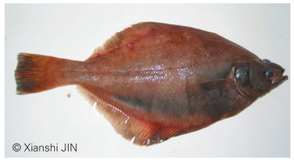
Globally significant fish in the Yellow Sea Ecoregion

A table of indicator fish species and their global significance

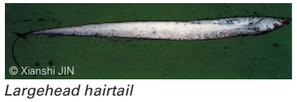
Indicator Species		Criteria for habitat and vulnerable species of global significance		
Scientific names	**FishBase name and/ or FAO English name (other common name)**	**Criterion 1: Endemism**	**Criterion 2: Vulnerable Species**	**Criterion 3: Commercially Important Species**
Larimichthys polyactis	(Small) Yellow croaker	CKJ	(not definite, need further defition)	C K J
Clupea pallasii pallasii	Pacific herring	CKJ (isolated stock)	CK	C
Gadus macrocephalus	Pacific cod	CKJ (isolated stock)	C K	Cva Kva
Penaeus chinensis	Fleshy prawn (Chinese/ Korean shrimp)	CKJ	C K	C Kva Jva
Pagrus major	Red seabream		C	Cva Jva
Trichiurus lepturus	Largehead hairtail			C K J
Pleuronectidae spp.	Flatfishes(mainly Cleisthenes herzensteini)	C	C	C K J
Cleisthenes pinetorum	Pointhead founder			Kvo Kva
Scomber japonicus	Chub mackerel			C K J
Engraulis japonicus	Japanese anchovy	C	C	Cvo K
Scomberomorus niphonius	Japanese Spanish mackerel	C		C Kva
Acetes spp.	Acetes shrimp	C K J	C K	C
Takifugu obscurus	River puffer	K J	K	
Atrobucca nibe	Blackmouth croaker		J	
Lepidotrigla microptera	Redwing searobin		K J	
Argyrosomus japonicus	Japanese meagre		J	
Chimaera phantasma	Silver chimaera (Ghost shark)		J	
Trachidermus fasciatus	Roughskin sculpin	C J		
Coilia nasus	Estuary tailfin anchovy	C K J	K (no data) J	
Muraenesox cinereus	Daggertooth pike conger		K	J
Paralichthys olivaceus	Olive flounder as a representitative of flounders			CKJ
Dentex tumifrons	Yellowback seabream as a representitative of sea breams			Jva
Lophius litulon	Yellow goosefish		K	Kva
Protosalanx chinensis	Chinese noodlefish		K	
Sebastes koreanus	Korean rockfish	K		
Raja pulchra	Mottled skate	K	K	Kva
Pampus echinogaster	Silver pomfret			C K
Periophthalmus modestus	Shuttles hoppfish		K	
Collichthys spp.	e.g.) Bighead croaker			K
(genus) Photololigo spp.	Swordtip squid as a representative of squids & cuttlefish e.g. Photololigo edulis			K J
Loligo spp. (Loligo japonica, L. beka)	Common squids		C	Cvo
Todarodes pacificus	Japanese flying squid			Cvo K
Portunus trituburculatus	Gazami crab(Blue crab)	K	K	C K
Acipenser sinensis	Chinese sturgeon		C IUCN CR	

small yellow croaker



Sohachi, a species of flatfishes

Pacific cod



Largehead hairtail

Notes:

Each indicator species were assessed against Criterion 1, 2 and 3. When an indicator species meets Criterion 1 according to data available in China, then it is indicated by C (China).

Note 1: In Criterion 1,2 and 3 columns, C indicates that a criterion is applicable to the corresponding species according to data from China, K: South Korea, J: Japan

Note 2: IUCN CR indicates the species is classified as Critically Endangered in the IUCN Red List of Threatened Species

Note 3: Cva: the species is commercially important by value in China, Kva: the species is commercially important by value in South Korea, Jva: the species is commercially important by value in Japan

Note 4: Cvo: the species is commercially important by volume in China

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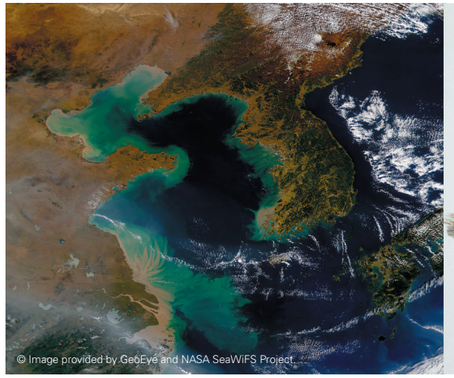
Fish of the Yellow Sea Ecoregion and their habitats



Satellite photo of Yellow Sea Ecoregion

Small Yellow Croaker –once the most common fish of the Yellow Sea Ecoregion

Fish of the Yellow Sea Ecoregion

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.

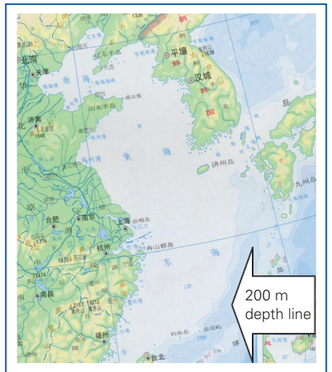
Valuable nutrients flow from the Yangtze and Yellow rivers and combine with sunlight and shallow waters to create an area that teems with abundant marine life.

Diversity of fish species

In the Yellow Sea alone, 276 species of fish have been recorded. Compositions of about 100 commercial fisheries species in the Yellow Sea are: 66% demersal fish (bottom dwelling fish), 18% pelagic fish (swimming in the water column), 7% cephalopods (octopus and squid), and 7% crustacea (shrimps), of which 45% is warm-water species, 46% warm-temperate species, and 9% cold-temperate species. In the Bohai Sea, 109 species of fish are found and data in South Korea shows that 339 species of fish are on the record for the Yellow Sea.

A unique cold water mass in the centre of the Yellow Sea

There is a 70-80 metre deep depression in the central part of the Yellow Sea. This depression holds a cold water mass throughout the year that provides an important habitat for cold-temperate fish species that are otherwise found in more northern seas.



Borders of the Yellow Sea Ecoregion

What is an ecoregion?

Biodiversity is not spread evenly across the Earth but follows complex patterns determined by climate, geology and the evolutionary history of the planet. These patterns are called ecoregions. WWF defines an ecoregion as a large unit of land or water containing a geographically distinct assemblage of species, natural communities, and environmental conditions.

The boundaries of an ecoregion are not fixed and sharp, but rather encompass an area within which important ecological and evolutionary processes most strongly interact.

Fish and People

Fish - A source of food and income and a foundation of life for coastal communities

Fisheries in the Yellow Sea Ecoregion generate a significant income as well as are a major source of food. A wide variety of fish, over 100 species, have commercial value. In China, the total fisheries output value from five provinces and municipalities along the Yellow Sea was about 80 billion RMB in 1997, accounting for about 1/3 of the national fisheries output. In South Korea, the catches from the Yellow Sea and the East China Sea on average for the last 30 years account for 30% of the national fisheries production.

Fisheries also have helped to support coastal communities to maintain their livelihoods and community structure.

Threats to Fish and Fisheries

Fish in the Yellow Sea Ecoregion is one of the most intensively exploited fisheries resources in the world. Increasing pollution and extensive reclamation of coast areas have also affected reproduction of fish.

A case of Small Yellow Croaker – From the one of the most abundant fish to up to 80% reduction

Small yellow croaker was one of the most abundant species in total fish catch in 1950's and 1960's in the Yellow Sea. In South Korea, it accounted for about 1/3 of the total catch in 1960's. However, the catch of small yellow croaker dramatically declined in following years because of overfishing. In China, small yellow croaker was the most dominant species in 1959 by occupying 37% in the catch, but it declined to only 9% in 1981. In South Korea, catch of small yellow croaker was similarly reduced by more than 80% between 1957 and 1983 while fishing intensity double from 1970's to 1980s.

In the 1990's, data from China shows some signs of recovery of small yellow croaker.

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

Global Treasure

Yellow Sea Ecoregion (203) has been selected by WWF as one of the Global 200 ecoregions, areas 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 conservation NGOs and 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.

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

In order to conserve the full array of biodiversity and ensure the use of its services by people are sustainable, it is necessary to conduct assessments beyond political boundaries and at an 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.

Methodology - finding priority fish species and their Ecologically Important Areas

Cooperation among scientific experts from China, South Korea, and Japan

Scientists from fisheries and ocean research institutes in China, South Korea and Japan have worked together to review and identify priority fish species and their habitats of global significance. Together they have set a common methodology and reached an agreement on priorities.

Biological Assessment

Using a further set of criteria, experts then prioritised the previously selected indicator species and their habitat. To do this, scientists took into account representativeness of habitat, endemism, threatened status, commercial importance, intact habitat, and genetic diversity reduction. According to this common criterion, each scientist analysed nationally available data to select appropriate indicator species and their important habitat. Then they compiled national Biological Assessment papers based on data from China, South Korea, and Japan.

In addition to fish, scientists have added some squid and crab species that are important to fisheries in the Yellow Sea Ecoregion

Priority Area Analysis

Using a further set of criteria, experts then prioritised the previously selected indicator species and their habitat. Scientists agreed that spawning aggregation areas are particularly important areas because they are geographically small but well defined and also they are critical areas to maintain populations. Scientists also pointed out that cold-water mass area is a unique and an important habitat because they support those isolated cold temperate species populations.

Experts then mapped the important habitat areas of each indicator species. This allowed scientists to visualise areas that are important for more than one species.

Results

Fish Ecologically Important Areas (FEIAs) are areas that experts deem critical for fish species. 40 indicator species were assessed under the criteria to identify globally significant species and their habitat. Of these indicator species, 14 species met the endemism criterion, 22 species met vulnerable species criterion, and 23 species met commercially important species criterion. Those indicator species that met any of these criteria were identified as globally significant species. Then habitat areas of these globally significant species, where those areas are critical for the survial of the species, were identified as indicator species ecologically important areas. In total, 16 FEIAs were identified.

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

A call to actions

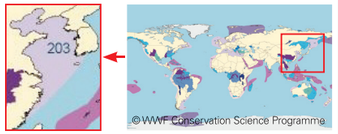
The analysis and results provided key data for developing a regional conservation strategy and monitoring its successes. In particular, the results will help to:

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

In order to conserve these globally significant fish species and their habitats, 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 MPAs. Filling major knowledge gaps in ecology and human impacts on indicator species is also an important action to take.



Yellow Sea Ecoregion (203)

LME #48 Yellow Sea in Large Marine Ecosystems

UNDP China — Yellow Sea

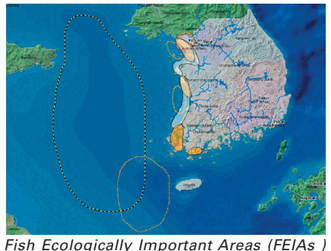
UNDP/GEF Yellow Sea Project

WWF — KORDI — KEI Korea Environment Institute

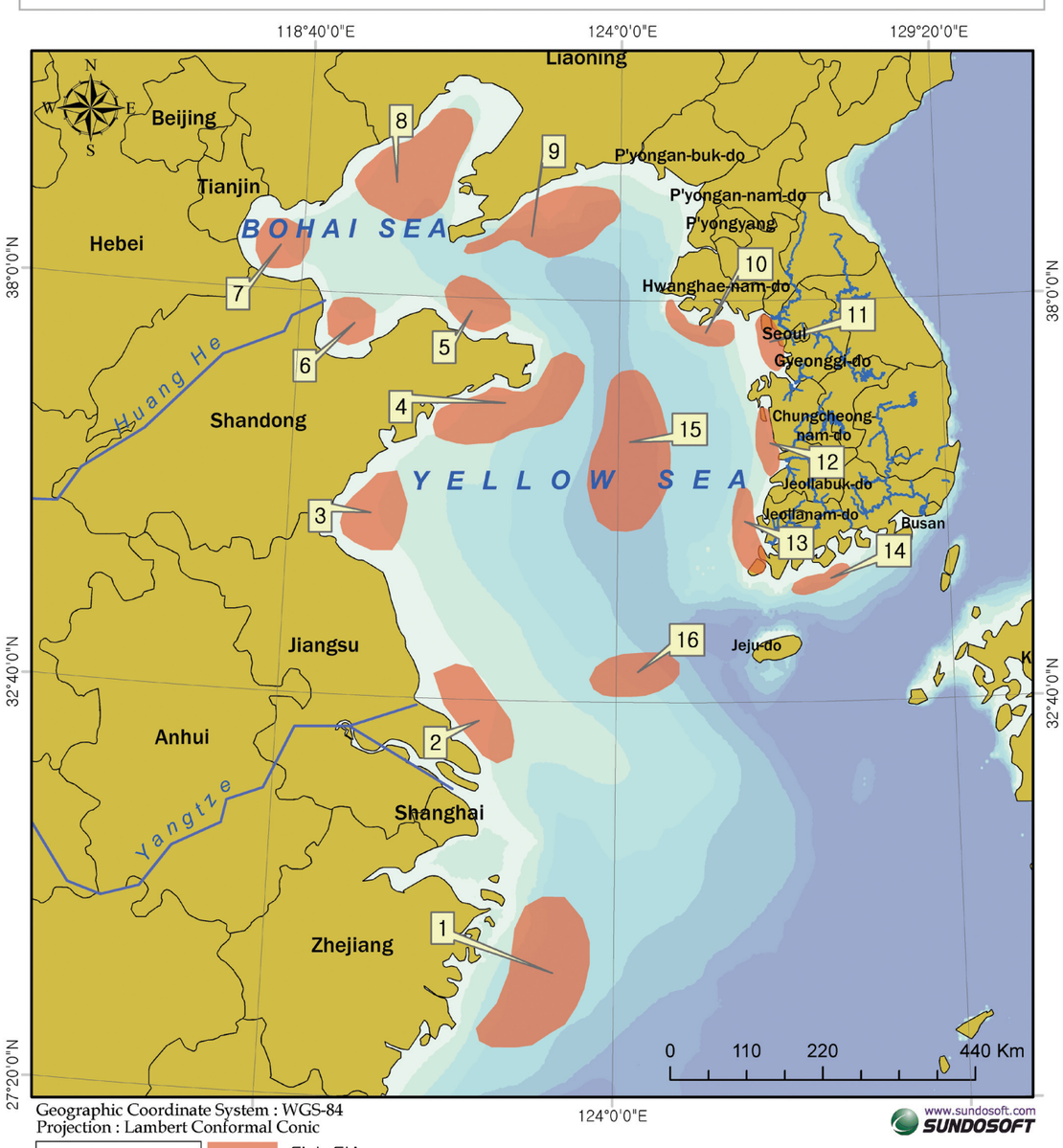
WWF/KORDI/KEI Yellow Sea Ecoregion Planning Programme

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

Important areas for a single fish species (Takifugu obscurus) according to Korean data.



Fish Ecologically Important Areas (FEIAs) were identified by overlapping important areas for many different species



No	Fish EIA	No	Fish EIA
1	Zhoushan	9	Haiyang Dao
2	Lusi	10	Hwanghae-do South Coast
3	Haizhou Bay	11	Gyeonggi-do Coast
4	Shidao-Rushan	12	Greater Geumgang River Esturay
5	Yanwei	13	Jeollanam-do West Coast
6	Laizhou Bay	14	Jeollanam-do South Coast
7	Bohai Bay	15	Yellow Sea Cold Water Mass
8	Liaodong Bay	16	Southern Yellow Sea