YELLOW SEA COAST

THE coastal wetlands around the Yellow and Bohai Seas are of immense importance for threatened waterbirds. They support the entire known global breeding populations of Black-faced Spoonbill and Saunders's Gull, and almost all breeding Chinese Egrets; the spoonbill and egret nest on small islands, mostly off western Korea, and the gull in coastal saltmarshes. High proportions of the populations of Swan Goose and Red-crowned Cranes winter on the coast of Jiangsu in China, and most of the world's Baikal Teal winter in South Korea. Large numbers of threatened waterbirds move through on passage, notably Spotted Greenshank and Spoon-billed Sandpiper, for which the region's intertidal mudflats provide vital feeding habitat.

- **Key habitats** Coastal wetlands, freshwater wetlands near the coast.
- **Countries and territories** **North Korea**; **South Korea**; **China** (Liaoning, Hebei, Tianjin, Shandong, Jiangsu, Shanghai).

	Threatened species			
	CR	EN	VU	Total
●	—	1	3	4
✈	1	2	7	10
🦆[1]	—	3	4	7
Total	1	6	14	21

Key: ● = breeding in this wetland region.
✈ = passage migrant.
🦆 = non-breeding visitor.
[1] The Conservation Dependent Dalmatian Pelican is also a non-breeding visitor to this region.

Islets off the west coast of Korea support almost the entire global breeding populations of Black-faced Spoonbill and Chinese Egret. PHOTO: HAIXIANG ZHOU

Table 1. Outstanding Important Bird Areas on the Yellow Sea coast.

	IBA name	Status	Territory	Threatened species
1	**Chongchon estuary**	(PA) [AP]	North Korea	Large numbers of migrant Swan Goose, White-naped, Hooded and Red-crowned Cranes and Spotted Greenshank
2	**Tegam-do, Chamcha-do and Mugi-do islands**	—	North Korea	Large Chinese Egret and Black-faced Spoonbill colonies
3	**Tok-do island**	PA	North Korea	Large Chinese Egret and Black-faced Spoonbill colonies
4	**Cheolweon basin, Demilitarised Zone (DMZ)**	— [AP]	North Korea; South Korea	Wintering White-naped and Red-crowned Cranes
5	**Western coast of DMZ, south to Ganghwa and Yeongjong islands**	(PA) [AP]	North Korea; South Korea	Large Chinese Egret and Black-faced Spoonbill colonies, passage Red-crowned Crane and Spotted Greenshank, Saunders's Gull has bred
6	**Namyang and Asan bays**	—	South Korea	Large wintering flocks of Baikal Teal, passage Spotted Greenshank and wintering Saunders's Gull
7	**Cheonsu bay**	(PA) [AP]	South Korea	Large wintering flocks of Baikal Teal, also wintering Hooded Crane and Saunders's Gull
8	**Saemangeum (Mangyeung and Tongjin estuaries) and Geum estuary**	(PA) [AP]	South Korea	Large numbers of passage Spoon-billed Sandpiper and Spotted Greenshank and wintering Baikal Teal and Saunders's Gull
9	**Haenam Gun wetlands**	—	South Korea	Large wintering flocks of Baikal Teal
10	**Suncheon-Kwangyang bays**	—	South Korea	Wintering Hooded Crane, Saunders's Gull and Relict Gull, passage Spotted Greenshank
11	**Shuangtai Hekou NNR**	PA [AP]	Liaoning	Largest known breeding colony of Saunders's Gull, breeding Red-crowned Crane and Marsh Grassbird, passage Oriental Stork and Siberian Crane
12	**Changshan islands**	—	Liaoning	Large Chinese Egret and small Black-faced Spoonbill colonies
13	**Beidaihe**	—	Hebei	Many threatened species on passage, including Oriental Stork, cranes (all four species) and Swinhoe's Rail
14	**Yellow River Delta NNR**	PA [AP]	Shandong	Breeding Saunders's Gull, wintering Red-crowned Crane (and Great Bustard), and many threatened waterbirds on passage
15	**Yancheng NNR**	PA [AP,BR,R]	Jiangsu	Breeding Saunders's Gull, many threatened species on passage and wintering, notably the largest wintering flock of Red-crowned Crane in the world
16	**Chongming Dao island**	(PA) [AP,R]	Shanghai	Wintering Hooded Crane, passage Black-faced Spoonbill and Spotted Greenshank

Note that more IBAs in this region will be included in the *Important Bird Areas in Asia*, due to be published in early 2004.

Key *IBA name*: NR = Nature Reserve; NNR = National Nature Reserve.
Status: PA = IBA is a protected area; (PA) = IBA partially protected; — = unprotected; AP = IBA is wholly or partially an Asia-Pacific waterbird network site (see p.35); BR = IBA is wholly or partially a Biosphere Reserve (see pp.34–35); R = IBA is wholly or partially a Ramsar Site (see pp.31–32).

The inter-tidal habitats around the Yellow Sea are vital for Spotted Greenshank and other migrant shorebirds, but are severely threatened by reclamation projects.

PHOTO: JOHN HOLMES

OUTSTANDING IBAs FOR THREATENED BIRDS (see Table 1)

The Yellow Sea coast is exceptionally important for threatened waterbirds, and sixteen IBAs have been selected to cover the most important breeding, passage and wintering sites for them.

CURRENT STATUS OF HABITATS AND THREATENED SPECIES

About 600 million people (c.10% of the world's population) live in the river catchments draining into the Yellow Sea, and the huge human pressure on the region has had a major impact on the environment. Large areas of coastline continue to be reclaimed for agriculture, industry, urban expansion and other development, with this part of China estimated to have lost c.37% of its intertidal areas since 1950, South Korea c.43% since 1917, as well as large areas in North Korea. The quality of the remaining wetlands has been reduced by pollution, unsustainable fishing and human disturbance. Despite these problems, the region still has many globally and regionally important wetlands, notably the outstanding IBAs listed in Table 1.

Table 2. Threatened birds of the Yellow Sea coast.

Species		Distribution and population
Dalmatian Pelican *Pelecanus crispus*	CD	Rare passage migrant, small wintering population in Jiangsu
Chinese Egret *Egretta eulophotes*	VU	Almost the entire global population breeds on small islands off the west coast of the Korean Peninsula and off Liaoning and (probably) Shandong
Oriental Stork *Ciconia boyciana*	EN	Most of global population migrates through the region, small numbers winter in Jiangsu
Black-faced Spoonbill *Platalea minor*	EN	The entire global population breeds on small islands off the west coast of the Korean Peninsula and off Liaoning
Swan Goose *Anser cygnoides*	EN	Passage and winter visitor, with the largest wintering concentrations in Jiangsu
Lesser White-fronted Goose *Anser erythropus*	VU	Passage and winter visitor, with significant winter counts in Shandong and Jiangsu
Baikal Teal *Anas formosa*	VU	Most of the global population winters in South Korea, mainly near the coast
Baer's Pochard *Aythya baeri*	VU	Widespread passage and winter visitor, largest counts in Tianjin, Shandong and Jiangsu
Scaly-sided Merganser *Mergus squamatus*	EN	Scarce passage and winter visitor
Siberian Crane *Grus leucogeranus*	CR	The eastern population migrates through the region, small numbers stage in Liaoning and Hebei
White-naped Crane *Grus vipio*	VU	A flock winters at the DMZ in Korea, and the Yangtze basin and Japanese wintering populations migrate through this region
Hooded Crane *Grus monacha*	VU	Flocks winter in South Korea and Shanghai, and the Yangtze basin and Japanese wintering populations migrate through this region
Red-crowned Crane *Grus japonensis*	EN	Large numbers winter in Jiangsu, with smaller flocks in Shandong and at the DMZ in Korea
Swinhoe's Rail *Coturnicops exquisitus*	VU	Occurs on passage, recorded annually at Beidaihe in Hebei in recent years
Spotted Greenshank *Tringa guttifer*	EN	Recorded widely on migration in inter-tidal habitats, important concentrations at several sites in South Korea, Shandong and Jiangsu
Spoon-billed Sandpiper *Eurynorhynchus pygmeus*	VU	Recorded widely on migration in small numbers in intertidal habitats, with the most important concentration in the Saemangeum area in South Korea
Saunders's Gull *Larus saundersi*	VU	The entire global population nests in coastal saltmarshes at a few sites in Liaoning, Hebei, Shangdong, Jiangsu and South Korea
Relict Gull *Larus relictus*	VU	Flocks recorded on passage and in winter at a few sites, the main wintering grounds of this poorly known species may prove to be in this region
Styan's Grasshopper-warbler *Locustella pleskei*	VU	Breeds on small islands off the south and west coasts of South Korea
Streaked Reed-warbler *Acrocephalus sorghophilus*	VU	This poorly known species has been recorded on passage in Hebei and Shanghai
Manchurian Reed-warbler *Acrocephalus tangorum*	VU	Recorded on passage in Liaoning and Hebei
Marsh Grassbird *Megalurus pryeri*	VU	Probably breeds in Liaoning and possibly in Shanghai, recorded on passage in South Korea and Hebei

In addition to the waterbirds, Great Bustard *Otis tarda* (VU; see G01) occurs on migration and in winter on the coastal plains of this region, and Greater Spotted Eagle *Aquila clanga* (VU; see F01) and Imperial Eagle *A. heliaca* (VU; see G01) both occur on migration.

● = region estimated to support >90% of global breeding population, ◍ = 10–50%, ○ = <10%; = region estimated to support >90% of global non-breeding population, = 50–90%, = 10–50%, = <10%, ? = proportion of global non-breeding population unknown; = region estimated to support >90% of global population on passage, = 50–90%, = 10–50%

CONSERVATION ISSUES AND STRATEGIC SOLUTIONS (summarised in Table 3)

Habitat loss and degradation

COASTAL RECLAMATION

Large areas of intertidal habitat have been lost around the Yellow Sea, and there are many large-scale ongoing projects and plans for further reclamation, for industrial development, agricultural land, salt works, urban expansion, aquaculture and freshwater reservoirs. In the past, sediment carried to the sea by large rivers, notably the Yellow and Yangtze Rivers, led to the growth in area of intertidal mudflats, which to some extent compensated for the habitat lost through reclamation and erosion. However, in the past decade the water and sediment flows in the Yellow River have declined drastically because of increased water extraction from the river for agricultural, industrial and domestic purposes. It is predicted that once the Three Gorges Dam is in operation there will also be a significant decline in the sediment discharged into the sea by the Yangtze.

China plans to reclaim a further 45% of its existing Yellow Sea mudflats, South Korea a further 34% (with many additional smaller projects proposed by local governments), while in North Korea it is believed that substantial investments already made in seawalls and irrigation channels will cause additional wetland habitat loss. Many IBAs listed in Table 1 are affected, including Saemangeum in South Korea, which is subject to the largest ongoing reclamation project in the world (at 401 km^2) that aims to landfill both estuaries following the construction of a 33 km dyke, due for completion in 2005. Although recent opposition to many of the ongoing and planned reclamation projects in South Korea appears to have caused a shift away from this type of project, the South Korean government recently decided to continue to implement the Saemangeum project.

There is a need to review and, if necessary, revise plans (at the national, provincial and local levels) for coastal reclamation around the Yellow Sea in North Korea, South Korea and China, in order to reconcile the needs of nature conservation and economic development. Environmental impact assessments should be conducted to review these projects, fully taking into account the value of intertidal wetlands for biodiversity and the ecological services that they provide (e.g. coastal protection, spawning grounds for fish). Given the importance of the Saemangeum area for biodiversity conservation and fisheries, the South Korean government should continue to reconsider this reclamation project, in line with internationally held obligations (e.g. Ramsar Resolution 7.21, Enhancing the conservation and wise use of inter-tidal areas).

CHANGING AGRICULTURAL PRACTICES

In South Korea, paddy fields are being replaced with other crops (e.g. vegetables and watermelons) grown under vinyl or in greenhouses, because of changing dietry habits and competition with cheap rice imports from the USA and Australia. This is reducing the foraging habitat available to cranes and other waterbirds, and needs to be offset by improved protection and management of the key remaining wetlands.

POTENTIAL DEVELOPMENT OF THE DEMILITARISED ZONE (DMZ) IN KOREA

The land in and around the DMZ (see Table 1), which currently divides North Korea and South Korea, is relatively undeveloped and subject to very little human disturbance. The DMZ is afforded protection by the current security situation in Korea, but could be opened up for development (with resulting increased disturbance) should the situation change in the future. Various options for the conservation of key areas for biodiversity need to be considered in advance, taking into account the extremely complex and delicate political situation surrounding the DMZ. These might include, for example, proposals to establish wetland conservation areas and national parks, where access and development would be controlled.

POLLUTION/PESTICIDES

The Yellow Sea is subject to major pollution from industrial effluent and domestic sewage, with long-term monitoring in China and South Korea showing that the seawater quality is steadily declining. This is a potential threat to waterbirds

Table 3. Conservation issues and strategic solutions for birds on the Yellow Sea coast.

Conservation issues	Strategic solutions
Habitat loss and degradation	
COASTAL RECLAMATION *CHANGING AGRICULTURAL PRACTICES* *POTENTIAL DEVELOPMENT OF THE DEMILITARISED ZONE (DMZ) IN KOREA* *POLLUTION/PESTICIDES* *DISTURBANCE*	➤ Review long-term national, provincial and local plans for reclamation on the Yellow Sea coast ➤ Assess the environmental impact of all proposed reclamation projects, and reconsider the Saemangeum project in South Korea ➤ Prepare plans to ensure the protection of key sites for threatened birds within the DMZ ➤ Continue to develop pollution control programmes, including systems to prevent spills at oilfields ➤ Control access to waterbird nesting colonies and roost sites
Protected areas coverage and management	
GAPS IN PROTECTED AREAS SYSTEM *WEAKNESSES IN RESERVE MANAGEMENT*	➤ Establish new wetland nature reserves, notably on the west coast of South Korea ➤ Give nature reserve management offices in China more authority to control land use inside their reserves ➤ Strengthen reserve management in China through improved funding, infrastructure and staff training
Exploitation of birds	
HUNTING *EGG COLLECTING*	➤ Strictly enforce laws banning the use of poisons for hunting in China, and patrol markets to prevent the sale of waterbirds ➤ Improve wardening at important waterbird nesting colonies
Gaps in knowledge	
INADEQUATE DATA ON THREATENED BIRDS	➤ Survey offshore islands in Korea and China to locate colonies of Chinese Egret and Black-faced Spoonbill ➤ Study the distribution and management needs of Great Bustards at the Yellow River delta ➤ Monitor populations of large waterbirds through counts on migration

Systems and contingency plans need to be put in place to prevent and control oil spills at major oilfields on the Chinese coast.

PHOTO: SIMBA CHAN

through direct poisoning or a reduction in the biomass of their prey. Shuangtai Hekou Nature Reserve is under threat of pollution from operations in the Liaohe oilfield, and oilfields at the Yellow River delta, near Tianjin and elsewhere are also potential sources of pollution. The use of agrochemicals and pesticides by farmers is also likely to be affecting some threatened waterbirds. Efforts are already underway to reduce pollution levels, for example by the Chinese government which is providing major funding to the Yellow Sea coastal provinces to install pollution control facilities. These measures need to be continued and extended to all parts of the region, with systems in place to prevent oil spills at Shuangtai Hekou Nature Reserve, the Yellow River delta and in the Tianjin area.

DISTURBANCE

In this densely populated region, human disturbance is a serious problem at many wetlands, with activities such as fishing, shellfish harvesting, and eel fry and lugworm collection disturbing the feeding and roosting grounds of threatened waterbirds (and nesting colonies of Saunders's Gull). Disturbance of nesting Chinese Egrets and Black-faced Spoonbills by photographers is thought to have led to increased predation by gulls, and to have been a major factor in egret population collapse at a colony in South Korea. Human usage of sensitive areas of coastal wetlands needs to be managed for biodiversity conservation, by working with local people for the sustainable use of wetland resources. Access to the most sensitive areas needs to be controlled, particularly at nesting colonies and roost sites, with clear guidelines prepared for visitors.

Protected areas coverage and management

GAPS IN PROTECTED AREAS SYSTEM

Several of the most important coastal wetlands around the Yellow Sea are officially protected, but there are some significant gaps, notably in South Korea where (despite recent efforts by the relevant government departments) there are still no comprehensively protected coastal wetlands. New nature reserves are needed on the west and south coasts of South Korea, and possibly at key wetlands in coastal North Korea and China. For example, a coastal wetland reserve should be considered at Beidaihe, because there is great potential for conservation education and the promotion of birdwatching at this popular tourist resort. Some existing reserves in China need expansion, for example Chongming and Xinglong Dongsha.

WEAKNESSES IN RESERVE MANAGEMENT

A major problem in China (and presumably also in North Korea) is the difficulty of managing existing nature reserves in the face of massive pressures from development, pollution and disturbance. A general beneficial measure would be to give the management offices of nature reserves more authority to control land use and development inside their reserves, notably at Yancheng, Yellow River Delta and Chongming Dongtan Nature Reserves, with good supervision from central government and the public to ensure improved management. The National Endangered Plant and Wildlife Protection and Nature Reserve Construction Program is a new Chinese government initiative to improve the existing protected area system and

The fisheries of the Yellow Sea provide a vital source of protein to the many people who live near the coast.

PHOTO: HAIXIANG ZHOU

establish new reserves, and it provides a mechanism to address the current management problems. It has the potential to provide stable funding for reserves and to improve reserve management, by improving their infrastructure, staff training, staff working conditions and the livelihood of local communities.

Exploitation of birds

HUNTING

Hunting is a threat to waterbirds in parts of this region. The use of poison baits is widespread in China and (to a lesser extent) South (and presumably also North) Korea, either deliberately placed by poachers to kill ducks and geese, or used by farmers to control rodents, but they also cause high mortality amongst cranes. The laws to prevent the use of these poisons should be more strictly enforced, and an education campaign launched to warn users of their adverse effects on wildlife and people. Markets in the region should be patrolled, to prevent the illegal sale of threatened waterbirds.

EGG COLLECTING

Local people and fishermen in China collect the eggs of the colonial Chinese Egret, Black-faced Spoonbill and Saunders's Gull for food. At Yancheng Nature Reserve, Saunders's Gull eggs have also been collected for zoos for captive breeding. Improved wardening of colonies is required to prevent these illegal activities, with associated education campaigns.

Gaps in knowledge

INADEQUATE DATA ON THREATENED BIRDS

Recent studies have added greatly to knowledge of threatened birds in this region, but many gaps remain. Some breeding colonies of Chinese Egrets and Black-faced Spoonbills remain to be located, and surveys are required in Korea, particularly in the western DMZ (which is currently very difficult to access because of the security situation) and in China, on uninhabited offshore islands in Liaoning, Shandong and possibly further south; these surveys should also search for nesting colonies of Chinese Crested-tern *Sterna bernsteini* (see S01). In addition to the nesting islands, surveys should identify the main feeding areas used by the nesting egrets and spoonbills, as these intertidal habitats on the mainland are likely to be more seriously threatened than the breeding sites. Structured interviews with fishermen in coastal ports could help locate offshore islands and remote coastal localities with breeding colonies of egrets and other birds. The Yellow River delta supports an important wintering population of Great Bustards, and their distribution needs to be studied to allow improved management of nature reserves for their benefit. The entire global or continental Asian populations of several threatened waterbirds migrate through the Yellow Sea, and changes in their numbers could therefore be monitored through regular systematic counts, for example at Beidaihe, where virtually the entire global populations of Oriental Stork and Siberian Crane have been counted on migration.

Chinese Egrets nest on offshore islets, but need inter-tidal flats on the nearby mainland for feeding.

PHOTO: HAIXIANG ZHOU