

Designation date: 07/12/2004 Ramsar Site no. 1441

# Information Sheet on Ramsar Wetlands (RIS) – 2009-2012 version

Available for download from [http://www.ramsar.org/ris/key\\_ris\\_index.htm](http://www.ramsar.org/ris/key_ris_index.htm).

*Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8<sup>th</sup> Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX.22 of the 9<sup>th</sup> Conference of the Contracting Parties (2005).*

## Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.
2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 14, 3rd edition). A 4th edition of the Handbook is in preparation and will be available in 2009.
3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

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## 1. Name and address of the compiler of this form:

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Designation date

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Site Reference Number

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## 2. Date this sheet was completed/updated:

June 5, 2012

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## 3. Country:

The People's Republic of China

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## 4. Name of the Ramsar site:

The precise name of the designated site in one of the three official languages (English, French or Spanish) of the Convention. Alternative names, including in local language(s), should be given in parentheses after the precise name.

Shuangtai Estuary

Nature Reserve

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## 5. Designation of new Ramsar site or update of existing site:

This RIS is for (tick one box only):

- a) Designation of a new Ramsar site ; or  
b) Updated information on an existing Ramsar site

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**6. For RIS updates only, changes to the site since its designation or earlier update:**

**a) Site boundary and area**

**The Ramsar site boundary and site area are unchanged:**

or

**If the site boundary has changed:**

- i) the boundary has been delineated more accurately ; or
- ii) the boundary has been extended ; or
- iii) the boundary has been restricted\*\*

and/or

**If the site area has changed:**

- i) the area has been measured more accurately ; or
- ii) the area has been extended ; or
- iii) the area has been reduced\*\*

\*\* **Important note:** If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

**b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:**

According to the observation records, the population size of the endangered *Larus saundersi* has increased year by year, from 5,000 (June, 2004) to 6,969 (June, 2011). During this period, 17 bird species were newly found in the site. The population size of the *Grus japonensis* which breeds in the site is maintained at a stable level of around 50 individuals.

Compared with the previous RIS, the application of the Criteria remains unchanged.

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**7. Map of site:**

Refer to Annex III of the *Explanatory Note and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

**a) A map of the site, with clearly delineated boundaries, is included as:**

- i) a hard copy (required for inclusion of site in the Ramsar List): ;
- ii) an electronic format (e.g. a JPEG or ArcView image) ;
- iii) a GIS file providing geo-referenced site boundary vectors and attribute tables .

**b) Describe briefly the type of boundary delineation applied:**

e.g. the boundary is the same as an existing protected area (nature reserve, national park, etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

This site has the same boundary with Shuangtai Estuary National Nature Reserve. It is located in the estuarine area of the Shuangtaizi River in Panjin City, Liaoning Province. The site is east to Erjiegou Town from Dawa County of Panjin City, west to the Daling Estuary of Jinzhou City, north to the Jinpan Highway, and south to the coastline and shallow sea of Bohai Sea.

**8. Geographical coordinates** (latitude/longitude, in degrees and minutes):

Provide the coordinates of the approximate centre of the site and/or the limits of the site. If the site is composed of more than one separate area, provide coordinates for each of these areas.

Center: 40°54'45" N, 121°45'41" E

Extent: 40°45'15"-41°13'49" N, 121°28'22"-122°01'26" E

**9. General location:**

Include in which part of the country and which large administrative region(s) the site lies and the location of the nearest large town.

This Ramsar Site lies in the estuary of the Liao River, north of Liaodong Bay, Northeastern China. It is about 35 kilometers away to the downtown area of Panjin City, Liaoning Province.

**10. Elevation:** (in metres: average and/or maximum & minimum)

Average: 2.5 m;

Maximum: 4 m; Minimum: 0 m.

**11. Area:** (in hectares)

128,000 ha

**12. General overview of the site:**

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

Shuangtai Estuary is a typical coastal wetland ecosystem mainly composed of reed (*Phragmites communis*) marshes, shoals and tidal-flats. It is where the Liao River enters the Bohai Sea. Shuangtai Estuary includes the essential part of the world's largest reed marsh (Lu X., et al. 2011.)

The Shuangtaizi River is characterized by its vast water area. Within its drainage area, there are dense rivers and large area of reed marshes. It provides important habitats for endangered wetland-dependent species, such as *Ciconia boyciana*, *Grus leucogeranus*, *Grus japonensis*, *Grus leucogeranus* and *Larus saundersi*. Shuangtai Estuary is in the north edge of the eastern coastal wetland in China, providing an important stopover to the migratory birds on the East Asian-Australasian Flyway. The wetland is the southernmost breeding site for *Grus japonensis* and the largest breeding site for *Larus saundersi* in the world. This Ramsar Site plays a key role in regional biodiversity conservation in China as well as East Asia.

**13. Ramsar Criteria:**

Tick the box under each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11). All Criteria which apply should be ticked.

1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9

**14. Justification for the application of each Criterion listed in 13 above:**

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

**Criterion 1:**

This Ramsar Site is located in Oriental Deciduous Forest Biogeographic Province, Palearctic Realm. It preserves integrated natural wetland for about 100 000 ha. The site is the northernmost coastal estuary wetland in this biogeographic region. Also, it is a representative of estuary wetland ecosystems in middle/high latitude regions of Asia, holding the world's largest reed marsh. The large

area of reed marsh and tidal-flat wetlands are rendering its hydrological and ecological functions which make great contributions to the coastal water purification and biodiversity conservation.

### Criterion 2:

Latin Name	Common Name	IUCN Category	CMS Appendix	CITES Appendix	National Protection Class
<i>Leucogeranus leucogeranus</i>	Siberian Crane	CR	I/II	I	I
<i>Grus japonensis</i>	Red-crowned Crane	EN	I/II	I/II	I
<i>Ciconia boyciana</i>	Oriental Stork	EN	I	I	-
<i>Tringa guttifer</i>	Spotted Greenshank	EN	II	I	II
<i>Anser cygnoides</i>	Swan Goose	VU	II	-	-
<i>Grus vipio</i>	White-naped Crane	VU	II	I/II	II
<i>Otis tarda</i>	Great Bustard	VU	I/II	I/II	I
<i>Egretta eulophotes</i>	Chinese Egret	VU	I	-	II
<i>Grus monacha</i>	Hooded Crane	VU	I	I/II	I
<i>Larus relictus</i>	Relict Gull	VU	I	I	I
<i>Larus saundersi</i>	Saunders's Gull	VU	I	-	-

### Criterion 3:

This Ramsar Site is a biodiversity hotspot in the Oriental Deciduous Forest Biogeographic Province, Palearctic Realm. There are 104 phytoplankton species, 127 vascular plant species and 920 animal species living in this wetland, much exceeding the average in this biogeographic region.

### Criterion 4:

The Ramsar Site provides important breeding habitats for many rare species. It is the largest breeding site for the endangered species *Larus saundersi* in the world. According to the observation (2009), there are over 5,000 *Larus saundersi* breeding in this Ramsar Site, accounting for 80% of the *Larus saundersi* breeding population in the world. Besides, this site is also the southernmost breeding site of *Phoca largha*. Every year, over 300 individuals of *Grus japonensis* take this site as an important stopover during migration, and *ca* 50 individuals of *Grus japonensis* breed in this site.

### Criterion 5:

According to the observation records from 2009 to 2011, there are over 100,000 waterfowl individuals observed in this Ramsar Site every year. The individuals of the major species are shown in the table below.

English name	Latin name	Count (year)		
		2009	2010	2011
Red-crowned Crane	<i>Grus japonensis</i>	327	326	291
Siberian Crane	<i>Grus leucogeranus</i>	34	223	156
Common Coot	<i>Fulica atra</i>	3760	2825	1690
Baikal Teal	<i>Anas formosa</i>	32000	50000	27890
Gadwall	<i>Anas strepera</i>	16500	26083	14800
Common Teal	<i>Anas crecca</i>	18500	17292	15430

Eurasian Oystercatcher	<i>Haematopus ostralegus</i>	1679	3000	987
Dunlin	<i>Calidris alpina</i>	7800	9600	5670
Red-necked Stint	<i>Calidris ruficollis</i>	4760	5600	1200
Great Knot	<i>Calidris tenuirostris</i>	4780	5877	6900
Black-tailed Godwit	<i>Limosa limosa</i>	3120	2766	2890
Bar-tailed Godwit	<i>Limosa lapponica</i>	7350	8700	6540
Slaty-backed Gull	<i>Larus schistisagus</i>	1805	2200	809
Black-headed Gull	<i>Larus ridibundus</i>	2870	1572	1945
Saunders's Gull	<i>Larus saundersi</i>	6397	6582	6969
Caspian Tern	<i>Caspian Tern</i>	329	123	98
Total		112011	142769	94265

**Criterion 6:**

English Name	Latin Name	Year	Count	1% level
Red-crowned Crane	<i>Grus japonensis</i>	2009	327	27
		2010	326	27
		2011	291	27
Saunders's Gull	<i>Larus saundersi</i>	2009	6397	85
		2010	6582	85
		2011	6969	85

**Criterion 7:**

As a typical estuary wetland, there are various aquatic species distributed in the diverse habitats. There are 44 crustacean species, 63 mollusc species, and 124 fish species. This site is rich in such economic species as *Pseudoscaena crocea*, *Lateolabrax japonicus*, *Mugil soiuy*, and *Meretrix meretrix*. The site is also the world's biggest clam (*Meretrix meretrix*) production area.

**Criterion 8:**

The site is the spawning site of some important migrating fish species, such as *Lateolabrax japonicus* and *Coilia ectenes*.

**15. Biogeography** (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

**a) biogeographic region:**

Oriental Deciduous Forest Biogeographic Province, Palearctic Realm

**b) biogeographic regionalisation scheme** (include reference citation):

A Classification of the Biogeographical Provinces of the World (Miklos D.F. Udvardy, 1975)

**16. Physical features of the site:**

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

**Geology and geomorphology:** This Ramsar Site is located at the tectonic unit of Liao River Rift. Since the Pleistocene, the Liao River Basin experienced transgression and recession for three times. In the Liao River estuary and Shuangtaizi River estuary, three strata were accumulated by the transgression, and there are evidences that the shoreline frequently advanced and retreated, indicating that tectonic movement was relatively active in this area. The geomorphological type of this area is alluvial coastal plain. The topography is flat and open with distinctive riverways, reed marshes and tidal-flats.

**Origin:** Naturally originated.

**Soil:** The components of the soils are mainly from the sands and sediments carried by the river. The soils are mainly composed of bog soil and coastal solonchak. Due to long term waterlogging, the permeability of the soil is low and the nutrient matters decompose slowly.

Salinity: 0.6-3.0% (in top soils); organic matter content: 1.5-2.5%; total nitrogen: 0.05-0.25%; available N: 20-50 ppm; available P: 3-20 ppm; available K: >200 ppm.

**Hydrology:** The water in this Ramsar Site is mainly supplied by surface water. The major surface runoffs in this site include Shuangtaizi River, DaLiao River, Raoyang River, Daling River. The Shuangtaizi River and Daling River are the main contributors to the establishment and maintenance of the wetlands in this area. According to the observation from Liujianfang Hydrological Station, the mean annual runoff of the Shuangtaizi River is 4.691 billion m<sup>3</sup>. The mean annual sediment concentration carried by the river is 3.4 kg/m<sup>3</sup>.

**Water quality:** Water quality in the reed marsh wetland in this site is at the Class-III level of national standard (there are 6 classes in the national standard of water quality, and Class-I represents the best quality). According to the monitoring records in 2010, the mean content of TP was 0.113 mg/L, that of TN was 1.286 mg/L, and that of COD was 27.186 mg/L (Wang et al. 2011).

**Tidal type:** Irregular semidiurnal tidal.

**Climate:** The site is located in the mid-latitude area where the climate is represented as warm temperate continental monsoon sub-humid climate. The mean annual temperature is 8.4 °C, the mean annual precipitation is 623.2 mm and the mean annual evaporation is 1 568.6 mm. Influenced by the Bohai Sea, wind speed and wind direction are relatively stable.

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#### 17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, and climate (including climate type).

The catchment of the wetland is Liao River Basin, with a total area of 229,000 km<sup>2</sup>. It is located in the Northeastern China. On its west side are the Great Xing'an Mountains, Qilaotu Mountains and Nuluerhu Mountains, with the elevation between 500 and 1,500 m. On its east side are Jilinhada Mountains, Longgang Mountains and Qian Mountains, with the elevation between 500 and 2,000 m. The midstream and downstream area of the Liao River is the Liao River Plain, with an elevation less than 200 m. The main soil type is brown soil and the main land use types are farmland and forest. Liao River Basin has a temperate continental monsoon sub-humid climate. The mean annual temperature is between 4 °C and 9 °C, decreasing from the south to north.

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#### 18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Shuangtai Estuary is connected with Liaodong Bay. Within the site, there are numerous rivers running into the Bohai Sea. The large areas of reed marshes have remarkable ability of water storage and flood control. With large area of floodplain connected with the flood discharge area of Panjin City, this site can reduce flood peak rapidly. It creates new tidal-flat areas by intercepting sediments. Also it can recharge ground water and avoid salt water invasion.

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## 19. Wetland Types

**a) presence:**

Circle or underline the applicable codes for the wetland types of the Ramsar “Classification System for Wetland Type” present in the Ramsar site. Descriptions of each wetland type code are provided in Annex I of the *Explanatory Notes & Guidelines*.

Marine/coastal: A • B • C • D • E • F • G • H • I • J • K • Zk(a)

Inland: L • M • N • O • P • Q • R • Sp • Ss • Tp • Ts • U • Va •  
Vt • W • Xf • Xp • Y • Zg • Zk(b)

Human-made: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • Zk(c)

**b) dominance:**

List the wetland types identified in a) above in order of their dominance (by area) in the Ramsar site, starting with the wetland type with the largest area.

H-G-A-F-M-N-Tp-Ts-W-Y-1-3-6-2

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**20. General ecological features:**

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

This Ramsar Site is mainly composed of large areas of marshes, neritic areas and tidal-flats. It is covered by seasonal wetland vegetation with a total coverage over 90%. The main constructive species are *Phragmites communis* and *Suaeda heteroptera*. The freshwater marsh ecosystem in this site shows integrated structures and functions.

This site is an important habitat for the waterfowls living in Liao River Delta. It provides abundant foods for cranes, stocks, geese, ducks, gulls, shorebirds and other wetland-dependent birds. The reed marsh wetlands provide safe breeding habitats for waterfowls, such as *Grus japonensis*, *Ardea cinerea*, *Ardea purpurea* and *Chlidonias hybrida*; the *Suaeda heteroptera* tidal-flat wetlands provide breeding habitats for *Gelochelidon nilotica*, *Recurvirostra avosetta* and the endangered species *Larus saundersi*. Moreover, *Suaeda heteroptera* vegetations also provide not only nesting materials, but also hiding places for *Larus saundersi*. Meanwhile, this Ramsar Site has great contributions to climate regulation and ecological balance maintenance.

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**21. Noteworthy flora:**

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

The flora in this site belongs to Northern China Flora. The vegetations are mainly composed of 4 types (i.e. small tree-shrub vegetation, meadow vegetation, marsh vegetation and aquatic vegetation). This site holds 231 plant species, including 104 phytoplankton and 127 vascular plant species.

There are numerous herbaceous plant species, while much less arbor plant species. *Phragmites communis*, *Suaeda heteroptera*, *Asteromoea integrifolia*, *Heteropappus hispidu*, *Xanthium strumarium*, *Artemisia lactifolia*, *Artemisia mogolica*, *Artemisia Leucophylla* are the dominant herbaceous plants and *Salix matsudana*, *Morus alba*, *Lespedeza floribunda*, *Tamarix chinensis* are the dominant arbor plants. In addition, the national Class-II protected species *Glycine soja* can be found in this site.

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**22. Noteworthy fauna:**

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare,

endangered or biogeographically important, etc., including count data. Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.

This Ramsar Site is rich in animal species. There are 51 zooplankton species, 21 echinodermata species, 11 oligochaetes species, 49 crustacea species from 22 families in 5 orders, 63 mollusca species from 26 families in 12 orders, 299 insect species from 77 families in 11 orders, 124 fish species from 57 families in 20 orders, 15 amphibian and reptile species, 267 bird species from 58 families in 17 orders, 20 mammal species from 10 families in 7 orders.

Besides the species listed in Criterion 2 of Section 14, there are 3 species under Class-I National Protection: *Ciconia nigra*, *Haliaeetus albicilla* and *Aquila chrysaetos*; 32 species under Class-II National Protection, such as *Platalea leucorodia*, *Cygnus olor*, *Cygnus Cygnus*, *Cygnus columbianus*, *Anser albifrons*, *Grus virgo*, *Grus grus*, *Numenius minutus*, *Nyctea scandiaca*, *Asio flammeus* and *Phoca largha*.

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### 23. Social and cultural values:

a) Describe if the site has any general social and/or cultural values e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values:

With abundant natural resources and beautiful landscapes, this Ramsar Site is of great tourism value. Moreover, it is the production base of fishery and reeds. Annual reed production is up to 500,000 tons, and the annual production of aquatic products is up to several million tons. This site keeps a well-protected natural ecosystem and provides an ideal base for scientific research on marine ecosystems, inland wetland ecosystems and inland-ocean ecotone ecosystems.

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning?

No.

If Yes, tick the box  and describe this importance under one or more of the following categories:

- i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:
- ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:
- iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:
- iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

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### 24. Land tenure/ownership:

a) within the Ramsar site:

State ownership; Shuangtai Estuary National Nature Reserve has the tenure of land use.

b) in the surrounding area:

State ownership; the local government has the tenure of land use.



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**25. Current land (including water) use:**

a) within the Ramsar site:

There are paddy fields of 157 ha (accounting for 0.1% of this site), aquaculture lands of 1,466 ha (accounting for 1.1% of this site) and a small amount of timberlands, salt fields and human settlements (<1% of this site). The rest lands of this site are under conservation.

b) in the surroundings/catchment:

Farmlands and reed production lands are the major land use forms. Panjin City is located 15 km away from this site, presenting a total area of urban lands of about 60 km<sup>2</sup>.

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**26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:**

a) within the Ramsar site:

Caused by climate drought, the rivers in this site seasonally dried up in some years, which reduced the coverage of the riparian vegetations in the dry seasons.

b) in the surrounding area:

The aquaculture in the surroundings could produce some adverse influences.

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**27. Conservation measures taken:**

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site:

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

The Reserve was approved as a National Nature Reserve in 1988. It joined the "East Asian-Australasian Wader Flyway Reserves Network" in 1996, and joined "Northeast Asia Crane Network" in 2002.

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate):

Ia ; Ib ; II ; III ; IV ; V ; VI

c) Does an officially approved management plan exist; and is it being implemented?:

*The Management Methods for Liaoning Shuangtai Estuary National Nature Reserve and Announcement on Strictly Forbidding Fishing, Hunting and Collecting Activities in Liaoning Shuangtai Estuary National Nature Reserve* was approved by the Panjin government in 1994.

*The Master Plan for Liaoning Shuangtai Estuary National Nature Reserve* was approved by State Forestry Administration in 2010. This plan is implemented during 2011-2020.

d) Describe any other current management practices:

An enforcement team has been established to execute the rules in the reserve. Feeding sites, rescue and breeding centers have been established for the animals. *Grus japonensis* and *Larus saundersi* have been bred successfully. Panjin Wetland Ecosystem Monitoring Station has been established to observe and study the formation, status and maintenance of the wetlands, as well as the biodiversity, behaviors, habitats and population relationships of the waterfowls. The reserve has carried out wetland ecosystem restoration project. About 400 ha of habitat have been restored for the *Larus saundersi* and 300 ha of degraded wetland have been restored by pumping sea water back.

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**28. Conservation measures proposed but not yet implemented:**

e.g. management plan in preparation; official proposal as a legally protected area, etc.

Water supply and wetland restoration projects are in preparation, e.g., *Wetland Restoration Project of Liaoning Shuangtai Estuary National Nature Reserve*, *Ecological Water Recharge Project of Liaoning Shuangtai Estuary National Nature Reserve*, *Wetland Conservation Project of Liaohe River Delta*.

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**29. Current scientific research and facilities:**

e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

For this site, 6 scientific projects founded by the National Science Foundation of China have been carried out. At the same time, the reserve has collaborated with Liaoning University to carry out *The Research on Constructing Non-migratory Grus japonensis Population*, and collaborated with Reed Institute of Liaoning Province to carry out the research on *Artificial Recovery Techniques of Suaeda heteroptera*. *The research on Biological Characters and Protective Measures of Larus saundersi* has also been carried out by the reserve. Moreover, the reserve has carried out some works on artificial insemination, incubation and brood on *Grus japonensis*. The research has collaborated with Japanese institutions to carry out the bird ringing and population monitoring on *Larus saundersi* in order to do long term research on its migration and protection. In addition, the reserve has joined the monitoring works of the GEF project on *Grus leucogeranus* migration, now the reserve has already monitored the migration of *Grus leucogeranus* in Liaoning Province for 5 years continuously.

Presently, the scientific equipments based in the management office include 7 computers, 5 high-powered telescopes, epidiascope, GPS, camera, etc.

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**30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:**

e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

The reserve carries out relevant activities in the "Bird-Loving Week" in April every year. It highly improved the reserve's popularity and public awareness of wildlife protection. The reserve has held "Bird-lovers Class" in many schools, and carried out lectures and activities on bird protection. The reserve itself has become an environment educational base for many schools. Moreover, the reserve has established an exhibition hall where science popularization and environmental education activities can be carried out for the visitors.

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**31. Current recreation and tourism:**

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

There are seasonal tourism activities in this Ramsar Site. Scenery-seeing and birds-watching are the main types of tourism. The annual tourist number is about 300,000. The tourists are strictly limited outside the core area of the reserve.

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**32. Jurisdiction:**

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept of Agriculture/Dept. of Environment, etc.

**Territorial:**

The Government of Panjin City.

**Functional:**

State Forestry Administration & Rural Economy Development Committee of Panjin City.

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**33. Management authority:**

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

**Principal** : Lifeng Wang (Director)

**Institution**: Bureau of Liaoning Shuangtai Estuary National Nature Reserve

**Address**: Shiyou Street 121, Panjin City 124010, Liaoning Province, China.

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**Fax**: +86-427-2287020

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### 34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

- Hu YM, Xiao DN. 1999. Behavioral fragmentation of water fowl habitat and its landscape ecological design in Shuangtai-hekou Reserve, Liaohening, China. *Journal of Environmental Sciences*, 11(2): 231-235.
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