 2010).

Examples of direct threats to bird populations include:

- Pollution from chronic oil spills. In most winters oiled birds (especially loons, gulls, alcids and grebes) can be found along all three coasts. However, to date there is no agreed protocol or central database for recording observations of oiled birds, and inadequate facilities for dealing with larger oil spills (Birds Korea 2010).

- Industrial pollution, which is suspected of contributing to a severe decline between the 1970s and early 2000s in northern Alaska of Amber-Listed Red-throated Loon *Gavia stellata*. Satellite tracking confirms that many of the ROK's wintering Red-throated Loons breed on the Alaskan North Slope, while more southern breeders winter in North America. Contaminants studies reveal a striking relationship between migration pathways and the much higher exposure to polychlorinated biphenyls found in birds that winter in East Asia (Schmutz *et al.* 2009, Schmutz 2010).
- Alien invasive species. On several islands, rats (both *Rattus rattus* and *Rattus norvegicus*) and alien invasive plant species have been identified as causing mortality in nesting Green-Listed Streaked Shearwater *Calonectris leucomelas* and Globally Near Threatened / Amber-Listed Swinhoe's Storm Petrel (Lee & Yoo 2002, Lee *et al.* 2009, Lee 2010).
- Fishing practices. In addition to over-exploitation of some marine species, survey of 31 East Sea ports in Gangwon Province, between November 2008 and February 2009, found 962 Amber-Listed Ancient Murrelet *Synthliboramphus antiquus* drowned as by-catch (Park *et al.* 2009). This study however recorded only those birds that were brought ashore and could be found: it did not estimate the number discarded at sea. It is thought likely that gill-net fisheries and other fishing practices are the major cause of the recent moderate to severe decline of the wintering population of Ancient Murrelet in ROK waters.

Based on the limited research effort to date, approximately 55 regularly occurring species are assessed as being ecologically-dependent on Marine Habitat (including Red-Listed Brant Goose, Black-faced Spoonbill and Chinese Egret and Green-Listed Black-tailed Gull which are dependent on both marine and intertidal areas, with the latter two species nesting on islands and foraging on tidal-flats). This total is comprised of seven Red-Listed, 12 Amber-Listed and 36 Green-Listed species (Table 11). However, several rarely-recorded species (e.g. Red Phalarope *Phalaropus fulicarius*, Aleutian Tern *Onychoprion aleuticus*, South Polar Skua *Stercorarius maccormicki* and Least Auklet *Aethia pusilla*) would most likely prove regularly occurring, and even perhaps locally numerous, if survey effort in open sea areas was increased. Among these species, a recent rapid population decline in the North American population of Aleutian Tern might require the species to be listed as Globally Vulnerable in the near-future (BirdLife 2014c), and therefore Red-Listed in the ROK.

Only two species of Marine Habitat at present have their abundance assessed as "1" in the Birds Korea Checklist (i.e. with an estimated 100,000 or more individuals present annually): the Globally Near Threatened / Amber-Listed Swinhoe's Storm Petrel and the Green-Listed Black-tailed Gull. However, it seems highly probable too that at least Green-Listed Streaked Shearwater, Red-necked Phalarope *Phalaropus lobatus*, Vega Gull *Larus vegae* and Common Tern *Sterna hirundo* and Amber-Listed Ancient Murrelet would also regularly meet this threshold if survey effort was increased.



Black-tailed Gull *Larus crassirostris*.



Swinhoe's Storm Petrel *Oceanodroma monorhis*.

Much of the limited research (and conservation work) undertaken in Marine Habitat has to date been focused on islands used by breeding species. On present knowledge, the most widespread and likely numerous breeding species in this habitat is Black-tailed Gull, with colonies on islands in all three seas and an increasing breeding population estimated at <50,000 pairs in 2009 (Kwon 2009). Kwon (2009) provides further national estimates that include <8,000 pairs of Streaked Shearwater and <30,000 pairs of Swinhoe's Storm Petrel, though Lee (2009, 2010) instead estimates between 60,000 and 110,000 breeding pairs of Swinhoe's Storm Petrel, most in the southwest. Recent survey work has also confirmed the presence of several hundred pairs of breeding Globally Vulnerable / Red-Listed Crested Murrelet *Synthliboramphus wumizusume*, with breeding now apparently confirmed on at least four islands (Kwon 2009, Kim *et al.* 2012, Park *et al.* 2013).



Streaked Shearwater *Calonectris leucomelas*.

There is one other Globally Threatened island-nesting species: the Globally Vulnerable / Red-Listed Styan's Grasshopper Warbler. Like the Black-faced Spoonbill and Swinhoe's Storm Petrel, the Styan's Grasshopper Warbler also has the centre of its global breeding population in the ROK, with locally high densities found on islands with extensive stands of sasa-type bamboo interspersed with broad-leaved evergreen bushes and trees, especially near to streams (Birds Korea 2010). Styan's Grasshopper Warbler was found on 20 out of 177 islands surveyed in Shinan County in the south-west, with no survey yet conducted on the County's remaining >800 islands and islets (Shinan 2010). In the same county, survey by Birds Korea in 2010 found 41-42 territories on Hatei Island (Edelsten *et al.* 2013), many concentrated in <5ha of suitable habitat; and 15 territories on Gageo Island (Birds Korea 2010). Within the ROK, this species is also known to breed north to 36°N in the Yellow Sea; south to Mara Island off Jeju (at 33.11° N, 126.27° E), which held 11 pairs in 2008 (Kim *et al.* 2009b); and more locally, on islands east to at least the Nakdong Estuary in Busan (35.05° N, 128.93° E) (Birds Korea Archives).



Styan's Grasshopper Warbler *Locustella pleskei*.

Survey work of seabirds-at-sea has been even more limited in scope. Present knowledge of seabird-at-sea distribution is based largely on survey along three commercial ferry routes in the Yellow Sea (Birds Korea 2010, Moores 2012); one short transect counted annually in the East Sea since 2009 as part of the MOE Census; and opportunistic count efforts of seabirds from land or from boats in <10 areas nationwide (Birds Korea Archives).

Survey by Moores (2012) showed that all seabird species were at least partial migrants in the Yellow Sea, with the majority being complete migrants. This research and more opportunistic counts suggest that large concentrations of birds can occur in Korean marine waters, although the main areas used by foraging Swinhoe's Storm Petrel have yet to be found (Birds Korea 2010). In addition to the two marine IBA's already recognised by BirdLife (centred on breeding colonies, with proposals to extend the area to adjacent open sea areas: BirdLife International 2014d), four areas appear regularly to support large concentrations of birds.

These are:

- Open sea in Incheon, off Gangryeon County (DPR Korea), between Socheong and Daeyeonpyeong islands in the Yellow Sea, where high day-counts during 72 ferry journeys along a narrow transect have included 5,900 Black-legged Kittiwake *Rissa tridactyla*, 5,500 Black-tailed Gull, >1,600 Common Tern, >1,000 Streaked Shearwater, almost 300 Ancient Murrelet, three Near Threatened Yellow-billed Loon *Gavia adamsii* and single (apparently juvenile) Near Threatened Long-billed Murrelet *Brachyramphus perdix* (Moore's 2012);
- Inshore waters and open sea off Goseong County (Gangwon Province) in the East Sea, where high day-counts during opportunistic surveys from land and from boats (up to a maximum of 14km from shore) have included an estimated 25,000 (Birds Korea Archives) and a counted 15,513 Ancient Murrelet (MOE Census 2009), probably 2,000 Arctic Loon *Gavia arctica* and 105 Spectacled Guillemot *Cephus carbo* (Birds Korea Archives);
- Inshore waters and open sea off the Guryongpo Peninsula (Gyeongsangbuk Province) also in the East Sea, with high day-counts from land during southward migration of perhaps ~20,000 Streaked Shearwater, 4,000 Ancient Murrelet, 3,200 Pacific Loon *Gavia pacifica*, "several thousand" Pomarine Skua *Stercorarius pomarinus* and 1,500 Common Tern (Birds Korea Archives);
- Inshore waters and open sea off Busan, lying between the East Sea and the Korea Strait, with large numbers of birds recorded in certain weather conditions and during southward migration, including an estimated 20,000 Streaked Shearwater on one date in September 2011 (Birds Korea Archives).

Table 11: Red- and Amber-Listed Species of Marine Habitat.

| Species | Scientific name | Rationale (see p.16, 19) | Trend Historical | Trend Recent | GCS | NCS |
|------------------------|--------------------------------------|-----------------------------|---------------------|-----------------|-----|-----|
| Brant Goose | <i>Branta bernicla</i> | NCS, NBS | DEC | DEC | LC | VU |
| Long-tailed Duck | <i>Clangula hyemalis</i> | GCS, HDS | DEC | UNK | VU | NO |
| Black-necked Grebe | <i>Podiceps nigricollis</i> | HDS, NBS | UNK | DEC | LC | NO |
| Black-faced Spoonbill | <i>Platalea minor</i> | GCS | DEC | INC | EN | NO |
| Chinese Egret | <i>Egretta eulophotes</i> | GCS, TNS, BDS | DEC | DEC | VU | NO |
| Crested Murrelet | <i>Synthliboramphus wumizusume</i> | GCS, TNS | UNK | UNK | VU | EN |
| Greater Scaup | <i>Aythya marila</i> | NBM | INC | DEC | LC | NO |
| Harlequin Duck | <i>Histrionicus histrionicus</i> | NCS | DEC | UNK | LC | NT |
| White-winged Scoter | <i>Melanitta deglandi stejnegeri</i> | NBM | UNK | DEC | *LC | NO |
| American Scoter | <i>Melanitta americana</i> | PCS, NBM | UNK | DEC | NT | NO |
| Red-throated Loon | <i>Gavia stellata</i> | HDR | DEC | DEC | LC | NO |
| Yellow-billed Loon | <i>Gavia adamsii</i> | PCS | DEC | UNK | NT | NO |
| Swinhoe's Storm Petrel | <i>Oceanodroma monorhis</i> | PCS, RCP | UNK | UNK | NT | NO |
| Long-billed Murrelet | <i>Brachyramphus perdix</i> | PCS, NCS | UNK | UNK | NT | NT |
| Ancient Murrelet | <i>Synthliboramphus antiquus</i> | HDR, NBM, BDM | DEC | DEC | LC | NO |
| Peregrine Falcon | <i>Falco peregrinus</i> | NCS | STA | INC | LC | VU |

Part 4: The Conservation Response

1. Science and Policy

The tenth meeting of the Conference of the Parties to the CBD adopted Decision X/10 (2010) in which it was decided that the fifth national reports, due in 2014, should focus on the implementation of the 2011-2020 Strategic Plan and on progress achieved towards the Aichi Targets. *Status of Birds, 2014* is an NGO response to that decision and to the worsening biodiversity crisis. It expands on information presented in the fifth national report (ROK 2014) and aims to support the nation's decision-makers and other key stakeholders with detailed and best information on birds and their habitats, insights on the most relevant legislation, and a series of recommendations (see below). It is presented fully in the understanding that the challenge of meeting the Aichi Targets and other existing conservation obligations cannot be overestimated. The Ministry of Environment, the Korea National Park Service, conservation bodies within other ministries, and many NGOs and specialized institutions have already done much to try to improve conservation opportunities in the ROK and regionally, and have had some success. However, the pressures on biodiversity both within the ROK and the wider region continue to grow, and now only five years remain in which the nation is obligated to halve the rate of loss of natural habitats and to improve the status of a large number of threatened species.

Conservation works best when science and policy support and reinforce each other. Reviewing the specialist literature on birds, it is apparent that multiple information gaps remain and that some of the available information is inaccurate. Conservation scientists therefore have the increasingly urgent responsibility to build scientific consensus by sharing methodologies as well as results; and to communicate best information clearly and consistently to other stakeholders, including decision-makers.

This report therefore provides a methodology for assessing population trends in the nation's birds and for identifying some of the highest conservation priorities. It presents this information clearly, detailing changes in population in some of the nation's most familiar bird species, including Red-Listed Barn Swallow and Mandarin Duck, as well as in some species that are far less well-known. It also provides key information on main habitats and changes to them. It is presented throughout with key references (two-thirds of which were published in the last ten years), and it is informed by population estimates and global status assessments published online in 2014 by international organizational partners to the conservation conventions. Moreover, this version is published in English, to enable wider sharing of this information with participants to the twelfth meeting of Conference of the Parties to the CBD in October 2014, and at related meetings.

We believe that the science is clear: more species of bird are declining in the ROK than increasing; and the rate of habitat loss, especially of intertidal wetland, has not yet been reduced. Rather, if development projects continue as proposed, the rate of loss of natural intertidal wetland is predicted to increase between now and 2020.

Status of Birds, 2014 also provides strong evidence of the link between bird population trends and the area and quality of habitat. While the science can always be improved and refined, it is already sufficient for use by decision-makers. Two decades ago, the UN clarified that "In order to protect the environment, the precautionary approach shall be widely applied by States ...Where there are threats of serious or irreversible damage lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation" (UN 1992). And subsequently, the UN-led Millennium Development Goals called for an integration of "the principles of sustainable development into country policies and programmes" by 2015 (UN 2014). These principles include Principle 15, the precautionary principle.

It is important to recognize that wise policies initiated in the 1970s led to large-scale reforestation and afforestation in the ROK, and forest now supports the majority of the nation's abundant and increasing bird species. These policies also resulted in multiple other longer-term benefits to the nation. They reduced soil erosion; have helped improve air and water quality; are providing citizens with much-needed recreational space; and only in the past decade or so, the nation's forests have become widely-understood as playing an important role in ameliorating some of the effects of human-induced climate change.

In a similar way, flawed policies on wetlands over the past few decades mean that the majority of the nation's most-threatened and fastest-declining bird species are those which are dependent on intertidal and freshwater wetlands. Even during the past ten years, we have lost to reclamation several of the nation's most important sites for shorebirds, and many of the nation's rivers have been degraded by massive infrastructural development.

Data gathered by Birds Korea and by government researchers show that, as a result of the present development model, there have been severe declines in several shorebird species and in many other species of waterbird since 2000. Declines have been greatest at sites most affected by habitat loss and degradation. As the majority of the nation's species are migratory, these declines have not been confined to the ROK alone. Rather, the effects of reclamation in the ROK have already been felt the whole length of the East Asian-Australasian Flyway, from Alaska south to Australasia, with declines in species like the Critically Endangered / Red-Listed Spoon-billed Sandpiper, the Globally Vulnerable / Red-Listed Great Knot and the Amber-Listed Dunlin.

There is increasingly strong scientific consensus on the poor status of the region's birds. Target 7.B of the Millennium Development Goals, adopted by Contracting Parties to the CBD in 2002, called by 2010 for a "significant reduction in the rate of loss" of biodiversity (United Nations Statistics Division 2014). This was understood to represent "the first ever high level, measurable political commitment to biodiversity conservation" (Wetlands International 2010). By 2010, although there was some evidence of progress in North America and Europe, 62% of known waterbird populations in Asia were found to be decreasing or extinct and only 10% were increasing (Wetlands International 2010). By 2012, in East Asia in general and the Yellow Sea in particular, "Observed rates of decline of waterbird species of 5-9% per year (and up to 26% per year for Critically Endangered Spoon-billed Sandpiper *Eurynorynchus pygmeus*)" were considered to be "among the highest of any ecological system on the planet" (MacKinnon *et al.* 2012). And by 2014, in a review of the Flyway's shorebirds, "Of 25 populations with known trends, 24 are declining" (Conklin *et al.* 2014).

Although outside of the scope of this report, research by others in the ROK confirms, rather unsurprisingly, that there have also been declines in other river and tidal-flat species during the past decade; that there have been declines in fisheries; that water quality in some rivers and inshore areas has worsened; and that the economic well-being of wetland-dependent human communities has declined. With such high environmental, social and economic costs, there is scant evidence with which to defend assertions that tidal-flat reclamation or the Four Rivers project are examples of genuinely sustainable development as defined by the Millennium Development Goals.

The present conservation response is inadequate to meet the Aichi Targets. To improve the response, institutes and domestic NGOs need to be properly supported to involve in and help lead conservation initiatives. A stronger bridge also needs to be built between the domestic science on biodiversity conservation and policy and legislation. Fortunately, there is already general public support for conservation, and in recognition of the importance of environmental conservation, the Ministry of Environment administered eleven statutes directly related to the conservation of the environment and biological diversity. In 2012, the Act on the Conservation and Use of Biodiversity was enacted, facilitating

“the country to manage biodiversity, allowing relevant ministries to be able to apply a streamlined and comprehensive biodiversity management system” (ROK 2014). This legislation forms a key component of the National Strategic Plan for Biodiversity, so is described in greater detail below, followed by a series of recommendations, also aimed at helping the nation meet the Aichi Targets.

2. Major Laws and Policies

There are several key pieces of biodiversity-related legislation in the ROK, which directly relate to the country’s obligation to implement the CBD.

- **Natural Environment Conservation Act**

The Natural Environment Conservation Act (NECA) was passed into law in 1990, before the adoption of the CBD. The NECA was subsequently amended in 1994 to include additional provisions for implementing the CBD. The core provision in this regard was Article 35, under which the ROK government was required to formulate and implement policy measures for biodiversity conservation and the implementation of the CBD and other major biodiversity-related treaties acceded to by the ROK.

The main instrument of the NECA for biodiversity conservation has been protected areas (NECA, Articles 12, 15, and 16). A key weakness of the NECA has been the absence of effective and binding conservation measures for non-protected areas, other than the weak environmental impact assessment regime under the Environmental Impact Assessment Act. The planning and use of non-protected areas falls under the jurisdiction of development-oriented government ministries and agencies, which have been largely responsible for large-scale development projects such as the Saemangeum reclamation and the Four Rivers project.

- **Act on the Conservation and Use of Biological Diversity**

The adoption of the Act on the Conservation and Use of Biological Diversity (ACUBD) in 2012 was a direct response to the adoption of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization in 2010. Since its adoption, the ACUBD has become the principal legislation for implementing the CBD through the 2012 amendment to the NECA, which removed core provisions relating to the CBD. The primary purpose of the ACUBD is to ensure sovereignty over genetic resources rather than to conserve biodiversity *in situ*. However, the Act does contain a number of provisions that should help to conserve biodiversity.

The ACUBD specifies the duties of the government in relation to biodiversity conservation. In particular, Articles 7 and 8 specify the responsibility of the government to formulate and implement a five-year National Biodiversity Strategy; Article 10 specifies the responsibility of the Minister of Environment to compile and maintain the complete list of species found in the ROK; and Article 14 specifies the duty and right of the Minister of Environment, the heads of relevant central administrative ministries and agencies, and the heads of provincial-level governments (“the authorities”) to take necessary emergency measures to avoid or mitigate adverse effects on biodiversity when deemed to be under significant threat from development projects.

Article 14 is of potentially great importance in improving conservation opportunities in the ROK. It allows the authorities to make an emergency order to, for example, urgently restore, rescue, or treat, or suspend development activities in order to avoid or mitigate rapid loss of biodiversity (Article 14(1)). This provision can be invoked when a natural disaster strikes (Article 14(1)(1)); when biodiversity is at risk of significant loss or extinction (Article 14(1)(2)); or when development projects put wildlife habitats at risk of large-scale degradation. Essentially, the authorities are granted the power to suspend any large-scale national development projects which seriously threaten biodiversity or wildlife habitats, such as the Four Rivers project or the Saemangeum reclamation. This provision is the first of its kind in ROK environmental law, and it may have far reaching implications.

There are, however, limits to its usefulness. First, the heads of provincial governments need to receive approval from the Minister of Environment before they can exercise their power. Therefore, the decision-making power is still centralized. Second, the Minister of Environment seems unlikely at present to exercise this right to oppose large-scale, development projects that are planned and executed by the central government.

- **Wildlife Protection and Management Act**

The Protection of Wild Fauna and Flora Act of 2004 was enacted to regulate trade in endangered species (with a view to implement the Convention on International Trade in Endangered Species of Wild Fauna and Flora). Therefore, despite the title of the statute, the Act is of little practical use for protecting threatened species from habitat loss and degradation.

- **Other Legislation**

Among other biodiversity-related legislation under the jurisdiction of the Ministry of Environment, are, in the order of adoption, the Natural Park Act 1980, the Special Act on the Ecosystem Conservation of Islands such as Dokdo Island 1997, the Wetlands Conservation Act 1999, the Act on the Protection of Baekdudaegan Mountain System 2005, and the National Trust Act on Cultural Heritage and Natural Environment Assets 2006. These statutes provide the legal grounds for different types of protected areas.

The most environmentally destructive pieces of legislation are the occasional special laws adopted by the National Assembly to allow speedy development of large-scale government-led projects, permitting large scale habitat loss and degradation over very large areas. Notable examples are the Special Act on the Utilization of Waterfronts for the Four Rivers Project and the Special Act on Promotion of the Saemangeum Project. There are around 50 statutes under which “permission, authorization, reporting, decision, designation, license, consultation, consent, cancellation, deliberation, *et cetera* shall be deemed to have been granted, made, given, or completed” for these development projects.

3. Twenty Recommendations for Meeting Selected Aichi Biodiversity Targets

Based on the findings of this report and other Birds Korea research, we believe that many of the efforts undertaken by GO and NGO bodies to help the nation meet its obligations to the Aichi Targets are being undermined by inconsistencies and gaps in information; by special laws; and by a lack of accountability for the impacts of large-scale development projects. In order to reduce the rate of biodiversity loss, information-gathering and information-sharing need to be enhanced; the rule of law needs to be promoted; and stronger checks need to be put in place on the discretionary powers of government and on large-scale development projects.

Towards the improved conservation of birds and their habitats in the ROK and the fulfillment of national obligations to the Aichi Targets, Birds Korea respectfully makes the following twenty recommendations:

Toward Strategic Goal A (Addressing the underlying causes of biodiversity loss)

- 1) Biodiversity values need to be more fully integrated into planning laws, which are administered by development-oriented ministries. At present, minimum recognition of the environment is given in development statutes such as the Public Waters Management and Reclamation Act, which is the main legal basis for much of the destruction of Intertidal Wetland.
- 2) Formal recognition of the precautionary approach (and principle) needs to be given in the national planning process, not limited to but including the Environmental Impact Assessment process. We cite the interpretation and application of this approach in the decision-making process in section 61(2) of the New Zealand's Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012. It states that: "If, in relation to making a decision under this Act, the information available is uncertain or inadequate, the [Environmental Protection Authority] must favour caution and environmental protection". This provision was invoked in the recent decision of the Environmental Protection Authority to reject the country's first seabed mining application by a private company.
- 3) We recommend the development of environmental directives (or test of some sort) that authorities must apply when considering resource use applications. In New Zealand, all resource use, development and protection must satisfy the purpose of the Resource Management Act 1991 and the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012, which is, in short, sustainable management of resources for social, cultural, and economic well-being while safeguarding the life-supporting capacity of the environment. If a resource consent application fails to meet this "sustainability test", then no consent is given, and the proposed activity cannot take place.
- 4) Hidden environmental costs of development projects that are not captured by project-based environmental impact assessments need to be captured through life-cycle assessments, and factored in fully into development proposals.
- 5) The Minister of Environment and other relevant Ministers and authorities need to be legally empowered to challenge special laws that are considered (in light of the precautionary approach) likely to lead to habitat loss and degradation or a decline in biodiversity.
- 6) Article 14 of the Act on the Conservation and Use of Biological Diversity (ACUBD) needs to be strengthened further, to make it proactive in order to avoid biodiversity loss, rather than reactive to loss as now.

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- 7) Already, relevant authorities are granted the power to suspend any large-scale national development projects which seriously threaten biodiversity or wildlife habitats under Article 14 of the ACUBD. An effective mechanism also needs to be developed that can be triggered by civil society to hold the Minister(s) and relevant authorities liable for damage in case he or she does not exercise their right under that Article.

Towards Target 5 (Reducing the rate of loss of natural habitats)

- 8) An independent review is required to measure the area of major habitat types and to identify changes in these habitats over time. This review should be conducted using remote sensing, not literature-driven, with the methodology and results shared publicly. The results should then be used to measure rates of change and also to help identify the most suitable areas for e.g. restoration, designation of new protected areas and the strengthening of ecological connectivity between sites (towards meeting Target 11). We cite Murray *et al.* (2012) as an example of a remote sensing methodology that enables changes and rate of change to be measured over a range of scales.
- 9) In light of the rate of decline of waterbirds demonstrated in this report and elsewhere, all development projects that require the reclamation of >10ha tidal-flat (either as single reclamation projects, or collectively), or that require modification of wetlands that are nationally or internationally important for biodiversity (in that they meet already-established criteria) need to be suspended, whether previously approved or not, and reviewed for their potential impact on bird-life and other biodiversity. Projects that are considered likely to cause a loss of tidal-flat area or to cause a decline in Globally or Nationally Threatened species or to cause a reduction in any wetland's international importance, should be modified or cancelled in line with existing obligations to conservation conventions and the precautionary principle.

Towards Target 6 (Fisheries)

- 10) Urgent measures need to be taken to reduce the negative impact of fisheries' practices on birds that forage at sea. One element of Target 6 is to ensure that fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems. As seabirds are especially poorly-known, the definition of "threatened" needs formally to incorporate Nationally Threatened species (e.g. Red- and Amber-Listed species).

Towards Target 11 (Expanding conservation areas)

- 11) At present, there is much greater inclusion of forest, especially hill and mountain forest, within the protected area system, than other habitats. Ramsar criteria for identifying sites of international importance to waterbirds need to be used to identify and lead to the designation of all internationally important wetland areas before 2020, including both Freshwater and Intertidal Wetland Areas.
- 12) Research is required to identify representative and nationally important areas of Grassland-type and Open Habitat. Sites that regularly hold Red-Listed and Amber-Listed species should be prioritized.

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- 13) Research needs to be conducted in open sea areas, within 2014 and 2015. In addition to breeding colonies, key sites of importance to seabirds-at-sea need to be identified and assessed, using criteria developed by BirdLife for the designation of Marine IBAs. Sites of high importance for foraging seabirds or areas where seabirds are concentrated during migration should be designated as marine protected areas, with measures taken to reduce mortality within such areas from e.g. pollution and unsustainable fishing practices.

Towards Target 15 (Ecosystem resilience and restoration)

- 14) Where feasible, tidal-flow at Saemangeum, in Namyang Bay and at other internationally intertidal wetlands needs to be increased within 2015, in order to restore a minimum of 15% of degraded intertidal wetland by 2020.
- 15) Where feasible, new dams constructed across the four main rivers need to be removed; bicycle lanes need to be re-routed away from the river's edge; and natural processes within the rivers need to be restored, to help regenerate areas degraded by the Four Rivers project and other river-construction work

Towards Target 19 (Information and the Science base)

- 16) Count data (by GO, academe, and NGO) from within the ROK needs to be organized into open-access databases using a consistent taxonomy and layout that encourages use by others. We cite our database of MOE Census data as an example of the value of this kind of approach.
- 17) A series of consultative meetings needs to be established within 2014 and held through 2015 with the active participation of GO, NGO and academe, in order to develop an approach similar to that described by Easton *et al.* (2009) and this report to organize information on population trends and conservation status of birds in ways that can more easily support decision-makers.
- 18) These consultative meetings then need to lead to the publication within 2015 of a document similar to *Status of Birds, 2014* that has been developed through collaboration of a range of players; endorsed by key conservation bodies (including e.g. the National Institute of Ecology; the EAAFP Secretariat; IUCN representatives in the ROK; and by lead officials responsible for the conservation of biodiversity within relevant ministries), and which can be posted online in Korean and in English.
- 19) In support of the above recommendation, BirdLife International should correct the bird information within the country profile and factsheets for the ROK and other nations within this region, and develop mechanisms through which meaningful support (technical, financial or otherwise) is provided to key organisations at the national-level and regional-level so that they can support BirdLife's role as part of the CBD's Clearing House Mechanism.
- 20) Available information on species trends across other taxonomic groups also needs to be brought together and published online, along with criteria for their assessment into appropriate criteria (similar to the Grey, Red, Amber and Green Lists presented here).

Appendix

The Birds Korea Checklist (Moores & Kim 2014a) lists 571 species recorded in the wild in the ROK up to and including April 2014. Of these, 535 species have been adequately-documented (i.e. with records supported by photographs, sound recordings or specimens, extant or documented in the ornithological literature).

The Checklist follows the taxonomy, order and nomenclature of the International Ornithological Congress (Gill & Donsker 2014), though including three unrecognized species (marked with ●); the highlighting of three potential “splits”, including Far Eastern Oystercatcher *Haematopus (ostralegus) osculans* and White-faced Plover *Charadrius (alexandrinus) dealbatus*; and the provision of some alternative English-language names, mostly for “Japanese”, when used for species which are not endemic to Japan (e.g. Black Wood Pigeon *Columba janthina* and Eastern Great Tit *Parus minor*).

- Species in Category One and Category Two of the Checklist (listed below) are naturally-occurring in the ROK and have been adequately-documented up to the end of April 2014.
- Category One of the Checklist contains 523 species and 608 subspecies adequately-documented since 1980.
- Two species were adequately-documented in the ROK for the first time between May and August 2014 (Tufted Puffin *Fratercula cirrhata* and Mongolian Lark *Melanocorypha mongolica*), and will be added to Category One of the Birds Korea Checklist in the next formal update.
- Category Two of the Checklist contains twelve species that have not been adequately-documented since 1980.
- Categories Three, Four and Six (omitted from this appendix) contain 35 species reported by competent observers, some of which have been published in the ornithological literature even though the records were unsupported by images, sound recordings or specimens. One of these (Aleutian Tern) was adequately-documented in August 2014.
- Only one species (Feral Pigeon) is a long-established non-native species in the ROK. It is listed in Category Five.
- All species within Categories Three, Four and Six; the majority of species in Category Two; and approximately a third of species in Category One of the Checklist are considered to be “irregularly occurring” in the ROK. Most have been recorded fewer than ten times; and there is no evidence that historically they were more widespread or numerous in the ROK. They were therefore not assessed for colour listing in this report.

The Birds Korea Checklist is also provided online in both Korean and English; is regularly-updated; and remains open to peer-review:

Korean:

<http://www.birdskorea.or.kr/Birds/Checklist/BK-CL-Checklist.shtml>

English:

<http://www.birdskorea.org/Birds/Checklist/BK-CL-Checklist.shtml>

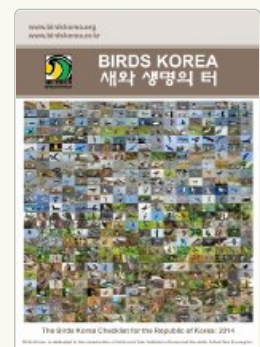


Table 12: The Birds Korea 2014 Checklist uses the following codes to indicate seasonality and abundance for each taxon.

| Seasonality | |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------|
| R | Largely resident |
| P | Largely a passage migrant |
| S | Largely a summer visitor |
| W | Largely a winter visitor |
| Approximate number of individuals by season (listed in order of abundance) | |
| 1 | = 100,000 |
| 2 | 10,000 - 99,999 |
| 3 | 1000 - 9,999 |
| 4 | 100 - 999 |
| 5 | 10 - 99 |
| V1 | Scarcely recorded, i.e. >10 records in total but <10 records/year |
| V2 | Rarely recorded, i.e. <10 records in total |
| Breeding | |
| 0 | No breeding record |
| 1 | Breeding has been confirmed in the ROK |
| 2 | Breeding is presumed in the ROK |
| 3 | Breeding took place pre-1980 in the ROK, but not subsequently |
| GCS Global Conservation Status (from BirdLife International 2014a) | |
| CR | Critically Endangered |
| EN | Endangered |
| VU | Vulnerable |
| NT | Near Threatened |
| LC | Least Concern |
| NR | Not Recognized |



Amber-listed **Far Eastern Oystercatcher** *Haematopus (ostralegus) osculans*.

Category 1:

Species of bird (and their subspecies) recorded in the Republic of Korea since 1980, documented with identifiable photographs, sound recordings or specimens.

Anseriformes

| Anatidae Ducks, Geese & Swans | | | GCS | Status | Breeds |
|-------------------------------|-----------------------------|----------------------------------|-----|-------------|--------|
| 1 | Swan Goose | <i>Anser cygnoides</i> | VU | P4, W5 | 0 |
| 2 | Taiga Bean Goose | <i>Anser fabalis</i> | NR | P2, W3, SV2 | 0 |
| 3 | Tundra Bean Goose | <i>Anser serrirostris</i> | NR | P1, W2, SV2 | 0 |
| 4 | Greylag Goose | <i>Anser anser</i> | LC | V2 | 0 |
| 5 | Greater White-fronted Goose | <i>Anser albifrons</i> | LC | P1, W2, SV1 | 0 |
| 6 | Lesser White-fronted Goose | <i>Anser erythropus</i> | VU | P5, W5 | 0 |
| 7 | Bar-headed Goose | <i>Anser indicus</i> | LC | V2 | 0 |
| 8 | Snow Goose | <i>Chen caerulescens</i> | LC | WV1 | 0 |
| 9 | Emperor Goose | <i>Chen canagica</i> | NT | V2 | 0 |
| 10 | Cackling Goose | <i>Branta hutchinsii</i> | LC | WV1 | 0 |
| 11 | Brant Goose | <i>Branta bernicla</i> | LC | W5 | 0 |
| 12 | Red-breasted Goose | <i>Branta ruficollis</i> | EN | V2 | 0 |
| 13 | Mute Swan | <i>Cygnus olor</i> | LC | V1 | 0 |
| 14 | Tundra Swan | <i>Cygnus columbianus</i> | LC | W5 | 0 |
| 15 | Whooper Swan | <i>Cygnus cygnus</i> | LC | W3, SV2 | 0 |
| 16 | Common Shelduck | <i>Tadoma tadoma</i> | LC | W2, SV2 | 0 |
| 17 | Ruddy Shelduck | <i>Tadoma ferruginea</i> | LC | W3, SV2 | 0 |
| 18 | Mandarin Duck | <i>Aix galericulata</i> | LC | R3, W3 | 1 |
| 19 | Gadwall | <i>Anas strepera</i> | LC | W3, SV2 | 0 |
| 20 | Falcated Duck | <i>Anas falcata</i> | NT | W3, SV1 | 2 |
| 21 | Eurasian Wigeon | <i>Anas penelope</i> | LC | P2, W2, SV1 | 0 |
| 22 | American Wigeon | <i>Anas americana</i> | LC | WV1 | 0 |
| 23 | Mallard | <i>Anas platyrhynchos</i> | LC | W1, S4 | 1 |
| 24 | Eastern Spot-billed Duck | <i>Anas zonorhyncha</i> | LC | W1, R2 | 1 |
| 25 | Northern Shoveler | <i>Anas clypeata</i> | LC | W3, SV2 | 0 |
| 26 | Northern Pintail | <i>Anas acuta</i> | LC | P2, W2, SV2 | 0 |
| 27 | Garganey | <i>Anas querquedula</i> | LC | P4 | 0 |
| 28 | Baikal Teal | <i>Anas formosa</i> | LC | W1, SV2 | 0 |
| 29 | Eurasian Teal | <i>Anas crecca</i> | LC | W2, SV1 | 0 |
| 30 | Green-winged Teal | <i>Anas carolinensis</i> | NR | V2 | 0 |
| 31 | Red-crested Pochard | <i>Netta rufina</i> | LC | WV1 | 0 |
| 32 | Common Pochard | <i>Aythya ferina</i> | LC | W2, SV2 | 0 |
| 33 | Baer's Pochard | <i>Aythya baeri</i> | CR | V1 | 0 |
| 34 | Ferruginous Duck | <i>Aythya nyroca</i> | NT | V1 | 0 |
| 35 | Ring-necked Duck | <i>Aythya collaris</i> | LC | V2 | 0 |
| 36 | Tufted Duck | <i>Aythya fuligula</i> | LC | P2, W3, SV2 | 0 |
| 37 | Greater Scaup | <i>Aythya marila</i> | LC | W2, SV2 | 0 |
| 38 | Lesser Scaup | <i>Aythya affinis</i> | LC | V2 | 0 |
| 39 | King Eider | <i>Somateria spectabilis</i> | LC | V2 | 0 |
| 40 | Harlequin Duck | <i>Histrionicus histrionicus</i> | LC | W4 | 0 |
| 41 | White-winged Scoter | <i>Melanitta deglandi</i> | LC | W3 | 0 |
| 42 | American Scoter | <i>Melanitta americana</i> | NT | W4 | 0 |
| 43 | Long-tailed Duck | <i>Clangula hyemalis</i> | VU | WV1 | 0 |
| 44 | Bufflehead | <i>Bucephala albeola</i> | LC | V2 | 0 |
| 45 | Common Goldeneye | <i>Bucephala clangula</i> | LC | W3 | 0 |
| 46 | Smew | <i>Mergellus albellus</i> | LC | W3 | 0 |
| 47 | Common Merganser | <i>Mergus merganser</i> | LC | W2, R5 | 1 |
| 48 | Red-breasted Merganser | <i>Mergus serrator</i> | LC | W3, SV2 | 0 |

| | | | GCS | Status | Breeds |
|-------------------------------------------------|---------------------------|------------------------------------|-----|-------------|--------|
| 49 | Scaly-sided Merganser | <i>Mergus squamatus</i> | EN | W4, P5 | 0 |
| Galliformes | | | | | |
| Phasianidae Pheasants, Fowl & Allies | | | GCS | Status | Breeds |
| 50 | Hazel Grouse | <i>Tetrastes bonasia</i> | LC | R1 | 1 |
| 51 | Japanese Quail | <i>Coturnix japonica</i> | NT | W3, R5 | 1 |
| 52 | Common Pheasant | <i>Phasianus colchicus</i> | LC | R1 | 1 |
| Gaviiformes | | | | | |
| Gaviidae Loons | | | | | |
| 53 | Red-throated Loon | <i>Gavia stellata</i> | LC | P3, W4 | 0 |
| 54 | Arctic Loon | <i>Gavia arctica</i> | LC | W3, SV2 | 0 |
| 55 | Pacific Loon | <i>Gavia pacifica</i> | LC | P3, W3, SV2 | 0 |
| 56 | Yellow-billed Loon | <i>Gavia adamsii</i> | NT | W5, SV2 | 0 |
| Procellariiformes | | | | | |
| Procellariidae Petrels, Shearwaters | | | | | |
| 57 | Bonin Petrel | <i>Pterodroma hypoleuca</i> | LC | V2 | 0 |
| 58 | Streaked Shearwater | <i>Calonectris leucomelas</i> | LC | S2 | 1 |
| 59 | Short-tailed Shearwater | <i>Puffinus tenuirostris</i> | LC | P4, WV2 | 0 |
| 60 | Flesh-footed Shearwater | <i>Puffinus carneipes</i> | LC | P5 | 0 |
| 61 | Bulwer's Petrel | <i>Bulweria bulwerii</i> | LC | V2 | 0 |
| Hydrobatidae Storm Petrels | | | | | |
| 62 | Swinhoe's Storm Petrel | <i>Oceanodroma monorhis</i> | NT | S1 | 1 |
| Podicipediformes | | | | | |
| Podicipedidae Grebes | | | | | |
| 63 | Little Grebe | <i>Tachybaptus ruficollis</i> | LC | W3, R3 | 1 |
| 64 | Red-necked Grebe | <i>Podiceps grisegena</i> | LC | W3 | 0 |
| 65 | Great Crested Grebe | <i>Podiceps cristatus</i> | LC | W2, R5 | 1 |
| 66 | Horned Grebe | <i>Podiceps auritus</i> | LC | W4, SV2 | 0 |
| 67 | Black-necked Grebe | <i>Podiceps nigricollis</i> | LC | W3 | 0 |
| Ciconiiformes | | | | | |
| Ciconiidae Storks | | | | | |
| 68 | Black Stork | <i>Ciconia nigra</i> | LC | V1 | 3 |
| 69 | Oriental Stork | <i>Ciconia boyciana</i> | EN | W5, SV2 | 3 |
| Pelecaniformes | | | | | |
| Threskiornithidae Ibises, Spoonbills | | | | | |
| 70 | Black-headed Ibis | <i>Threskiornis melanocephalus</i> | NT | V2 | 0 |
| 71 | Eurasian Spoonbill | <i>Platalea leucorodia</i> | LC | W4, SV1 | 0 |
| 72 | Black-faced Spoonbill | <i>Platalea minor</i> | EN | S3, W5 | 1 |
| Ardeidae Herons, Bitterns | | | | | |
| 73 | Eurasian Bittern | <i>Botaurus stellaris</i> | LC | W5, P5 | 0 |
| 74 | Yellow Bittern | <i>Ixobrychus sinensis</i> | LC | S3 | 1 |
| 75 | Von Schrenck's Bittern | <i>Ixobrychus eurhythmus</i> | LC | S5 | 1 |
| 76 | Cinnamon Bittern | <i>Ixobrychus cinnamomeus</i> | LC | V1 | 0 |
| 77 | Black Bittern | <i>Dupetor flavicollis</i> | LC | PV1 | 0 |
| 78 | Japanese Night Heron | <i>Gorsachius gossagi</i> | EN | V1 | 1 |
| 79 | Malayan Night Heron | <i>Gorsachius melanolophus</i> | LC | V2 | 0 |
| 80 | Black-crowned Night Heron | <i>Nycticorax nycticorax</i> | LC | S3, R5 | 1 |
| 81 | Striated Heron | <i>Butorides striata</i> | LC | S3, WV2 | 1 |
| 82 | Chinese Pond Heron | <i>Ardeola bacchus</i> | LC | P4, S5, WV2 | 1 |
| 83 | Eastern Cattle Egret | <i>Bubulcus coromandus</i> | NR | S3 | 1 |
| 84 | Grey Heron | <i>Ardea cinerea</i> | LC | S2, R3, P3 | 1 |
| 85 | Purple Heron | <i>Ardea purpurea</i> | LC | PV1 | 0 |

| | | | GCS | Status | Breeds |
|-----------------------------------------------|-------------------------|---------------------------------|-----|--------------|--------|
| 86 | Great Egret | <i>Ardea alba</i> | LC | S2, P3, W3 | 1 |
| 87 | Intermediate Egret | <i>Egretta intermedia</i> | LC | S3 | 1 |
| 88 | Little Egret | <i>Egretta garzetta</i> | LC | S2, W4 | 1 |
| 89 | Pacific Reef Egret | <i>Egretta sacra</i> | LC | R4 | 1 |
| 90 | Chinese Egret | <i>Egretta eulophotes</i> | VU | S4, WV2 | 1 |
| Fregatidae Frigatebirds | | | | | |
| 91 | Great Frigatebird | <i>Fregata minor</i> | LC | V2 | 0 |
| 92 | Lesser Frigatebird | <i>Fregata ariel</i> | LC | V1 | 0 |
| Sulidae Gannets, Boobies | | | | | |
| 93 | Masked Booby | <i>Sula dactylatra</i> | LC | V2 | 0 |
| 94 | Red-footed Booby | <i>Sula sula</i> | LC | V2 | 0 |
| 95 | Brown Booby | <i>Sula leucogaster</i> | LC | V2 | 0 |
| Phalacrocoracidae Cormorants, shags | | | | | |
| 96 | Pelagic Cormorant | <i>Phalacrocorax pelagicus</i> | LC | W3, R4 | 1 |
| 97 | Great Cormorant | <i>Phalacrocorax carbo</i> | LC | W3, R3 | 1 |
| 98 | Temminck's Cormorant | <i>Phalacrocorax capillatus</i> | LC | R3, W3 | 1 |
| Accipitriformes | | | | | |
| Pandionidae Ospreys | | | | | |
| 99 | Western Osprey | <i>Pandion haliaetus</i> | LC | P4, W5, SV2 | 0 |
| Accipitridae Kites, Hawks & Eagles | | | | | |
| 100 | Black-winged Kite | <i>Elanus caeruleus</i> | LC | V2 | 0 |
| 101 | Bearded Vulture | <i>Gypaetus barbatus</i> | LC | V2 | 0 |
| 102 | Crested Honey Buzzard | <i>Pernis ptilorhynchus</i> | LC | P3, S5 | 1 |
| 103 | Himalayan Vulture | <i>Gyps himalayensis</i> | LC | V2 | 0 |
| 104 | Cinereous Vulture | <i>Aegypius monachus</i> | NT | W3, SV2 | 0 |
| 105 | Crested Serpent Eagle | <i>Spilornis cheela</i> | LC | V2 | 0 |
| 106 | Greater Spotted Eagle | <i>Clanga clanga</i> | VU | P5, WV1, SV2 | 0 |
| 107 | Booted Eagle | <i>Hieraaetus pennatus</i> | LC | V2 | 0 |
| 108 | Steppe Eagle | <i>Aquila nipalensis</i> | LC | V1 | 0 |
| 109 | Eastern Imperial Eagle | <i>Aquila heliaca</i> | VU | V1 | 0 |
| 110 | Golden Eagle | <i>Aquila chrysaetos</i> | LC | W5, SV2 | 3 |
| 111 | Bonelli's Eagle | <i>Aquila fasciata</i> | LC | V2 | 0 |
| 112 | Chinese Sparrowhawk | <i>Accipiter soloensis</i> | LC | P3, S4 | 1 |
| 113 | Japanese Sparrowhawk | <i>Accipiter gularis</i> | LC | P3, R4 | 1 |
| 114 | Eurasian Sparrowhawk | <i>Accipiter nisus</i> | LC | P3, W3 | 0 |
| 115 | Northern Goshawk | <i>Accipiter gentilis</i> | LC | P3, W3, R5 | 1 |
| 116 | Eastern Marsh Harrier | <i>Circus spilonotus</i> | LC | P5, WV1 | 0 |
| 116 | Hen Harrier | <i>Circus cyaneus</i> | LC | P5, WV1 | 0 |
| 118 | Pied Harrier | <i>Circus melanoleucos</i> | LC | P5 | 0 |
| 119 | Black Kite | <i>Milvus migrans</i> | LC | W4, P4, R5 | 1 |
| 120 | White-tailed Eagle | <i>Haliaeetus albicilla</i> | LC | W4, RV1 | 1 |
| 121 | Steller's Sea Eagle | <i>Haliaeetus pelagicus</i> | VU | W5 | 0 |
| 122 | Grey-faced Buzzard | <i>Butastur indicus</i> | LC | P2, S5 | 1 |
| 123 | Rough-legged Buzzard | <i>Buteo lagopus</i> | LC | W5 | 0 |
| 124 | Upland Buzzard | <i>Buteo hemilasius</i> | LC | P4, W5 | 0 |
| 125 | Eastern Buzzard | <i>Buteo japonicus</i> | NR | P3, W3, SV2 | 0 |
| Gruiformes | | | | | |
| Rallidae Rails, Crakes & Coots | | | | | |
| 126 | Swinhoe's Rail | <i>Coturnicops exquisitus</i> | VU | V2 | 0 |
| 127 | Brown-cheeked Rail | <i>Rallus indicus</i> | NR | W5 | 0 |
| 128 | White-breasted Waterhen | <i>Amaurornis phoenicurus</i> | LC | P5, SV2 | 1 |
| 129 | Baillon's Crake | <i>Porzana pusilla</i> | LC | P5 | 0 |

| | | | GCS | Status | Breeds |
|-----------------------------------------|---------------------------|-------------------------------------------|-----|--------------|--------|
| 130 | Ruddy-breasted Crane | <i>Porzana fusca</i> | LC | S5 | 1 |
| 131 | Band-bellied Crane | <i>Porzana paykullii</i> | NT | V1 | 0 |
| 132 | Watercock | <i>Gallicrex cinerea</i> | LC | S5 | 1 |
| 133 | Common Moorhen | <i>Gallinula chloropus</i> | LC | S3, R4 | 1 |
| 134 | Eurasian Coot | <i>Fulica atra</i> | LC | W2, R4 | 1 |
| Gruidae Cranes | | | | | |
| 135 | Siberian Crane | <i>Grus leucogeranus</i> | CR | V1 | 0 |
| 136 | Sandhill Crane | <i>Grus canadensis</i> | LC | V1 | 0 |
| 137 | White-naped Crane | <i>Grus vipio</i> | VU | W3, P3 | 0 |
| 138 | Demoiselle Crane | <i>Grus virgo</i> | LC | V2 | 0 |
| 139 | Red-crowned Crane | <i>Grus japonensis</i> | EN | W4 | 0 |
| 140 | Common Crane | <i>Grus grus</i> | LC | V1 | 0 |
| 141 | Hooded Crane | <i>Grus monacha</i> | VU | P3, W4 | 0 |
| Charadriiformes | | | | | |
| Turnicidae Buttonquails | | | | | |
| 142 | Yellow-legged Buttonquail | <i>Turnix tanki</i> | LC | V1 | 2 |
| Haematopodidae Oystercatchers | | | | | |
| 143 | Far Eastern Oystercatcher | • <i>Haematopus (ostralegus) osculans</i> | LC | W3, R4 | 1 |
| Recurvirostridae Stilts, Avocets | | | | | |
| 144 | Black-winged Stilt | <i>Himantopus himantopus</i> | LC | P4, S5, WV2 | 1 |
| 145 | Pied Avocet | <i>Recurvirostra avosetta</i> | LC | V1 | 0 |
| Charadriidae Plovers | | | | | |
| 146 | Northern Lapwing | <i>Vanellus vanellus</i> | LC | W4 | 0 |
| 147 | Grey-headed Lapwing | <i>Vanellus cinereus</i> | LC | V1 | 0 |
| 148 | Pacific Golden Plover | <i>Pluvialis fulva</i> | LC | P4 | 0 |
| 149 | Grey Plover | <i>Pluvialis squatarola</i> | LC | P3, W3 | 0 |
| 150 | Common Ringed Plover | <i>Charadrius hiaticula</i> | LC | V1 | 0 |
| 151 | Long-billed Plover | <i>Charadrius placidus</i> | LC | R3 | 1 |
| 152 | Little Ringed Plover | <i>Charadrius dubius</i> | LC | P3, S3, WV2 | 1 |
| 153 | Kentish Plover | <i>Charadrius alexandrinus</i> | LC | P2, S4, W4 | 1 |
| 154 | Mongolian Plover | <i>Charadrius mongolus</i> | LC | P3, WV1 | 0 |
| 155 | Greater Sand Plover | <i>Charadrius leschenaultii</i> | LC | P5 | 0 |
| 156 | Oriental Plover | <i>Charadrius veredus</i> | LC | V1 | 0 |
| 157 | Eurasian Dotterel | <i>Charadrius morinellus</i> | LC | V2 | 0 |
| Rostratulidae Painted-snipes | | | | | |
| 158 | Greater Painted-snipe | <i>Rostratula benghalensis</i> | LC | R5 | 1 |
| Jacanidae Jacanas | | | | | |
| 159 | Pheasant-tailed Jacana | <i>Hydrophasianus chirurgus</i> | LC | S5 | 1 |
| Scolopacidae Sandpipers, Snipes | | | | | |
| 160 | Eurasian Woodcock | <i>Scolopax rusticola</i> | LC | P4, W4 | 0 |
| 161 | Jack Snipe | <i>Lymnocyrtus minimus</i> | LC | V2 | 0 |
| 162 | Solitary Snipe | <i>Gallinago solitaria</i> | LC | W5 | 0 |
| 163 | Latham's Snipe | <i>Gallinago hardwickii</i> | LC | P5 | 0 |
| 164 | Pin-tailed Snipe | <i>Gallinago stenura</i> | LC | P4, WV2 | 0 |
| 165 | Swinhoe's Snipe | <i>Gallinago megala</i> | LC | P4 | 0 |
| 166 | Common Snipe | <i>Gallinago gallinago</i> | LC | P3, W5 | 0 |
| 167 | Long-billed Dowitcher | <i>Limnodromus scolopaceus</i> | LC | V1 | 0 |
| 168 | Asian Dowitcher | <i>Limnodromus semipalmatus</i> | NT | PV1 | 0 |
| 169 | Black-tailed Godwit | <i>Limosa limosa</i> | NT | P3, SV1, WV2 | 0 |
| 170 | Bar-tailed Godwit | <i>Limosa lapponica</i> | LC | P2, SV2, WV2 | 0 |
| 171 | Little Whimbrel | <i>Numenius minutus</i> | LC | P5 | 0 |
| 172 | Whimbrel | <i>Numenius phaeopus</i> | LC | P3, SV2, WV2 | 0 |
| 173 | Eurasian Curlew | <i>Numenius arquata</i> | NT | P3, W3, S5 | 0 |

| | | | GCS | Status | Breeds |
|--------------------------------------------|--------------------------|-------------------------------------|-----|-------------|--------|
| 174 | Far Eastern Curlew | <i>Numenius madagascariensis</i> | VU | P3, S4, WV1 | 0 |
| 175 | Spotted Redshank | <i>Tringa erythropus</i> | LC | P4, W5 | 0 |
| 176 | Common Redshank | <i>Tringa totanus</i> | LC | P4, S5, WV2 | 1 |
| 177 | Marsh Sandpiper | <i>Tringa stagnatilis</i> | LC | P4 | 0 |
| 178 | Common Greenshank | <i>Tringa nebularia</i> | LC | P3, W5 | 0 |
| 179 | Nordmann's Greenshank | <i>Tringa guttifer</i> | EN | P5 | 0 |
| 180 | Green Sandpiper | <i>Tringa ochropus</i> | LC | P3, W4 | 0 |
| 181 | Wood Sandpiper | <i>Tringa glareola</i> | LC | P3 | 0 |
| 182 | Grey-tailed Tattler | <i>Tringa brevipes</i> | LC | P3 | 0 |
| 183 | Terek Sandpiper | <i>Xenus cinereus</i> | LC | P2, SV2 | 0 |
| 184 | Common Sandpiper | <i>Actitis hypoleucos</i> | LC | P3, S4, W4 | 1 |
| 185 | Ruddy Turnstone | <i>Arenaria interpres</i> | LC | P3, WV2 | 0 |
| 186 | Great Knot | <i>Calidris tenuirostris</i> | VU | P2 | 0 |
| 187 | Red Knot | <i>Calidris canutus</i> | LC | P4 | 0 |
| 188 | Sanderling | <i>Calidris alba</i> | LC | P3, W4 | 0 |
| 189 | Red-necked Stint | <i>Calidris ruficollis</i> | LC | P2, WV2 | 0 |
| 190 | Little Stint | <i>Calidris minuta</i> | LC | V1 | 0 |
| 191 | Temminck's Stint | <i>Calidris temminckii</i> | LC | P4, WV2 | 0 |
| 192 | Long-toed Stint | <i>Calidris subminuta</i> | LC | P4 | 0 |
| 193 | Pectoral Sandpiper | <i>Calidris melanotos</i> | LC | V1 | 0 |
| 194 | Sharp-tailed Sandpiper | <i>Calidris acuminata</i> | LC | P3 | 0 |
| 195 | Curlew Sandpiper | <i>Calidris ferruginea</i> | LC | P5 | 0 |
| 196 | Dunlin | <i>Calidris alpina</i> | LC | P1, W2 | 0 |
| 197 | Spoon-billed Sandpiper | <i>Eurynorhynchus pygmeus</i> | CR | P5 | 0 |
| 198 | Broad-billed Sandpiper | <i>Limicola falcinellus</i> | LC | P3 | 0 |
| 199 | Buff-breasted Sandpiper | <i>Tryngites subruficollis</i> | NT | V2 | 0 |
| 200 | Ruff | <i>Philomachus pugnax</i> | LC | P5, WV2 | 0 |
| 201 | Red-necked Phalarope | <i>Phalaropus lobatus</i> | LC | P3 | 0 |
| 202 | Red Phalarope | <i>Phalaropus fulicarius</i> | LC | V1 | 0 |
| Glareolidae Coursers, Pratincoles | | | | | |
| 203 | Oriental Pratincole | <i>Glareola maldivarum</i> | | P5, SV2 | 2 |
| Laridae Gulls, Terns & Skimmers | | | | | |
| 204 | Black-legged Kittiwake | <i>Rissa tridactyla</i> | LC | P2, W3 | 0 |
| 205 | Slender-billed Gull | <i>Chroicocephalus genei</i> | LC | V2 | 0 |
| 206 | Black-headed Gull | <i>Chroicocephalus ridibundus</i> | LC | P2, W2, S5 | 0 |
| 207 | Saunders's Gull | <i>Chroicocephalus saundersi</i> | VU | W3, P3, S4 | 1 |
| 208 | Relict Gull | <i>Ichthyiaetus relictus</i> | VU | WV1 | 0 |
| 209 | Pallas's Gull | <i>Ichthyiaetus ichthyiaetus</i> | LC | V1 | 0 |
| 210 | Black-tailed Gull | <i>Larus crassirostris</i> | LC | S1, W2, R2 | 1 |
| 211 | Common Gull | <i>Larus canus</i> | LC | W2 | 0 |
| 212 | Glaucous-winged Gull | <i>Larus glaucescens</i> | LC | W5 | 0 |
| 213 | Glaucous Gull | <i>Larus hyperboreus</i> | LC | W4, SV2 | 0 |
| 214 | Kumlien's Gull | <i>Larus glaucoides</i> | LC | WV1 | 0 |
| 215 | Thayer's Gull | <i>Larus thayeri</i> | LC | WV1 | 0 |
| 216 | American Herring Gull | <i>Larus smithsonianus</i> | NR | WV1 | 0 |
| 217 | Vega Gull | <i>Larus vegae</i> | NR | W2, P2, S5 | 0 |
| 218 | • Mongolian Gull | • <i>Larus mongolicus</i> | NR | P2, W3, S4 | 1 |
| 219 | Caspian Gull | <i>Larus cachinnans</i> | LC | V1 | 0 |
| 220 | Slaty-backed Gull | <i>Larus schistisagus</i> | LC | W3, SV1 | 0 |
| 221 | Lesser Black-backed Gull | <i>Larus fuscus</i> | LC | V2 | 0 |
| 222 | • Heuglin's Gull | • <i>Larus heuglini taimyrensis</i> | NR | P3, W3 | 0 |
| 223 | Gull-billed Tern | <i>Gelochelidon nilotica</i> | LC | V1 | 0 |
| 224 | Caspian Tern | <i>Hydroprogne caspia</i> | LC | V1 | 0 |
| 225 | Greater Crested Tern | <i>Thalasseus bergii</i> | LC | V2 | 0 |

| | | | GCS | Status | Breeds |
|----------------------------------|----------------------------|------------------------------------|-----|---------|--------|
| 226 | Little Tern | <i>Sterna albifrons</i> | LC | S3, WV2 | 1 |
| 227 | Bridled Tern | <i>Onychoprion anaethetus</i> | LC | V2 | 0 |
| 228 | Sooty Tern | <i>Onychoprion fuscatus</i> | LC | V1 | 0 |
| 229 | Roseate Tern | <i>Sterna dougallii</i> | LC | V2 | 0 |
| 230 | Common Tern | <i>Sterna hirundo</i> | LC | P2, SV2 | 0 |
| 231 | Whiskered Tern | <i>Chlidonias hybrida</i> | LC | P5, WV1 | 0 |
| 232 | White-winged Tern | <i>Chlidonias leucopterus</i> | LC | P4 | 0 |
| 233 | Black Tern | <i>Chlidonias niger</i> | LC | V2 | 0 |
| Stercorariidae Skuas | | | | | |
| 234 | South Polar Skua | <i>Stercorarius maccormicki</i> | LC | S5 | 0 |
| 235 | Pomarine Skua | <i>Stercorarius pomarinus</i> | LC | P4, WV2 | 0 |
| 236 | Parasitic Jaeger | <i>Stercorarius parasiticus</i> | LC | V1 | 0 |
| Alcidae Auks | | | | | |
| 237 | Brunnich's Murre | <i>Uria lomvia</i> | LC | W5 | 0 |
| 238 | Common Murre | <i>Uria aalge</i> | LC | W5 | 0 |
| 239 | Spectacled Guillemot | <i>Cepphus carbo</i> | LC | W5 | 0 |
| 240 | Long-billed Murrelet | <i>Brachyramphus perdix</i> | NT | W5, SV2 | 0 |
| 241 | Ancient Murrelet | <i>Synthliboramphus antiquus</i> | LC | W2, S4 | 1 |
| 242 | Crested Murrelet | <i>Synthliboramphus wumizusume</i> | VU | S4 | 1 |
| 243 | Least Auklet | <i>Aethia pusilla</i> | LC | WV1 | 0 |
| 244 | Rhinoceros Auklet | <i>Cerorhinca monocerata</i> | LC | W3 | 0 |
| Columbiformes | | | | | |
| Columbidae Pigeons, Doves | | | | | |
| 245 | Hill Pigeon | <i>Columba rupestris</i> | LC | R5 | 1 |
| 246 | Stock Dove | <i>Columba oenas</i> | LC | V2 | 0 |
| 247 | Black Wood Pigeon | <i>Columba janthina</i> | NT | R4 | 1 |
| 248 | Oriental Turtle Dove | <i>Streptopelia orientalis</i> | LC | R1 | 1 |
| 249 | Eurasian Collared Dove | <i>Streptopelia decaocto</i> | LC | V1 | 0 |
| 250 | Red Turtle Dove | <i>Streptopelia tranquebarica</i> | LC | V1 | 0 |
| 251 | Spotted Dove | <i>Spilopelia chinensis</i> | LC | V2 | 0 |
| 252 | White-bellied Green Pigeon | <i>Treron sieboldii</i> | LC | V1 | 0 |
| Cuculiformes | | | | | |
| Cuculidae Cuckoos | | | | | |
| 253 | Lesser Coucal | <i>Centropus bengalensis</i> | LC | V2 | 0 |
| 254 | Chestnut-winged Cuckoo | <i>Clamator coromandus</i> | LC | V2 | 0 |
| 255 | Asian Koel | <i>Eudynamys scolopacea</i> | LC | V2 | 0 |
| 256 | Fork-tailed Drongo-Cuckoo | <i>Surniculus dicruroides</i> | NR | V2 | 0 |
| 257 | Large Hawk-Cuckoo | <i>Hierococcyx sparveroides</i> | LC | V2 | 0 |
| 258 | Northern Hawk-Cuckoo | <i>Hierococcyx hypertyrhus</i> | LC | S4 | 1 |
| 259 | Lesser Cuckoo | <i>Cuculus poliocephalus</i> | LC | S3 | 1 |
| 260 | Indian Cuckoo | <i>Cuculus micropterus</i> | LC | S3 | 1 |
| 261 | Oriental Cuckoo | <i>Cuculus optatus</i> | LC | S3, P3 | 1 |
| 262 | Common Cuckoo | <i>Cuculus canorus</i> | LC | S3 | 1 |
| Strigiformes | | | | | |
| Tytonidae Barn Owls | | | | | |
| 263 | Eastern Grass Owl | <i>Tyto longimembris</i> | LC | V2 | 0 |
| Strigidae Owls | | | | | |
| 264 | Northern Scops Owl | <i>Otus semitorques</i> | NR | R4 | 1 |
| 265 | Oriental Scops Owl | <i>Otus sunia</i> | LC | S3 | 1 |
| 266 | Snowy Owl | <i>Bubo scandiacus</i> | LC | V2 | 0 |
| 267 | Eurasian Eagle-Owl | <i>Bubo bubo</i> | LC | R3 | 1 |
| 268 | Eastern Tawny Owl | <i>Strix niviculum</i> | NR | R5 | 1 |
| 269 | Ural Owl | <i>Strix uralensis</i> | LC | R5 | 1 |

| | | | GCS | Status | Breeds |
|--------------------------------------|------------------------------|---------------------------------|-----|------------|--------|
| 270 | Little Owl | <i>Athene noctua</i> | LC | V1 | 1 |
| 271 | Northern Boobook | <i>Ninox japonica</i> | NR | P3, S3 | 1 |
| 272 | Long-eared Owl | <i>Asio otus</i> | LC | W5 | 0 |
| 273 | Short-eared Owl | <i>Asio flammeus</i> | LC | W5 | 0 |
| Caprimulgiformes | | | | | |
| Caprimulgidae Nightjars | | | | | |
| 274 | Grey Nightjar | <i>Caprimulgus jotaka</i> | LC | P3, S3 | 1 |
| Apodiformes | | | | | |
| Apodidae Swifts | | | | | |
| 275 | Himalayan Swiftlet | <i>Aerodramus brevirostris</i> | LC | V1 | 0 |
| 276 | White-throated Needletail | <i>Hirundapus caudacutus</i> | LC | P4, S5 | 2 |
| 277 | Alpine Swift | <i>Tachymarptis melba</i> | LC | V2 | 0 |
| 278 | Pacific Swift | <i>Apus pacificus</i> | LC | P2, S3 | 1 |
| 279 | House Swift | <i>Apus nipalensis</i> | LC | V1 | 0 |
| Coraciiformes | | | | | |
| Coraciidae Rollers | | | | | |
| 280 | Oriental Dollarbird | <i>Eurystomus orientalis</i> | LC | P3, S3 | 1 |
| Alcedinidae Kingfishers | | | | | |
| 281 | Ruddy Kingfisher | <i>Halcyon coromanda</i> | LC | S4 | 1 |
| 282 | Black-capped Kingfisher | <i>Halcyon pileata</i> | LC | S3 | 1 |
| 283 | Common Kingfisher | <i>Alcedo atthis</i> | LC | S3, R5 | 1 |
| Bucerotiformes | | | | | |
| Upupidae Hoopoes | | | | | |
| 284 | Eurasian Hoopoe | <i>Upupa epops</i> | LC | S3, WV1 | 1 |
| Piciformes | | | | | |
| Picidae Woodpeckers | | | | | |
| 285 | Eurasian Wryneck | <i>Jynx torquilla</i> | LC | P4, WV2 | 0 |
| 286 | Rufous-bellied Woodpecker | <i>Dendrocopos hyperythrus</i> | LC | PV1 | 0 |
| 287 | Japanese Pygmy Woodpecker | <i>Dendrocopos kizuki</i> | LC | R1 | 1 |
| 288 | Grey-capped Pygmy Woodpecker | <i>Dendrocopos canicapillus</i> | LC | R5 | 1 |
| 289 | White-backed Woodpecker | <i>Dendrocopos leucotos</i> | LC | R2 | 1 |
| 290 | Great Spotted Woodpecker | <i>Dendrocopos major</i> | LC | R1 | 1 |
| 291 | Tristram's Woodpecker | <i>Dryocopus javensis</i> | LC | DD | 1 |
| 292 | Black Woodpecker | <i>Dryocopus martius</i> | LC | R3 | 1 |
| 293 | Grey-headed Woodpecker | <i>Picus canus</i> | LC | R2 | 1 |
| Falconiformes | | | | | |
| Falconidae Caracaras, Falcons | | | | | |
| 294 | Common Kestrel | <i>Falco tinnunculus</i> | LC | W3, P3, R4 | 1 |
| 295 | Amur Falcon | <i>Falco amurensis</i> | LC | P4 | 0 |
| 296 | Merlin | <i>Falco columbarius</i> | LC | W5, P5 | 0 |
| 297 | Eurasian Hobby | <i>Falco subbuteo</i> | LC | P3, S4 | 1 |
| 298 | Saker Falcon | <i>Falco cherrug</i> | EN | V1 | 0 |
| 299 | Gyr Falcon | <i>Falco rusticolus</i> | LC | V2 | 0 |
| 300 | Peregrine Falcon | <i>Falco peregrinus</i> | LC | R3, W4, P4 | 1 |
| Passeriformes | | | | | |
| Pittidae Pittas | | | | | |
| 301 | Fairy Pitta | <i>Pitta nympha</i> | VU | S4 | 1 |
| 302 | Blue-winged Pitta | <i>Pitta moluccensis</i> | LC | V2 | 0 |
| Artamidae Woodswallows | | | | | |
| 303 | Ashy Woodswallow | <i>Artamus fuscus</i> | LC | V2 | 0 |
| Campephagidae Cuckooshrikes | | | | | |
| 304 | Black-winged Cuckooshrike | <i>Coracina melaschistos</i> | LC | V2 | 0 |

| | | | GCS | Status | Breeds |
|------------------------------------|---------------------------|----------------------------------|-----|--------------|--------|
| 305 | Ashy Minivet | <i>Pericrocotus divaricatus</i> | LC | P3 | 0 |
| 306 | Ryukyu Minivet | <i>Pericrocotus tegimae</i> | LC | V2 | 0 |
| Laniidae Shrikes | | | | | |
| 307 | Tiger Shrike | <i>Lanius tigrinus</i> | LC | P4, S4 | 1 |
| 308 | Bull-headed Shrike | <i>Lanius bucephalus</i> | LC | R2, P4 | 1 |
| 309 | Brown Shrike | <i>Lanius cristatus</i> | LC | P3, S5 | 1 |
| 310 | Red-backed Shrike | <i>Lanius collurio</i> | LC | V2 | 0 |
| 311 | Long-tailed Shrike | <i>Lanius schach</i> | LC | P5, WV1, SV2 | 0 |
| 312 | Great Grey Shrike | <i>Lanius excubitor</i> | LC | V2 | 0 |
| 313 | Steppe Grey Shrike | <i>Lanius pallidirostris</i> | NR | V2 | 0 |
| 314 | Chinese Grey Shrike | <i>Lanius sphenocercus</i> | LC | P5, W5, RV2 | 2 |
| Oriolidae Figbirds, Orioles | | | | | |
| 315 | Black-naped Oriole | <i>Oriolus chinensis</i> | LC | S2, P2 | 1 |
| Dicruridae Drongos | | | | | |
| 316 | Black Drongo | <i>Dicrurus macrocercus</i> | LC | P5 | 0 |
| 317 | Ashy Drongo | <i>Dicrurus leucophaeus</i> | LC | V1 | 0 |
| 318 | Hair-crested Drongo | <i>Dicrurus hottentottus</i> | LC | V1 | 0 |
| Monarchidae Monarchs | | | | | |
| 319 | Asian Paradise Flycatcher | <i>Terpsiphone paradisi</i> | LC | V1 | 0 |
| 320 | Black Paradise Flycatcher | <i>Terpsiphone atrocaudata</i> | NT | S4, P5 | 1 |
| Corvidae Crows, Jays | | | | | |
| 321 | Eurasian Jay | <i>Garrulus glandarius</i> | LC | R1 | 1 |
| 322 | Azure-winged Magpie | <i>Cyanopica cyanus</i> | NR | R2 | 1 |
| 323 | Eurasian Magpie | <i>Pica pica</i> | LC | R1 | 1 |
| 324 | Spotted Nutcracker | <i>Nucifraga caryocatactes</i> | LC | R5 | 2 |
| 325 | Daurian Jackdaw | <i>Coloeus dauuricus</i> | LC | P4, W4 | 0 |
| 326 | House Crow | <i>Corvus splendens</i> | LC | V2 | 0 |
| 327 | Rook | <i>Corvus frugilegus</i> | LC | W2, P2 | 0 |
| 328 | Carion Crow | <i>Corvus corone</i> | LC | W3, R4 | 1 |
| 329 | Large-billed Crow | <i>Corvus macrorhynchos</i> | LC | R1 | 1 |
| Bombycillidae Waxwings | | | | | |
| 330 | Bohemian Waxwing | <i>Bombycilla garrulus</i> | LC | W4, P4 | 0 |
| 331 | Japanese Waxwing | <i>Bombycilla japonica</i> | NT | W4, P4 | 0 |
| Paridae Tits, chickadees | | | | | |
| 332 | Coal Tit | <i>Pariparus ater</i> | LC | R1, W1 | 1 |
| 333 | Yellow-bellied Tit | <i>Pardaliparus venustulus</i> | LC | P5, W5 | 2 |
| 334 | Varied Tit | <i>Sittiparus varius</i> | LC | R1 | 1 |
| 335 | Marsh Tit | <i>Poecile palustris</i> | LC | R1 | 1 |
| 336 | Willow Tit | <i>Poecile montanus</i> | LC | V2 | 0 |
| 337 | Northern Great Tit | <i>Parus major</i> | LC | V2 | 0 |
| 338 | Eastern Great Tit | <i>Parus minor</i> | NR | R1, W1 | 1 |
| Remizidae Penduline Tits | | | | | |
| 339 | Chinese Penduline Tit | <i>Remiz consobrinus</i> | LC | P3, W4 | 0 |
| Panuridae Bearded Reedling | | | | | |
| 340 | Bearded Reedling | <i>Panurus biarmicus</i> | LC | V2 | 0 |
| Alaudidae Larks | | | | | |
| 341 | Greater Short-toed Lark | <i>Calandrella brachydactyla</i> | LC | P4 | 0 |
| 342 | Asian Short-toed Lark | <i>Calandrella cheleensis</i> | LC | V1 | 0 |
| 343 | Crested Lark | <i>Galerida cristata</i> | LC | RV1 | 1 |
| 344 | Eurasian Skylark | <i>Alauda arvensis</i> | LC | W4, R5 | 1 |
| 345 | • Far Eastern Skylark | • <i>Alauda japonica</i> | LC | W3, R4 | 1 |
| 346 | Horned Lark | <i>Eremophila alpestris</i> | LC | V2 | 0 |

| | | | GCS | Status | Breeds |
|--------------------------------------------------|-----------------------------------|-----------------------------------|-----|--------------|--------|
| Pycnonotidae Bulbuls | | | | | |
| 347 | Light-vented Bulbul | <i>Pycnonotus sinensis</i> | LC | S4, P5, R5 | 1 |
| 348 | Brown-eared Bulbul | <i>Hypsipetes amaurotis</i> | LC | R1, P2 | 1 |
| Hirundinidae Swallows, martins | | | | | |
| 349 | Sand Martin | <i>Riparia riparia</i> | LC | P4 | 0 |
| 350 | Pale Martin | <i>Riparia diluta</i> | NR | V2 | 0 |
| 351 | Barn Swallow | <i>Hirundo rustica</i> | LC | P1, S2, WV2 | 1 |
| 352 | Eurasian Crag Martin | <i>Ptyonoprogne rupestris</i> | LC | V2 | 0 |
| 353 | Common House Martin | <i>Delichon urbicum</i> | LC | P5 | 0 |
| 354 | Asian House Martin | <i>Delichon dasypus</i> | LC | P3, SV2, WV2 | 1 |
| 355 | Red-rumped Swallow | <i>Cecropis daurica</i> | LC | P1, S3 | 1 |
| Cettiidae Cettia bush warblers and allies | | | | | |
| 356 | Japanese Bush Warbler | <i>Horomis diphone</i> | LC | R3, W3 | 1 |
| 357 | Korean Bush Warbler | <i>Horomis borealis</i> | LC | P3, S4, WV2 | 1 |
| 358 | Asian Stubtail | <i>Urosphena squameiceps</i> | LC | P2, S3 | 1 |
| Aegithalidae Bushtits | | | | | |
| 359 | Long-tailed Tit | <i>Aegithalos caudatus</i> | LC | R1 | 1 |
| Phylloscopidae Leaf warblers and allies | | | | | |
| 360 | Willow Warbler | <i>Phylloscopus trochilus</i> | LC | V2 | 0 |
| 361 | Siberian Chiffchaff | <i>Phylloscopus collybita</i> | LC | V1 | 0 |
| 362 | Wood Warbler | <i>Phylloscopus sibilatrix</i> | LC | V2 | 0 |
| 363 | Dusky Warbler | <i>Phylloscopus fuscatus</i> | LC | P3, S4, WV2 | 1 |
| 364 | Alpine Leaf Warbler | <i>Phylloscopus occisinensis</i> | NR | V2 | 0 |
| 365 | Yellow-streaked Warbler | <i>Phylloscopus armandii</i> | LC | V2 | 0 |
| 366 | Radde's Warbler | <i>Phylloscopus schwarzi</i> | LC | P4, S5 | 1 |
| 367 | Pallas's Leaf Warbler | <i>Phylloscopus proregulus</i> | LC | P3, S5, WV2 | 1 |
| 368 | Yellow-browed Warbler | <i>Phylloscopus inornatus</i> | LC | P1, WV2 | 0 |
| 369 | Hume's Leaf Warbler | <i>Phylloscopus humei</i> | LC | P5 | 0 |
| 370 | Arctic Warbler | <i>Phylloscopus borealis</i> | LC | P2 | 0 |
| 371 | Kamchatka Leaf Warbler | <i>Phylloscopus examinandus</i> | NR | P4 | 0 |
| 372 | Japanese Leaf Warbler | <i>Phylloscopus xanthodryas</i> | NR | P5 | 0 |
| 373 | Two-barred Warbler | <i>Phylloscopus plumbeitarsus</i> | NR | P4, S5 | 1 |
| 374 | Pale-legged Leaf Warbler | <i>Phylloscopus tenellipes</i> | LC | P3, S3 | 1 |
| 375 | Sakhalin Leaf Warbler | <i>Phylloscopus borealoides</i> | LC | V1 | 0 |
| 376 | Eastern Crowned Warbler | <i>Phylloscopus coronatus</i> | LC | S2, P3 | 1 |
| 377 | Claudia's Leaf Warbler | <i>Phylloscopus claudiae</i> | LC | V2 | 0 |
| Acrocephalidae Reed warblers and allies | | | | | |
| 378 | Oriental Reed Warbler | <i>Acrocephalus orientalis</i> | NR | S2, P3 | 1 |
| 379 | Black-browed Reed Warbler | <i>Acrocephalus bistrigiceps</i> | LC | P3, S5 | 1 |
| 380 | Manchurian Reed Warbler | <i>Acrocephalus tangorum</i> | VU | V2 | 0 |
| 381 | Paddyfield Warbler | <i>Acrocephalus agricola</i> | LC | V2 | 0 |
| 382 | Thick-billed Warbler | <i>Iduna aedon</i> | LC | P4 | 0 |
| 383 | Booted Warbler | <i>Iduna caligata</i> | LC | V2 | 0 |
| Locustellidae Grassbirds and allies | | | | | |
| 384 | Baikal Bush Warbler | <i>Locustella davidi</i> | LC | V1 | 0 |
| 385 | Lanceolated Warbler | <i>Locustella lanceolata</i> | LC | P3 | 0 |
| 386 | Middendorff's Grasshopper Warbler | <i>Locustella ochotensis</i> | LC | P4 | 0 |
| 387 | Styan's Grasshopper Warbler | <i>Locustella pleskei</i> | VU | S3, P4 | 1 |
| 388 | Pallas's Grasshopper Warbler | <i>Locustella certhiola</i> | LC | P3, WV2 | 0 |
| 389 | Gray's Grasshopper Warbler | <i>Locustella fasciolata</i> | LC | P4 | 0 |
| Cisticolidae Cisticolas and allies | | | | | |
| 390 | Far Eastern Cisticola | <i>Cisticola juncidis</i> | LC | S3, R5 | 1 |

| | | | GCS | Status | Breeds |
|--------------------------------------------------|-----------------------------------|--------------------------------|-----|--------------|--------|
| Sylviidae Sylviid Babblers | | | | | |
| 391 | Barred Warbler | <i>Sylvia nisoria</i> | LC | V2 | 0 |
| 392 | Lesser Whitethroat | <i>Sylvia curruca</i> | LC | V2 | 0 |
| Timaliidae Babblers, Parrotbills | | | | | |
| 393 | Vinous-throated Parrotbill | <i>Sinosuthora webbiana</i> | LC | R1 | 1 |
| Zosteropidae White-eyes | | | | | |
| 394 | Chestnut-flanked White-eye | <i>Zosterops erythroleurus</i> | LC | P3 | 0 |
| 395 | Japanese White-eye | <i>Zosterops japonicus</i> | LC | R2, P4 | 1 |
| Regulidae Goldcrests, kinglets | | | | | |
| 396 | Goldcrest | <i>Regulus regulus</i> | LC | W2, P2 | 0 |
| Troglodytidae Wrens | | | | | |
| 397 | Eurasian Wren | <i>Troglodytes troglodytes</i> | LC | W2, R3 | 1 |
| Sittidae Nuthatches | | | | | |
| 398 | Eurasian Nuthatch | <i>Sitta europaea</i> | LC | R2 | 1 |
| 399 | Chinese Nuthatch | <i>Sitta villosa</i> | LC | WV1 | 0 |
| Certhiidae Treecreepers | | | | | |
| 400 | Eurasian Treecreeper | <i>Certhia familiaris</i> | LC | W5, R5 | 1 |
| Sturnidae Starlings | | | | | |
| 401 | Red-billed Starling | <i>Spodiopsar sericeus</i> | LC | P4, S5, W5 | 1 |
| 402 | White-cheeked Starling | <i>Spodiopsar cineraceus</i> | LC | W3, R3 | 1 |
| 403 | Daurian Starling | <i>Agropsar sturninus</i> | LC | P4, SV1 | 1 |
| 404 | Chestnut-cheeked Starling | <i>Agropsar philippensis</i> | LC | P4, SV2, WV2 | 1 |
| 405 | White-shouldered Starling | <i>Stumia sinensis</i> | LC | PV1 | 0 |
| 406 | Rosy Starling | <i>Pastor roseus</i> | LC | V2 | 0 |
| 407 | Common Starling | <i>Stumus vulgaris</i> | LC | W4, P4 | 0 |
| Turdidae Thrushes | | | | | |
| 408 | Orange-headed Thrush | <i>Geokichla citrina</i> | LC | V2 | 0 |
| 409 | Siberian Thrush | <i>Geokichla sibirica</i> | LC | P4, SV2 | 0 |
| 410 | White's Thrush | <i>Zoothera aurea</i> | NR | P2, S2, R4 | 1 |
| 411 | Grey-backed Thrush | <i>Turdus hortulorum</i> | LC | P2, S3, WV2 | 1 |
| 412 | Grey Thrush | <i>Turdus cardis</i> | LC | P4 | 0 |
| 413 | Chinese Blackbird | <i>Turdus merula</i> | LC | P5, SV2, WV2 | 1 |
| 414 | Eyebrowed Thrush | <i>Turdus obscurus</i> | LC | P2 | 0 |
| 415 | Pale Thrush | <i>Turdus pallidus</i> | LC | P2, S1, R3 | 1 |
| 416 | Brown-headed Thrush | <i>Turdus chrysolaus</i> | LC | P4 | 0 |
| 417 | Black-throated Thrush | <i>Turdus atrogularis</i> | NR | V1 | 0 |
| 418 | Red-throated Thrush | <i>Turdus ruficollis</i> | NR | P5, WV1 | 0 |
| 419 | Naumann's Thrush | <i>Turdus naumanni</i> | NR | P3, W2 | 0 |
| 420 | Dusky Thrush | <i>Turdus eunomus</i> | NR | P2, W3 | 0 |
| 421 | Fieldfare | <i>Turdus pilaris</i> | LC | V2 | 0 |
| 422 | Redwing | <i>Turdus iliacus</i> | LC | V2 | 0 |
| 423 | Chinese Thrush | <i>Turdus mupinensis</i> | LC | V2 | 0 |
| Muscicapidae Chats, Old World Flycatchers | | | | | |
| 424 | Grey-streaked Flycatcher | <i>Muscicapa griseisticta</i> | LC | P3 | 0 |
| 425 | Dark-sided Flycatcher | <i>Muscicapa sibirica</i> | LC | P3 | 0 |
| 426 | Asian Brown Flycatcher | <i>Muscicapa latirostris</i> | LC | P2, S4 | 1 |
| 427 | Ferruginous Flycatcher | <i>Muscicapa ferruginea</i> | LC | V2 | 0 |
| 428 | Chinese Blue Flycatcher | <i>Cyornis glaucicomans</i> | NR | V2 | 0 |
| 429 | Fujian Niltava | <i>Niltava davidi</i> | LC | V2 | 0 |
| 430 | Blue-and-white Flycatcher | <i>Cyanoptila cyanomelana</i> | LC | P2, S2 | 1 |
| 431 | Zappey's Flycatcher | <i>Cyanoptila cumatilis</i> | NR | V2 | 0 |
| 432 | Verditer Flycatcher | <i>Eumyias thalassinus</i> | LC | V1 | 0 |
| 433 | European Robin | <i>Erithacus rubecula</i> | LC | V2 | 0 |

| | | | GCS | Status | Breeds |
|--------------------------------------------------|----------------------------|----------------------------------|-----|-------------|--------|
| 434 | Siberian Blue Robin | <i>Larivora cyane</i> | LC | P3, S3 | 1 |
| 435 | Rufous-tailed Robin | <i>Larivora sibilans</i> | LC | P3 | 0 |
| 436 | Japanese Robin | <i>Larivora akahige</i> | LC | P5, WV2 | 0 |
| 437 | Bluethroat | <i>Luscinia svecica</i> | LC | P5, WV2 | 0 |
| 438 | Siberian Rubythroat | <i>Calliope calliope</i> | LC | P3, S4, WV2 | 1 |
| 439 | Red-flanked Bluetail | <i>Tarsiger cyanurus</i> | LC | P1, W4 | 0 |
| 440 | Yellow-rumped Flycatcher | <i>Ficedula zanthopygia</i> | LC | P3, S3 | 1 |
| 441 | Narcissus Flycatcher | <i>Ficedula narcissina</i> | LC | P3 | 0 |
| 442 | Green-backed Flycatcher | <i>Ficedula elisae</i> | NR | V2 | 0 |
| 443 | Mugimaki Flycatcher | <i>Ficedula mugimaki</i> | LC | P3 | 0 |
| 444 | Red-breasted Flycatcher | <i>Ficedula parva</i> | LC | V1 | 0 |
| 445 | Taiga Flycatcher | <i>Ficedula albicilla</i> | LC | P4 | 0 |
| 446 | Eastern Black Redstart | <i>Phoenicurus ochruros</i> | LC | PV1 | 0 |
| 447 | Daurian Redstart | <i>Phoenicurus aureus</i> | LC | R1, W2 | 1 |
| 448 | Plumbeous Water Redstart | <i>Phoenicurus fuliginosus</i> | LC | V1 | 1 |
| 449 | White-capped Redstart | <i>Phoenicurus leucocephalus</i> | LC | V2 | 0 |
| 450 | Blue Rock Thrush | <i>Monticola solitarius</i> | LC | S3, R4 | 1 |
| 451 | White-throated Rock Thrush | <i>Monticola gularis</i> | LC | P3 | 0 |
| 452 | Stejneger's Stonechat | <i>Saxicola stejnegeri</i> | NR | P2, S3, WV2 | 1 |
| 453 | Grey Bush Chat | <i>Saxicola ferreus</i> | LC | V1 | 0 |
| 454 | Northern Wheatear | <i>Oenanthe oenanthe</i> | LC | V2 | 0 |
| 455 | Isabelline Wheatear | <i>Oenanthe isabellina</i> | LC | V2 | 0 |
| 456 | Desert Wheatear | <i>Oenanthe deserti</i> | LC | V2 | 0 |
| 457 | Pied Wheatear | <i>Oenanthe pleschanka</i> | LC | PV1 | 0 |
| Cinclidae Dippers | | | | | |
| 458 | Brown Dipper | <i>Cinclus pallasii</i> | LC | R3 | 1 |
| Passeridae Old World Sparrows | | | | | |
| 459 | House Sparrow | <i>Passer domesticus</i> | LC | V2 | 0 |
| 460 | Russet Sparrow | <i>Passer rutilans</i> | LC | R4, P5 | 1 |
| 461 | Eurasian Tree Sparrow | <i>Passer montanus</i> | LC | R1 | 1 |
| Estrildidae Waxbills, Munias & Allies | | | | | |
| 462 | Scaly-breasted Munia | <i>Lonchura punctulata</i> | LC | V2 | 0 |
| Prunellidae Accentors | | | | | |
| 463 | Alpine Accentor | <i>Prunella collaris</i> | LC | W4 | 0 |
| 464 | Siberian Accentor | <i>Prunella montanella</i> | LC | W2 | 0 |
| 465 | Japanese Accentor | <i>Prunella rubida</i> | LC | V2 | 0 |
| Motacillidae Wagtails, Pipits | | | | | |
| 466 | Forest Wagtail | <i>Dendronanthus indicus</i> | LC | P4, S5 | 1 |
| 467 | Western Yellow Wagtail | <i>Motacilla flava</i> | LC | DD | 0 |
| 468 | Eastern Yellow Wagtail | <i>Motacilla tschutschensis</i> | NR | P2, WV2 | 0 |
| 469 | Citrine Wagtail | <i>Motacilla citreola</i> | LC | P5 | 0 |
| 470 | Grey Wagtail | <i>Motacilla cinerea</i> | LC | P2, S3, R5 | 1 |
| 471 | White Wagtail | <i>Motacilla alba</i> | LC | P1, S2, W3 | 1 |
| 472 | Japanese Wagtail | <i>Motacilla grandis</i> | LC | R3 | 1 |
| 473 | Richard's Pipit | <i>Anthus richardi</i> | LC | P3, WV2 | 0 |
| 474 | Blyth's Pipit | <i>Anthus godlewskii</i> | LC | P5 | 0 |
| 475 | Meadow Pipit | <i>Anthus pratensis</i> | LC | V2 | 0 |
| 476 | Tree Pipit | <i>Anthus trivialis</i> | LC | PV1 | 0 |
| 477 | Olive-backed Pipit | <i>Anthus hodgsoni</i> | LC | P1, W3, SV1 | 1 |
| 478 | Pechora Pipit | <i>Anthus gustavi</i> | LC | P3 | 0 |
| 479 | Rosy Pipit | <i>Anthus roseatus</i> | LC | V2 | 0 |
| 480 | Red-throated Pipit | <i>Anthus cervinus</i> | LC | P3, WV1 | 0 |
| 481 | Buff-bellied Pipit | <i>Anthus rubescens</i> | LC | P2, W3 | 0 |

| | | | GCS | Status | Breeds |
|--------------------------------------------------------------|--------------------------------|--------------------------------------|-----|-------------|--------|
| 482 | Water Pipit | <i>Anthus spinoletta</i> | LC | V1 | 0 |
| Fringillidae Finches | | | | | |
| 483 | Brambling | <i>Coelebs montifringilla</i> | LC | P1, W2 | 0 |
| 484 | Hawfinch | <i>Coccothraustes coccothraustes</i> | LC | W2 | 0 |
| 485 | Chinese Grosbeak | <i>Eophona migratoria</i> | LC | S4, W5 | 1 |
| 486 | Japanese Grosbeak | <i>Eophona personata</i> | LC | P5, W5 | 0 |
| 487 | Pine Grosbeak | <i>Pinicola enucleator</i> | | V2 | 0 |
| 488 | Eurasian Bullfinch | <i>Pyrrhula pyrrhula</i> | LC | W3 | 0 |
| 489 | Asian Rosy Finch | <i>Leucosticte arctoa</i> | LC | WV1 | 0 |
| 490 | Common Rosefinch | <i>Carpodacus erythrinus</i> | LC | P4, WV2 | 0 |
| 491 | Long-tailed Rosefinch | <i>Carpodacus sibiricus</i> | LC | P3, W3 | 0 |
| 492 | Pallas's Rosefinch | <i>Carpodacus roseus</i> | LC | W4, P4 | 0 |
| 493 | Grey-capped Greenfinch | <i>Chloris sinica</i> | LC | R2, W2 | 1 |
| 494 | Common Redpoll | <i>Acanthis flammea</i> | LC | WV1 | 0 |
| 495 | Arctic Redpoll | <i>Acanthis hornemanni</i> | NR | V2 | 0 |
| 496 | Red Crossbill | <i>Loxia curvirostra</i> | LC | W4, SV2 | 2 |
| 497 | Eurasian Siskin | <i>Spinus spinus</i> | LC | P1, W2, SV2 | 2 |
| Emberizidae Buntings, New World Sparrows & Allies | | | | | |
| 498 | Yellowhammer | <i>Emberiza citrinella</i> | LC | V2 | 0 |
| 499 | Pine Bunting | <i>Emberiza leucocephalos</i> | LC | V1 | 0 |
| 500 | Godlewski's Bunting | <i>Emberiza godlewskii</i> | LC | V2 | 0 |
| 501 | Meadow Bunting | <i>Emberiza cioides</i> | LC | R3, W3 | 1 |
| 502 | Ortolan Bunting | <i>Emberiza hortulana</i> | LC | V2 | 0 |
| 503 | Tristram's Bunting | <i>Emberiza tristrami</i> | LC | P3, S4, WV1 | 1 |
| 504 | Chestnut-eared Bunting | <i>Emberiza fucata</i> | LC | P4, S4, W4 | 1 |
| 505 | Little Bunting | <i>Emberiza pusilla</i> | LC | P2, W4 | 0 |
| 506 | Yellow-browed Bunting | <i>Emberiza chrysophrys</i> | LC | P3 | 0 |
| 507 | Rustic Bunting | <i>Emberiza rustica</i> | LC | P2, W2 | 0 |
| 508 | Yellow-throated Bunting | <i>Emberiza elegans</i> | LC | W1, P2, R2 | 1 |
| 509 | Yellow-breasted Bunting | <i>Emberiza aureola</i> | EN | P4 | 0 |
| 510 | Chestnut Bunting | <i>Emberiza rutila</i> | LC | P2, WV2 | 0 |
| 511 | Black-headed Bunting | <i>Emberiza melanocephala</i> | LC | V1 | 0 |
| 512 | Red-headed Bunting | <i>Emberiza bruniceps</i> | LC | V2 | 0 |
| 513 | Yellow Bunting | <i>Emberiza sulphurata</i> | VU | P4 | 0 |
| 514 | Black-faced Bunting | <i>Emberiza spodocephala</i> | LC | P1, W4, SV2 | 2 |
| 515 | Grey Bunting | <i>Emberiza variabilis</i> | LC | W5, PV1 | 0 |
| 516 | Pallas's Reed Bunting | <i>Emberiza pallasii</i> | LC | P2, W2 | 0 |
| 517 | Ochre-rumped Bunting | <i>Emberiza yessoensis</i> | NT | P5, W5 | 0 |
| 518 | Common Reed Bunting | <i>Emberiza schoeniclus</i> | LC | W3 | 0 |
| 519 | White-crowned Sparrow | <i>Zonotrichia leucophrys</i> | LC | V2 | 0 |
| 520 | Golden-crowned Sparrow | <i>Zonotrichia atricapilla</i> | LC | V2 | 0 |
| 521 | Savannah Sparrow | <i>Passerculus sandwichensis</i> | LC | V2 | 0 |
| Calcariidae Longspurs, snow buntings | | | | | |
| 522 | Lapland Longspur | <i>Calcarius lapponicus</i> | LC | W3 | 0 |
| 523 | Snow Bunting | <i>Plectrophenax nivalis</i> | LC | V1 | 0 |

Category 2:

Species of bird (and their subspecies) recorded in the Republic of Korea before 1980, supported by photographs or specimens, which have not been recorded after 1980 with the same level of documentation.

Anseriformes

Anatidae Ducks, Geese & Swans

| Anatidae Ducks, Geese & Swans | | | GCS | Status | Breeds |
|-------------------------------|------------------|-------------------------|-----|--------|--------|
| 524 | Crested Shelduck | <i>Tadorna cristata</i> | CR | V2 | 0 |

Procellariiformes

Diomedidae Albatrosses

| | | | | | |
|-----|------------------------|-----------------------------|----|----|---|
| 525 | Short-tailed Albatross | <i>Phoebastria albatrus</i> | VU | V2 | 0 |
|-----|------------------------|-----------------------------|----|----|---|

Pelecaniformes

Threskiornithidae Ibises

| | | | | | |
|-----|--------------|------------------------|----|----------|---|
| 526 | Crested Ibis | <i>Nipponia nippon</i> | EN | (W3, P5) | 0 |
|-----|--------------|------------------------|----|----------|---|

Pelecanidae Pelicans

| | | | | | |
|-----|---------------------|------------------------------|----|----|---|
| 527 | Great White Pelican | <i>Pelecanus onocrotalus</i> | LC | V2 | 0 |
| 528 | Dalmatian Pelican | <i>Pelecanus crispus</i> | VU | V2 | 0 |

Accipitriformes

Accipitridae Kites, Hawks & Eagles

| | | | | | |
|-----|---------------------|----------------------------|----|----|---|
| 529 | Mountain Hawk-Eagle | <i>Nisaetus nipalensis</i> | LC | V2 | 0 |
|-----|---------------------|----------------------------|----|----|---|

Otidiformes

Otididae Bustards

| | | | | | |
|-----|---------------|-------------------|----|------|---|
| 530 | Great Bustard | <i>Otis tarda</i> | VU | (W4) | 0 |
|-----|---------------|-------------------|----|------|---|

Pteroclidiformes

Pteroclididae Sandgrouse

| | | | | | |
|-----|---------------------|----------------------------|----|----|---|
| 531 | Pallas's Sandgrouse | <i>Syrhaptes paradoxus</i> | LC | V2 | 0 |
|-----|---------------------|----------------------------|----|----|---|

Coraciiformes

Alcedinidae Kingfishers

| | | | | | |
|-----|--------------------|----------------------------|----|----|---|
| 532 | Crested Kingfisher | <i>Megaceryle lugubris</i> | LC | V2 | 0 |
|-----|--------------------|----------------------------|----|----|---|

Passeriformes

Locustellidae Grassbirds and allies

| | | | | | |
|-----|-----------------|--------------------------|----|----|---|
| 533 | Marsh Grassbird | <i>Locustella pryeri</i> | NT | V2 | 0 |
|-----|-----------------|--------------------------|----|----|---|

Timaliidae Babbler, Parrotbills

| | | | | | |
|-----|----------------------|-------------------------------|----|----|---|
| 534 | Chinese Hill Warbler | <i>Rhopophilus pekinensis</i> | LC | V2 | 0 |
|-----|----------------------|-------------------------------|----|----|---|

Fringillidae Finches

| | | | | | |
|-----|----------------------|-------------------------|----|----|---|
| 535 | Two-barred Crossbill | <i>Loxia leucoptera</i> | LC | V2 | 0 |
|-----|----------------------|-------------------------|----|----|---|

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