NEASPEC
NORTH-EAST ASIAN SUBREGIONAL PROGRAMME FOR ENVIRONMENTAL COOPERATION

RASON MIGRATORY BIRD RESERVE : *BIRDS AND HABITATS*

DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA

UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific
EAST AND NORTH-EAST ASIA OFFICE

Hanns Seidel Foundation

UNITED NATIONS
ESCAP
Economic and Social Commission for Asia and the Pacific
East and North-East Asia Office

Since its inauguration in 2010, the United Nations Economic and Social Commission for Asia and the Pacific: East and North-East Asia Office (ESCAP-ENEA) has been a subregional platform for multilateral partnerships and intergovernmental cooperation for inclusive and sustainable development in Northeast Asia. It works with six member States of ESCAP in the subregion, namely China, Democratic People's Republic of Korea, Japan, Mongolia, Republic of Korea and the Russian Federation, and two associate members, Hong Kong and Macau.

ESCAP-ENEA also serves as the Secretariat of the North-East Asian Subregional Programme for Environmental Cooperation (NEASPEC).

For more information, please visit http://enea.unescap.org/ and http://www.neaspec.org/

Hanns
Seidel
Foundation

The Hanns-Seidel-Foundation (HSS) is an independent German think-tank headquartered in Munich (Bavaria), and its Korea Office (in Seoul) was established in 1987. HSS Korea Office works on the reconciliation of the Korean Peninsula and capacity-building in the fields of economy and trade in the Democratic People's Republic of Korea. It has been continuously carrying out projects to improve local administration and autonomy and the position of women in politics and society.

For more information, please visit http://www.hss.de

RASON MIGRATORY BIRD RESERVE :
BIRDS AND HABITATS

DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA

2014

Preface

North-East Asia is home to numerous migratory bird species. Some of these species are endangered and many are threatened. They need our immediate attention at putting in place effective measures for their conservation. Because of their migratory nature, the quality and connectivity of habitats along their flyways are crucial for feeding, stopping-over, wintering and breeding. Rapid development in the subregion and the resulting habitat fragmentation and degradation are posing severe threats to migratory birds, significantly reducing the availability of high quality habitats needed for their various life stages.

In order to effectively manage and protect these habitats for the conservation of migratory birds, we must understand the conditions, threats and potential of their key habitats. While it is difficult even in a single jurisdiction, it is particularly challenging in transboundary habitats where the level of available information, as well as habitat management practices can significantly differ. It is therefore essential that countries work closely together in drawing up of a transboundary habitat management/conservation plan.

North-East Asia witnessed increased international cooperation in recent years in protecting migratory birds. The North-East Asian Subregional Programme for Environmental Cooperation (NEASPEC) has been working on promoting environmental cooperation in the subregion since 1993. It has recently launched a nature conservation project to conserve key habitats of migratory birds, which includes studies on transboundary habitats in North-East Asia to improve scientific understanding and cooperation among countries. The Hanns-Seidel-Foundation has been working on sustainable livelihood, afforestation and crane protection in Democratic People's Republic of Korea (DPRK).

In view of the need for a more complete picture of the Tumen River Delta habitat located at the border of China, DPRK and the Russian Federation, HSS joined hands with UNESCAP East and North-East Asia Office which serves as the Secretariat of NEASPEC, to conduct field survey with a team of international experts at Rason Migratory Bird Reserve in March 2014.

This field survey has produced the first makings of baseline information of the habitat, and most importantly, it confirmed that the Reserve meets Ramsar criteria as an 'internationally important wetland' and that it supports over a hundred species of birds.

We are pleased to present this preliminary but encouraging news of the Reserve as a high quality stopover and breeding habitat. It marks a key step in developing better insight into the Tumen River Delta habitat. It is our hope that this field survey and its follow-up work will provide the technical basis for international cooperation in conserving this important transboundary habitat.

Bernhard Seliger
Resident Representative
Hanns-Seidel-Foundation
Korea Office

Kilaparti Ramakrishna
Head
ESCAP East and North-East
Asia Office

Acknowledgements

This report is prepared based on valuable field input and advice from the team of experts including Cai Lu (Beijing Forestry University), Spike Millington (East Asian-Australasian Flyway Partnership), Nial Moores (Birds Korea), Oliver Radtke (Robert Bosch Foundation), Yury Shibaev and Sergei Surmach (Far East Branch of Russian Academy of Sciences), and Wei Hong Zhu (Yanbian University) who participated in a field survey in Rason Migratory Bird Reserve during 26-31 March 2014.

Extensive mapping and geographical information contributions were made by Cai Lu, Gongqi Sun and Jiyuan Fan (Beijing Forestry University), Tau Chia Cham (ESCAP-ENEA) and Wei Hong Zhu (Yanbian University).

Various technical inputs were also received from Jong-Ryol Chong (Korea University in Tokyo), Sunyoung Bak and Kyungwon Kim (Korean Society of Environment and Ecology).

The team of report preparation includes Gabrielle Chan, Sangmin Nam and Mi-jin Lee (ESCAP-ENEA). The report is designed by Da-young Ahn.

Table of Contents

01 Background

In 1959, DPRK established the first group of four nature reserves and four seabird reserves according to the Decision of the Cabinet on the Protection of Useful Animals and Plants. Since then, the Government has expanded the protected areas under the categories of strict nature protected areas, natural parks, natural monument areas, habitat/species protection areas, landscape protection areas, and resources management protection areas, covering approximately 7.3% of the territory. As of 2014, 24 migratory bird (wetlands/ breeding area) reserves have been designated. Amongst these reserves, habitats of NEASPEC target species, i.e. White-naped Crane (WC), Hooded Crane (HC) and Black-faced Spoonbill (BFS) are as follows:

Table 1
DPRK Migratory Bird Reserves with NEASPEC Target Species

	DPRK Migratory Bird Reserves	WC	HC	BFS
1	Mundok Migratory Bird (Wetland) Reserve	●	●	
2	Ryongyon White-naped crane Reserve	●	●	●
3	Sindo Migratory Bird (Wetland) Reserve	●	●	
4	Rason Migratory Bird (Wetland) Reserve	●	●	
5	Kumya Migratory Bird (Wetland) Reserve	●		
6	Island Taegam and Island Sogam Sea Bird Breeding Protected Area			●
7	Island Tok Sea Bird Breeding Reserve			●
8	Kwangpo Migratory Bird (Wetland) Reserve	●		
9	Unryul Migratory Bird (Wetland) Reserve			●
10	September 18 Reservoir Migratory Bird Reserve	●	●	●
11	Ongjin Migratory Bird (Wetland) Reserve	●		●
12	Chongdan Migratory Bird (Wetland) Reserve			●
13	Orangchon Migratory Bird (Wetland) Reserve	●		

DPRK has conducted several follow-up assessments such as a general investigation of wetlands in 1997 and an investigation of protected areas during 2000-2001 to update the database and identify threats to conservation. Nonetheless, there are pressing issues threatening the country's ecosystem, for instance, degraded mountainous forest due to deforestation and climate change; important habitats for migratory birds being under pressure due to development and agriculture; and serious biodiversity loss due to anthropogenic factors.

The "Environment and Climate Change Outlook of DPRK", a report jointly published by DPRK and UNEP in 2012, made the following recommendations to enhance effectiveness and efficiency on migratory bird reserves[1]:

- Representativeness: protected areas should include a representative sample of biodiversity, with more attention to the underrepresented species
- Connectivity: habitats between protected areas, such as (transboundary) ecological corridors, should also be considered for conservation actions
- Priority: areas of significant ecosystem service provision, and threatened or endangered biodiversity should be given more concerns
- Effectiveness: existing actions should be regularly monitored and evaluated, as well as adjusted and improved based on the changing circumstances

Rason Migratory Bird Reserve is one of the thirteen migratory bird reserves with NEASPEC target species observed as shown in Table 1. It is located at the east of Rason Special Economic Zone, which borders China and the Russian Federation, and is adjacent to the Tumen River Estuary.

1 Democratic People's Republic of Korea, Environment and Climate Change Outlook, UNEP (2012)

The Reserve therefore has a vital role in conservation and transboundary cooperation of the overall Delta habitat. It was designated as a category IV reserve (under IUCN criteria) by the Administration Council of Ratification in 1995, as one of the twenty-four migratory bird reserves in DPRK. It covers 3,200 ha (32 km^2) of wetland, rice farmlands, and hilly areas around three natural lakes: Manpo, Dongbonpo and Sobonpo in North Hamgyong Province[2]. The lakes have been used as rice paddy (Lower Sobonpo), for irrigation and aquaculture including prawn-farming, with duck farms at the lakeshore[3].

As a part of Rason Special Economic Zone and the East Asian-Australasian Flyway which is the most threatened migratory bird flyway, it is extremely important that Rason's internationally important habitats are conserved while ensuring that national and regional plans for development are fully respected. Rason is currently undergoing rapid development both within and outside its city centre. This includes establishment of new tourist infrastructure including hotels, restaurants and sightseeing spots, and the conversion of natural habitat into aquaculture farms. For that reason, Rason Special Economic Zone Authority has supported this survey to determine the current status of birds and local habitats, as well as to exchange views on conservation and development.

Research and monitoring on migratory birds in the Chinese and Russian territories of the Tumen River Delta indicates that it is a habitat for thousands of migratory birds including globally vulnerable migratory bird species.

In this connection, Hanns-Seidel-Foundation and UNESCAP East and North-East Asia Office (ENEA), with the generous support of the Economic Cooperation Bureau of the People's Committee of Rason City, conducted a field survey in Rason Migratory Bird Reserve during 26-31 March 2014. With the habitat and birds data generated from this survey, the gap can be filled to provide a much more complete picture of the Tumen River Delta habitat. Most importantly, this information forms the scientific and technical basis for economic development whilst enabling Rason's wetlands to be conserved.

Figure 1
Overview and Location of Rason (Source: Google Map)

2 MAB National Committee of DPRK, Natural Protected Areas in the DPR Korea, Pyongyang (2005).

3 MAB National Committee of DPRK, Wetland (Waterfowl Habitat) and its Conservation in the DPR Korea, Pyongyang (2002).

02
Field Survey

Birds

Bird counts focused on identifying priority species for conservation (including species found in internationally important concentrations and species of special global conservation concern), are summarized in the Annex. The table includes day totals and a grand total (in some cases, some birds were counted twice as the same areas were revisited; the grand total excludes these double-counted birds). Some of the higher counts are provided as estimates and might be revised following further analysis of the data.

Much evidence of bird migration through the area was observed. Manpo, Sobonpo and adjacent areas are internationally important for waterbirds. During the field survey, separately and combined both Manpo and Sobonpo have met Ramsar Convention "Criteria for Identifying Wetlands of International Importance" in terms of overall abundance (20,000 or more waterbirds: Criterion 5); in supporting 1% or more of a population of a waterbird species (Criterion 6); and in supporting globally-threatened waterbird species (Criterion 2).

The close proximity of a diverse range of habitats within this area supports a diverse avifauna, with approximately 110 bird species recorded in only three days of fieldwork. The highest concentrations of birds were found in those areas that had limited human access, and included several small islands in Manpo; and areas of wet reed and open water on Sobonpo. Some birds were found to be tolerant of human disturbance; others were much shier and were easily-disturbed.

Swans and some ducks (species and individuals) of freshwater and marine habitats, were especially well-represented in the areas surveyed but reed-bed specialists and raptors were poorly-represented during this field survey. It was also evident that some species used more than one area and more than one habitat (e.g. geese flocks roosted on lakes and fed in rice-fields; and duck flocks that moved between the sea and the lakes).

Total number of birds (species and individuals) is expected to be much higher than suggested by this field survey or occasional survey work. Further research (especially in May, June, October and November) would be helpful in identifying waterbird usage in other months and in assessing possible best-management approaches.

Specific findings are as follows:

- Manpo is estimated to support more than 20,000 waterbirds during the time of this field survey. These included Ramsar-defined internationally important concentrations of *Cygnus olor* (with 7% of the East Asian population recorded), *Anas penelope* and *Anas falcata*. Species of special global conservation recorded at Manpo included *Coturnix japonica* (globally Near-threatened), *Anas falcata* (globally Near-threatened) and *Numenius madagascariensis* (globally Vulnerable).
- Sobonpo is estimated to support more than 22,000 waterbirds, especially towards the seaward part of the lake. These included internationally important concentrations of *Anas falcata* (globally Near-threatened) and *Aythya fuligula*. Species of special global conservation concern recorded at Sobonpo included *Coturnix japonica* (globally Near-threatened), *Grus monacha* (globally Vulnerable), *Grus vipio* (globally Vulnerable) and *Numenius madagascariensis* (globally Vulnerable).
- Globally-threatened and globally near-threatened species were also recorded on Dongbonpo (*Larus relictus*: globally Vulnerable), in rice-fields (*Coturnix japonica, Grus monacha, Grus vipio*), in reed-beds (*Emberiza yessoensis*: globally Near-threatened) and also in the coastal zone (*Numenius madagascariensis, Calidris tenuirostris*: both globally Vulnerable), and in marine waters (*Clangula hyemalis*: globally Vulnerable).

Wetland and Habitat

The current lake system at Rason Migratory Bird Reserve has two tidal inlets with tributary of the Tumen River in the delta area, and consists of freshwater, semi-freshwater and tidal water lakes. It is estimated that the lakes were disconnected from the sea by reclamation about 20 to 40 years ago.

4 http://www.ramsar.org/cda/en/ramsar-about-faqs-what-are-criteria/main/ramsar/1-36-37%5E7726_4000_0__

Table 2
Estimated Area of Each Habitat Type
in Rason Migratory Bird Reserve

Habitat	Area(ha)
Lake	3,056
Marsh	209
Ponds	45
Reed	247
Rice Paddy	2,117
Riverine	4,033
Delta	1,300
Coastal	561
Built	650

Table 3
Estimated Lake Areas in
Rason Migratory Bird Reserve

Lakes	Area (ha) as of 18 September 2013
Manpo	788
Sobonpo	1,759
Dongbonpo	152
Hondam-Ji	107

Water bodies – Dongbonpo and Sobonpo together are one water body divided by weirs. Manpo is an isolated semi-freshwater lake separated by reclaimed farmlands in-between Sobonpo. The sizes of water bodies change with seasonality due to the variation in rainfall, irrigation and tidal effects.

Drainage ditches in farmlands and along the main road are partly connected to the lake systems. Dykes with sluices divided Dongbonpo and Sobonpo, the sluices at Dongbonpo were opened thus making it a brackish water lake with 20-30cm of water level fluctuation with the tides. Dykes in the Sobonpo divided the freshwater lake into 3 sub-lakes: Upper Sobonpo, Middle Sobonpo and Lower Sobonpo. Abandoned weirs in Lower Sobonpo may fragment the lakes into smaller square water bodies at times of low water level as they were previously reclaimed rice paddies.

All three lakes are shallow with approximate depth of less than 2 meters. Most of the waters around were no more than 50cm deep. A number of marsh patches are distributed in between Manpo and Sobonpo, connecting with irrigation and drainage ditches. Both Manpo and Dongbonpo have tidal creek; Manpo is only occasionally connected to the sea because of the natural jam of creek whilst Dongbonpo has free tidal flow when the gates are opened. There are two irrigation ditches connected Upper Sobonpo with the Tumen Riverine.

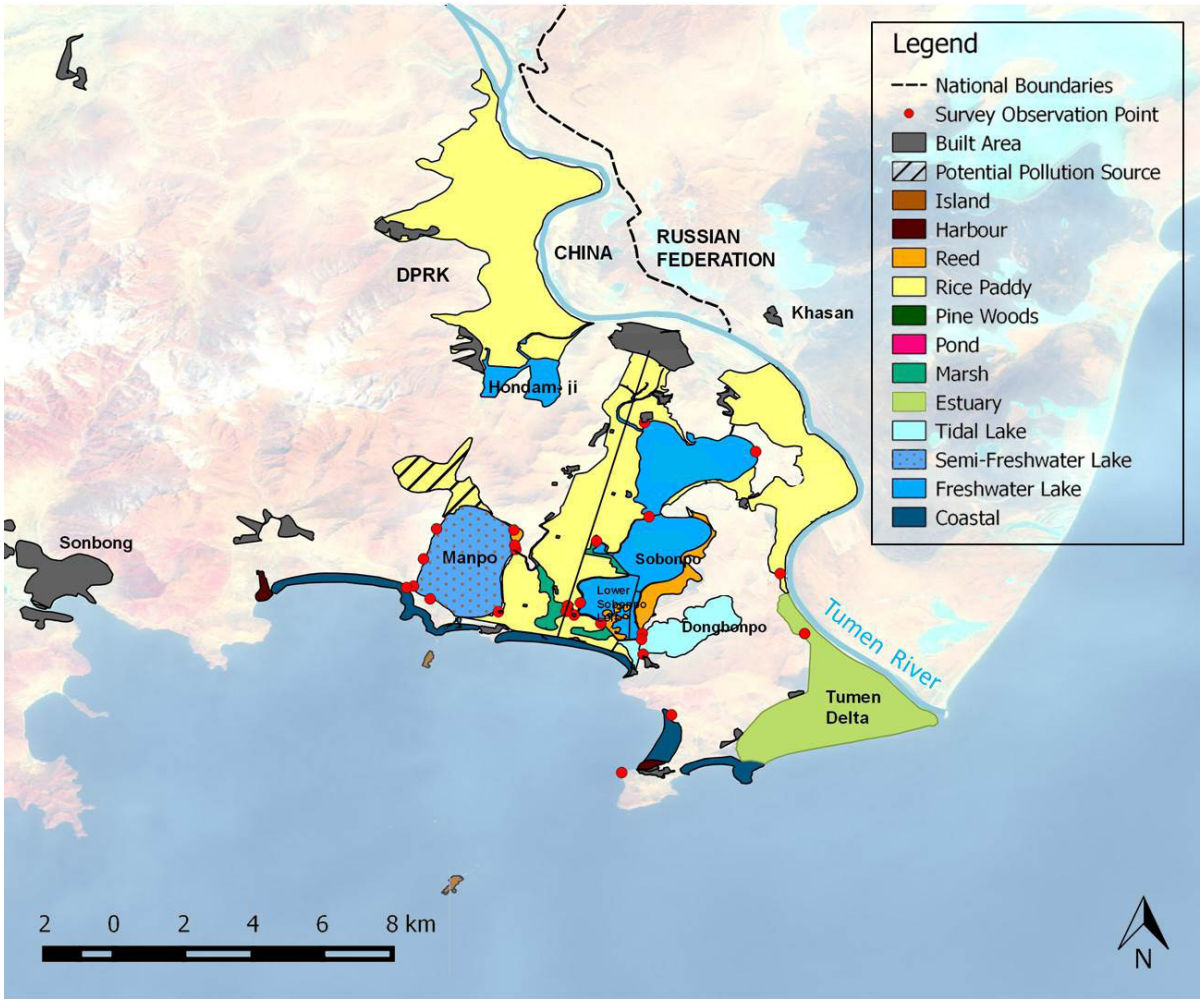
Landscape and land use - Rice paddies reclaimed from the floodplain of the inlets, marshes and ponds can be found between Manpo and Sobonpo. Hills are the dominant landscape between the wetland valley and the Tumen River, making the wetland valley a relatively isolated ecosystem from the city of Sonbong. At the very east of the Reserve, the entire area of the Tumen Riverine had been reclaimed as rice paddy. Coastal area in the south is consisted of pinewoods, bushes, grasslands and sand beaches. Only one mudflat was observed near Uam-ri in this survey.

Vegetation, animals and soil - There are patches of reed at the northwest corner of Manpo, Lower Sobonpo and east bank of Middle Sobonpo. One species of submerged plant (to be identified, NTI) was growing only in Manpo providing feed for swans. Another species of submerged plant was found in Upper Sobonpo (*Ceratophyllum demersum*). Spotted reeds and cattails were observed in Lower Sobonpo and marshes. Two species of small fishes were observed in Manpo (1 spp., NTI) and Sobonpo (1 spp. of carp, *Crucian*). Shell fishes and snails were found mostly in Sobonpo. From bank observation, the bottom of Manpo and Dongbonpo appeared sandy and the bottom of Sobonpo is mix of sands and mud. Farmlands visited in this field survey had rich and peat-like soil, and some rice paddies were converted into swamps in the lake basin, creating diverse habitats for water birds.

Human activities - Of the six villages visited surrounding the three lakes; one is located at the sea shore (Uam-Ri). Agriculture is the major human activity in the area. Small sized fishing may take place in Sobonpo. No heavy traffic had been observed in the area and coastal shoreline was controlled with very limited human access. Freshwater lakes Sobonpo and Manpo are used for irrigation. In general, no serious human disturbance has been observed in the area. Tumen Town in the north of the lakes is the only main town in the area and a cargo centre. Potential industry development may increase disturbance to the Reserve.

The area had undergone human conversion in the past decades and is now temporarily stabilized. The composition of wetlands and limited disturbances provides high quality stopover and breeding habitats for birds in the lower Tumen River and its delta. It is also a part of an integrated and transboundary ecosystem among China, DPRK and the Russian Federation.

Figure 2
Habitats of Rason Migratory Birds Reserve[5]



5 Produced with survey information by Cai Lu, Gongqi Sun and Jiyuan Fan of Beijing Forestry University and Tau Chia Cham of ESCAP ENEA, April 2014

03 Recommendations

The recommendations are interlinked with the overall goal to enhance conservation and management of the Reserve as well as the Tumen River Delta transboundary habitat as a whole. It is therefore advised that all the recommendations be considered together rather than as separate items.

01 **Strengthen Habitat Management** – DPRK Central government has recognized the importance of this habitat and established the Reserve since 1995. However, it is unclear whether site boundaries have been demarcated and if a specific management plan has been developed for the Reserve.

- Development of a formal comprehensive management plan to integrate nature conservation with local and regional development, control potential risks such as pollution and human disturbance, e.g., tourists that would threaten the habitat, and explore the possibility of reforestation. A map on the recommended zonation for the Reserve (see Figure 3) is produced from the findings of this field survey to support development of the management plan.

It highlights **(i) core zones** that are critical for migratory birds and require highest level of protection with minimal disturbance and less alternation of current land use, and **(ii) buffer zones** where migratory birds can be found at different times of the day such as for feeding and controlled human activities can be allowed, for example, for bird-watching and agriculture, or areas that do not directly connected to the birds but will affect their habitats through various ecological processes, such as fertilized drainage flows into the lakes through irrigation ditches.

The planning of regional development will directly/indirectly affect the core zone. It is expected that more species and key habitats will be identified should further survey and monitoring be carried out. For that reason, this map is an **underestimation of areas that requires protection in the**

Reserve. To maintain the ecological characters of the habitat complex in the core zone, the three lakes, marshes, ponds and surrounding rice paddies should be the priority targets. Ecosystem-based management requires comprehensive management of the Tumen Riverine and mountainous area adjacent to the habitats. The plan needs to develop periodic targets for conservation and local development. Any industry development should be restricted in the core and buffer zones, while managed organic agriculture.

02 Designation of Ramsar Sites (Wetlands of International Importance). As presented in the findings, the Reserve has met Ramsar criteria. Apart from the recognition as an internationally important wetland, the three pillars[6] of the Ramsar Convention on effective management, wise use[7] and international cooperation provide a useful concept and framework for managing the Reserve. It is therefore recommended that **DPRK become a contracting party of the Ramsar Convention and designate Rason Migratory Bird Reserve as a Ramsar Site.** There is also the possibility of designation as **Asia's first transboundary Ramsar Site** if jointly applied with wetlands in the Chinese and Russian territories (see Figure 4) of the Tumen River Delta.

03 Baseline and long-term monitoring. Although this field survey has provided some evidence on the ecological significance of the Reserve, this baseline estimate only offers a spatial and temporal snapshot. For the development of a management plan as well as to provide evidence for designation as a Ramsar site, 'accurate data on various scientific and conservation parameters and a map precisely delimiting the boundaries of the site'[8] has to be prepared and submitted. Further survey is needed to generate a sufficient baseline for monitoring and comparison, and long-term monitoring scheme and capacity is required to assess habitat conditions, biodiversity conservation (notably for migratory waterbirds) and effectiveness of management.

04 Building local capacity (including equipment) for monitoring and management. Local capacity has to be built to implement and sustain the above recommendations so that the work is carried out with local ownership. Key local capacity needs include: (i) identification and scientific knowledge of migratory birds and species status; (ii) technical knowledge of habitat assessment and management; as well as (iii) national and international habitat management regulations and standards. The equipment needs for assessment and monitoring such as telescopes, binoculars and positioning devices will also have to be addressed.

05 Stepping up international cooperation and eco-tourism planning will enable more effective management of habitats in the Reserve and the Tumen River Delta. As a region with rapid growing eco-tourism demand, trilateral cooperation in particular on joint habitat management and eco-tourism planning will be essential and beneficial for the overall conservation and development of the Delta.

06 Suggested sequence and windows of opportunities to implement recommendations actions

- Monitoring and data collection would be the first priority in order to generate a full picture of seasonality of waterbirds and habitats.
- Training on monitoring and management can be carried out following the surveys. This may also be combined with workshops to develop management and monitoring plans utilizing international expertise.
- A key step is the initiating the development of a strategy for trilateral cooperation in the Tumen River Delta.

6 The Ramsar Contracting Parties, or Member States, have committed themselves to implementing the 'three pillars' of the Convention: to designate suitable wetlands for the List of Wetlands of International Importance ('Ramsar List') and ensure their effective management; to work towards the wise use of all their wetlands through national land-use planning, appropriate policies and legislation, management actions, and public education; and to cooperate internationally concerning transboundary wetlands, shared wetland systems, shared species, and development projects that may affect wetlands. (http://www.ramsar.org/)

7 The wise use of wetlands is defined as "the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development". 'Wise use' therefore has at its heart the conservation and sustainable use of wetlands and their resources, for the benefit of humankind. (http://www.ramsar.org/)

8 Data needed to fill in a Ramsar Information Sheet http://www.ramsar.org/cda/en/ramsar-about-sites/main/ramsar/1-36-55_4000_0__

Figure 3
Sketch Map of Recommended Zonation in Rason Migratory Bird Reserve

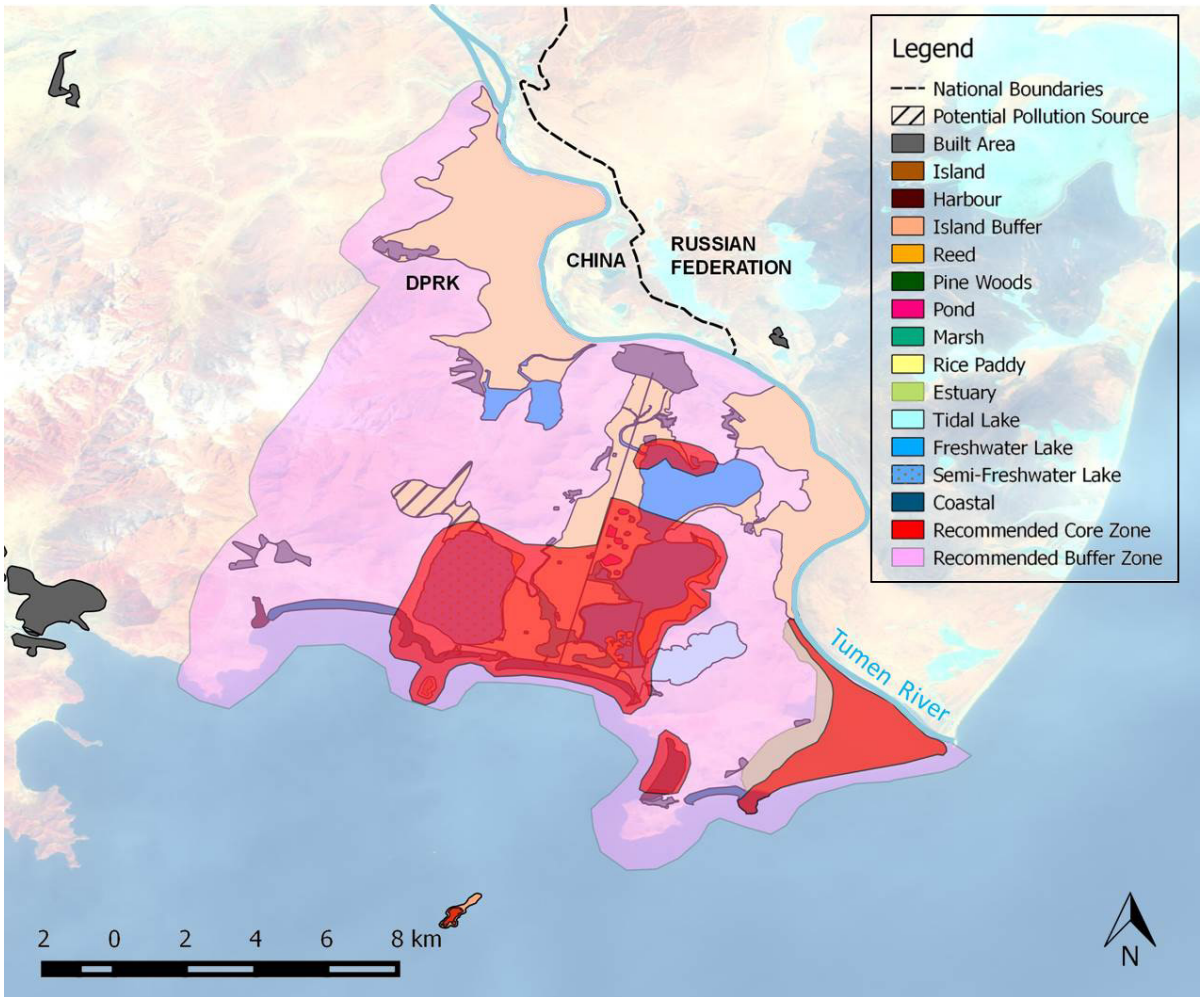
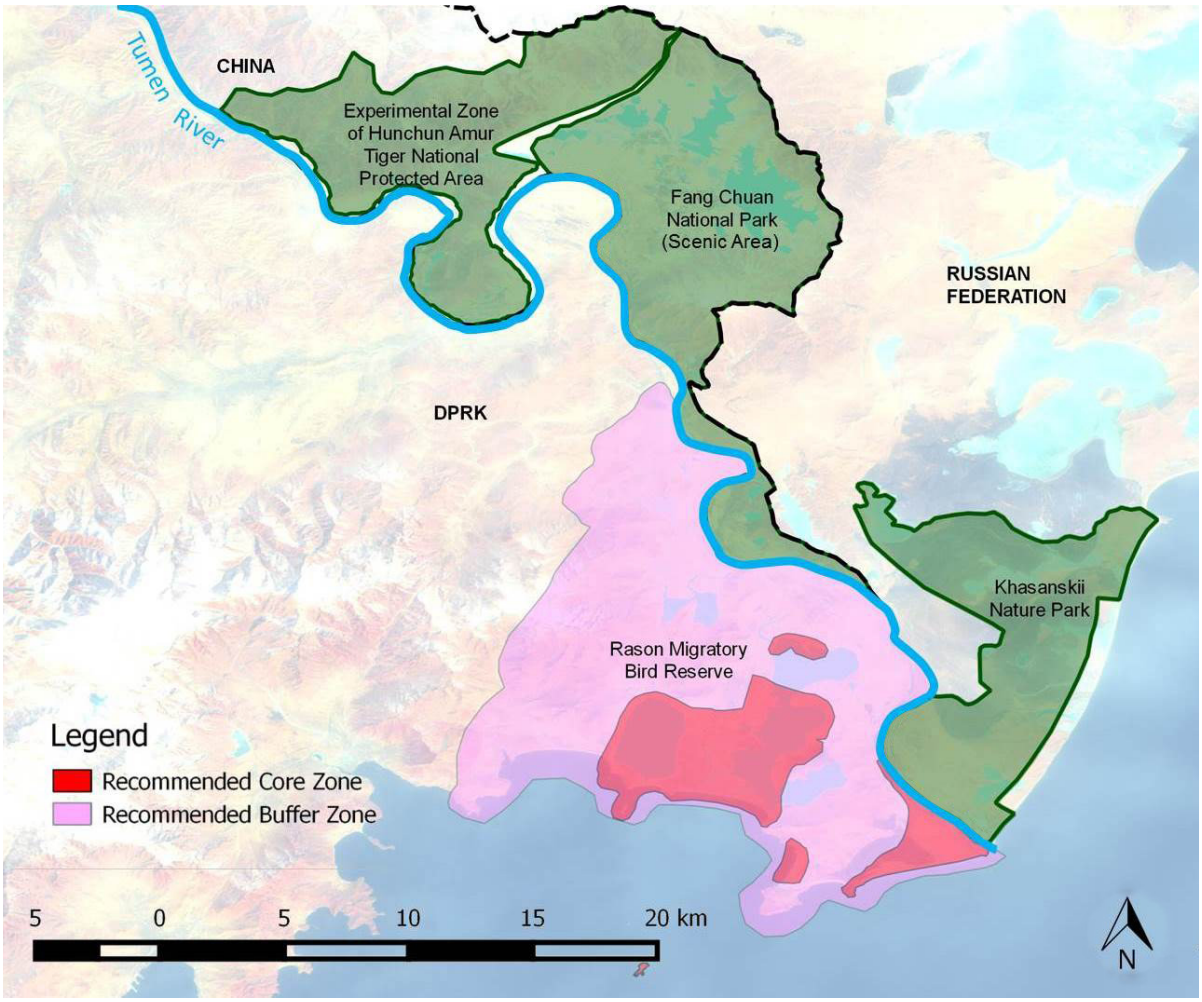


Figure 4
Wetlands and Key Protected Areas in China, DPRK and the Russian Federation at the Tumen River Delta



Annex

Bird Species and Numbers Recorded during the Survey Rason, 26-31 March 2014

Common Name	Korean name (in DPRK)	Scientific Name	Status
01 **Hooded Crane**	흰목검은두루미 (갯두루미)	*Grus monacha*	VU
02 **White-naped Crane**	재두루미	*Grus vipio*	VU
03 **Taiga Bean Goose**	큰부리큰기러기	*Anser fabalis*	
04 **Tundra Bean Goose**	큰기러기	*Anser serrirostris*	
05 **Greater White-fronted Goose**	쇠기러기	*Anser albifrons*	
06 **Northern Pintail**	가창오리	*Anas acuta*	
07 **Falcated Duck**	붉은꼭두오리	*Anas falcata*	NT, II
08 **Eurasian Wigeon**	알숭오리	*Anas penelope*	II, HC
09 **Mute Swan**	혹고니	*Cygnus olor*	II, HC
10 **American Wigeon**	아메리카 홍머리오리	*Anas americana*	FR
11 **Whooper Swan**	큰고니	*Cygnus cygnus*	
12 **Gadwall**	알락오리	*Anas strepera*	
13 **Relict Gull**	고대갈매기	*Ichthyaetus relictus*	VU, FR
14 **Eurasian Spoonbill**	누른뺨저어새	*Platalea leucorodia*	FR
15 **Great Knot**	붉은어깨갯도요	*Calidris tenuirostris*	VU
16 **Baikal Teal**	반달오리	*Anas formosa*	HC
17 **Northern Shoveler**	넙적부리오리	*Anas clypeata*	

26-28 Mar	29 Mar	30-31 Mar	Total	Habitat			Migration
				(W) water bird	(L) shallow water (A) aquatic plant (D) diver(deep water)	(T) tidal flat (N) sand or mud bar (S) sea water	
				(+)	(G) grass field	(P) rice paddies	
				(F) forest bird	(F) forest (B) bush	(V) village (R) raptor	
0	1	0	1	(W)	(L) + (A) + (P)		M
0	11	23	34	(W)	(L) + (A) + (P)		M
15	20	40	75	(W)	(L) + (A) + (P)		M
10	115	450	575	(W)	(L) + (A) + (P)		M
460	250	250	600	(W)	(L) + (P)		M
170	20	400	570	(W)	(L) + (P)		M
1,105	1,300	2,000	3,100	(W)	(L) + (A)		M
8,170	2,250	4,000	12,200	(W)	(L) + (A)		M
106	P	P	106	(W)	(L) + (A)		M
1	0	0	1	(W)	(L) + (A)		M
303	10	P	315	(W)	(L) + (A)		M
108	100	500	610	(W)	(L) + (A)		M
0	0	5	5	(W)	(L) + (T)		M
0	19	0	19	(W)	(L) + (T)		M
0	1	0	1	(W)	(L) + (T)		M
30	130	235	350	(W)	(L)		M
170	100	200	370	(W)	(L)		M

Common Name	Korean name (in DPRK)	Scientific Name	Status
18 **Garganey**	알락발구지	*Anas querquedula*	
19 **Eurasian Teal**	되강오리	*Anas crecca*	
20 **Tufted Duck**	흰죽지댕기오리	*Aythya fuligula*	II
21 **Red-necked Grebe**	붉은목농병아리	*Podiceps grisegena*	HC
22 **Common Pochard**	흰죽지오리	*Aythya ferina*	
23 **Greater Scaup**	흰죽지검은머리오리	*Aythya marila*	
24 **Common Goldeneye**	까치비오리	*Bucephala clangula*	
25 **Smew**	흰비오리	*Mergellus albellus*	
26 **Far Eastern Curlew**	알락꼬리마도요	*Numenius madagascariensis*	VU
27 **Long-tailed Duck**	바다꿩	*Clangula hyemalis*	VU, HC
28 **Harlequin Duck**	흰무늬오리	*Histrionicus histrionicus*	
29 **White-winged Scoter**	흰눈섭검은오리	*Melanitta deglandi*	
30 **American Scoter**	검은오리	*Melanitta americana*	
31 **Red-throated Loon**	붉은부리다마지	*Gavia stellata*	
32 **Arctic Loon**	푸른목다마지	*Gavia arctica*	
33 **Mallard**	청둥오리	*Anas platyrhynchos*	
34 **Eastern Spot-billed Duck**	흰뺨검둥오리	*Anas zonorhyncha*	
35 **Northern Lapwing**	댕기도요	*Vanellus vanellus*	
36 **Black-tailed Gull**	개갈매기	*Larus crassirostris*	
37 **Common Gull**	갈매기	*Larus canus*	

26-28 Mar	29 Mar	30-31 Mar	Total	Habitat			Migration
				(W) water bird	(L) shallow water (A) aquatic plant (D) diver(deep water)	(T) tidal flat (N) sand or mud bar (S) sea water	
				(+)	(G) grass field	(P) rice paddies	
				(F) forest bird	(F) forest (B) bush	(V) village (R) raptor	
4	0	11	15	(W)	(L)		M
225	200	500	750	(W)	(L)		M
440	2,900	4,000	4,650	(W)	(D)		M
83	2	25	110	(W)	(D)		M
515	1,100	500	2,100	(W)	(D)		M
2	60	100	160	(W)	(D)		M
8	30	1,180	1,200	(W)	(D)		M
7	P	P	7	(W)	(D)		M
0	1	0	4	(W)	(T)		M
246	P	140	390	(W)	(S)		M
3	8	21	32	(W)	(S)		M
163	57	50	270	(W)	(S)		M
12	0	30	42	(W)	(S)		M
0	0	1	1	(W)	(S)		M
0	0	1	1	(W)	(S)		M
1,100	500	5,500	6,700	(W)	(L) + (A) + (P)		-
25	30	200	250	(W)	(L) + (A) + (P)		-
0	0	50	50	(W)	(G) + (L) + (T)		-
20	75	75	170	(W)	(S) + (T) + (L)		-
15	75	100	190	(W)	(S) + (T) + (L)		-

Common Name	Korean name (in DPRK)	Scientific Name	Status
38 **Glaucous Gull**	흰갈매기	*Larus hyperboreus*	
39 **Vega Gull**	재갈매기	*Larus vegae*	
40 **Mongolian Gull**	노랑발갈매기	*Larus mongolicus*	
41 **Slaty-backed Gull**	큰재갈매기	*Larus schistisagus*	
42 **Heuglin's Gull**	줄무늬노랑발갈매기	*Larus heuglini*	
43 **Little Grebe**	농병아리	*Tachybaptus ruficollis*	
44 **Far Eastern Oystercatcher**	까치도요	*Haematopus ostralegus osculans*	
45 **Black-crowned Night Heron**	밤물까마귀	*Nycticorax nycticorax*	
46 **Black-headed Gull**	붉은부리갈매기	*Chroicocephalus ridibundus*	
47 **Mandarin Duck**	원앙새	*Aix galericulata*	II
48 **Eurasian Coot**	물닭	*Fulica atra*	
49 **Red-breasted Merganser**	바다비오리	*Mergus serrator*	
50 **Temminck's Cormorant**	바다까마우지	*Phalacrocorax capillatus*	
51 **Grey Heron**	왜가리	*Ardea cinerea*	
52 **Great Egret**	대백로	*Ardea alba*	
53 **Spotted Redshank**	학도요	*Tringa erythropus*	
54 **Common Redshank**	붉은발도요	*Tringa totanus*	
55 **Common Merganser**	(갯)비오리	*Mergus merganser*	
56 **Great Crested Grebe**	뿔농병아리	*Podiceps cristatus*	
57 **Black-necked Grebe**	검은목농병아리	*Podiceps nigricollis*	

26-28 Mar	29 Mar	30-31 Mar	Total	Habitat			Migration
				(W) water bird	(L) shallow water (A) aquatic plant (D) diver(deep water)	(T) tidal flat (N) sand or mud bar (S) sea water	
				(+)	(G) grass field	(P) rice paddies	
				(F) forest bird	(F) forest (B) bush	(V) village (R) raptor	
20	20	3	40	(W)	(S) + (T) + (L)		-
10	2	5	17	(W)	(S) + (T) + (L)		-
40	30	100	150	(W)	(S) + (T) + (L)		-
3	1	1	5	(W)	(S) + (T) + (L)		-
2	1	0	4	(W)	(S) + (T) + (L)		-
1	0	0	1	(W)	(L) + (D)		-
0	5	0	5	(W)	(L) + (T)		-
0	1	0	1	(W)	(L) + (G)		-
35	100	100	230	(W)	(L) + (S)		-
86	48	5	135	(W)	(L) + (F)		-
1,970	900	1,500	3,500	(W)	(D) + (A)		-
38	200	625	850	(W)	(D) + (S)		-
0	0	10	10	(W)	(D) + (S)		-
20	70	35	110	(W)	(L)		-
25	190	85	300	(W)	(L)		-
0	0	1	1	(W)	(L)		-
0	0	2	2	(W)	(L)		-
33	100	100	230	(W)	(D)		-
81	75	45	200	(W)	(D)		-
31	3	0	34	(W)	(D)		-

Common Name	Korean name (in DPRK)	Scientific Name	Status
58 **Pelagic Cormorant**	까막가마우지	*Phalacrocorax pelagicus*	
59 **Great Cormorant**	깻까마우지	*Phalacrocorax carbo*	
60 **Little Ringed Plover**	알도요	*Charadrius dubius*	
61 **Kentish Plover**	흰가슴알도요	*Charadrius alexandrinus*	
62 **Common Snipe**	깍도요	*Gallinago gallinago*	
63 **Spectacled Guillemot**	붉은발바다오리	*Cepphus carbo*	
64 **Rook**	떼까마귀	*Corvus frugilegus*	
65 **Eurasian Magpie**	까치	*Pica pica*	
66 **Carrion Crow**	까마귀	*Corvus corone*	
67 **Eurasian Jay**	어치	*Garrulus glandarius*	
68 **Marsh Tit**	쇠박새	*Poecile palustris*	
69 **Coal Tit**	깨새	*Periparus ater*	
70 **Siberian Accentor**	떪종다리	*Prunella montanella*	
71 **Ochre-rumped Bunting**	검은머리멧새	*Emberiza yessoensis*	NT
72 **Red-billed Starling**	붉은부리찌르레기	*Spodiopsar sericeus*	
73 **White-cheeked Starling**	찌르러기	*Spodiopsar cineraceus*	
74 **Common Starling**	흰점찌르러기	*Sturnus vulgaris*	
75 **Dusky Thrush**	개똥지빠귀	*Turdus eunomus*	
76 **Meadow Bunting**	멧새	*Emberiza cioides*	
77 **Rustic Bunting**	뿔멧새	*Emberiza rustica*	

26-28 Mar	29 Mar	30-31 Mar	Total	Habitat			Migration
				W water bird	L shallow water A aquatic plant D diver(deep water)	T tidal flat N sand or mud bar S sea water	
				+	G grass field	P rice paddies	
				F forest bird	F forest B bush	V village R raptor	
14	3	35	52	W	D		-
50	350	200	450	W	D		-
1	5	2	8	W	N		-
0	2	0	2	W	N		-
0	4	0	4	W	N		-
1	0	10	11	W	S		-
0	100	0	100	F	F + B + G + P		-
20	30	20	70	F	F + B + G + V		-
0	2	0	2	F	F + B + G + V		-
0	1	0	1	F	F + B + G		-
0	0	3	3	F	F + B		-
0	0	5	5	F	F + B		-
1	0	2	3	F	F + B		-
0	0	2	2	F	G + B		-
0	3	0	3	F	G + B		-
2	7	0	9	F	G + B		-
0	3	0	3	F	G + B		-
0	4	1	5	F	G + B		-
10	10	5	25	F	G + B		-
5	250	5	260	F	G + B		-

Common Name	Korean name (in DPRK)	Scientific Name	Status
78 **Yellow-throated Bunting**	노랑떡멧새	*Emberiza elegans*	
79 **Black-faced Bunting**	버들멧새	*Emberiza spodocephala*	
80 **Pallas's Reed Bunting**	북떪멧새	*Emberiza pallasi*	
81 **Common Reed Bunting**	큰검은머리멧새	*Emberiza schoeniclus*	
82 **Common Pheasant**	꿩	*Phasianus colchicus*	
83 **Eurasian Tree Sparrow**	참새	*Passer montanus*	
84 **White Wagtail**	알락할미새	*Motacilla alba*	
85 **Hill Pigeon**	낭비둘기	*Columba rupestris*	
86 **Oriental Turtle Dove**	떪비둘기	*Streptopelia orientalis*	
87 **Great Spotted Woodpecker**	알락딱따구리 (오색더구리)	*Dendrocopos major*	
88 **Grey-headed Woodpecker**	푸른딱따구리 (청더구리)	*Picus canus*	
89 **Goldcrest**	금상모박새	*Regulus regulus*	
90 **Chinese Nuthatch**	쇠동고비	*Sitta villosa*	
91 **Eastern Great Tit**	박새	*Parus minor*	
92 **Vinous-throated Parrotbill**	부비새	*Sinosuthera webbiana*	
93 **Naumann's Thrush**	티티새	*Turdus naumanni*	
94 **Daurian Redstart**	딱새	*Phoenicurus auroreus*	
95 **Bull-headed Shrike**	개구마리	*Lanius bucephalus*	
96 **Long-tailed Shrike**	긴꼬리때까치	*Lanius schach*	
97 **Chinese Grey Shrike**	물개구마리	*Lanius sphenocercus*	

26-28 Mar	29 Mar	30-31 Mar	Total	Habitat			Migration
				(W) water bird	(L) shallow water (A) aquatic plant (D) diver(deep water)	(T) tidal flat (N) sand or mud bar (S) sea water	
				(+)	(G) grass field	(P) rice paddies	
				(F) forest bird	(F) forest (B) bush	(V) village (R) raptor	
8	10	5	23	(F)	(G) + (B)		-
0	1	0	1	(F)	(G) + (B)		-
0	1	0	1	(F)	(G) + (B)		-
0	0	1	1	(F)	(G) + (B)		-
15	10	10	35	(F)	(G) + (B)		-
75	200	50	325	(F)	(B) + (V)		-
5	8	4	17	(F)	(N) + (B)		-
0	0	2	2	(F)	(F)		-
5	10	2	17	(F)	(F)		-
0	1	1	2	(F)	(F)		-
1	0	0	1	(F)	(F)		-
2	0	5	7	(F)	(F)		-
0	0	6	6	(F)	(F)		-
2	0	6	8	(F)	(B)		-
10	10	10	30	(F)	(B)		-
1	2	1	4	(F)	(B)		-
0	1	0	1	(F)	(B)		-
1	1	1	3	(F)	(B)		-
			1?	(F)	(B)		-
1	2	0	3	(F)	(B)		-

Common Name	Korean name (in DPRK)	Scientific Name	Status
98 **Brambling**	꽃참새	*Fringilla montifringilla*	
99 **Long-tailed Rosefinch**	긴꼬리양지니	*Carpodacus sibiricus*	
100 **Pallas's Rosefinch**	양지니	*Carpodacus roseus*	
101 **Grey-capped Greenfinch**	방울새	*Chloris sinica*	
102 **Common Redpoll**	붉은방울새	*Acanthis flammea*	
103 **Eurasian Siskin**	검은머리방울새	*Spinus spinus*	
104 **Japanese Quail**	메추리	*Coturnix japonica*	NT
105 **Eurasian Skylark**	종다리	*Alauda arvensis*	
106 **Far Eastern Skylark**	극동종다리	*Alauda japonica*	
107 **Eurasian Hoopoe**	후투디	*Upupa epops*	
108 **Eurasian Sparrow hawk**	큰새매	*Accipiter nisus*	
109 **White-tailed Eagle**	흰꼬리수리	*Haliaeetus albicilla*	
110 **Common Kestrel**	조롱이	*Falco tinnunculus*	
111 **Peregrine Falcon**	꿩매	*Falco peregrinus*	

26-28 Mar	29 Mar	30-31 Mar	Total	Habitat			Migration
				(W) water bird	(L) shallow water (A) aquatic plant (D) diver(deep water)	(T) tidal flat (N) sand or mud bar (S) sea water	
				(+)	(G) grass field	(P) rice paddies	
				(F) forest bird	(F) forest (B) bush	(V) village (R) raptor	
1	0	14	15	(F)	(B)		-
1	0	0	1	(F)	(B)		-
0	0	1	1	(F)	(B)		-
25	20	20	65	(F)	(B)		-
0	1	0	1	(F)	(B)		-
1	1	3	5	(F)	(B)		-
1	2	0	3	(F)	(G)		-
15	20	25	60	(F)	(G)		-
5	15	20	40	(F)	(G)		-
1	1	0	1	(F)	(G)		-
0	0	1	1	(F)	(R)		-
0	2	0	2	(F)	(R)		-
0	0	2	2	(F)	(R)		-
1	0	1	2	(F)	(R)		-
				(W) 63 (F) 48			

Notes

1 Order and Nomenclature from Birds Korea (2013).

2 Under status, NT (globally Near-threatened) and VU (globally Vulnerable) follow BirdLife International (2014);
II= Internationally Important (based on Wetlands International 2014 and Ramsar Convention waterbird criteria for the identification of internationally important wetlands); HC = likely to be the highest count of this species in the DPRK based on a limited literature search; FR = likely to be a first record of this species for the DPRK based on Tomek (1999-2002) and on a limited literature search.

3 In count rows, “P” indicates Present but not counted.

References

- Austin, O. L., Jr 1948. The birds of Korea. Bulletin of the Museum of Comparative Zoology, Harvard University 101: 1-301.
- BirdLife International. 2014. IUCN Red List for birds. Downloaded on multiple dates in April 2014.
- Birds Korea. 2013. The Birds Korea Checklist, June 2013, accessed on April 8th 2014 at: http://birdskorea.org/Birds/Checklist/BK-CL-Checklist-Jun-2013.shtml
- DPRK. 2002. Red Data Book of DPRK (Animal). Pyongyang, 2002.
- Duckworth, J.W. 2004. Eight birds new to DPR Korea. Forktail 116-120.
- Duckworth, J.W. 2006. Records of some bird species hitherto rarely found in DPR Korea. Bull.
- British Ornithologists' Club. 2006. 126 (4) 253-290.
- Gluschenko Yu. N., Kalnitskaya I., Katin I., Korobov D. & Liu Huajin (2012). Faunistic notes on the birds of Primorye and adjacent areas of Northeast China. Far East J. Orn., 3:53-60. Publisher's translation into English.
- MAB 2002. Wetland (Waterfowl Habitat) and Its Conservation in DPR Korea. MAB National Committee of DPR Korea, with support from East Asian Biosphere Reserve Network (EABRN) of UNESCO-MAB Programme. Pyongyang 2002.
- Ramsar. 2014. The Criteria for Identifying Wetlands of International Importance. 1999. Accessed on April 8th 2014 at: http://www.ramsar.org/cda/en/ramsar-about-sites-criteria-for/main/ramsar/1-36-55%5E20740_4000_0__
- Tomek, T. 1999-2002. The birds of North Korea. Acta Zoologica Cracoviensia 42: 1-217; 45: 1-235 (in English).
- Wetlands International. 2014. Waterbird Population Estimates 5. Accessed on April 7th 2014 at: http://wpe.wetlands.org/search

North-East Asian Subregional Programme for Environmental Cooperation (NEASPEC)

NEASPEC is a comprehensive intergovernmental cooperation framework, established in 1993 by six member States, China, Democratic People's Republic of Korea, Japan, Mongolia, Republic of Korea and the Russian Federation.

In 2007, NEASPEC member States adopted the NEASPEC Nature Conservation Strategy at the 12th Senior Officials Meeting, which identified six flagship species that are critically endangered and unique in the North-East Asian subregion:

- Amur Tiger
- Amur Leopard
- Snow Leopard
- Black-faced Spoonbill
- White-naped Crane
- Hooded Crane

As animals and ecosystems are distributed regardless of national borders while the biodiversity management is based on the political delineation, transboundary cooperation is vital to support effective conservation in habitats along international borders. There has been growing webs of communication and collaboration across the borders, but current cooperation needs to be further strengthened for comprehensive and coordinated actions. NEASPEC aims to provide a partnership platform that brings all stakeholders together to share information and undertake joint action, thereby making transboundary cooperation more efficient and effective.

For further information, please visit http://www.neaspec.org