Songdo Tidal Flat forms part of the larger area of intertidal mudflat along the coast of Incheon City that is internationally important for as a feeding and roosting site for waterbirds at different stages of their life cycle, e.g. for ducks during the winter, and for shorebirds during spring and autumn migration. A number of the waterbirds that occur are internationally threatened, such as the endangered Black-faced Spoonbills Platalea minor. Other waterbirds occur at
Summary

Songdo Tidal Flat forms part of the larger area of intertidal mudflat along the coast of Incheon City that is internationally important for as a feeding and roosting site for waterbirds at different stages of their life cycle, e.g. for ducks during the winter, and for shorebirds during spring and autumn migration. A number of the waterbirds that occur are internationally threatened, such as the endangered Black-faced Spoonbills *Platalea minor*. Other waterbirds occur at
2 - Data & location

2.1 - Formal data

2.1.1 - Name and address of the compiler of this RIS

Name
(1) Jeong In Park, Deputy Director; (2) Dr. Inseo HWANG, Senior Researcher

Institution/agency
(1) Ministry of Oceans and Fisheries; (2) Korea Marine Environment Management Corporation

Postal address
(1) Marine Environment Policy Bureau, Marine Ecology Division
Government Complex Sejong, 5-Dong, 94, Dasom2-Ro Sejong-City, 339-012, Republic of Korea
(2) MPA Center / Marine Environment Cooperation Team, Tel: +82-2-3498-8583, ishwang@koem.or.kr

E-mail
jhbin@korea.kr

Phone
+82-44-200-5313

Fax
+82-44-200-53

2.1.2 - Period of collection of data and information used to compile the RIS

From year

To year

<no data available>

2.1.3 - Name of the Ramsar Site

Official name (in English, French or Spanish)
Songdo Tidal Flat

Unofficial name (optional)
2.2 - Site location

2.2.1 - Defining the Site boundaries

b) Digital map/image

<1 file(s) uploaded>

Boundaries description (optional)

The boundary for the designation of the new Ramsar Site is the same as the existing protected area (Songdo Tidal Flat Coastal Wetland Protected Area), which is located in central part of Gyeonggi Bay, Gyeonggi Province, Republic of Korea. The 0.6113¢ of coastal wetland protected area was designated by Incheon City on December 31st, 2009.

2.2.2 - General location

a) In which large administrative region does the site lie?

Incheon Metropolitan City

b) What is the nearest town or population centre?

Seoul

2.2.3 - For wetlands on national boundaries only

a) Does the wetland extend onto the territory of one or more other countries?

Yes

No

b) Is the site adjacent to another designated Ramsar Site on the territory of another Contracting Party?

Yes

No

2.2.4 - Area of the Site

Official area, in hectares (ha):

611

Area, in hectares (ha) as calculated from GIS boundaries

614.75

2.2.5 - Biogeography

Biogeographic regions

Regionalisation scheme(s)

Biogeographic region

Marine Ecoregions of the World (MEOW)

Cold Temperate Northwest Pacific
3 - Why is the Site important?

3.1 - Ramsar Criteria and their justification

Criterion 2: Rare species and threatened ecological communities

Criterion 4: Support during critical life cycle stage or in adverse conditions

☑️ Species and Threatened Communities

☑️ Support for Critical Life Cycle Stage
3.3 - Animal species whose presence relates to the international importance of the site

<table>
<thead>
<tr>
<th>Phylum</th>
<th>Scientific name</th>
<th>Common name</th>
<th>Species qualifies under criterion</th>
<th>Species contributes under criterion</th>
<th>Pop. Size</th>
<th>Period of pop. Est.</th>
<th>% occurrence</th>
<th>IUCN Red List</th>
<th>CITES Appendix I</th>
<th>CMS Appendix I</th>
<th>Other Status</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHORDATA/AVES</td>
<td>Anas acuta</td>
<td>Northern Pintail</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHORDATA/AVES</td>
<td>Anas platyrhynchos</td>
<td>Mallard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHORDATA/AVES</td>
<td>Anas poecilorhyncha</td>
<td>Spot-billed Duck</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHORDATA/AVES</td>
<td>Aythya ferina</td>
<td>Common Pochard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHORDATA/AVES</td>
<td>Calidris alpina</td>
<td>Dunlin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHORDATA/AVES</td>
<td>Calidris tenuirostris</td>
<td>Great Knot</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHORDATA/AVES</td>
<td>Numenius madagascariensis</td>
<td>Far Eastern Curlew</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHORDATA/AVES</td>
<td>Platalea minor</td>
<td>Black-faced Spoonbill</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


3.4 - Ecological communities whose presence relates to the international importance of the site
4. What is the Site like? (Ecological character description)

4.1 - Ecological character

Songdo Tidal Flat is the place for intermediate visit where the birds, which migrate along the route between East Asia and Australia, temporarily stay for rest and feeding while moving to the wintering area in Australia and New Zealand after breeding in Tundra area of Siberia and grass area of Mongolia. In spring and autumn, mainly Eurasian Oystercatcher (Haematopus ostralegus), Kentish Plover (Charadrius alexandrinus), Lesser Sand Plover (Charadrius mongolus), Bar-tailed Godwit (Limosa lapponica), Great Knot (Calidris tenuirostris), and Dunlin (Calidris alpina) were eating feeds or resting.

The area of Songdo Tidal Flat has once been an immense mud flat with width of 6-7km with high biological varieties and primary and secondary production (Yoo, 1998). More than 200 species of macrobenthic animal lived in this habitat with total average biomass (wet weight) of about 300g/m² and maximum value as high as 2kg/m² has been recorded in the unit of investigation station (Yoo, 1998).

The upper zone of the tidal flat is brachyuran zone which, unlike Europe or America, is uniquely found in Asia, having high variety of crabs of Macrophthalmus japonicus, and Ilyoplax pingi inhabiting in the area with large portion of density and biomass in the community. These are known to be important prey species for water birds. The middle zone of the tidal flat is molluscan zone in which bivalves, Solen strictus, gastropods, Umbonium thomasi are dominant, the former being one of important industrial species. The lower zone of the tidal flat is holothurians zone which can be characterized by the habitat of sea cucumbers, Protankyra bidentata, with communities showing high variety of living organisms. These zonation patterns observed in Songdo Tidal Flat have been compared with intervals of about 10 years, which showed stable maintenance during the period (Hong and Yoo, 2001).

4.2 - What wetland type(s) are in the site?

Marine or coastal wetlands

<table>
<thead>
<tr>
<th>Wetland type (code and name)</th>
<th>Local name</th>
<th>Ranking of extent (1: greatest - 4: least)</th>
<th>Area (ha) of wetland type</th>
</tr>
</thead>
<tbody>
<tr>
<td>G: Intertidal mud, sand or salt flats</td>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

4.3 - Biological components

4.3.1 - Plant species

Other noteworthy plant species
### 4.3.2 Animal species

<table>
<thead>
<tr>
<th>Phylum</th>
<th>Scientific name</th>
<th>Common name</th>
<th>Pop. size</th>
<th>Period of pop. est.</th>
<th>% occurrence</th>
<th>Position in range / endemism / other</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHORDATA/AVES</td>
<td>Falco peregrinus</td>
<td>Peregrine Falcon</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHORDATA/AVES</td>
<td>Haliaeetus albicilla</td>
<td>White-tailed Eagle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHORDATA/AVES</td>
<td>Limosa limosa</td>
<td>Black-tailed Godwit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHORDATA/AVES</td>
<td>Numenius arquata</td>
<td>Eurasian Curlew</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 4.4 Physical components

#### 4.4.1 Climate
- Average air temperature: 12.7 degrees C
- Annual precipitation: 1,303mm

#### 4.4.2 Geomorphic setting
- Minimum elevation above sea level (in metres): -1
- Maximum elevation above sea level (in metres): 8
- Entire river basin
- Upper part of river basin
4.4.3 - Soil

Mineral

Organic

No available information

Are soil types subject to change as a result of changing hydrological conditions (e.g., increased salinity or acidification)?

- Yes
- No

Please provide further information on the soil (optional)

Surface sediment of Songdo tidal flat is dominated by mud and silt. There are four types of sedimentary facies at the western part including silt (Z), sandy silt (sZ), sandy mud (sM) and muddy sand (mS). The proportion of gravel, sand, silt and mud content is 0.2%, 26.0%, 65.1% and 8.7%, respectively. At the eastern part, there are six types of sedimentary facies including silt (Z), sandy mud (sM), sandy silt (sZ), mud (M), slightly gravelly sandy mud ((g)mS) and gravelly muddy sand (gmS). The proportion of gravel, sand, silt and mud content is 1.0%, 19.3%, 60.7% and 19.0% respectively.

4.4.4 - Water regime

Water permanence

Presence?

Changes at RIS update

Usually seasonal, ephemeral or intermittent water present

Source of water that maintains character of the site

Presence?

Predominant water source

Changes at RIS update

Water inputs from surface water

Marine water
Please add any comments on the water regime and its determinants (if relevant). Use this box to explain sites with complex hydrology:

Seunggicheon River flows across northwest area of Songdo Tidal Flat, the river water flows into the tidal flat through Namdong retarding basin. The aggregate length of all the tributaries as well as the river Seunggicheon is 10.33km with adjacent area of 26.083¢.

Connectivity of surface waters and of groundwater

Stratification and mixing regime

4.4.5 - Sediment regime

- Significant erosion of sediments occurs on the site
- Significant accretion or deposition of sediments occurs on the site
- Significant transportation of sediments occurs on or through the site
- Sediment regime is highly variable, either seasonally or inter-annually
- Sediment regime unknown

Please provide further information on sediment (optional):

The sources of sediment are the Han River and adjacent water

Water turbidity and colour

Light - reaching wetland

Water temperature

4.4.6 - Water pH

- Acid (pH < 5.5)
- Circumneutral (pH: 5.5-7.4)
- Alkaline (pH > 7.4)
- Unknown

Please provide further information on pH (optional):
4.4.7 - Water salinity

- Fresh (Mixohaline/Mixosaline (0.5-30 g/l))
- Euhaline/Eusaline (30-40 g/l)
- Hyperhaline/Hypersaline (>40 g/l)
- Unknown

Please provide further information on salinity (optional):

Salinity (psu): 24.1~31.7 (mean 29.8)

4.4.8 - Dissolved or suspended nutrients in water

- Eutrophic
- Mesotrophic
- Oligotrophic
- Dystrophic
- Unknown

Please provide further information on dissolved or suspended nutrients (optional):

Dissolved Oxygen (mg/L): 6.4~15.4 (mean 9.4)
Chemical Oxygen Demand (COD) (mg/L): 1.2~3.8 (mean 1.75)
Suspended Solids (SS) (mg/L): 3.3~70.0 (mean 18.1)
Chl.a (3μg/L): 0.2~44.9 (mean 7.5)

Dissolved organic carbon

Redox potential of water and sediments

Water conductivity
4.4.9 - Features of the surrounding area which may affect the Site

Please describe whether, and if so how, the landscape and ecological characteristics in the area surrounding the Ramsar Site differ from the site itself:

i) broadly similar  
ii) significantly different

Surrounding area has greater urbanisation or development  
Surrounding area has higher human population density  
Surrounding area has more intensive agricultural use  
Surrounding area has significantly different land cover or habitat types

Please describe other ways in which the surrounding area is different:

The coast of Incheon, in which Songdo Tidal Flat is located, is a river mouth of coastal plain with a complicated shoreline, and about 170 large and small islands scattered including Ganghwado, Seokmodo and Yeongjongdo. Large scale intertidal zones are developed around the islands due to tides, and immense mud flats extend by deposits of fine sediments from the land and ocean.

In the northeast, Mt. Cheongryang (150m) and Mt. Munhak (213m) are developed without specific orientations with local hills, and in the east area, unnamed low hills are developed to the north and south direction centering around Mt. Obong (105m).

Regarding macroscopic geological characteristics of Songdo Tidal Flat, there are metamorphic rocks of precambrian era, igneous rocks of Jurassic Period of Mesozoic era, volcanic rocks of Cretaceous period, and alluvium layers of the 4th period.

Direction of winds varies a lot locally. Monsoons blow from the southwest in summer and from the north in winter.

4.5 - Ecosystem services

4.5.1 - Ecosystem services/benefits

<table>
<thead>
<tr>
<th>Provisioning Services</th>
<th>Examples</th>
<th>Importance/Extent/Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food for humans</td>
<td>Sustenance for humans (e.g., fish, molluscs, grains)</td>
<td>Low</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Regulating Services</th>
<th>Examples</th>
<th>Importance/Extent/Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erosion protection</td>
<td>Soil, sediment and nutrient retention</td>
<td>High</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cultural Services</th>
<th>Examples</th>
<th>Importance/Extent/Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spiritual and inspirational</td>
<td>Inspiration</td>
<td>Medium</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scientific and educational</th>
<th>Examples</th>
<th>Importance/Extent/Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term monitoring site</td>
<td></td>
<td>Low</td>
</tr>
</tbody>
</table>
Other ecosystem service(s) not included above:

Within the site:

Outside the site:

Have studies or assessments been made of the economic valuation of ecosystem services provided by this Ramsar Site?

- Yes
- No
- Unknown

4.5.2 - Social and cultural values

i) the site provides 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) the site has exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland

iii) the ecological character of the wetland depends on its interaction with local communities or indigenous peoples

iv) 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

4.6 - Ecological processes

Primary production

Nutrient cycling

Carbon cycling

Animal reproductive productivity

Vegetational productivity, pollination, regeneration processes, succession, role of fire, etc.

Notable species interactions, including grazing, predation, competition, diseases and pathogens
Notable aspects concerning animal and plant dispersal

Notable aspects concerning migration

Pressures and trends concerning any of the above, and/or concerning ecosystem integrity
## 5. How is the Site managed? (Conservation and management)

### 5.1. Land tenure and responsibilities (Managers)

#### 5.1.1. Land tenure/ownership

<table>
<thead>
<tr>
<th>Category</th>
<th>Within the Ramsar Site</th>
<th>In the surrounding area</th>
</tr>
</thead>
<tbody>
<tr>
<td>National/Federal government</td>
<td>☑</td>
<td>☐</td>
</tr>
<tr>
<td>Provincial/region/state government</td>
<td>☐</td>
<td>☑</td>
</tr>
</tbody>
</table>

Provide further information on the land tenure/ownership regime (optional):

#### 5.1.2. Management authority

Please list the local office/offices of any agency or organization responsible for managing the site:

- Marine and Islands Policy Division

Provide the name and title of the person or people with responsibility for the wetland:

- Inkuen HWANG, Deputy Director

Postal address:

29, Jeonggak-ro, Namdong-gu, Incheon, Republic of Korea (ZIP: 405-750)

E-mail address:

### 5.2. Ecological character threats and responses (Management)

#### 5.2.1. Factors (actual or likely) adversely affecting the Site’s ecological character
5.2 - Threats to the site

### Agriculture and aquaculture

<table>
<thead>
<tr>
<th>Actual threat</th>
<th>Potential threat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within the site</td>
<td>In the surrounding area</td>
</tr>
<tr>
<td>Marine and freshwater aquaculture</td>
<td>Low impact</td>
</tr>
</tbody>
</table>

### Transportation and service corridors

<table>
<thead>
<tr>
<th>Actual threat</th>
<th>Potential threat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within the site</td>
<td>In the surrounding area</td>
</tr>
<tr>
<td>Roads and railroads</td>
<td>Medium impact</td>
</tr>
</tbody>
</table>

### Natural system modifications

<table>
<thead>
<tr>
<th>Actual threat</th>
<th>Potential threat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within the site</td>
<td>In the surrounding area</td>
</tr>
<tr>
<td>Unspecified/others</td>
<td>Medium impact</td>
</tr>
</tbody>
</table>

Please describe any other threats (optional):

Planned for deposits for spoil soils, and fishing licenses have been requested by fishermen of Yeonsu-gu. The coastal fishing license is permitted for people lives in their area by the local government base on Public Waters Management Act and Fisheries Law.

### 5.2.2 - Legal conservation status

**National legal designations**

<table>
<thead>
<tr>
<th>Designation type</th>
<th>Name of area</th>
<th>Online information url</th>
<th>Overlap with Ramsar Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal Wetland Protected Area</td>
<td>Songdo Tidal Flat Coastal Wetland Protected Area</td>
<td>whole</td>
<td></td>
</tr>
</tbody>
</table>

### 5.2.3 - IUCN protected areas categories (2008)

| Ia Strict Nature Reserve | Ib Wilderness Area: protected area managed mainly for wilderness protection | II National Park: protected area managed mainly for ecosystem protection and recreation |
III Natural Monument: protected area managed mainly for conservation of specific natural features

IV Habitat/Species Management Area: protected area managed mainly for conservation through management intervention

V Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation

VI Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems

5.2.4 - Key conservation measures

<table>
<thead>
<tr>
<th>Measures</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal protection</td>
<td>Implemented</td>
</tr>
</tbody>
</table>

Other:

5.2.5 - Management planning

Is there a site-specific management plan for the site? Yes

Has a management effectiveness assessment been undertaken for the site? Yes

If the site is a formal transboundary site as indicated in section Data and location > Site location, are there shared management planning processes with another Contracting Party? Yes

Please indicate if a Ramsar centre, other educational or visitor facility, or an educational or visitor programme is associated with the site:
5.2.6 - Planning for restoration

Is there a site-specific restoration plan?

<no data available>

5.2.7 - Monitoring implemented or proposed
6.1.1 - Bibliographical references


Incheon City, 2009. Notification of designation for wetland preservation area of Songdo Tidal Flat.

Incheon Free Economic Zone Authority, 2009. Study for establishing alternative habitats for preserving habitat environment of wild birds, p 289.


Complete list of references can be found under the document: KR_lit1502
iii. a description of the site in a national or regional wetland inventory

iv. relevant Article 3.2 reports

v. site management plan

vi. other published literature

6.1.3 - Photograph(s) of the Site

Please provide at least one photograph of the site:

Default picture (Ramsar, 01.01.1900)

6.1.4 - Designation letter and related data

Designation letter

Date of Designation

2014-07-10