

Biological Assessment of Ecologically Important Areas for Bird Taxonomic Group of the Yellow Sea Ecoregion

China Part

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Ecological sub-regions

Definition and description of sub-regions

Sub-regions were defined as Palaearctic and Oriental realms according to biogeographical zones of fauna. The Palaearctic realm is the current distribution centre for animals in the cool-temperate zone of the old world, and the Oriental realm is the current distribution center for animals in the tropical zone of Asia. The boundary of these two regions is the Huaihe River. With temperate climate in the north and subtropical climate in the south, the Huaihe River is also the north boundary of most of animals in tropical and subtropical zones.

Sub-region 1:

Sub-region 1 is the Palaearctic realm; it is defined as the area north of the Huaihe River and includes the Bohai Sea, the Yellow Sea and the northern part of the East China Sea. Most birds in this sub-region are migratory.

Sub-region 2:

Sub-region 2 is the Oriental realm; it is defined as the area south of the Huaihe River and covers the southern part of the East China Sea. This sub-region contains wintering grounds for birds in the Palaearctic realm.

The entire Yellow Sea Ecoregion (YSE) falls into sub-region 1.

Common Criteria for Identification of Ecologically Important Areas of the YSE

The Bird Taxonomic Group adopted the following common criteria to identify Ecologically Important Areas for birds in the YSE (Table 1).

Table 1. List of Adopted Common Criteria for Bird Taxonomic Group

Adopted Common Criteria	Selected Indicator Species/ Species Groups	Definition of Indicator Species	Definition of Ecologically Important Areas	Major sources of reference	Major Knowledge Gaps
Criterion 1: representative species/habitat types	red-crowned crane, hooded crane, white-naped Crane, black-faced spoonbill, oriental white stork, Chinese egret, baikal teal, whooper swan, Saunders gull, oystercatcher, Far eastern curlew	Species whose main breeding grounds, stopover sites, and/or wintering grounds are located mainly in the YSE	Breeding grounds, stopover sites or wintering grounds	Lu 1990; Ma et al. 1993; Chen 1998; Zheng & Wang 1998; Yin et al. 1999, 2000; Ma et al. 2000; Su et al. 2000; BirdLife International 2001; Ma & Ma 2001; Barter 2002; Wan et al. 2001; Qian 2002; Shan et al. 2002; Ma & Li 2002; Li & Wang 2002; Jiang et al. 2002; Zhang et al. 2002;	Number and distribution of Anatidae and seabirds in the YSE; Environmental changes and their effects on waterbirds; Stopover ecology of shorebirds; Comprehensive survey on waterfowl

Adopted Common Criteria	Selected Indicator Species/ Species Groups	Definition of Indicator Species	Definition of Ecologically Important Areas	Major sources of reference	Major Knowledge Gaps
Criterion 2: endemism and unique species assemblages (endemic to Bohai/ Yellow Sea / East China Sea)	not adopted	not adopted	not adopted	not adopted	not adopted
Criterion 3: species richness	not adopted	not adopted	not adopted	not adopted	not adopted
Criterion 4-A: spp. of special concern (threatened and/or protected spp.)	red-crowned crane(E), hooded crane(V), white-naped crane(V), black-faced spoonbill(E), oriental white stork(E), Chinese Egret(V), baikal teal(V), saunders's gull(V) Whooper swan (2 nd level protected bird in China) (Refer to IUCN Category on Endangered species)	Endangered (E) or vulnerable (V) species in the world or in China	Breeding grounds, stopover sites or wintering grounds	Zheng & Wang 1998; BirdLife International; 2001	Breeding, stopover and wintering ecology of waterbirds
Criterion 4-B: species of special concern (depleted storks)	not adopted	not adopted	not adopted	not adopted	not adopted
Criterion 5-A: commercially important (Volume)	not adopted	not adopted	not adopted	not adopted	not adopted
Criterion 5-B: commercially important (Value)	not adopted	not adopted	not adopted	not adopted	not adopted
Criterion 6: intact habitat / ecological processes	not adopted	not adopted	not adopted	not adopted	not adopted
Criterion 7: Ramsar 20,000 / 1% criteria	Waterbirds	More than 20,000 birds, or > 1% of total population in the world	Breeding grounds, stopover sites or wintering grounds	Wetlands International 2002	

Selected Indicator Species under Criterion 1: Representative species/ habitat types

Definition of Indicator Species under Criterion 1:

Representative species whose main breeding grounds, stopover sites and/or wintering grounds are located in the YSE.

Selected Indicator Species:

[Red-crowned crane] *Grus japonensis* [丹顶鹤, Dandinghe]

Reason for Selection:

The Red-crowned crane has an estimated population of 1,400 in the YSE. This accounts for as many as 90% of the migratory population in the world and about 60% of the total number in the world.

In the YSE under China's jurisdiction, the red-crowned crane has been recorded at: the Shuangtaihe River Delta, Beidaihe, Nanbu, the Changdao Islands, the Yellow River Delta, Rongcheng, Lianyungang and Yancheng.

[Hooded crane] *Grus monacha* [白头鹤, Baitouhe]

Reason for Selection:

The hooded crane has a population of about 11,000 in the world and most of them winter in Izumi, Japan. About 1,000 birds have been recorded in China in the winter and most of them pass through the YSE during migration. More than 100 of the birds winter at Chongming Dongtan in Shanghai and some small populations winter at the coast of the YSE. The west coast of the Korean peninsula also provides important wintering grounds and stopover sites for the hooded crane.

In the YSE under China's jurisdiction, the hooded crane has been recorded at: the Yalu River estuary, the Shuangtaihe River delta, Beidaihe, the Yellow River Delta, and Chongming Dongtan of Shanghai.

[White-naped crane] *Grus vipio* [白枕鹤, Baizhenhe]

Reason for Selection:

The white-naped crane has a population of 5,000 in the world. The YSE has important stopover sites for most of the cranes and also provides wintering grounds for about 1,000 birds in China and South Korea.

In the YSE under the jurisdiction of China, the hooded crane has been recorded at: the Shuangtaihe River delta, Beidaihe, Tianjin coastal regions, the Yellow River Delta, Yancheng coastal region and Chongming Dongtan of Shanghai.

[Black-faced spoonbill] *Platalea minor* [黑脸琵鹭, Heilianpilu]

Reason for Selection:

The Black-faced spoonbill has a population of about 1,100 in the world. The YSE holds the breeding grounds and stopover sites for almost the entire population. An especially important small population winters in the YSE.

In the YSE under China's jurisdiction, the black-faced spoonbill has been recorded at: the Yalu River estuary, Xingren Tuo of the Changshan Islands, Shuangtaihe estuary, the Yellow River delta, Rongcheng, Yancheng and Chongming Dongtan of Shanghai.

[Oriental white stork] *Ciconia boyciana* [东方白鹤, Dongfangbaiguan]

Reason for Selection:

The oriental white stork has a population of about 3,000 in the world and most of them winter in China. The YSE has important stopover sites for the stork. A small population winters in the YSE.

In the YSE under China's jurisdiction, the oriental white stork has been recorded at: Shuangtaihe estuary, Beidaihe, Tianjin coastal region, the Yellow River Delta, Yancheng, and Chongming Dongtan of Shanghai.

[Chinese egret] *Egretta eulophotes* [黄嘴白鹭, Huangzuibailu]

Reason for Selection:

The Chinese egret has a population of about 3,000 in the world and more than two thirds of them breed in the YSE, primarily in the Bohai Sea and the northern part of the YSE.

In the YSE under China's jurisdiction, Chinese egret have been recorded at: She Island, Haimao Island in Dalian Bay, the Changshan Islands, Beidaihe, Shijiu tuo in Tangshan City, Lianyungang, Yancheng, and Chongming Dongtan.

[Baikal teal] *Anas formosa* [花脸鸭, Hualianya]

Reason for Selection:

The baikal teal has a population of more than 300,000 in the world and more than 200,000 birds are distributed in the YSE, primarily in South Korea.

In the YSE under China's jurisdiction, only a small number of birds have been recorded in coastal areas. Baikal teal have been recorded at: Beidaihe, the Tianjin coast, the Yellow River Delta, Qingdao, Rizhao, Yancheng, and Chongming Dongtan.

[Whooper swan] *Cygnus cygnus* [大天鹅, Datiane]

Reason for Selection:

The whooper swan has a population of about 7,000 in the YSE under China's jurisdiction, especially in Rongcheng, where about 5,000 birds winter every year. About 2,000 birds have been recorded in the Yellow River Delta in the winter. A large flock has been recorded in South Korea.

[Saunders's gull] *Larus saundersi* [黑嘴鸥, Hezuiou]

Reason for Selection:

Saunders's gull has a population of less than 10,000 in the world and most of them are distributed in the YSE. About 4,000 birds have been recorded during breeding periods. This region is also a major wintering grounds for more than 6,000 of them, including 3,000 in South Korea and more than 3,000 in China. About 3,000 birds breed in the west coast of the Yellow Sea.

In the YSE under China's jurisdiction, Saunders's gull have been recorded at: the Yalu river estuary, the Shuangtaihe estuary, Beidaihe, Tianjin Coastal region, the Yellow River Delta, Qingdao, Lianyungang, Yancheng, and Chongming Dongtan.

[Oystercatcher] *Haematopus ostralegus* [砾鹬, Liyu]

Reason for Selection:

The YSE is extremely important for the Oystercatcher (*H. O. Osculans*), whose total population is about 10,000. Part of the flyway population breeds in the YSE and most of the population spends the non-breeding season in the region.

In the YSE the oystercatcher has a population of more than 6,000, with about 400 during the northward migration, about 1,900 during the southward migration and about 6,000 during the non-breeding season (about 5,700 in Geum Gang Hagu in South Korea, and 200 in Yancheng National Nature Reserve).

In the YSE under China's jurisdiction, the oystercatcher was recorded in: the Yalu River Estuary (189 birds), the Shuangtaihe Estuary (500 birds), the Yellow River delta (76 birds) and the Yancheng coastal region (320 birds).

[Far eastern curlew] *Numenius madagascariensis* [红腰杓鹬, Hongyaoshaoyu]

Reason for Selection:

The far eastern curlew has a population of about 38,000 worldwide. It breeds in East Asia and winters in Southeast Asia and Australia. The YSE contains important stopover sites for the curlew.

In the YSE under China's jurisdiction, large flocks of far eastern curlew have been recorded in the the Yalu river estuary (3,744 birds), the Shuangtaihe estuary (1,803 birds), the Yellow River Delta (1,125 birds), Dongsha (819 birds) and Chongming Dongtan (794 birds).

Definition of Ecologically Important Areas for the Selected Indicator Species:

Major areas of distribution of the bird species mentioned above are considered to be ecologically important areas.

Selected Indicator Species under Criterion 4: Species of Special Concern

Definition of Indicator Species under Criterion 4:

Species that are listed in either national or international lists of threatened species.

Selected Indicator Species:

[Red-crowned crane] *Grus japonensis* [丹顶鹤, Dandinghe]

Reason for Selection:

With about 2,500 birds in the world in total, the red-crowned crane is a globally endangered species and listed as a 1st level protected bird in China. The YSE covers the migratory routes and wintering grounds for the majority of its migratory population.

[Hooded crane] *Grus monacha* [白头鹤, Baitouhe]

The hooded crane is a vulnerable species in the world and is a 1st level protected bird in China. About 10,000 birds winter in Izumi, Japan. About 1,000 winter in China, of which more than 100 birds can be recorded in the southern YSE (Chongming Dongtan). The northern YSE contains important winter stopover sites.

[White-naped crane] *Grus vipio* [白枕鹤, Baizhenhe]

The white-naped crane is a vulnerable species internationally and is listed as a 2nd level protected bird in China. The total population worldwide is about 7,200. The northern YSE has important stopover sites for this species. A small number of cranes also winter in the coastal region of the southern YSE.

[Black-faced spoonbill] *Platalea minor* [黑脸琵鹭, Heilianpilu]

The black-faced spoonbill is an endangered species worldwide and is listed as a 2nd level protected birds in China. The YSE covers the breeding grounds, stopover sites and wintering grounds of this species.

[Oriental white stork] *Ciconia boyciana* [东方白鹤, Dongfangbaiguan]

The oriental white stork is endangered worldwide and is listed as one of the 1st level protected birds in China. Only about 3,000 birds exist worldwide. The YSE covers the major migratory routes of the stork. A small population winters in the YSE.

[Chinese egret] *Egretta eulophotes* [黄嘴白鹭, Huangzuibailu]

The Chinese egret is labeled as a vulnerable species worldwide and is listed as a 2nd level protected bird in China. Only about 3,000 birds are left in the wild. The Bohai Sea and the northern part of the YSE contain the major breeding grounds of the egret. The birds stay in the southern part of the YSE during migration.

[Baikal teal] *Anas formosa* [花脸鸭, Hualianya]

Baikal teal is a vulnerable species. It has a population of more than 300,000 worldwide, and more than 200,000 birds are distributed in the YSE, primarily in South Korea. In the YSE under China's jurisdiction, only a small number of birds have been recorded in coastal regions in recent years.

[Whooper swan] *Cygnus cygnus* [大天鹅, Datiane]

The whooper swan is a 2nd level protected bird in China. About 5,000 birds winter in Rongcheng in Shandong Province and about 2,000 birds have been recorded in the Yellow River Delta.

[Saunders's gull] *Larus saundersi* [黑嘴鸥, Heizuiou]

Saunders's gull is a globally endangered species. Their numbers are estimated at 7,100-9,600. The YSE provides the major breeding and wintering grounds for this species.

Table 2. List of selected Indicator Species

Selected Indicator Species	Criterion 1	Criterion 4
	Representative species/ habitat types	Species of Special Concern
Red-crowned crane	X	X
Hooded crane	X	X
White-naped crane	X	X
Black-faced spoonbill	X	X
Chinese egret	X	X
Oriental white stork	X	X
Baikal teal	X	X
Whooper swan	X	X
Saunders's gull	X	X
Oystercatcher	X	
Far eastern Curlew	X	

Note: X indicates that the species was selected under the corresponding criterion.

Maps and Description of Ecologically Important Areas for Bird Taxonomic Group

Table 3. List of Maps and Area Names for Ecologically Important Bird Areas

Map Number	Indicator Species	Area names for Bird Ecologically Important Areas					
Map 1	Red-crowned crane (<i>Grus japonensis</i>)	Shuangtai he estuary	Beidaihe	Nanbu saltmarsh	The Yellow River Delta	Yancheng coastal region	
Map 2	Hooded crane (<i>Grus monacha</i>)	Beidaihe	Nanbu saltmarsh	The Yellow River Delta	Chongming Dongtan		
Map 3	White-naped crane (<i>Grus vipio</i>)	Beidaihe	Nanbu saltmarsh	Beidagang	Nandagang	The Yellow River Delta	
Map 4	Black-faced spoonbill (<i>Platalea minor</i>)	Yancheng coastal region	Chongming Dongtan				
Map 5	Chinese egret (<i>Egretta eulophotes</i>)	Dalian Bay	The Changshan Islands				
Map 6	Oriental white stork (<i>Ciconia boyciana</i>)	The Shuangtai he estuary	Beidaihe	Nanbu saltmarsh	Beidagang	Nandagang	The Yellow River Delta
		Yancheng coastal region					
Map 7	Whooper swan (<i>Cygnus cygnus</i>)	The Yellow River Delta	Rongcheng coastal region				
Map 8	Saunders's gull (<i>Laurs saundersi</i>)	The Yalu River estuary	The Shuangtaihe estuary	The Yellow River delta	Yancheng coastal region		
Map 9	Oystercatcher (<i>Haematopus ostralegus</i>)	The Yalu River estuary	The Shuangtaihe estuary	The Yellow River Delta	Yancheng coastal region		

Map 10	Far eastern curlew (<i>Numenius madagascariensis</i>)	The Yalu River estuary	The Shuangtaihe estuary	The Yellow River Delta	Dongsha	Chongming Dongtan	
Map 11	Ramsar 20000 or 1% criteria	The Yalu River estuary	The Shuangtaihe estuary	Beidaihe	West Bohai Bay regions	The Yellow River delta	Laizhou Bay
		Rongcheng coastal region	Lianyungang coastal region	Yancheng coastal region	Dongsha	Chongming Dongtan	

Ecologically Important Bird Areas (BEIA) by Species

BEIA for red-crowned crane (Map 1)

Area Name:

The Shuangtaihe Estuary

Location (city, province, country, geographical coordinates):

Panjin City Liaoning Province, China, 40°45'-41°10' N, 121°30'-122°00' E

Area Description:

The Shuangtaihe estuary is an important breeding ground and stopover site for the red-crowned crane. About 400 cranes are recorded here every year during breeding and migration periods (Zheng & Wang, 1998; BirdLife International, 2001).

Area Name:

Beidaihe

Location (city, province, country nearest to the area, geographical coordinates):

Qinhuangdao City, Hebei Province, China, 39°49' N, 119°30' E

Area Description:

Beidaihe contains important stopover sites for the red-crowned crane. More than 500 cranes have been recorded there during the migration period.

Area Name:

Nanbu saltmarsh

Location (city, province, country nearest to the area, geographical coordinates):

Tangshan City, Hebei Province, China, 39°06' N, 118°18' E

Area Description:

Nanbu saltmarsh is located northwest of Bohai Bay. It includes mudflats, saltmarshes and has saltworks nearby. Satellite tracking data shows that this area is an important stopover site for the red-crowned crane (Tamura et al. 2000).

Area Name:

The Yellow River Delta

Location (city, province, country, geographical coordinates):

Dongying City, Shandong Province, China, 37°35' -38°12' E N, 118°33' - 119°20' E

Area Description:

The Yellow River Delta is an Ecologically Important Area because it is an important stopover and wintering ground for the red-crowned crane. More than 800 cranes have been recorded during

migration season and more than 200 winter in this region (Zheng & Wang, 1998; BirdLife International, 2001; Li & Mundkur, 2004).

Area Name:

Yancheng coastal region

Location (city, province, country, geographical coordinates):

Yancheng City, Jiangsu Province, China, 32°20' -34°37' N, 119°29' - 121°16'E

Area Description:

Yancheng coastal region is an Ecologically Important Area because it is the largest wintering ground for the red-crowned crane, with about 800-1000 wintering cranes every year. (Zheng & Wang, 1998; BirdLife International, 2001).

Knowledge gaps and specific studies needed:

Stopover ecology of the red-crowned crane.

BEIA for hooded crane (Map 2)

Area Name:

Beidaihe

Location (city, province, country, geographical coordinates):

Qinhuangdao City, Hebei Province, China, 39°49' N, 119°30'E

Area Description:

Beidaihe is an Ecologically Important Area because it is an important stopover site for the hooded crane. More than 500 cranes can be recorded in this region during migration season (Zheng & Wang, 1998; BirdLife International, 2001).

Area Name:

Nanbu saltmarsh

Location (city, province, country, geographical coordinates):

Tangshan City, Hebei Province, China, 39°06' N, 118°18'E

Area Description:

Nanbu saltmarsh is located in the northwest of Bohai Bay. It includes mudflats, saltmarshes and has saltworks nearby. Satellite tracking data shows that this area is an important stopover site for the hooded crane (Higuchi et al. 1994).

Area Name:

The Yellow River Delta

Location (city, province, country nearest to the area, geographical coordinates):

Dongying City, Shandong Province, China, 37°35' -38°12' N, 118°33' - 119°20'E

Area Description:

The Yellow River Delta is ecologically important area because it is an important stopover site for the hooded crane. More than 50 birds can be recorded during the migration season (Zheng & Wang, 1998; BirdLife International, 2001).

Area Name:

Chongming Dongtan

Location (city, province, country, geographical coordinates):

Chongming County, Shanghai City, China, 31°30' N, 121°45' E

Area Description:

Chongming Dongtan is an important stopover site and wintering ground for migratory water birds. This region is an important wintering ground for the hooded crane and more than 100 individuals can be observed here every year. This region is also an important stopover site for shorebirds, especially during their northward migration. Other water birds, such as the white-naped crane, the Chinese egret, the black-faced spoonbill, Saunders's gull, the white stork, the oystercatcher, Baikal teal have also been recorded here.

Knowledge gaps and specific studies needed:

Habitat conditions of the hooded crane in the winter.

BEIA for the white-naped crane (Map 3)

Area Name:

Beidaihe

Location (city, province, country nearest to the area, geographical coordinates):
Qinhuangdao City, Hebei Province, China, 39°49' N, 119°30'E

Area Description:

Beidaihe is an Ecologically Important Area because it is an important stopover site for the white-naped crane. More than 150 white-naped cranes can be observed in this region during the migration season (Zheng & Wang, 1998; BirdLife International, 2001).

Area Name:

Nanbu saltmarsh

Location (city, province, country, geographical coordinates):
Tangshan City, Hebei Province, China, 39°06' N, 118°18'E

Area Description:

Nanbu saltmarsh is located in the northwest of Bohai Bay. It includes mudflats, saltmarshes and has saltworks nearby. Satellite tracking data shows that this area is an important stopover site for the white-naped crane (Harris et al. 2000).

Area Name:

Beidagang

Location (city, province, country nearest to the area, geographical coordinates):
Jinghai County, Tianjin City, China, 38°40'-38°50' N, 117°15'-117°30'E

Area Description:

Beidagang is located in the west of Bohai Bay. It includes mudflats, saltmarsh and has lakes nearby. This area is an important stopover site for the white-naped crane (Harris et al. 2000).

Area Name:

Nandagang

Location (city, province, country, geographical coordinates):
Cangzhou City, Hebei Province, China, 38°30' N, 117°30'E

Area Description:

Nandagang is located in the northwest of Bohai Bay. It includes mudflats, saltmarshes, aquaculture ponds, saltworks and has reservoirs nearby. Satellite tracking data shows that this area is an important stopover site for the white-naped crane (Harris et al. 2000).

Area Name:

The Yellow River Delta

Location (city, province, country, geographical coordinates):
Dongying City, Shandong Province, China, 37°35' -38°12E N, 118°33'- 119°20'E

Area Description:

The Yellow River Delta is an important stopover site for the white-naped crane. More than 50 birds can be recorded here during migration periods (Zheng & Wang, 1998; BirdLife International, 2001).

Knowledge gaps and specific studies needed:

Stopover ecology of white-naped crane.

BEIA for Black-faced spoonbill (Map 4)

Area Name: Yancheng coastal region

Location (city, province, country geographical coordinates):

Yancheng City, Jiangsu Province, China, 32°20' -34°37' N, 119°29' - 121°16'E

Area Description:

The Yancheng coastal region is an important stopover site for the black-faced spoonbill. More than 30 black-faced spoonbills winter here every year (Zheng & Wang, 1998; BirdLife International, 2001).

Area Name: Chongming Dongtan

Location (city, province, country nearest to the area, geographical coordinates):

Chongming County, Shanghai City, China, 31°30' N, 121°45' E

Area Description:

Chongming Dongtan is an Ecologically Important Area because it is an important stopover site for the black-faced spoonbill. The largest number recorded is 62 during the northward migration period. A small population also winter here.

Knowledge gaps and specific studies needed:

- Breeding ecology of the black-faced spoonbill.
- Investigations on the breeding grounds of the black-faced spoonbill.

BEIA for Chinese egret (Map 5)

Area Name: Dalian Bay

Location (city, province, country nearest to the area, geographical coordinates):

Dalian City, Liaoning Province, China, 38°43'-38°57' N, 121°02'-121°15' E

Area Description:

Dalian Bay is important because it is an important breeding ground for the Chinese egret. About 300 birds have been recorded on the islands (Snake Island, Haimao Island,) in this region.

Area Name: The Changshan Islands

Location (city, province, country nearest to the area, geographical coordinates):

Changhai County, Liaoning Province, China, 39°31' N, 123°02' E

Area Description:

The Changshan Islands are important because they are an important breeding ground for the Chinese egret. About 550 birds have been recorded on the islands (Xingren Tuo, Yuanbao Tuo) in this region.

Knowledge gaps and specific studies needed:

Breeding ecology of the Chinese egret.

BEIA for Oriental white stork (Map 6)

Area Name: The Shuangtaihe estuary

Location:

Panjin City, Liaoning Province, China, 40°45'-41°10' N, 121°30'-122°00' E

Area Description:

The Shuangtaihe estuary is important because it is an important stopover site for the white stork. The largest number recorded is nearly 500.

Area Name: Beidaihe

Location (city, province, country nearest to the area, geographical coordinates):

Qinhuangdao City, Hebei Province, China, 39°49' N, 119°30' E

Area Description:

Beidaihe is an Ecologically Important Area because it is an important stopover site for the white stork. The largest number recorded was more than 2,700 in 1986. There were about 1,100 birds recorded in 1995.

Area Name: Nanbu saltmarsh

Location (city, province, country nearest to the area, geographical coordinates):

Tangshan City, Hebei Province, China, 39°06' N, 118°18' E

Area Description:

Nanbu saltmarsh is located in the northwest of Bohai Bay. It includes mudflats, saltmarshes and has saltworks nearby. Satellite tracking data showed that this area is an important stopover site for the oriental white stork (Higuchi et al. 2000).

Area Name: Beidagang

Location (city, province, country nearest to the area, geographical coordinates):

Jinghai County, Tianjin City, China, 38°40'-38°50' N, 117°15'-117°30' E

Area Description:

Beidagang is located in the west of Bohai Bay. It includes mudflat, saltmarsh and has lakes nearby. This area is an important stopover sites for the oriental white stork (Higuchi et al. 2000; Zhang et al. 2001).

Area Name: Nandagang

Location (city, province, country nearest to the area, geographical coordinates):

Cangzhou City, Hebei Province, China, 38°30' N, 117°30' E

Area Description:

Nandagang is located in the northwest of Bohai Bay. It includes mudflats, saltmarshes and aquaculture ponds, saltworks and reservoirs nearby. Satellite tracking data showed that this area is an important stopover site for the oriental white stork (Higuchi et al. 2000).

Area Name: The Yellow River Delta

Location (city, province, country nearest to the area, geographical coordinates):

Dongying City, Shandong Province, China, 37°35' -38°12' E N, 118°33' - 119°20' E

Area Description:

The Yellow River Delta is located at the estuary of the Yellow River. It includes mudflats, saltmarshes, saltworks and aquaculture ponds. It is an important stopover site for the oriental white stork during migration periods (Zhao and Song, 1995; Higuchi et al. 2000).

Area Name: Yancheng coastal region

Location (city, province, country nearest to the area, geographical coordinates):
Yancheng City, Jiangsu Province, China, 32°20' -34°37' N, 119°29' - 121°16'E

Area Description:

The Yancheng coastal region is an Ecologically Important Area because it is an important wintering ground for the oriental white stork; about 50 birds can be found every year in Yancheng National Nature Reserve.

Knowledge gaps and specific studies needed:

Migration flyway and stopover sites of oriental white stork.

BEIA for whooper swan (Map 7)

Area Name: Yellow River delta

Location (city, province, country nearest to the area, geographical coordinates):
Dongying City, Shandong Province, China, 37°35' -38°12'N, 118°33' - 119°20'E

Area Description:

The Yellow River Delta is an Ecologically Important Area because it is an important wintering ground for the whooper swan. The largest number recorded there was about 2,000.

Area Name: Rongcheng coastal region

Location (city, province, country nearest to the area, geographical coordinates):
Rongcheng City, Shandong Province, China, 37°15' -37°25' N, 122°20' - 122°40' E

Area Description:

Rongcheng coastal region is an important wintering ground for the whooper swan. The largest number recorded there is about 5,000.

Knowledge gaps and specific studies needed:

Wintering ecology of whooper swan.

BEIA for Saunders's gull (Map 8)

Area Name: The Yalu River Delta

Location:
Dandong City, Liaoning Province, China, 39°40' N, 123°10' E

Area Description:

The Yalu River estuary is an Ecologically Important Area because it is an important breeding ground, stopover site and wintering ground for migratory water birds. Millions of birds of 241 species have been recorded here. This region is an important breeding ground of Saunders's gull, with a recorded population of about 500 birds. 189 oystercatchers were recorded in 2000. The hooded crane can also be recorded here during the migratory period.

Area Name: The Shuangtaihe estuary

Location (city, province, country nearest to the area, geographical coordinates):
Panjin City, Liaoning Province, China, 40°45' -41°10' N, 121°30' -122°00' E

Area Description:

The Shuangtaihe estuary is an Ecologically Important Area because it is an important breeding ground for the Saunders's gull. More than 2,000 breeding birds were recorded from 1996-1999 in this region.

Area Name: The Yellow River delta

Location (city, province, country nearest to the area, geographical coordinates):
Dongying City, Shandong Province, China, 37°35' -38°12' N, 118°33' - 119°20'E

Area Description:

The Yellow River Delta is an Ecologically Important Area because it is an important breeding ground for the Saunders's gull. The largest number of birds recorded here was 1,500.

Area Name: Yancheng coastal region

Location (city, province, country nearest to the area, geographical coordinates):
Yancheng City, Jiangsu Province, China, 32°20' -34°37' N, 119°29' - 121°16'E

Area Description:

Yancheng coastal region is an Ecologically Important Area because it is an important breeding ground and wintering ground for the Saunders's gull. It is the southernmost breeding ground for the birds. More than 1,000 breeding birds have been recorded there in the summer and more than 2,000 birds winter there.

Knowledge gaps and specific studies needed:

Breeding and wintering ecology of the Saunders's gull

BEIA for oystercatcher (Map 9)

Area Name: Yalu River delta

Location:
Dandong City, Liaoning Province, 39°40' N, 123°10' E

Area Description:

The Yalu River estuary is an Ecologically Important Area because it is an important stopover site for the oystercatcher during northward migration. In 2000, 189 birds were recorded here.

Area Name: The Shuangtaihe estuary

Location (city, province, country nearest to the area, geographical coordinates):
Panjin City, Liaoning Province, China, 40°45'-41°10' N, 121°30'-122°0' E

Area Description:

The Shuangtaihekou estuary is an Ecologically Important Area because it is an important stopover site for the oystercatcher. In 1992, 100 birds were recorded in during the northward migration and 500 birds were recorded during the southward migration.

Area Name: The Yellow River delta

Location (city, province, country nearest to the area, geographical coordinates):
Dongying City, Shandong Province, China, 37°35' -38°12' N, 118°33' - 119°20'E

Area Description:

The Yellow River Delta is an Ecologically Important Area because it is an important stopover site for oystercatcher. 130 birds were recorded in 1992 during northward migration.

Area Name: Yancheng coastal region

Location (city, province, country nearest to the area, geographical coordinates):
Yancheng City, Jiangsu Province, China, 32°20' -34°37' N, 119°29' - 121°16'E

Area Description:

Yancheng coastal region is an Ecologically Important Area because it is an important habitat for oystercatcher during non-breeding season. About 200 birds were recorded in 1997.

Knowledge gaps and specific studies needed:

Stopover ecology of the oystercatcher.

BEIA for Far Eastern Curlew (Map 10)

Area Name: Yalu River delta

Location:

Dandong City, Liaoning Province, China, 39°40' N, 123°10' E

Area Description:

The Yalu River estuary is located at the boundary of China and North Korea. It includes mudflats, saltmarshes and reed covered beaches. The largest number of far eastern curlew recorded in this area was 3,744 during northward migration period, nearly 10% of the total number in the world.

Area Name: The Shuangtaihe estuary

Location (city, province, country nearest to the area, geographical coordinates):

Panjin City, Liaoning Province, China, 40°45'-41°10' N, 121°30'-122°0' E

Area Description:

The Shuangtaihe estuary consists of mudflats, saltmarshes, reed lands, and aquaculture ponds. It also has saltworks nearby. This area is an important stopover site for the far eastern curlew. A total of 1,803 birds were recorded during northward migration period.

Area Name: The Yellow River Delta

Location (city, province, country nearest to the area, geographical coordinates):

Dongying City, Shandong Province, China, 37°35' -38°12'N, 118°33' - 119°20'E

Area Description:

The Yellow River Delta is located at the mouth of the Yellow River. It includes mudflats, saltmarshes, saltworks and aquaculture ponds. The delta is an important stopover site for the far eastern curlew during northward migration periods.

Area Name: Dongsha

Location (city, province, country nearest to the area, geographical coordinates):

Dongtai City, Jiangsu Province, China, 33°07'N, 121°21'E

Area Description:

Dongsha is formed by the sedimentation of soil and sand brought by the Yangtze River. It consists of islands and shoals with extensive intertidal flats. Dongsha is an important stopover site for the far eastern curlew during northward migration periods. The largest number of far eastern curlew recorded here was 819.

Area Name: Chongming Dongtan

Location (city, province, country nearest to the area, geographical coordinates):

Chongming County, Shanghai City, China, 31°30' N, 121°45' E

Area Description:

Chongming Dongtan is located at the estuary of the Yangtze River. It consists of intertidal flats, saltmarshes, aquaculture ponds, and inner dykes. The largest number of the curlew recorded in this area is 794 during the northward migration period.

Knowledge gaps and specific studies needed:

Stopover ecology of the far eastern curlew.

BEIA for Ramsar 20000/1% criteria (Map 11)

Area Name: The Yalu River estuary

Location:

Dandong City, Liaoning Province, China, 39°40' N, 123°10' E

Area Description:

The Yalu River estuary consists of mudflats, saltmarshes and reed covered beaches. 10 species of shorebirds reach internationally important numbers during northward migration including more than 10% of the estimated flyway population of great knot and bar-tailed godwit. This site may support more than 200,000 Shorebirds during the northward migration period.

Area Name: The Shuangtaihe estuary

Location (city, province, country nearest to the area, geographical coordinates):

Panjin City, Liaoning Province, China, 40°45'-41°10' N, 121°30'-122°0' E

Area Description:

The Shuangtaihekou estuary consists of mudflats, saltmarshes, reed lands, and aquaculture ponds and has saltworks nearby. Fourteen species of shorebirds reach internationally important numbers (Northward migration: 11 species, Southward migration: 7 species, Breeding: 4 species). This site may support more than 100,000 Shorebirds during northward and southward migration periods. This site has been listed in the Ramsar Convention List of Wetlands of International Importance.

Area Name: Beidaihe

Location (city, province, country nearest to the area, geographical coordinates):

Qinhuangdao City, Hebei Province, China, 39°49' N, 119°30' E

Area Description:

Beidaihe contains intertidal flats and has aquaculture ponds nearby. A total of 15 species of Shorebirds reach internationally important numbers (northward migration: 10 species, southward migration: 9 species). More than 40% of the estimated flyway population of Eurasian curlew during southward migration and about 10% during northward migration have been recorded there.

Area Name: West Bohai Bay region

Location (city, province, country nearest to the area, geographical coordinates):

Tianjin City, China, 39°00' N, 117°42' E

Area Description:

West Bohai Bay region consists of intertidal flats, saltmarshes and saltworks. It has aquaculture ponds nearby. A total of 17 species of Shorebirds reach internationally important numbers here (northward migration: 14 species, southward migration: 8 species, non-breeding period: one species, breeding period: one species). More than 5% of the estimated flyway population of red knot and grey plover have been recorded here. This site may support 100,000 Shorebirds during the northward migration period.

Area Name: The Yellow River Delta

Location (city, province, country nearest to the area, geographical coordinates):

Dongying City, Shandong Province, China, 37°35' -38°12'N, 118°33' - 119°20'E

Area Description:

The Yellow River Delta is located at the estuary of the Yellow River. It includes mudflats, saltmarshes, saltworks and aquaculture ponds. A total of 17 species of shorebirds reach internationally important numbers here (Northward migration: 16 species, Southward migration: five species). During the

northward migration period, more than 20% of the estimated flyway population of Eurasian curlew and more than 10% of Kentish plover and grey plover have been recorded there. This site may support 200,000 Shorebirds during the northward migration period.

Area Name: Laizhou Bay

Location (city, province, country nearest to the area, geographical coordinates):
Laizhou City, Shandong Province, China, 39°30'N, 119°10'E

Area Description:

Laizhou Bay includes intertidal areas backed by saltworks and aquaculture ponds. Three species of shorebirds reach internationally important numbers during the northward migration period. A total of 53,463 Shorebirds was recorded in 2004. It is estimated that this site may support 100,000 Shorebirds during the northward migration period.

Area Name: Rongcheng coastal region

Location (city, province, country nearest to the area, geographical coordinates):
Rongcheng City, Shandong Province, China, 37°15' -37°25' N, 122°20' - 122°40' E

Area Description:

Rongcheng coastal region includes some rocky tidalflats, arenaceous bay and muddy bay. The largest number of whooper swan, which is about 5,000, was recorded in winter; this accounts for about 8% of the total population in East Asia.

Area Name: Lianyungang coastal region

Location (city, province, country nearest to the area, geographical coordinates):
Lianyungang City, Jiangsu Province, China, 34°50'N, 119°50'E

Area Description:

Lianyungang coastal region includes intertidal areas and saltworks. Six species of Shorebirds reach internationally important numbers during the northward migration period. A total of 33,628 Shorebirds were recorded here in 2004. It is estimated that this site may support 90,000 shorebirds during northward migration period.

Area Name: Yancheng coastal region

Location (city, province, country nearest to the area, geographical coordinates):
Yancheng City, Jiangsu Province, China, 32°20' -34°37' N, 119°29' - 121°16'E

Area Description:

Yancheng coastal region includes intertidal area, saltmarsh, reed lands, saltworks and aquaculture ponds. A total of 23 species of shorebirds reach internationally important numbers with 18 species during the northward migration, 17 during the southward migration, seven during the non-breeding period and three species during the breeding period. This region holds more than 10% of the estimated flyway population of marsh sandpiper and sanderling, more than 5% of the total number of dunlin during northward migration, more than 10% of the estimated flyway population of spotted redshank and little ringed plover, more than 5% of the total number of marsh sandpiper and Kentish plover during southward migration and more than 5% of the total number of sanderling during the non-breeding period. The highest number of Shorebirds recorded was: 111,285 during northward migration, 82,530 during southward migration and 27,181 during the non-breeding period. It is estimated that the region may support about one million waterfowl during migration and non-breeding periods. This region has been listed in the Ramsar Convention List of Wetlands of International Importance.

Area Name: Dongsha

Location (city, province, country nearest to the area, geographical coordinates):
Dongtai City, Jiangsu Province, China, 33°07'N, 121°21'E

Area Description:

Dongsha is formed by the sedimentation of soil and sand brought by the Yangtze River. It consists of islands and shoals with extensive intertidal flats. Thirteen species of shorebirds reach internationally important numbers (northward migration period: five species, southward migration period: 11 species, non-breeding period: two species). This site holds more than 5% of the estimated flyway population of the Asian dowitcher during the southward migration period. It is estimated that this site may support 100,000 shorebirds during the northward migration period and more than 300,000 shorebirds during the southward migration period.

Area Name: Chongming Dongtan

Location (city, province, country nearest to the area, geographical coordinates):
Chongming County, Shanghai City, China, 31°30' N, 121°45' E

Area Description:

Chongming Dongtan is located at the estuary of Yangtze River; it consists of intertidal flats, saltmarsh, aquaculture ponds, and inner dykes. Six species of shorebirds reached internationally important number (northward migration: 6 species, southward migration period: 1 species). This site holds more than 5% of the estimated flyway population of Kentish plover during southward migration period. It is estimated that this site may support 100,000 Shorebirds during northward migration period. More than 20,000 water birds were recorded in winter in 2004. This site has been listed in the Ramsar Convention List of Wetlands of International Importance.

Knowledge gaps and specific studies needed:

The numbers and distribution of waterfowl in the YSE under China's jurisdiction.

BEIA for Baikal teal

The majority of Baikal teal population stays in South Korea. Only a small number of Baikal teals have been recorded in the YSE under China's jurisdiction in recent years.

Knowledge gaps and specific studies needed:

The number and distribution of Baikal teal in the YSE under China's jurisdiction.

KNOWLEDGE GAPS AND SPECIFIC STUDIES NEEDED FOR BIRDS

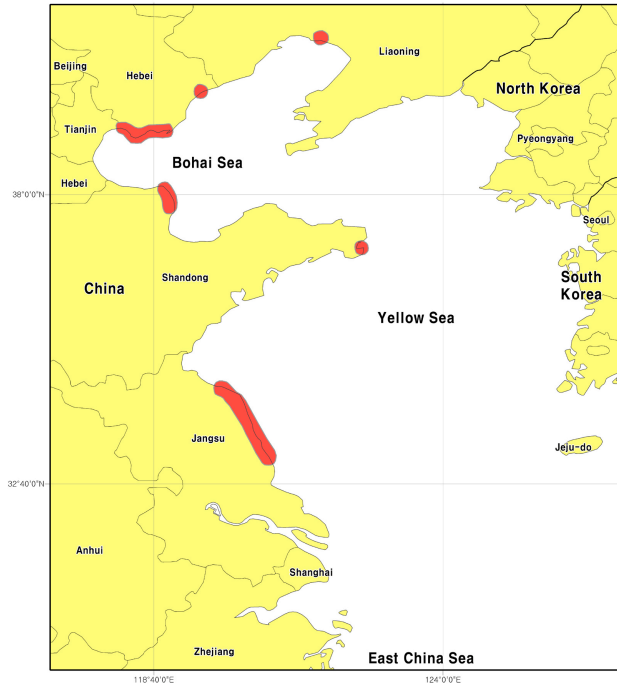
1. In addition to the knowledge gaps specific to each Indicator Species, there is a knowledge gap regarding the effects that environmental changes have on water birds and their habitats. Environmental changes include: human disturbance (such as oil fields); expansion of *Spartina alterniflora*, an invasive plant on wetlands; and reclamation of tidelands.
2. The YSE has important stopover sites for shorebirds in the East Asian-Australasian Flyway. Therefore, habitat use and fuel deposition of dominant bird species during stopover periods need to be studied. This study is important for the development of conservation strategies for shorebirds in the YSE and the East Asian-Australasian Flyway.
3. Anatidae and seabirds form an important bird group in the YSE. However, only small amounts of historical data are available for Anatidae and very limited data is available for seabirds. More field surveys on the current number and distribution of Anatidae and seabirds are badly needed.
4. Shorebirds have been surveyed in the past ten years in the YSE. However, data is far from thorough. Comprehensive surveys are still needed to understand species composition, number of each species and distribution of different species.

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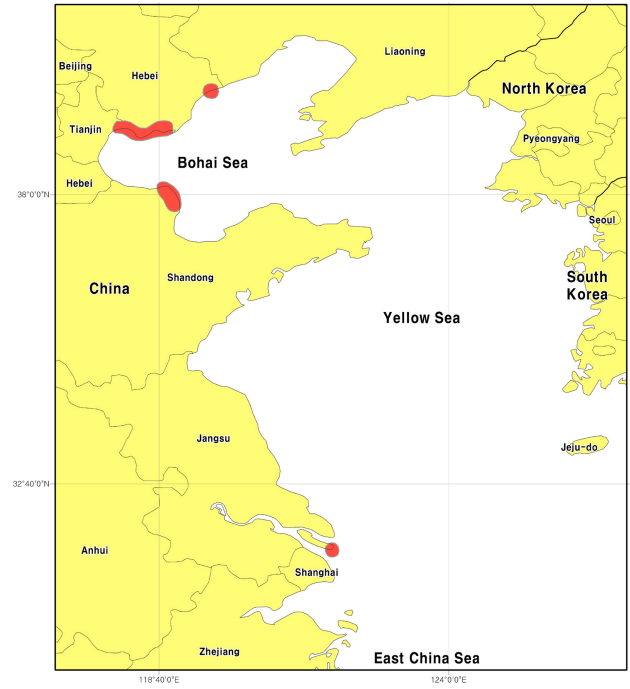
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Map1 Red-crowned crane (*Grus japonensis*)



Map2 Hooded crane (*Grus monacha*)



Map3 White-naped crane (*Grus vipio*)



Map4 Black-faced spoonbill (*Platalea minor*)



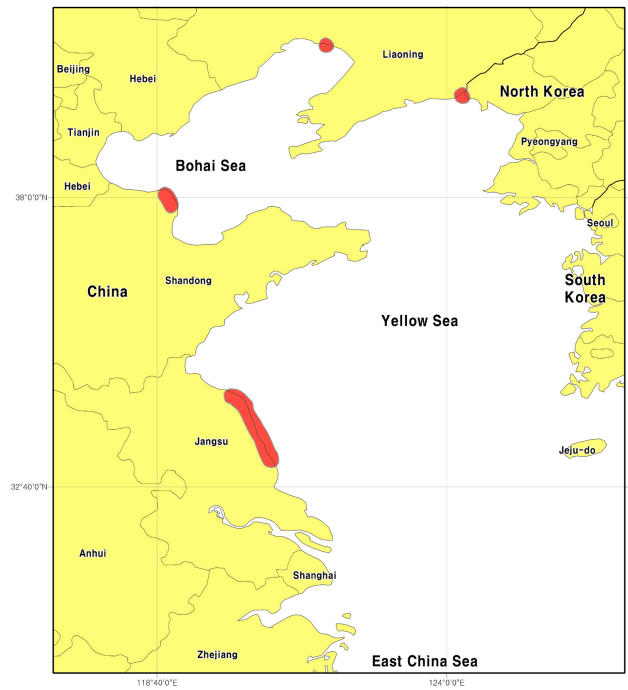
Map5 Chinese egret (*Egretta eulophotes*)



Map6 Oriental white stork (*Ciconia boyciana*)



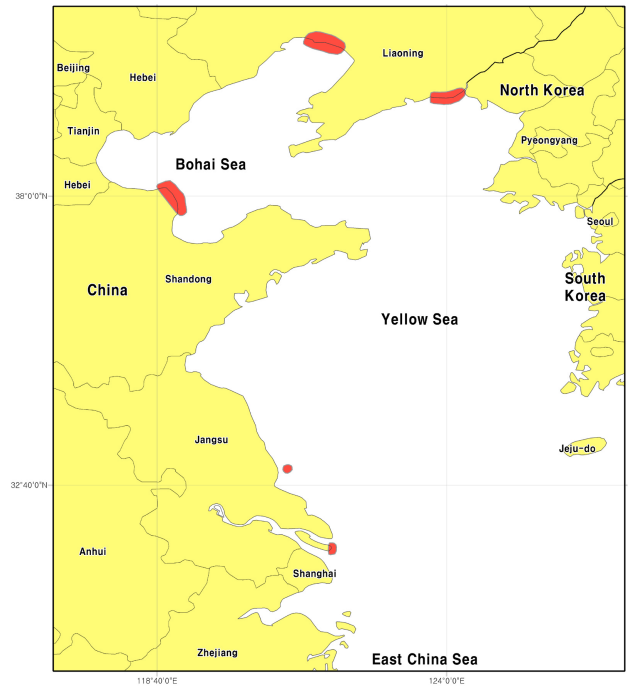
Map7 Whooper swan (*Cygnus cygnus*)



Map8 Saunders's gull (*Larus saundersi*)



Map9 Oystercatcher (*Haematopus ostralegus*)



Map10 Far eastern curlew (*Numenius madagascariensis*)



Map11 Ramsar 20000 or 1% criteria