Potential Priority Areas in Yellow Sea Ecoregion
(China and South Korea)
- Yellow Sea Ecoregion Planning Programme -

WWF   KORDI   KEI

No	Area Name of PPAs	No	Area Name of PPAs	No	Area Name of PPAs	No	Area Name of PPAs
1	Zhoushan Archipelago	7	Yanwei	13	Chongshandao Islands	19	Huksando Island
2	Wetland in Yangtze Estuary	8	Huanghe-Laizhouwan	14	Yalujiang Estuary	20	Yeongsangang Estuary
3	Southern Jiangsu Coast	9	Bohaiwan	15	Baengnyeongdo-Yeonpyeongdo Islands	21	Boseong-Yeoja Bays
4	Northern Jiangsu Coast	10	Qinghuangdao	16	Gyeonggi Bay	22	Jejudo Island
5	Haizhou Bay	11	Liaohe River Estuary	17	Cheonsu Bay	23	Yellow Sea Cold Water Mass
6	Qing-Shi	12	Haiyangdao - Changxing Islands	18	Geumgang-Mangyeongang-Dongjingang Estuaries		

Photos by: WON, Changman, PARK, Jinyoung, Xianshi JIN, JE, Jonggeel, MIN, Byungmee, C.K.Tseng et al. offered by Ding Lanping, Tobai Sadayosi, GeoEye and NASA SeaWiFS Project

Potential Priority Areas for Biodiversity Conservation of the Yellow Sea Ecoregion
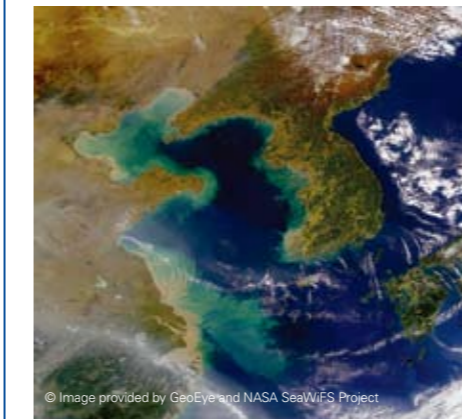
Satellite photo of Yellow Sea Ecoregion

Biodiversity of Yellow Sea Ecoregion

The Yellow Sea Ecoregion - A Global Treasure, A Global Concern

About the area

The Yellow Sea Ecoregion is one of the world's largest areas of continental shelf. The Yellow Sea Ecoregion encompasses the Bohai Sea, the Yellow Sea and the East China Sea. It is a transboundary area, and extends from the coastlines of China, North Korea, and South Korea to a depth of 200m.

Valuable nutrients flow from the Yangtze and Yellow rivers and combine with sunlight and shallow waters to create an area that teems with abundant marine life.

Global Treasure

Yellow Sea Ecoregion has been selected by WWF as one of the Global 200 ecoregions that are key to global biodiversity conservation. This marine ecosystem is also one of the Large Marine Ecosystems (LME) of the world.

Global Concern

The global importance of the Yellow Sea Ecoregion has been recognised by governments and the international community in recent years. Starting in 1992, the Chinese and South Korean governments together developed a transboundary approach to the management of the Yellow Sea area with the assistance of UNDP, UNEP, the World Bank, and NOAA. In 2005, a UNDP/GEF project, the Yellow Sea Large Marine Ecosystem project, was officially launched with participation of the Chinese and South Korean governments.

Meanwhile, in 2002, WWF and other research institutes in China, South Korea and Japan began an assessment of Yellow Sea Ecoregion biodiversity. The objective of this regional partnership was to prioritise conservation actions based on scientific data.

(203) Yellow Sea Ecoregion

LME #48 Yellow Sea Large Marine Ecosystem

UNDP/GEF Yellow Sea Project

WWF/KORDI/KEI Yellow Sea Ecoregion Planning Programme

Biodiversity, People and Threats

The Millennium Ecosystem Assessment, which the United Nations, governments and a broad range of other stakeholders around the world supported, summarised in its report in 2005 that:

'Everyone in the world depends completely on Earth's ecosystems and the services they provide, such as food, water, disease management, climate regulation, spiritual fulfilment, and aesthetic enjoyment.'

Everyone in Yellow Sea Ecoregion also depends completely on this marine and coastal ecosystem and the services they provide. For example, fish and other marine invertebrates such as squids and clams provide food. They also provide many jobs and a large amount of cash through which local and national economies benefit. Coastal plants and clams in coastal areas help to reduce pollution by taking in excessive nutrients.

The Yellow Sea Ecoregion's biodiversity, marine ecosystem and ecosystem services have already been greatly changed and are still facing threats.

For example, overfishing has reduced commercially important fish species by more than 40% from the early 1960s to the 80s. Reclamation and other forms of conversion have changed coastal habitat. In South Korea, about 43% of intertidal wetlands were lost during the 20th century and in China, about 37% of intertidal wetlands have been converted in the last 50 years. These threats to and losses of biodiversity and ecosystem services have impacted the well-being of people in the Yellow Sea Ecoregion.

An urgent need: Finding conservation priorities at a transboundary ecoregional scale

In order to maintain the full array of biodiversity - species, communities, ecosystems, and ecological processes, it is necessary to assess biodiversity beyond political boundaries and at the ecoregional scale.

An ecoregional approach helps ensure that we do not overlook areas that are particularly unique or threatened, allowing for smarter trade-offs and greater positive impacts that are more likely to endure over time.

Will the next generation continue to enjoy a healthy Yellow Sea Ecoregion?

Methodology for finding Potential Priority Areas

Cooperation among scientific experts from China, South Korea, Japan and international conservation NGOs

Scientists from universities and ocean, fisheries, and environmental research institutes in China, South Korea, Japan and international conservation NGOs cooperated to review and identify priority species and their habitat of global significance. Together they have set a common methodology and reached an agreement on priorities areas for biodiversity conservation.

Biological Assessment

Scientists first developed a set of criteria for indicator species and habitat types that are important for biodiversity conservation. The scientists designated six animal and plant groups (taxonomic groups: mammal, bird, fish, coastal mollusk, coastal plant, and algae groups) and developed a set of criteria (representative species and/or habitat types, endemism, threatened status, and commercial importance criteria). The scientists then applied a combination of these criteria to each taxonomic group.

According to these common criteria, each scientist analysed nationally available data in China and South Korea, and for the fish assessment, data available in Japan was also analysed. The scientists then finalised appropriate indicator species and ecologically important areas and compiled national Biological Assessment papers.

Priority Area Analysis

Secondly, the scientists reviewed a further set of criteria that defines globally significant indicator species and their ecologically critical habitat. The objective of this step was to prioritise among important species and important habitats. Each taxonomic group again reviewed and adopted the group's own appropriate set of criteria.

Thirdly, the scientists overlaid maps of important habitat for each indicator species within their taxonomic group. This allowed the scientists to visualise overlapping areas and to delineate areas that are important for a number of Indicator species. These areas were named Ecologically Important Areas (EIAs). In total, six EIA maps were produced:
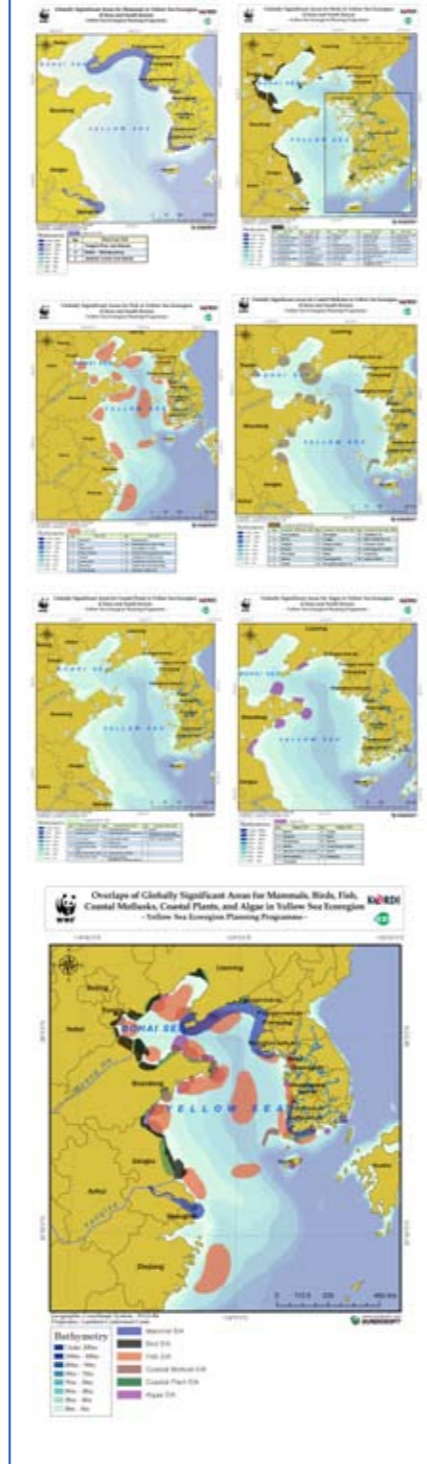
1) Mammal Ecologically Important Areas (MEIAs),
2) Bird Ecologically Important Areas (BEIAs),
3) Fish Ecologically Important Areas (FEIAs),
4) Coastal Mollusk Ecologically Important Areas (CMEIAs),
5) Coastal Plant Ecologically Important Areas (CPEIAs),
6) Algae Ecologically Important Areas (AEIAs).

Fourthly, the scientists examined overlapping areas of the six Ecologically Important Areas. In order to delineate areas that are suitable as units of biodiversity conservation, not only exact overlapping areas but also size and connectivity of Ecologically Important Areas are examined. The areas that the scientists identified and mapped according these rules were named Potential Priority Areas (PPAs).

Finally, the scientists checked that all major habitat types were included in the list of Potential Priority Areas. An Ecologically Important Area that covered an unrepresented habitat type (cold water mass) was added to the list.

Scientific experts from China, South Korea, Japan and other countries cooperated to analyse priority areas

The Results - 23 Potential Priority Areas for biodiversity conservation identified

122 Indicator Species in six taxonomic groups were analysed for their global significance and 111 Ecologically Important Areas were identified. In total, 23 Potential Priority Areas were identified in the Yellow Sea Ecoregion. This was the first time such a comprehensive and trans-regional assessment and analysis of priority areas for biodiversity conservation for the Yellow Sea Ecoregion was conducted.

The Yellow Sea Ecoregion Planning Programme will publish the full results of the biodiversity assessment and the priority area analysis so that the results will be accessible by scientists and government agencies to use in the future.

A Call to Action

The results provided key data for developing a regional conservation strategy and monitoring its successes. In particular, the results will help to:

1) Establish a network of representative marine protected areas at the ecoregional scale;
2) Evaluate effectiveness of existing protected areas;
3) Monitor the status of biodiversity.

In order to conserve biodiversity, in particular, these 23 sets of globally significant Potential Priority Areas, various stakeholders need to take concerted actions. Community-based organisations, the scientific community, national and local government agencies, legislative bodies, non-government organisations including religious groups, the general public, the media, donor communities, industries, consumers, and youth groups all have important roles to play. For example, national and local government agencies can contribute by strengthening cross-sectoral coordination in the establishment and improvement of the management of marine protected areas (MPAs). Filling major knowledge gaps in ecology and human impacts on indicator species is also an important action to take.

Potential Priority Areas (PPAs) in the Yellow Sea Ecoregion

Table of Potential Priority Areas (PPAs) and Ecologically Important Areas of Six Taxonomic Groups in the Yellow Sea Ecoregion

Area code	Area Name of Potential Priority Areas (PPAs)	Mammal Ecologically Important Areas (MEIAs)	Bird Ecologically Important Areas (BEIAs)	Fish Ecologically Important Areas (FEIAs)	Coastal Mollusc Ecologically Important Areas (CMEIAs)	Coastal Plant Ecologically Important Areas (CPEIAs)	Algae Ecologically Important Areas (AEIAs)
PPA1	Zhoushan Archipelago	n/a	n/a	FEIA1 Zhoushan	n/a	n/a	n/a
PPA2	Wetland in Yangtze Estuary	MEIA1 Yangzte River and Estuary	BEIA1 Jiuduansha BEIA2 Chongming Dongtan	n/a	n/a	CPEIA1 Yangtze River Estuary	n/a
PPA3	Southern Jiangsu Coast	n/a	n/a	FEIA2 Lusi	n/a	n/a	n/a
PPA4	Northern Jiangsu Coast	n/a	BEIA3 Yancheng coast	n/a	CMEIA1 Lianyungang	CPEIA2 Yancheng Beach	n/a
PPA5	Haizhou Bay	n/a	BEIA4 Lianyungang coast	FEIA3 Haizhou Bay	CMEIA1 Lianyungang CMEIA2 Rizhao (smaller part)	CPEIA3 Lu-su Coast	AEIA1 Rizhao
PPA6	Qing-Shi	n/a	BEIA6 Rongcheng coast	FEIA4 Shidao-Rushan	CMEIA4 Rushan CMEIA5 Rongcheng	CPEIA4 Rongcheng Beach	AEIA2 Qingdao AEIA3 Rongcheng
PPA7	Yanwei	n/a	n/a	FEIA5 Yanwei	CMEIA6 Weihai CMEIA7 Yantai	CPEIA5 Jiaodong Peninsula Coast	AEIA4 Weihai
PPA8	Huanghe-Laizhouwan	n/a	BEIA7 Laizhouwan BEIA8 Huanghe delta	FEIA6 Laizhou bay	n/a	CPEIA6 Laizhou Bay East Coast CPEIA7 Huanghe Delta	n/a
PPA9	Bohaiwan	n/a	BEIA9 Bohaiwan S BEIA10 Bohaiwan SW BEIA11 Bohaiwan NW BEIA12 Bohaiwan N	FEIA7 Bohai Bay	CMEIA9 Tanggu	CPEIA8 Nandagang Marsh	n/a
PPA10	Qinghuangdao	n/a	BEIA12 Bohaiwan N BEIA13 Beidaihe	FEIA8 Liaodong Bay	CMEIA10 Qinhuangdao	CPEIA9 Qinhuangdao Sand Beaches	AEIA6 Qinhuangdao
PPA11	Liaohe Estuary	n/a	BEIA14 Liaodongwan N	n/a	n/a	CPEIA10 Liaohe River Delta	n/a
PPA12	Haiyangdao - Changxing Islands	MEIA2 Dalian - Baengnyeong	BEIA15 Dalianwan	FEIA8 Liaodong Bay (small part)	CMEIA12 Dalian Bay	CPEIA11 Dalian Bay	n/a
PPA13	Changshandao Islands	MEIA2 Dalian - Baengnyeong	BEIA16 Changshan Islands	FEIA9 Haiyang dao	n/a	CPEIA12 Changhai Islands	AEIA7 Changhai
PPA14	Yalujiang Estuary	MEIA2 Dalian - Baengnyeong	BEIA17 Yalujiang coast	FEIA9 Haiyang dao (small part)	n/a	CPEIA13 Yalujiang River Mouth	n/a
PPA15	Baengnyeongdo-Yeonpyeongdo Islands	MEIA2 Dalian - Baengnyeong	n/a	FEIA10 Hwanghae-do South Coast	n/a	CPEIA14 Baengnyeongdo-Ganghwado-Jawoldo	n/a
PPA16	Gyeonggi Bay	n/a	BEIA18 Hangang estuary and Imjingang estuary BEIA19 Sihwaho lake BEIA20 Jangdan BEIA21 Yudo BEIA22 Ganghwado Island BEIA23 Yeongheung-do BEIA24 Yeongjong island BEIA25 Songdo island BEIA26 Namyang bay BEIA27 Asan bay BEIA28 Seonjedo Island BEIA29 Daebudo	FEIA11 Gyeonggi-do Coast	CMEIA13 Gyeonggi Bay	CPEIA14 Baengnyeongdo-Ganghwado-Jawoldo	n/a
PPA17	Cheonsu Bay	n/a	BEIA30 Cheonsu bay	FEIA12 Greater Geum River Estuary(smaller part)	CMEIA14 Chungcheongnam-do	CPEIA15 Sinduri	AEIA8 Taean
PPA18	Geumgang-Mangyeongang-Dongjingang Estuaries	n/a	BEIA31 Yubudo island BEIA32 Geumgang river BEIA33 Mangyeonggang estuary BEIA34 Dongjingang estuary	FEIA12 Greater Geum River Estuary(smaller part)	CMEIA15 Jeollabuk-do	CPEIA16 Mangyeong and Dongjin esutuaries -Hampyeong bay	AEIA9 Buan
PPA19	Huksando Island	n/a	n/a	FEIA13 Jeollanam-do west coast	CMEIA16 West Jeollanam-do	n/a	n/a
PPA20	Yeongsangang Estuary	MEIA3 Coasts and Islands of Jeolla-do	BEIA36 Youngamho, Geumho and Youngsanho lakes BEIA37 Gocheonamho lake	FEIA13 Jeollanam-do west coast	n/a	CPEIA16 Mangyeong and Dongjin esutuaries -Hampyeong bay (smaller part) CPEIA17 Jindo - Suncheon bay (smaller part)	n/a
PPA21	Boseong-Yeoja Bays	MEIA3 Coasts and Islands of Jeolla-do	BEIA38 Gangjin Bay BEIA39 Suncheon bay	FEIA14 Jeollanam-do south coast	CMEIA17 East Jeollanam-do 1 CMEIA18 East Jeollanam-do 2 CMEIA19 East Jeollanam-do 3	CPEIA17 Jindo - Suncheon bay	AEIA10 Wando
PPA22	Jejudo Island	n/a	BEIA42 Jeju Island	n/a	CMEIA20 Jeju island	n/a	AEIA13 Seogwipo
PPA23	Yellow Sea Cold Water Mass	n/a	n/a	FEIA16 Yellow Sea Cold Water Mass	n/a	n/a	n/a