

Realizing Baekryeong Island's Ecotourism Potential



Birds Korea (2019)



Birds Korea: Dedicated to the Conservation of Birds and their Habitats in Korea and the wider Yellow Sea Eco-region



Cover Image: Wall mural in Hwadong Village, Baekryeong Island. The Oriental Storks are living symbols of Hwadong and of Baekryeong Island.

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Our Work in Ongjin County (2003-2019)

This report is based on more than 15 years of work by Birds Korea in Ongjin County:

- **2003.** First bird surveys conducted on Socheong Island and on Baekryeong Island
- **2007.** First international publication on the birds of Socheong Island: Moores, N. (2007).
- **2010.** First public call for a migratory bird research centre to be built on Socheong Island: Birds Korea (2010).
- **2013-2019.** 176 days of bird survey on Baekryeong Island conducted by Dr. Nial Moores (Director, Birds Korea), including winter bird and breeding bird surveys in 2018.
- **2014-2018.** Birds Korea guided visiting birdwatchers from the USA, Belgium, Italy and Canada to Baekryeong Island.
- **2017.** Birds Korea joined with the Hanns Seidel Foundation (Korea office) to identify ways in which Baekryeong Island could benefit from the conservation of the island's biodiversity.
 - Calendar of birds of Baekryeong Island produced with students from Chadwick International School, Incheon, given to students on Baekryeong Island in 2018.
- **2018.** Start of the Birds Korea Baekryeong Wetlands Project, largely funded by Lush (UK) with additional support from the Hanns Seidel Foundation.
 - Research on amphibians by Dr. Amael Borzee (Ehwa University and Birds Korea member) and Dr. Chuang Ming-feng;
 - Two days of research on the ecological health of drainage channels in 2018 by Dr Kim Su-Kyung (Eco Institute for Oriental Stork and Birds Korea co-founder);
 - Meetings both on and off-island to discuss conservation proposals, including at the Ongjin County office on November 19th.
 - First scientific publication on a bird species nesting on Baekryeong Island: Moores & Seliger (2018).
- **2019.** Further bird survey and ecological mapping.
 - Frog ladders donated for use on Baekryeong Island by Trevor Rose (UK);
 - Expert advice on planning proposals provided by Professor Emeritus Randy Hester and Adjunct Professor Emeritus Marcia McNally, Department of Landscape Architecture and Environmental Planning at the University of California, Berkeley and SAVE International (USA);
 - Amphibian data and map of main habitat types prepared by Desiree Andersen (Ehwa University);
 - LA Times newspaper article featuring birds of Baekryeong Island (July 23rd);
 - Publication of this report, "Realizing Baekryeong Island's Ecotourism Potential", funded by Hanns Seidel Foundation (Korea office) (August).



In all of our work in Ongjin County and throughout the Korean Peninsula we always aim to help both people and wildlife – for now and far into the future.

Aim of this Report

Baekryeong Island is one of the most important areas for birds on the Korean Peninsula. There is a great diversity of habitats and of wildlife. The island also has areas of outstanding beauty and a well-developed tourism infrastructure. As such, the island has enormous but still un-recognised potential for ecotourism. Ecotourism is an environmentally-friendly and low impact form of tourism that can help to generate new jobs and provide long-term, sustainable economic opportunities for many of the island's residents.

We have therefore written this report to share with local people and decision-makers in Ongjin County (and nationally).

Our Aim is to show how species can be conserved and local livelihoods on Baekryeong Island can be improved through simultaneously (a) enhancing and managing habitats, and (b) increasing opportunities for ecotourism and special marketing of sustainable products (rice, seaweed, fish, salt etc.).

Our Proposals Include:

- Installing frog-ladders and other “furniture” designed to help frogs avoid becoming trapped in concrete drains;
- Restoring the international importance of Hwadong Wetland to waterbirds, through reducing disturbance caused by a newly-constructed road and by restoring water;
- Removing construction waste and fill from reedbed areas (e.g. in Yeonhwa Ri), in order to restore ponds and reedbeds;
- Conserving and restoring tidal flats and tidal areas on the island;
- Enhancing rice field on the island as habitat for wildlife through: promotion of organic farming; keeping rice fields wet in winter; improving drainage channels as fish habitat.

Potential benefits to islanders come from:

- New jobs and income possibilities through a substantial increase in ecotourism and birdwatching activities, requiring the development of new and appropriate soft and hard infrastructure within more wildlife-friendly landscapes
- An increase in investment from central government for habitat restoration; species' conservation; farm income diversification; organic farming; and environmental education initiatives.
- Enhancement of economically valuable ecosystem services (including improved fisheries; reduced water pollution; improved air quality; increased carbon sink capacity);
- An improvement in the identity of the island as wildlife-friendly, helping to increase the market value of sustainable island-produce;

Potential social benefits gained through:

- Increase in sustainable tourism to parts of the island which currently do not benefit from tourism;
- A stronger, positive Baekryeong Island brand, both nationally and internationally, rooted in the island's cultural and ecological values;
- Increased potential for inter-Korean exchange between the Ongjin County offices in Incheon and in the DPRK focused on sustainable farming and fishing, biodiversity conservation and ecotourism.

1. Introduction

Land-owners and decision-makers the world over are confronted with ever more complex choices in trying to balance the need to maintain economic growth while responding to long-term threats that include climate change, worsening air quality and the loss of biodiversity – the richness of life that supports human livelihoods and provides trillions of dollars in the form of ecosystem services to the global economy annually (e.g. Costanza et al. 2014; Ramsar Convention 2018).

This report, funded by the Hanns Seidel Foundation, has been developed over several years by Birds Korea to help support land-owners and decision-makers on Baekryeong Island, in the Incheon Metropolitan Area and nationally.

Based on more than 180 days of field research on the island, multiple discussions, advice from professional planners and conservation scientists, study visits to multiple sites in Korea and overseas, and almost 30 references from recent relevant literature, this report identifies key sites and species; and makes a series of proposals which aim to benefit local communities and the nation as a whole.

None of these proposals requires or implies any change in land ownership; and only one of the proposals requires a major change in land use, that to restore an area of tidal flat. In combination, we consider that these proposals would help to make Baekryeong Island a world-class ecotourist destination. In addition, if construction of the Baekryeong airport proceeds in 2019-2024, these proposals should also help to offset some of the environmental challenges that will result (CAPA 2019).

We offer these proposals now, in the hope that they can be discussed, understood, improved by new ideas and insights originating from local communities, and once accepted, implemented by relevant land-owners and decision-makers – either by individual farmers, or by villages, or by various levels of government.

Importantly too, all of the proposals are based on actions that have been taken elsewhere, successfully helping to generate income for local communities while also helping to conserve biodiversity and to reduce the community's carbon footprint.

Some of the proposals in this report are minor, such as putting more “frog ladders” in drains to help conserve frog populations. Two frog species on Baekryeong Island are Nationally Endangered. Their conservation is required by law. Equally important, frogs provide farmers with a free service by consuming large numbers of harmful insects in rice-fields (Huang et al. 2014; Khatiwada et al. 2016), helping to reduce the need to use expensive insecticides.



Amphibians cannot climb steep concrete walls. Once they enter in to concrete drains like this, they are trapped and die. This photograph shows the mass mortality in May 2015 of dozens of Nationally Vulnerable Black-spotted Pond Frog *Pelophylax nigromaculatus* in a new concrete drain in Jincheon.



Frog ladders can help amphibians to escape out of steep-sided drains. However, ramps like these (also in Jincheon) can be expensive to install. That is why we are proposing the installation of a new type of frog ladder (see Section 6).

Some of the proposals require a small investment of funds in order to create high impact improvements and to help create local jobs. These include constructing reed-screens on some sections of road to help reduce disturbance to species like the Oriental Stork, a very shy and decreasing species that winters on Baekryeong Island.



The new road through the wetland at Hwadong (top left) has resulted in the decline of wild Oriental Storks which occur naturally on Baekryeong Island, because the birds do not tolerate disturbance well. The easiest way to reduce disturbance would be to create a reed-screen between the road and the wetland, as along the Geum River near Gunsan (top right).

The cost of such screening is very small compared to the huge sums of money so far invested in trying to restore the Oriental Stork to the Republic of Korea, which has required a decade-long captive breeding program (below) followed by the development of the increasingly popular Yesan Stork Centre.



The Oriental Stork is a Nationally Endangered species and a National Natural Monument already celebrated in wall murals in Hwadong Village. The loss of such species to the island would indicate a loss of culture and history and a worsening environment. The continuing presence of the Oriental Stork, in contrast, however, should attract tourists and generate income for local communities. The Yesan Stork Centre had 30,000 visitors in 2018 and 60,000 visitors in the first six months of 2019, coming to see and to learn about storks and their rice field habitat. We expect that people will want to come to Baekryeong Island to see these birds too.

And some of the proposals in their current form would require substantial investment and support from both local and national government. This is because there is increasing demand both in the Republic of Korea and internationally for experiences that could only be had on Baekryeong Island – if steps are taken to conserve wildlife habitats on the island.

The most ambitious of our proposals calls for the opening of the Baekryeong Reservoir's sluice gates, to restore a substantial area of natural tidal flat as part of a multiple use area that could include fish-farms or lotus ponds, a nature reserve and even a Baekryeong Wetlands Experience Centre aimed at attracting a large number of ecotourists, families and school groups.

Many of the proposals might seem odd or surprising at first, because they are very different from the kind of development that most people have become used to on the island. To understand more of their scientific and economic rationale and to help with discussion and decision-making, please read on. Thank you.

2. The Economics of Wetlands

Baekryeong is very special among Korean islands in having many, diverse wetlands. The most extensive wetland type is rice field. Rice fields are vital to the economy of rice farmers and to Baekryeong Island as a whole. They also provide vital habitat for many threatened bird and amphibian species (e.g., Borzee et al. 2018a; Herring et al. 2019).

This Birds Korea report makes several proposals which are relevant to rice fields and rice farmers on Baekryeong Island. These proposals aim to increase economic opportunities for rice farmers and to help conserve wildlife.

This is essential, because national long-term trend data confirm that the number of people working in agriculture and in rice-farming is decreasing; that the rural population is aging rapidly; and that the area of rice field is decreasing (e.g. OECD 2009; Cho 2018). In addition, many species that are dependent on rice fields are in severe decline (Moores et al. 2014; Borzee et al. 2018b). This is even though many of these same species provide benefits to farmers by consuming harmful insects, weeds and by helping to fertilize fields through their droppings (Kurechi 2007; Huang et al. 2014). In many areas too, wetland species can help to generate substantial incomes for local farmers by attracting birdwatchers and ecotourists.

Rice farmers – on Baekryeong Island and throughout Korea - deserve much greater economic opportunity. Rice farmers are vital to food security and to food culture; and the quality of the rice that they grow is an important part of peoples' health and well-being.



Farmers on Baekryeong Island are already highly skilled managers of water and of rice – a wetland plant. In addition to providing food security, their rice fields can support many different species through the year. Farmers deserve more opportunities to farm sustainably and to benefit more from tourism to the island.

Experience from within and outside of Korea, clearly suggests that there is much potential on Baekryeong Island for increasing rural ecotourism which could benefit both farmers and wildlife. This potential could be realized by an increase in organic rice farming, supported by specialized marketing so that organic “waterbird-friendly” rice can be sold at a higher price. Other steps that could be taken include the flooding of rice fields in winter to attract waterbirds and birdwatchers who come to see them; increasing the number of home-stay farms on the island, to cater for ecotourists and birdwatchers; and by offering tourists the opportunity to learn about rice-farming, by working in rice fields.

In Thailand and Viet Nam, some rice farms charge visitors up to 100USD per person per night to stay in farming villages and to work in rice fields during the day. Why not on Baekryeong Island too?

There are already tourist farms in the Republic Korea. As noted by OECD (2009), however, many of these have closed because of “over-investment in facilities not strongly affiliated to the local culture, traditions and natural environment”. All the same, increasing rural tourism is already included in the national 2018-2022 Development Plan of the Ministry of Agriculture, Food and Rural Affairs (Cho 2018). National government is therefore committed to helping develop rural tourism.

In addition to extensive rice-fields and kilometers of drainage channels, there are also many small ponds, reservoirs, reed-beds and even tidal flats. However, many of these wetlands are still viewed by most people as wasteland. As a result, much of the tidal flat at Jincheon has recently been impounded; the wetland at Hwadong is being drained; and a large part of the main reed-bed in Yeonhwa Ri has been in-filled with construction waste. These wetlands urgently need better management if their economic and ecological values are to be maintained or improved.



The Jincheon Tidal flat (looking towards the ferry terminal), May 2014.



Reclamation of a large part of the Jincheon Tidal Flat, May 2017.



The impounded area of Jincheon Tidal Flat. In 2019, seawater still entered through sluice gates each high tide. It would cost very little to maintain this area as tidal flat with controlled tides, to benefit wildlife and ecotourists.



Part of the multi-billion Won Ulseuk Island restoration project, Nakdong Estuary, Busan (2007). Here, following major investment, tidal water is controlled by sluices to provide shallow wetland habitat for key species of birds – an attraction for wildlife and ecotourists there.

Indeed, the economic value of tidal flats and coastal wetlands like those on Baekryeong Island has long been underestimated by most people, both here in Korea and throughout the world - perhaps because only a small part of their value is immediately available to local communities, in the form of locally-caught shellfish and fish.

Fortunately, scientific understanding of wetland values continues to grow and improve. In 2006, a study estimated the annual value of Korean tidal flats at about 32,000 USD/ ha / yr, with a third of this value coming from marine products

(KORDI 2006). A more recent study estimates the Total Economic Value of ecosystem services provided by coastal wetlands much higher, at 190,000 USD/ ha / yr (De Groot et al. 2012).

This makes tidal flats and coastal wetlands among the most valuable places on Earth.

This is because tidal flats and coastal wetlands also:

- (1) Store carbon from the sea and air more rapidly and more efficiently than tropical rain forest (Duarte et al. 2005). Wetland restoration is therefore increasingly recognised as a key nature-based solution for helping to reduce or mitigate the level of national greenhouse gas emissions;
- (2) Help convert polluting wastewater and agricultural run-off into biomass;
- (3) Help reduce the cost of damage from storms;
- (4) Are vital nurseries for several commercially-important fish species – and are therefore essential for the maintenance of marine fisheries (Mackinnon et al. 2012);
- (5) Support many highly specialized and threatened species, including birds like the Endangered Black-faced Spoonbill;
- (6) Are the natural focus of ecotourism and environmental education programs in many countries, helping to create jobs and to strengthen local pride.

Because of this much-improved recognition of the value of wetlands economically and for peoples' well-being, China recently announced that it would stop tidal flat reclamation, and is now enacting policies which aim to reverse decades of wetland loss through large-scale wetland restoration projects (Moore et al. 2019). Many areas that were targeted for destruction are instead now listed as part of the China Migratory Birds World Heritage Site (EAAFP 2019), and wetland conservation and wise use forms a core element of the modern Chinese concept of "Ecological Civilization".

Understanding of the benefits of wetland conservation has also grown in the Republic of Korea, in part because the value of coastal wetlands for tourism has become so evident. For example, Suncheon Bay in South Jeolla Province, largely comprised of rice fields, reed-beds and tidal flats, is designated as one of the nation's top 100 tourist sites by the Ministry of Culture, Sports and Tourism and the Korea Tourism Bureau (Korea Bizwire 2019). Approximately two million tourists visit Suncheon Bay annually, with the Bay's economic value to tourism recently estimated at 177 Billion Korean Won per year (Lee et al. 2017). This means that the Suncheon Bay Wetland has an annual tourism value of approximately 150 million USD per year, or 45,000USD/ha/ yr.



Baekryeong Island



The world famous Suncheon Bay

Baekryeong Island's wetlands are not wastelands. Rather, there are very strong economic arguments for restoring some of the island's tidal flats; and for managing remaining wetlands appropriately. Some ideas to help increase the economic value of the islands on Baekryeong Island are given in more detail in the pages that follow.

3. Birdwatching and Ecotourism

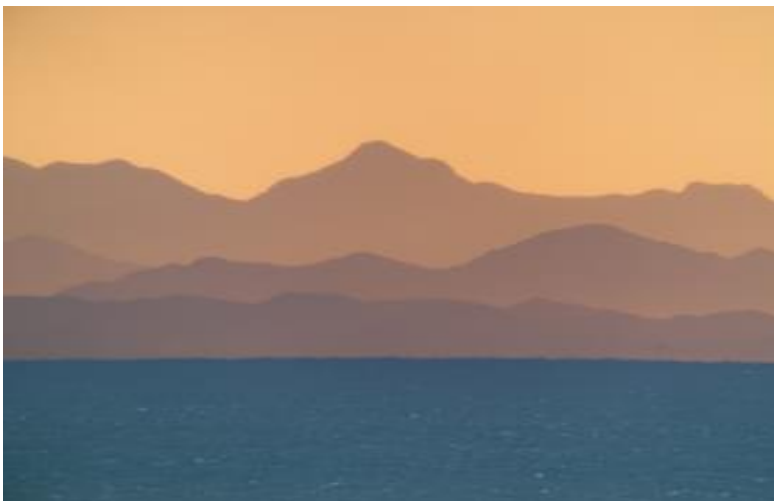
Baekryeong Island already supports a strong tourism sector. Many of the visitors to the island join package group tours; stay at selected motels (most in Jincheon) for one or two nights; and tour the island by bus, visiting only a few culturally important sites. In addition to this kind of high-volume tourism, Baekryeong Island also has substantial potential for ecotourism.

Ecotourism is one of the most rapidly growing tourism sectors in the world (Joyner et al. 2018). Ecotourists – including nature lovers and birdwatchers - want a different, slower kind of tourist experience. They choose to visit places with special species and natural attractions, beautiful landscapes and a distinctive culture. Some ecotourists want to experience rice farming, salt production and village life, and are willing to pay higher prices for local products like rice, salt and seaweed if they are produced sustainably; others, including birdwatchers, want to spend their time experiencing and enjoying wildlife.

Birdwatching is already one of the most popular outdoor ecotourism activities in North America, Western Europe and increasingly in many parts of Asia, including China. In the United States of America, 17.8 million people travel every year to see birds; and in 2011, these birdwatchers spent \$14.9 billion during their travels on food, lodging and transportation, creating 666,000 jobs (USFWS, 2011).

In the Republic of Korea, huge numbers of people already visit Jeju Island, Suncheon Bay and wetlands like Junam Reservoir to enjoy nature, including birds and wetlands.

Surprisingly though, only small numbers of birdwatchers or ecotourists visit Baekryeong. But in many ways, Baekryeong Island is one of the very best places in Korea for birdwatching and for ecotourism. The island itself still has areas of outstanding beauty, and the views across to the Hwanghaenam coast are often spectacular; there are exciting species to see throughout the year, with Oriental Storks, eagles and geese in winter and Spotted Seals and breeding Black-faced Spoonbills in summer; and, of special importance, the island is situated on the shortest sea-crossing for migrant birds flying between China and the Korean Peninsula and is therefore used by many tens of thousands of birds each spring and autumn.



The Hwanghaenam Coast of the DPRK as seen from Jincheon, Baekryeong Island



The Hwadong Wetlands, Baekryeong Island (November 2013)

The island also has many different types of habitats - including wetlands, rocky shores and fish-rich seas, agricultural fields and forests, all supporting their own mix of species.

And finally, in addition to already having tourist infrastructure, Baekryeong Island is also the ideal size for birdwatchers and ecotourists. It is small enough to drive round in a day, but big enough so that there are always different places to explore.

In 2017 and 2018, Birds Korea therefore helped to guide birdwatchers on Baekryeong Island from Korea and from overseas, including from Belgium, Italy, Canada and the USA. Most of these overseas birdwatchers stayed 3-5 days each on the island, spending more than 100,000 Korean Won per person per day on food, accommodation and transport. All said that they enjoyed their visit to Baekryeong Island because of the combination of special birds, beautiful landscapes and very friendly local people.

Even if only a thousand birdwatchers and an additional ten thousand ecotourists were to visit the island every year, they would generate massive additional income for some people on the island, including in areas that are currently not visited by tourists.



Birdwatchers from Canada enjoying the view across Baekryeong Island, November 2018.



Birdwatchers from Seoul and Incheon at the Hwadong Wetland, May 2017.



A highlight for many visitors to Baekryeong Island is the wonderful kindness and warmth of the people!



Suncheon Bay: one of Korea's most famous and popular tourist destinations.



Suncheon Bay: tourists are willing to pay money to see wetlands and birds.

4. The Birds of Baekryeong Island

A total of 344 bird species were recorded on Baekryeong Island during 176 days of survey between March 2013 and the end of May 2019. At least six of these had never been seen in the Republic of Korea before. In comparison, only 298 bird species in total were recorded on Socheong Island during 175 days of survey between 2003 and 2005 (Moore 2007). The much higher number of species found on Baekryeong Island is mostly due to the presence of wetlands.

Forty-seven of the bird species recorded on Baekryeong Island are listed by the Ministry of Environment, Cultural Administration and / or Ministry of Maritime Affairs as Nationally Endangered, as National Monuments or as Marine Conservation Priorities (MOE 2017). At least 41 of these very important “Priority Bird Species” as defined by this report are known to occur regularly or used to occur regularly on Baekryeong Island between 2013 and 2015.

These 41 “Priority Bird Species” are listed in Table 1 and have been used by Birds Korea to identify Priority Areas for conservation and for ecotourism (see Sections 5 and 6). They include the Oriental Stork, Priority Bird Species #7, which is a regular migrant and winter visitor to Baekryeong Island.



Oriental Storks, Baekryeong Island, December 2007 and November 2013.

The Oriental Stork is one of Korea’s largest and rarest birds. The species’ long bill and long legs are perfect for finding food including fish, frogs and large insects in shallow wetlands like rice fields, drainage channels and shallow ponds. The species does not eat rice; cannot swim (so cannot use areas of deep water); and is often very shy.





Oriental Stork, Jeulpo Bay, Jeollabuk Province. Keeping rice-fields wet in winter helps to keep mud soft and fish active for longer, allowing Oriental Storks to find their food efficiently.

Formerly a Korean breeding species, the Oriental Stork is currently assessed as Nationally Endangered (Class 1) and Globally Endangered, with a wild national population in the Republic of Korea of probably less than 50 birds each winter, and a total world population of only between 1,000 and 2,500 mature individuals (MOE 2017; IUCN 2019).

The Oriental Stork has declined rapidly because of the degradation and loss of natural wetlands. In addition, in rice-field areas widespread pesticide use and the conversion of soft-banked drainage channels to concrete drainage systems has reduced the amount of fish and other animals available to them to eat.

Because of its rarity and cultural importance, the species was designated as National Natural Monument #199 in 1968 and a national initiative is currently underway to restore the Oriental Stork population in the Republic of Korea. Actions taken include an expensive decade-long captive breeding program and the establishment of the Yesan Stork Park, with a dedicated research team, including Dr Kim Su-Kyung (a cofounder of Birds Korea), and the active support of 100 local rice farmers. Rice farmers in turn are supported by Yesan County with organic fertilizer and some other costs, allowing them to farm organically. This increases the availability of natural food in the rice fields for storks. The storks are now a major tourist attraction. Sixty thousand people visited the Yesan Stork Centre in the first six months of 2019 alone.

In other areas, including at Kabukurinuma, Miyagi Prefecture, in northern Japan, additional incentives have been found for farmers who have converted to organic rice-growing and also to maintaining water in rice fields throughout the winter: both measures which improve rice-fields' attractiveness to waterbirds and other wildlife.



Tundra Bean Geese, Baekryeong Island, January 2018. Although most farmers were initially suspicious, research by agricultural scientists in Japan confirms that geese are helpful, not harmful, to rice farmers. Most geese arrive in November after the rice has been harvested; they avoid fields with dense rice plants; they spend the winter feeding on waste rice grains and husks, rice straw and on weeds; their droppings are natural fertilizers; and they migrate north again in March and early April, before rice is planted. Big flocks of geese are also very popular with birdwatchers and eco-tourists.

This modified farming approach has resulted in a substantial increase in numbers of birds in rice-fields and increased revenues for farmers (Kurechi 2007). Waterbirds feed in winter rice fields on spilt grain and on weeds, reducing the need to use herbicides; their droppings help to fertilise the fields. And the rice that is grown is then marketed as waterbird-friendly rice and sold at a substantially higher market price per kilo than standard rice. Other rice products, including Japanese rice wine have also been marketed successfully in the same way (Japanese Ministry of Environment 2010).

In addition to their value for generating ecotourist revenue and for consuming rice-field weeds, many other species of bird also provide high value free services to farmers and landowners. A review of research from around the world (Şekercioğlu 2017) showed that while some bird species can cause crop damage (typically of less than 1% of yield), other species, like owls, consume many thousands of mice, potentially saving an equivalent of 13 tons of grain in a single bird's lifetime. Other species feed primarily on insects – and in one study in the Netherlands, birds were found to reduce 66% of damage caused by insects to apple orchards.



Short-eared Owl, Jincheon, November 2016: a major predator of mice and rats



Common Cuckoo, Jincheon, May 2015, a major consumer of caterpillars

Table 1. Priority Bird Species on Baekryeong Island

Priority Bird Species Number	Global Conservation Status ¹	Species	Nationally Endangered Class 1 ²	Nationally Endangered Class 2 ²	MOMAF “Important species” ²	National Monument Number ²
# 1	VU	Swan Goose		x		325-1
# 2	LC	Taiga Bean Goose		x		
# 3	VU	Lesser White-fronted Goose		x		
# 4	LC	Mute Swan	x			201-3
# 5	LC	Whooper Swan		x		201-2
# 6	LC	Mandarin Duck				327
# 7	EN	Oriental Stork				199
# 8	LC	Eurasian Spoonbill		x		205-2
# 9	EN	Black-faced Spoonbill	x		#12	205-1
# 10	LC	Von Schrenck's Bittern		x		
# 11	VU	Chinese Egret	x		#3	361
# 12	LC	Pelagic Cormorant			#8	
# 13	LC	Western Osprey		x		
# 14	LC	Crested Honey Buzzard		x		
# 15	VU	Greater Spotted Eagle		x		
# 16	LC	Golden Eagle	x			242-2
# 17	LC	Chinese Sparrowhawk		x		232-2
# 18	LC	Japanese Sparrowhawk		x		
# 19	LC	Eurasian Sparrowhawk		x		323-4
# 20	LC	Northern Goshawk		x		323-1
# 21	LC	Eastern Marsh Harrier				323-3
# 22	LC	Hen Harrier		x		323-6
# 23	LC	Pied Harrier		x		323-5
# 24	LC	Black Kite		x		
# 25	LC	White-tailed Eagle	x			243-4
# 26	VU	Steller's Sea Eagle	x			243-3
# 27	LC	Upland Buzzard		x		
# 28	LC	Watercock		x		446
# 29	NT	Far Eastern Oystercatcher			#1	326
# 30	EN	Far Eastern Curlew		x	#11	
# 31	LC	Lesser Cuckoo				447
# 32	LC	Northern Scops Owl				324-7
# 33	LC	Oriental Scops Owl				324-6
# 34	LC	Northern Boobook				324-3
# 35	LC	Common Kestrel				323-8
# 36	LC	Merlin		x		
# 37	LC	Peregrine Falcon	x			
# 38	VU	Fairy Pitta		x		204
# 39	NT	Black Paradise Flycatcher		x		
# 40	CR	Yellow-breasted Bunting		x		
# 41	NT	Ochre-rumped Bunting		x		

1: IUCN (2019) 2: MOE (2017).

5. The Sixteen Priority Areas

Sixteen Priority Areas for wildlife conservation and ecotourism have been identified by our research (Fig. 1).

One of the Priority Areas (Area 16) was primarily included because of the regular presence of the Nationally Endangered Spotted Seal *Phoca largia*. The remaining 15 Priority Areas each regularly support three or more Priority Bird Species (numbered as in Table 1, these are listed by Area in Table 2); with boundaries for each of these 15 areas based largely on the distribution and observed local movement of these bird species and the extent of preferred habitat type. The boundaries therefore often follow roads, tracks and the edges of fields. We also made an effort to exclude especially sensitive areas.

No change in ownership or substantial land-use is required in any of the 16 Priority Areas to increase their value to conservation and ecotourism. Instead, their value to wildlife and to ecotourists can be enhanced through minor changes in management and infrastructure to increase the natural services which the habitats provide; and to generate potential additional sources of revenue for local communities.



Fig 1. The 16 Priority Areas on Baekryeong: all with great potential for ecotourism, environmental education and “green business” in the form of specially marketed produce. Different colours are used to indicate differences in the most important habitat type in each of the 16 Priority Areas. Light blue indicates shore and sea; dark blue indicates a reservoir; yellow and orange indicate artificial wetlands (mainly rice-fields, salt pans and agricultural ponds); brown indicates tidal wetland; and green indicates forest and forest edge as the most important habitat type.

Proposals for more substantial land-use changes in two areas of former tidal flat (Area 8, now impounded as a reservoir; and Area 15, currently part-impounded) are also included in this report, as their restoration would provide substantial benefits to the island and to the nation.

Table 2: Priority Bird Species and Priority Areas

Priority Area #	Area Name	Important Habitat, listed in order of importance	Priority Bird Species (see Table 1)	Additional Priority Species
1	Dumujin Coast and Sea	Rocky coast; Sea	7,11,12,13,14,20,35,36,37	
2	Dumujin valley	Stream; Forest; Ponds; Arable land	11,14,15,17,19,33 36,37,38, 40,41	
3	Yeonhwa Ri rice-fields and wetlands	Rice-fields; Ponds; Reedbeds; Forest; Open areas	2,6,7,9,11,13, 14,17,18,19,20, 27,28,29,31,35,36,37,40,41	<i>Pelophylax chosonicus</i> , <i>Kaloula borealis</i>
4	Junghwadong Dam and Forest	Forest; Arable land; Freshwater reservoir	6,17,18,19,20,31,33,35,36,37,38, 39,40,41	
5	Pukbu Ri southern rice-fields	Rice-fields	2,7,9,11,13,16,20,25,27,35,36,37	
6	The Hwadong Wetland	Shallow water; Reedbeds; Open areas; Drainage channels; Salt pans; Forest	1,2,3,4,5,6,7,8,9,10,11,13,15,20, 21,25,26,27,29,33,34,35,36,37, 39,41	
7	Central Rice-fields (East)	Rice-fields; Fallow land	2,6,13, 20,22, 24,35,37	<i>Kaloula borealis</i>
8	Main Reservoir	Reservoir edge; Open water	2,5,7,11,13,25,29,37	
9	Sagot Beach and Sea Area	Beach; Sea; Saltmarsh	11,12,29,30	
10	Sagot Ri	Ponds; Arable land; Forest	18,19,20,35,36	<i>Pelophylax chosonicus</i>
11	Gwanchang Coast and Near Sea	Sea cliffs; Islets; Sea	9,11,12,29	
12	Gwanchang Rice-fields and Wetlands	Rice-fields; Ponds; Lotus ponds; Forest edge	6,9,11,17,28,35,36,37	<i>Kaloula borealis</i>
13	Jincheon Northeast Fields and Wetlands	Arable fields; Reedbeds; Rice-fields; Ponds; Forest	10,11,12,19,20,23,24,29,31,35, 36,37, 39, 40,41	<i>Pelophylax chosonicus</i> , <i>Kaloula borealis</i>
14	Jincheon Southeast Rice-fields and wetlands	Rice-fields; Streams; Ponds	6,9,11,18,20,29,33,34, 35,36,37, 40,41	<i>Kaloula borealis</i>
15	Jincheon Tidal flat	Tidal flat; Saltmarsh; Coastal habitat	9,11,13, 29,30,37	
16	Jincheon East Sea	Rocky shore; Islets; Sea	12,29	<i>Phoca larga</i>

While some of the Priority Areas are discrete, others (e.g. Priority Areas 5, 6, 7 and 8) are connected by the movement of species like the Black-faced Spoonbill, the Oriental Stork and geese which frequently move between areas used for feeding and areas used for roosting or nesting.



Black-faced Spoonbill (Priority Bird Species #9): This species nests in Priority Area 11; and feeds on fish and shrimp (they also do not eat rice!) in rice-fields and in shallow wetlands throughout the island.

6. Proposals: All Relevant Priority Areas

Many species of wildlife (i.e. birds, wild mammals, fish, amphibians, reptiles and insects) and of wild plant are in decline in the Republic of Korea and globally for many of the same reasons: habitat loss and degradation; the impacts of pollutants and pesticides; invasive alien species and climate change (e.g. CBD 2010). The natural balance in the environment has been disrupted and as a result more and more people have started to regret the loss of “Nature” in their lives. This is why an increasing number of tourists are now choosing to travel to beautiful places with abundant wildlife; and why so many people are willing to pay more for organic produce.

On Baekryeong Island, as elsewhere in the Republic of Korea, there has been massive environmental change in recent decades: some very positive, like the re-growth of forest; others negative. Natural wetlands especially have been much degraded, with a correspondent decline in wetland species.

In the early 1990s, seawall construction impounded a large area of tidal flat to create the main reservoir and the central rice fields (much of current Priority Areas 5, 6, 7 and 8). According to some islanders, Nationally Endangered species like Chinese Egret (Priority Bird Species # 11) and Far Eastern Curlew (Priority Bird Species # 30) have decreased markedly as a result; some other bird species, like Tundra Bean Goose – a now locally common species - will likely have increased on the island because of the greater availability of rice-fields to feed in since the late 1990s and early 2000s.

Even since 2013, when regular Birds Korea research started on Baekryeong Island, there have been many major changes to wetlands. Many ponds have been in-filled; the salt pans at Hwadong have fallen out of usage; the freshwater wetland at Hwadong has been largely drained and a road has been constructed through it, scaring away many of the waterbirds; many natural or soft-banked drainage channels have been concreted; and a third of the remaining tidal flat at Jincheon has been impounded. Although the number of many migrant landbirds remains very high, the number of overwintering Oriental Stork has decreased markedly; and many fields which previously supported large numbers of frogs and birds now appear to be largely empty of wildlife.



North side of Priority Area 6, the Hwadong Wetland (May 2014).



North side of Priority Area 6, the Hwadong Wetland (November 2016).



Amphibian and bird-rich rice-field and stream bank in Jincheon South (Priority Area 14), October 2016



And the same area in Jincheon South, May 2019...where much has now been lost to wildlife and to ecotourists

In order to help generate potential new revenue from ecotourism for people on Baekryeong Island, and to help the Republic of Korea fulfil existing national obligations to the Ramsar Convention, the Convention on Biological Diversity and to help reduce greenhouse gas emissions, a series of positive measures could be taken throughout the island, starting with the 16 Priority Areas.

For wildlife, where possible

- (i) Move toward organic production (rice and other crops);
- (ii) Retain water in rice fields through winter;



Rice-fields kept flooded through winter, Junam, Changwon. Such fields provide excellent habitat for waterbirds. In turn, concentrations of waterbirds like this are very attractive to birdwatchers and ecotourists. Wet rice-fields and high-quality wetlands can even be used to help concentrate waterbirds away from e.g. airports, helping to reduce the risk of “bird strike”.

- (iii) Install frog-ladders in drainage channels to enable amphibians to move between forest and fields (frogs are unable to escape from steep-sided drains: Watabe et al. 2010);



The frog ladder designed by Trevor Rose is cheap and easy to install. Here is one being tested at the Oriental Stork park in Yesan, June 2019.



Birds Korea has been seeking permission since late 2018 to install this type of frog ladder into concrete drains on Baekryeong Island.

- (iv) Monitor breeding birds (especially in Priority Area 11) to prevent illegal egg-collection;



Large numbers of birds nest on the ground along parts of the coast, especially in Gwangchang, in Priority Area 11. Even though the area is fenced-off, some people still use a long pole with a “sock” at the end to collect eggs illegally.

- (v) Maintain ponds in rice-fields and arable areas;



Habitat of Gold-spotted Pond Frog *Pelophylax chosonicus*, Sagot Ri (Priority Area 10)



Gold-spotted Pond Frog *Pelophylax chosonicus* © Amael Borzee

- (vi) Maintain and restore reedbeds and natural wetland;
(vii) Erect screens and blinds to reduce disturbance to waterbirds and other species close to important wetland areas;



At Junam Reservoir in Changwon, naturally- growing reed and a wooden fence are used to reduce disturbance to waterbirds



In the Nakdong Estuary in Busan, a reed screen has small windows built into it to let people see birds without disturbing them

- (viii) Remove garbage from ponds and streams, and prevent pollution from entering the ponds and waterways;
- (ix) Maintain streams and drainage channels with soft banks and bottoms;
- (x) Create access points for fish and amphibians to move between drainage channels (used in winter) and rice fields (used in summer) as currently in fields in Yeonhwa Ri;



In Yeonhwa Ri (Priority Area 3), the main drainage channel is excellent for both people and wildlife. Here, a pipe connects the drainage channel directly to the rice-fields, allowing fish to move freely between the drainage channel and the rice-fields. This allows the fish to survive in high numbers. As a result, there are fish for local people to catch; and high numbers of fish-eating waterbirds. These include Watercock, Priority Bird Species #28. This is the only area on Baekryeong Island where our surveys found breeding Watercock – and the only place with abundant fish in a drainage channel.



- (xi) When maintaining drainage channels, either leave most of the vegetation on the banks or remove vegetation only from one side of the channel at a time, leaving several years between cutting (and not dredging the whole channel and cutting vegetation on both sides at one time);



Complete removal of vegetation and dredging of mud increases the functionality of channels in rice-fields. However, if done all at once, it increases erosion of valuable soils and also destroys wildlife habitat, killing amphibians and fish and reducing the area's value to ecotourists.

- (xii) Avoid dredging or maintenance work in drainage channels and where possible tree-cutting between May and September to avoid disturbance to nesting birds;
- (xiii) Pave main roads but leave smaller tracks unpaved;
- (xiv) Allow pot-holes and puddles to form on tracks that can then be used by birds for drinking and bathing.



Birds need water. The presence of even small puddles like these help to save birds' lives – and also makes a walk in the forest much more enjoyable for ecotourists.

For Birdwatchers and Ecotourists

- (i) Provide more interpretation boards with information on important species (i.e. Priority Bird Species and other nationally Endangered wildlife);



There are signboards in Jincheon already describing about Spotted Seals: similar signs on other Endangered wildlife would help to raise awareness, and form an important part of the ecotourist experience.

- (ii) Provide hides and shelters in key areas, so that species can be watched closely;



Screen with window-slots for seeing Black-faced Spoonbills: Dongmak Lagoon, Song Do, Incheon.



Screen with window-slots and roof to protect visitors from rain: Nakdong Estuary, Busan.



Birdwatching hide, London, UK. The roof is covered with grass, and the sides are blocked with bushes so the birds cannot see or hear people approach.



Inside the birdwatching hide, London, UK: seats and narrow window slots allow people to watch birds well, without disturbing them.

- (iii) Reduce use of plastic in agriculture; and dispose of all plastic waste carefully;



- (iv) Identify suitable farm-houses and homes for home-stay tourism;
- (v) Identify suitable islanders for training as nature guides;
- (vi) Develop sustainably-produced products for sale to ecotourists;
- (vii) Consider developing a nature centre on the island in a suitable disused building (e.g. the disused hospital in Jincheon) and constructing a Wetland Experience Centre.

7. Management and Ecotourism Proposals for the Sixteen Priority Areas

Priority Area 1, Dumujin Coast and Sea

Current Tourism: Sight-seeing, boat trips and restaurants.

Ecotourism & Birdwatching Values: Beautiful rocky coast; nesting seabirds, including Pelagic Cormorant (Priority Bird Species # 12); migrant landbirds in forest; large numbers of migrating birds depart the island from this area (more than 15,000 counted in a single day).

Management Issues: None

Proposal: Provide education boards, explaining bird migration across the Yellow Sea and between Baekryeong Island and Hwanghaenam Province.



The Dumujin headland, with the Hwanghaenam coast just visible behind: only 15-20 minutes flight time for a migrant bird. An information board explaining bird migration could help people to understand how closely Baekryeong Island is ecologically linked to the Hwanghaenam Province part of Ongjin County.

Priority Area 2, Dumujin Valley

Current Tourism: None.

Ecotourism & Birdwatching Values: High. Stream with reedbeds; ponds; open fields, forest edge. There are sometimes very large numbers of migrant birds present.

Management Issues:

- (i) Currently, stream contains a lot of garbage. Dredging in 2016 and 2017 also removed a lot of vegetation and soft mud from the stream bottom and sides.
- (ii) The ponds are exposed to many pollutants.

Proposals:

- (i) Remove garbage from the stream;
- (ii) Change stream management methods (as described in point [xi] above);
- (iii) Identify ways to reduce pollution reaching ponds.

Priority Area 3, Yeonhwa Ri rice-fields and wetlands.

Current Tourism: Large numbers of visitors pay their respects at the Cheonan Warship Cenotaph; some tourists enter the beach here when the gate is open; but none explore the wetland habitats. Most stay for only about one hour.

Ecotourism & Birdwatching Values: Very high. Vegetated main stream is very important for rice-field fish, and a series of ponds are important for birds, amphibians and insects, including diving-beetles.

Management Issues:

- (i) Oil-tar is still leaking from old containers, trapping birds and other wildlife;
- (ii) Some of the main reed-bed has been filled with construction waste.



Old oil barrels have leaked, spreading oil that then traps wildlife: easy for the proper authorities to remove and clean.



One of the most beautiful views on the island in 2014 had by 2015 been largely spoiled by building waste dumped in the main reedbed.

Proposals:

- (i) Identify the best management approaches to maintain the ecological health of the stream and connections between the stream and the rice-fields.
- (ii) Remove the oil-tar from the area.
- (iii) Remove construction waste from ponds and wetlands to restore their wetland values.
- (iv) Put boards up with information on geology, ecology and main species of area close to the café/ toilet block at the entrance to the road up to the Cenotaph.

Priority Area 4, Junghwadong Dam and Forest

Current Tourism: Many tourists visit the Junghwadong church; but very few people continue on to the Dam.

Ecotourism & Birdwatching Values: Very high. This is a very beautiful area, with many migrant birds, especially in spring.



Management Issue: Plastic waste from agricultural work here is extremely bad.

Proposals:

- (i) Talk with local farmers about use of plastic and / or convenient and legal methods of disposal.
- (ii) Place signboards asking for visitors to be quiet and to take any garbage with them.

Priority Areas 5 & 7, Pukbu Ri southern rice-fields and Central Rice-fields (East)

Current Tourism: None.

Ecotourism & Birdwatching Values: Very high in winter, with large goose flock using this area and many raptors; used by feeding Oriental Stork (Priority Bird Species #7) in winter and feeding Chinese Egret (Priority Bird Species #11) in summer. The only Korean breeding site for Chinese Penduline Tit *Remiz consobrinus* is found in Priority Area 7 (Moore & Seliger 2018).

Management Issue: Potentially a large part of Priority Area 5 will be developed as a new airport.

Proposals:

- (i) In order to maintain biodiversity and to reduce the potential of air-strike, create better conditions for birds – including safe undisturbed areas for roosting and suitable areas for feeding – away from the proposed airport and air traffic e.g. in Priority Areas 6, 7 and 8 (see Figs. .



Fig. 2 (left) & Fig. 3 (right). Movements of birds between feeding and roosting areas link several of the Priority Areas together ecologically. Fig. 3 shows the daily distribution of Tundra Bean Goose in Priority Areas 5 & 7 (in years 2017-2019): red indicates the main areas used for feeding; blue indicates the main areas used for roosting. Future management of this area needs to recognize these movements, to ensure that safe feeding and roosting areas remain.

- (ii) Change management approach of many drainage channels (numbered 1 in Fig. 4) and of reedbed (numbered 2). Dredging in 2017 destroyed this main channel's value for wildlife.

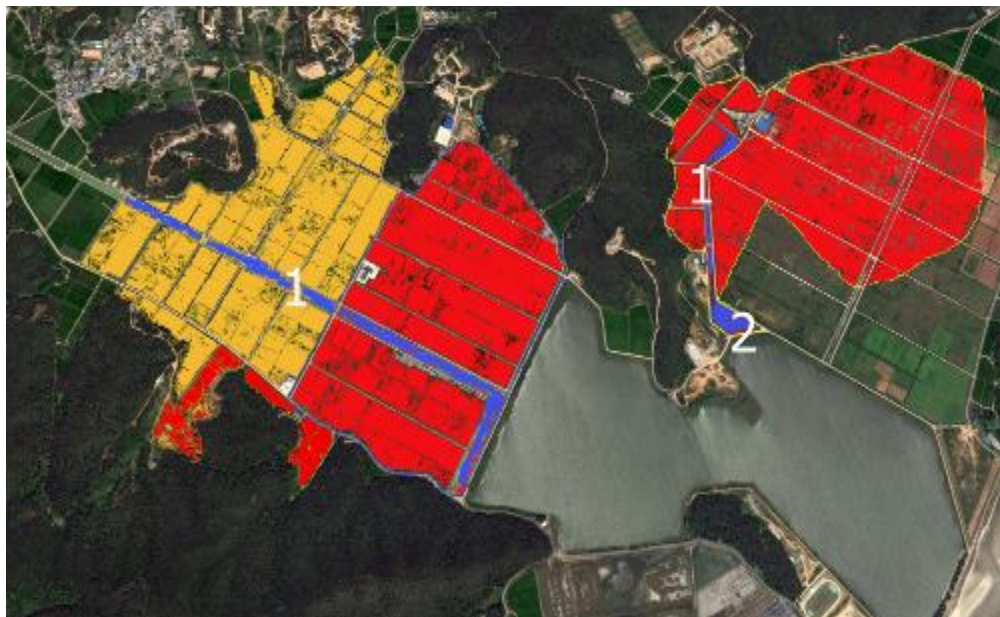


Fig. 4. Potential Management Units of Priority Areas 5 & 7. This whole area is currently shared by several Priority Bird Species. Yellow indicates currently important rice-field habitat which appears likely to be directly impacted by the construction of the new airport. Red indicates currently important habitat which is less likely to be impacted by the construction of the new airport. This red area includes most of the area recently used by foraging Tundra Bean Goose (shown in Fig 3.) and also supports many other Priority Bird Species. "1" indicates main drainage channels, marked in blue; "2" indicates an important reed-bed and shallow water area which was deep-dredged during the 2017 breeding season.



Area of reed and mud, numbered 2 in Figure 4, which was deep-dredged in May 2017. Before reed-cutting, the area was used by many breeding birds. Before dredging, the area was used by many feeding egrets and Black-faced Spoonbill (Priority Bird Species #9). It will take several years for this area to recover its ecological value, when it should again become available for Oriental Stork (Priority Bird Species # 7). Better management of areas like this will be important if ecotourism is to grow on the island.

Priority Area 6, The Hwadong Wetland

Current Tourism: None.

Ecotourism & Birdwatching Values: Until recently extremely high.



Main Marsh in the Hwadong Wetland in November 2013: at that time used throughout the winter by thousands of geese, two species of swans (Priority Species 4 & 5) and a flock of up to 17 Oriental Stork.



The Oriental Stork is a living symbol of Hwadong and of Baekryeong Island. In February 2018, our research found no swans and only 1-2 Oriental Storks on Baekryeong Island.

Management Issues:

- (i) The construction of a road between the main reservoir and the Hwadong Wetland has increased levels of disturbance greatly, so that many shy and sensitive species (like the Oriental Stork) can no longer use most of the wetland;

- (ii) The construction of deep drainage channels appears to be aimed at draining the whole area;
- (iii) The salt-pans apparently fell into disuse in 2018.

Proposals:

- (i) Develop a comprehensive management and ecotourism plan for the area, which can improve local peoples' livelihoods and conserve biodiversity;
- (ii) Toward that end, erect tall reed-screens attached to the fence along the road, to reduce disturbance to the waterbirds;



Concept for converting the currently wide road between the Baekryeong Reservoir and the Hwadong Wetland into a “Slow Street”, where people can walk safely and watch waterbirds without causing disturbance. Image created by Prof. Randy Hester & Prof. Marcia McNally, UC Berkeley.

- (iii) Place viewing screens in select places along the reed fence to allow people to see the waterbirds;
- (iv) Add education boards to explain about wetland ecosystems and about key species;
- (v) Reverse the plan to drain the area; and allow the area to flood, either naturally or through pumping from existing drains;
- (vi) Improve the attractiveness of the wetland to visiting ecotourists by constructing a screened walkway through much of the wetland (see white dotted line in Figs. 5 & 6);
- (vii) Improve the safety and attractiveness of the area by closing parts of one side of the new road and adding speed-bumps;
- (viii) Work with villagers in Hwadong to identify potential home-stays and farmhouse accommodation;
- (ix) Use areas of organically grown rice to create a sustainable rice-field experience area;
- (x) Find ways to support – technically and economically - the reopening of the salt pans;
- (xi) Create a specific “wetland-friendly” and “waterbird-friendly” brand, to sell local products (including rice and salt) at a high price to visiting ecotourists and birdwatchers.
- (xii) Construct birdwatching hides. Request a small payment for people to use the hides, with this money then paid to maintain the hides and to local guides.
- (xiii) Train a small number of islanders to work as professional nature guides



Fig. 5. Proposed “Baekryeong Wetlands Experience” Ecotourism Zone

Key

Blue: Open water

Yellow: Reed-bed

Potentially...

1. Homestay Area
2. Restaurants and shops selling locally “waterbird-friendly” produce
3. Organic Rice Fields, with hands-on experience of rice-farming for visitors
4. Hwadong Wetland Reserve for birdwatching, artists, and ecotourists;
5. Working salt-farm, with visitors hands-on experience of making salt;
6. Forest Walk
7. Main Reservoir: with restoration to tidal flat providing another very different wetland experience

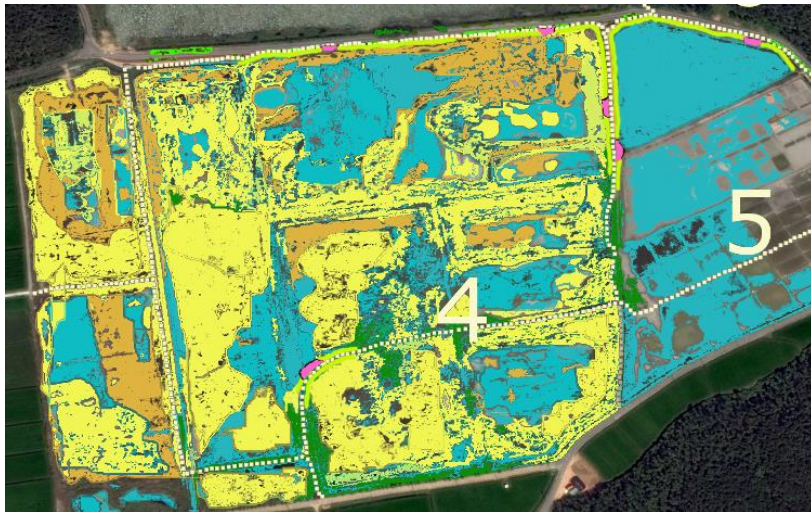


Fig. 6. Proposed Hwadong Wetland Reserve: Detail

Key

Blue: Open Water

Yellow: Reed bed

Brown: Open mud, sand

White dots: Footpath

Pink: Birdwatching hides

Light Green: Reed screens

Bright green: Planted vegetation in sections of road to slow traffic.

Priority Area 8, Main Reservoir

Current Tourism: None.

Ecotourism & Birdwatching Values: Formerly high; currently low.

Management Issues:

- (i) Water quality in reservoir is poor and apparently declining;
- (ii) Lack of “soft” or “shallow” edge combined with increase in infrastructure around the reservoir means that the reservoir is increasingly disturbed and poor for birds.

Proposals:

- (i) Partially open the sluice gates to allow limited tidal exchange (Fig. 7);
- (ii) Maintain the water in the reservoir at a substantially lower level, so that a much more extensive edge forms which can then be used by waterbirds.



Fig. 7. Proposed Tidal Flat Restoration

Partial Opening of the Sluice gate

Key:

- Blue: open water
- Brown: Mud and stone edge revealed by lower water level
- Yellow: Naturally colonizing reed-beds
- Green: Natural spread of exiting vegetation

- (iii) Consider restoration of the main reservoir as a fully tidal basin (Fig. 8).
- (iv) Create new inner dykes and impoundments within this basin, to create water pollution control ponds (a natural vegetated system of treating polluted water) and an area for fish-farms and / or lotus ponds;
- (v) Link the restored tidal wetland to other restored wetland areas to make an attractive destination for ecotourists, including a new Baekryeong Wetland Experience Centre to be constructed on open ground next to the sports stadium.



Fig. 8. Proposed Tidal Flat Restoration

Full Opening of the Sluice-gates

Key

- 1. Water Pollution Control Ponds
- 2. Fish ponds and / or lotus ponds
- 3. Tidal Flat Experience Area
- 4. Tidal Flat Wetland Reserve
- 5. Baekryeong Wetlands Experience Centre
- 6. Restored Hwadong Salt-pans for salt-making experience
- 7. Hwadong Wetland Reserve
- 8. Hwadong Rice-farming Experience Area
- 9. Beach Experience Area

Priority Area 9, Sagot Beach and Sea Area

Current Tourism: Many vehicles on the northeastern part of the beach; very few tourists visit the southwestern end of the beach.

Ecotourism & Birdwatching Values: Moderate to high. The landscape is beautiful; there is a small natural saltmarsh; the area is used by Far Eastern Oystercatcher (Priority Bird Species #29), especially in winter; and substantial numbers of seaduck winter on the sea.



Beach looking southwest



Far Eastern Oystercatcher on the Sagot Beach

Management Issues: None in the southwest of the beach. Compaction of the beach and garbage is a problem toward the northeastern part of the beach.

Proposals:

- (i) Include the southwestern part of the beach within the wider wetland restoration project as a different type of wetland experience;
- (ii) Prevent excessive disturbance at all times of the year, and provide a fenced-off area above the high tide line in the beach area for nesting birds in summer, including Far Eastern Oystercatcher.

Priority Area 10, Sagot Ri

Current Tourism: None.

Ecotourism & Birdwatching Values: Moderate. This is an interesting working landscape, with one or more agricultural ponds that support the nationally Endangered Golden-spotted Pond Frog.

Management Issues: Ponds used by nationally Endangered Golden-spotted Pond Frog are exposed to high levels of pollution.

Proposals:

- (i) Work with local farmers to conserve amphibian population in the ponds;
- (ii) Identify which farmers would prefer to farm organically; and help them to find a dedicated market to sell to visitors.

Priority Area 11, Gwanchang Coast and Near Sea

Current Tourism: None.

Ecotourism & Birdwatching Values: Very high. Beautiful landscape supports a spectacular colony of nesting Black-tailed Gulls and other birds. Within this colony of 5,000+ pairs of gulls, 4-5 pairs of Black-faced Spoonbill (Priority Bird Species #9) and five breeding pairs of Chinese Egret (Priority Bird Species #11) nested in 2018.



A close-up visit to a large breeding colony of seabirds is a highlight for any ecotourist. The colony in Gwanchang Ri is huge; has a beautiful backdrop, likely to evoke complex emotions; and contains Endangered species, making it a world-class experience.

Management Issues:

- (i) Most of the area is protected by fencing. However, the military appears to be unaware of the ecological importance of this area, and have made some recent changes to access points and to observation areas which inadvertently caused some of the colony to be abandoned.
- (ii) A very small number of islanders collect eggs illegally.

Proposals:

- (i) Provide tourist information boards about the importance of this colony;
- (ii) Provide information to the military and local households directly about the importance of this colony and on potential ways to reduce disturbance to nesting birds;
- (iii) Create a convenient and safe parking place so that more visitors can stop and view the colony through the fence.

Priority Area 12, Gwanchang Rice-fields and Wetlands

Current Tourism: Some people visit a privately-owned area of lotus ponds, already managed as a tourist attraction with a coffee shop and accommodation. The remainder of the area is not visited by tourists.

Ecotourism & Birdwatching Values: High, with very substantial numbers of amphibians (including possibly hundreds of the nationally Endangered *Kaloula borealis*) and feeding egrets and spoonbills in summer.

Management Issues:

- (i) Recent efforts have been made to drain several natural areas of wetland;
- (ii) Some of the area is increasingly disturbed by music and lights;
- (iii) In 2018, a large number of gulls were killed by pesticides and died in rice fields within this Priority Area.

Proposals:

- (i) Work with the lotus pond landowner(s) to try to maintain remaining valuable areas of wetland in and around the ponds for both amphibians and birds.
- (ii) If area is better managed for wildlife, work with landowners to promote their accommodation as a major ecotourist resort.
- (iii) Work with local farmers to reduce risk of mass die-off of birds caused by pesticides and chemicals.

Priority Area 13, Jincheon Northeast Fields and Wetlands

Current Tourism: Almost none.

Ecotourism & Birdwatching Values: Very high: beautiful working landscape, with one especially important area of reeds and farm ponds and extensive open arable fields which held a flock of 240 globally Critically Endangered Yellow-breasted Bunting (Priority Bird Species #40) in May 2019. The area supports a very good diversity of additional Priority Bird and Amphibian Species and enormous numbers of birds are possible during migration (>25,000 in a day).

Management Issues:

- (i) Gradual increase in construction of houses;
- (ii) Increased concreting of drains;
- (iii) Working fields, good for diversity, falling out of use.

Proposals:

- (i) Placement of multiple frog ladders;
- (ii) Consider replacing deep concrete drains with softer-sided drainage channels;
- (iii) Erect information boards for visitors, highlighting key areas and species;
- (iv) Identify farmers willing to shift to organic agriculture and help find a suitable market for their produce.

Priority Area 14, Jincheon Southeast Rice-fields and wetlands

Current Tourism: None.

Ecotourism & Birdwatching Values: Very high. Wetland areas support high diversity (both amphibians and birds, within easy reach of Jincheon town).

Management Issues:

- (i) Increased concreting of drainage channels;
- (ii) In-filling of remaining wetland areas.



Small reedbed in Jincheon, November 2016: this area supported many birds, fish and also amphibians, including large numbers of *Kaloula borealis*.



Same area, June 2018. Most has been in-filled. A small area of wet field remains nearby: that area still supports several dozen nationally Endangered *Kaloula borealis*.

Proposals:

- (i) Conserve remaining natural or near-natural wetlands;
- (ii) Placement of multiple frog ladders in concrete drainage channels;
- (iii) Consider replacing deep concrete drains with traditional softer-sided drainage channels;
- (iv) Erect information boards for visitors, highlighting key areas and species;
- (v) Work with local farmers to identify those willing to shift to organic agriculture.

Priority Area 15, Jincheon Tidal-flat

Current Tourism: None.

Ecotourism & Birdwatching Values: High. The last major area of tidal flat remaining on the island. The area supports several specialized tidal flat species; could be an attractive place to visit; and is the first and last place that tourists see when they visit the island.

Management Issues: Ongoing reclamation of about one-third of the natural tidal flat (Numbered 1 in Fig. 9).



Fig. 9. Priority Area (boundary marked in brown)

Key

- 1. Recently impounded tidal flat (still tidal in 2019)
- 2. Main tidal flat
- 3. Open ground used by nesting Far Eastern Oystercatcher (Priority Bird Species #29)
- 4. "Hinterland": natural tidal flat vegetation yields to planted conifers
- 5. Tidal inlet, with salt marsh plants

Proposals:

- (i) Maintain tidal exchange within the area of impounded tidal flat (Numbered 1); and cancel any plans for in-filling. Based on published estimates of economic value of tidal flats, the remaining 15ha of tidal flat at

Jincheon (Numbered 2) has a value of between 600,000 USD and 2,850,000 USD / yr (KORDI 2006; De Groot et al. 2012).

- (ii) Re-profile area Numbered 5, to allow some tidal effect and to increase the area of salt marsh – a beautiful habitat that has multiple valuable roles, including capturing carbon (Sousa et al. 2017).



Jincheon Tidal Flat, Area Numbered 4 in Fig. 9



Jincheon Tidal Flat, Area Numbered 5 in Fig. 9

- (iii) Area Numbered 3 is used by nesting Far Eastern Oystercatcher (Priority Bird Species #29). Restrict access during the summer months; and cut back vegetation each winter to maintain patches of open ground for nesting Far Eastern Oystercatcher.
- (iv) Create a better walking path through the hinterland of the tidal flat (i.e. through the planted trees in area Numbered 4), to improve access while reducing disturbance to tidal flat species.

Priority Area 16, Jincheon East Sea

Current Tourism: Limited.

Ecotourism & Birdwatching Values: High. This is both a beautiful area and also the best place in Korea to see Spotted Seal *Phoca largae*. With the support and leadership of the NGO Green Korea United, considerable efforts have already been made by some islanders and organisations to research and to conserve the dwindling seal population here, e.g. by creating new resting areas for the species.

Management issues: No major issues.

Proposals:

- (i) To improve opportunities for people to see seals well without causing disturbance, provide a viewing platform with fixed telescopes to let people watch the Spotted Seals from the beach.
- (ii) Regulate against boats and other potential sources of disturbance to the Spotted Seals.



Jincheon east sea, August 2017



Spotted Seals, Jincheon east sea, October 2018

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