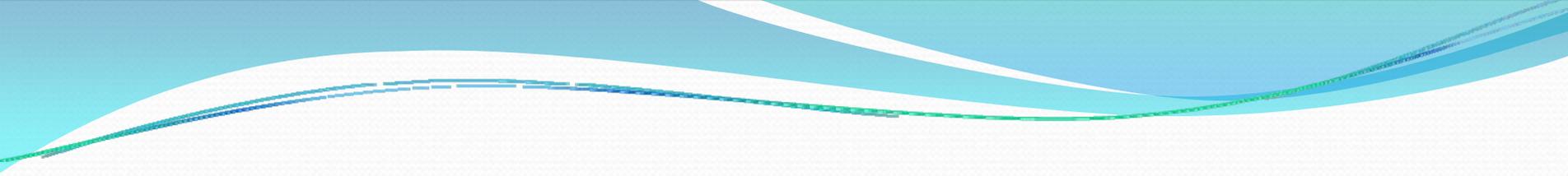


Yellow Sea Marine Ecoregion for Implementation of Ecosystem-based Management in Marine Capture Fisheries

Inja Yeon, H.J. Whang, M.h. Shon, Y.J. Im, J.G. Myoung
and WWF YSEPP project partners (NFRDI, KORDI, KEI,
YSFRI China, SNFRI Japan, etc.)

Contents

- EBM for WWF
- Yellow Sea Ecoregion Planning Program
 - Study site
 - Current situation of Yellow Sea Ecoregion
 - Analysis
 - Results
- Future work



EBM for WWF

Aspects of EBM for WWF

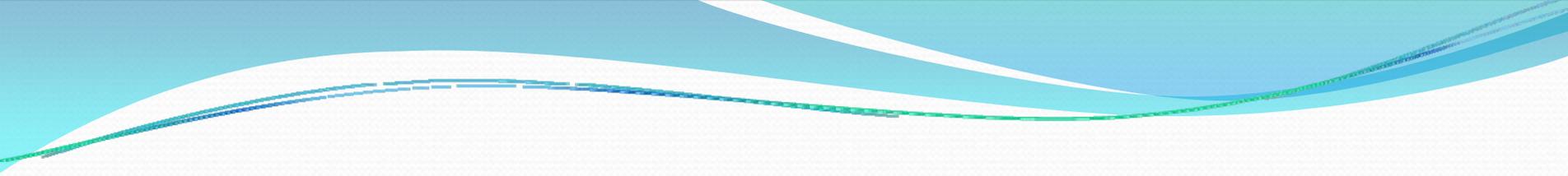
- Key aspects of the WWF ecoregion approach
 1. Sustainable management of fisheries and other marine resources through ecosystem-based management
 2. Establishment of well-managed, representative networks Marine Protected Areas
- To achieve 'sustainability' in exploiting natural resources

Principles of EBM for WWF

- Maintaining the natural structure and function of ecosystems and their productivity
- Incorporates human use and values of ecosystems in managing the resource
- Recognizing that ecosystems are dynamic and constantly changing
- Based on a shared vision of all stakeholders
- Based on scientific knowledge, adapted by continual learning and monitoring

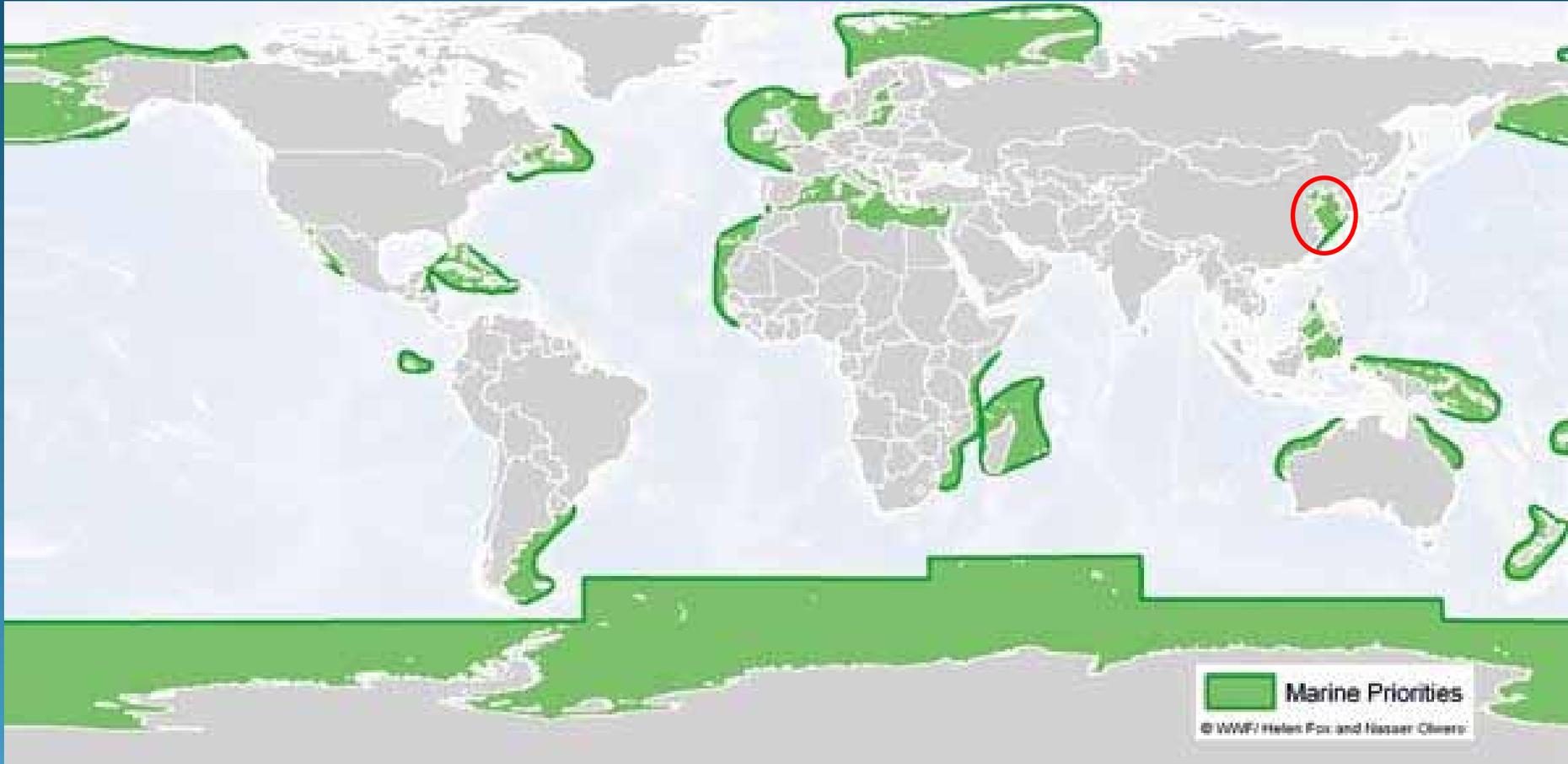
Operational Components for Implementing EBM Fisheries

1. Identify the stakeholder community
2. Prepare a map of the ecoregions and habitats
3. Identify partners and their specific interests
4. Establish the ecosystem values
5. Determine the major factors that could affect the ecosystem values
6. Conduct an ecological risk assessment
7. Establish objectives and targets for specific elements of ecosystems
8. Establish strategies within the fishery for achieving targets
9. Design an effective information system, including monitoring
10. Establish research and information needs and priorities
11. Design performance assessment and review processes
12. Prepare an education and training package for outreach to fishers and other stakeholders



Yellow Sea Ecoregion Planning Program

Study site



Yellow Sea Marine Ecoregion



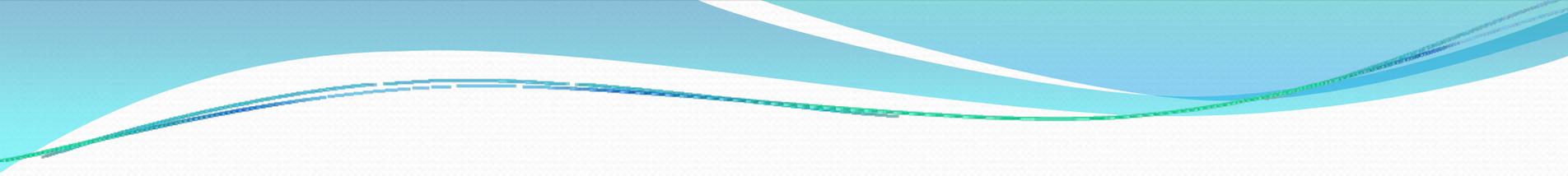
- Including the Yellow Sea, the Bohai Sea and part of the East China Sea
- Semi-enclosed body of water bordering China, North Korea and South Korea
- Covers approximately 40,000 square kilometers

Current Situation of the Yellow Sea Ecoregion

- Remarked seasonal variations; cold and warm temperature species, approximately 1,600 species
- One of the most heavily exploited in the world by fishing mainly by Chinese, Korean and some Japanese vessels
- 100 commercially important species
- Landings of commercially important species: declined by about 30% over the past twenty years
- Many of the larger or higher value species has been replaced by fisheries for smaller or less value species
- Main causes of structure changes of fish communities: overfishing, pollution, extensive coastal development
- 600 million people, over a dozen urban

Yellow Sea Ecoregion Planning Program

- The long-term goal: to help achieve conservation and sustainable use of biodiversity
- Strategy :
 - 1) Prioritizing conservation actions
 - 2) Building human and institutional capacity to implement an Ecoregion Action Plan
 - 3) Taking early action to enable a smooth transition from planning to implementation



The strategy of building the scientific foundation involved bringing together acknowledged scientific experts from China, South Korea and Japan to participate in a process to find potential priority areas and determine appropriate EBM actions

Analysis of Yellow Sea Ecoregion for Fish

- Five criteria:

1. Representative species/habitat types

2. Isolated stock or species,
endemic and unique species assemblages

3. Vulnerable/Depleted species

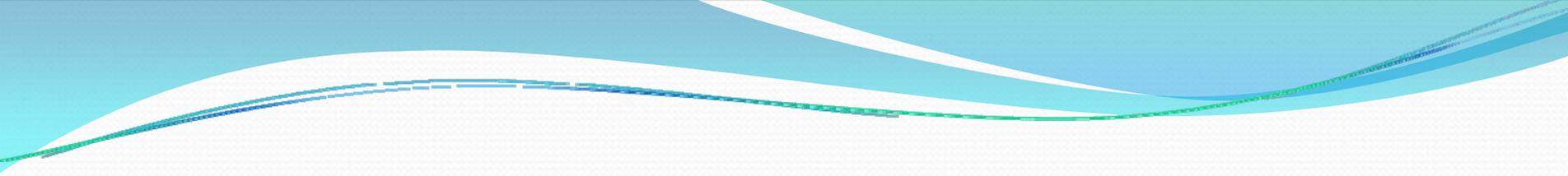
4. Commercial importance, both by value and volume

5. Change in biological characteristics
in response to fishing pressure

- Species for priority indicator:

25 species including fish, shrimps and crabs in Korea

Totally 34 species, Korea, China and Japan



Results

Step 1

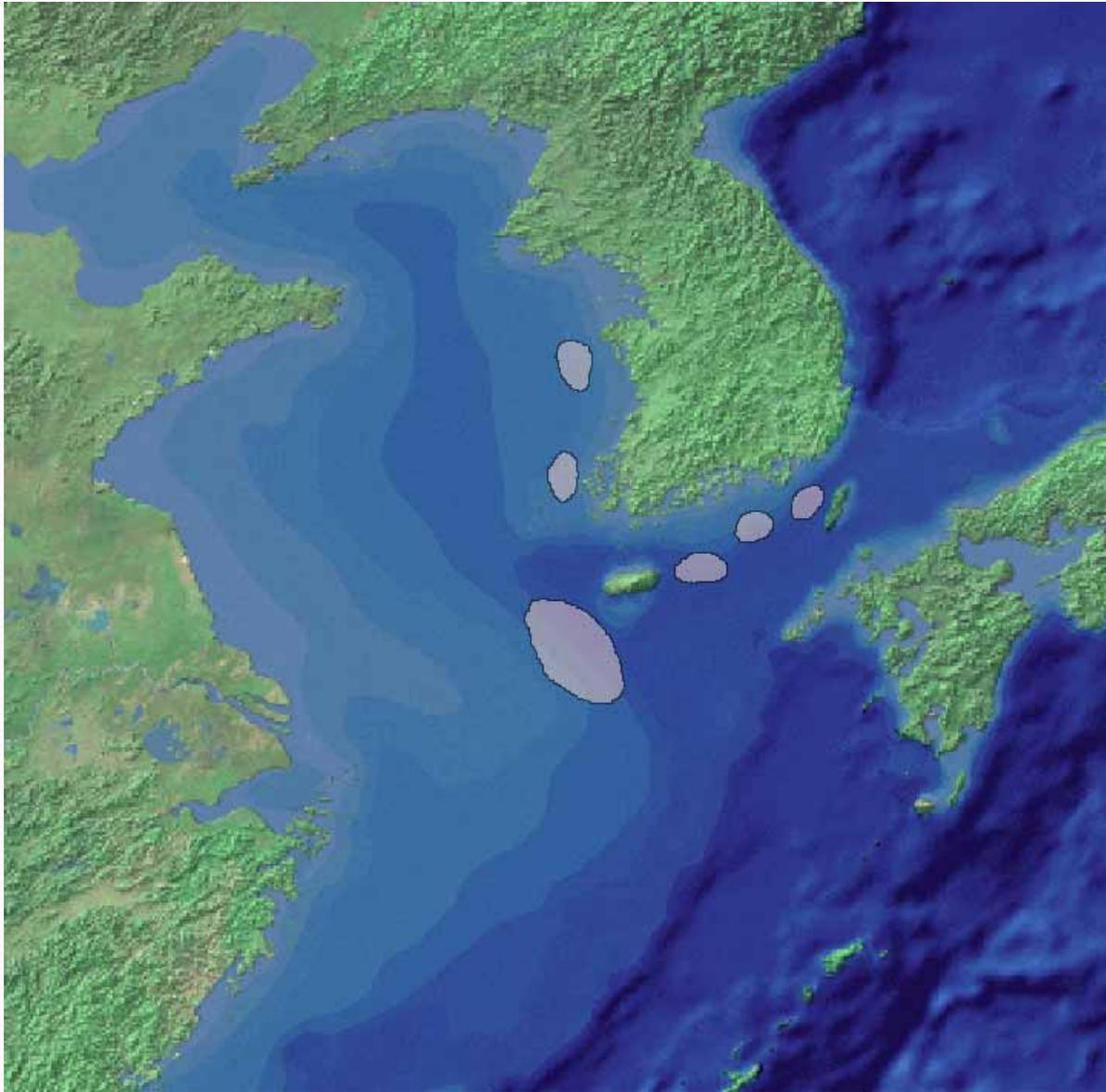
Adopted common criteria	Proposed Indicator Species/ Groups	Habitat/biological Characteristics or Stock Status of Indicator Species	Ecologically Important Areas
Criterion 1 Representative species / habitat types	<i>Raja pulchra</i>	Yellow Sea cold water mass	Trough area occupied by cold water mass, spawning ground in coastal area
Criterion 2 Isolated stock or species, endemism and unique species assemblages			
Additional Criterion Changes in biological characteristics			

Other steps

- Definition of indicator species under each criterion
- Analyzing biological and ecological characteristics of each indicator species; especially ecological important areas for conserving
- Assessing stock variations
- Drove the map of each indicator species from the results of above steps

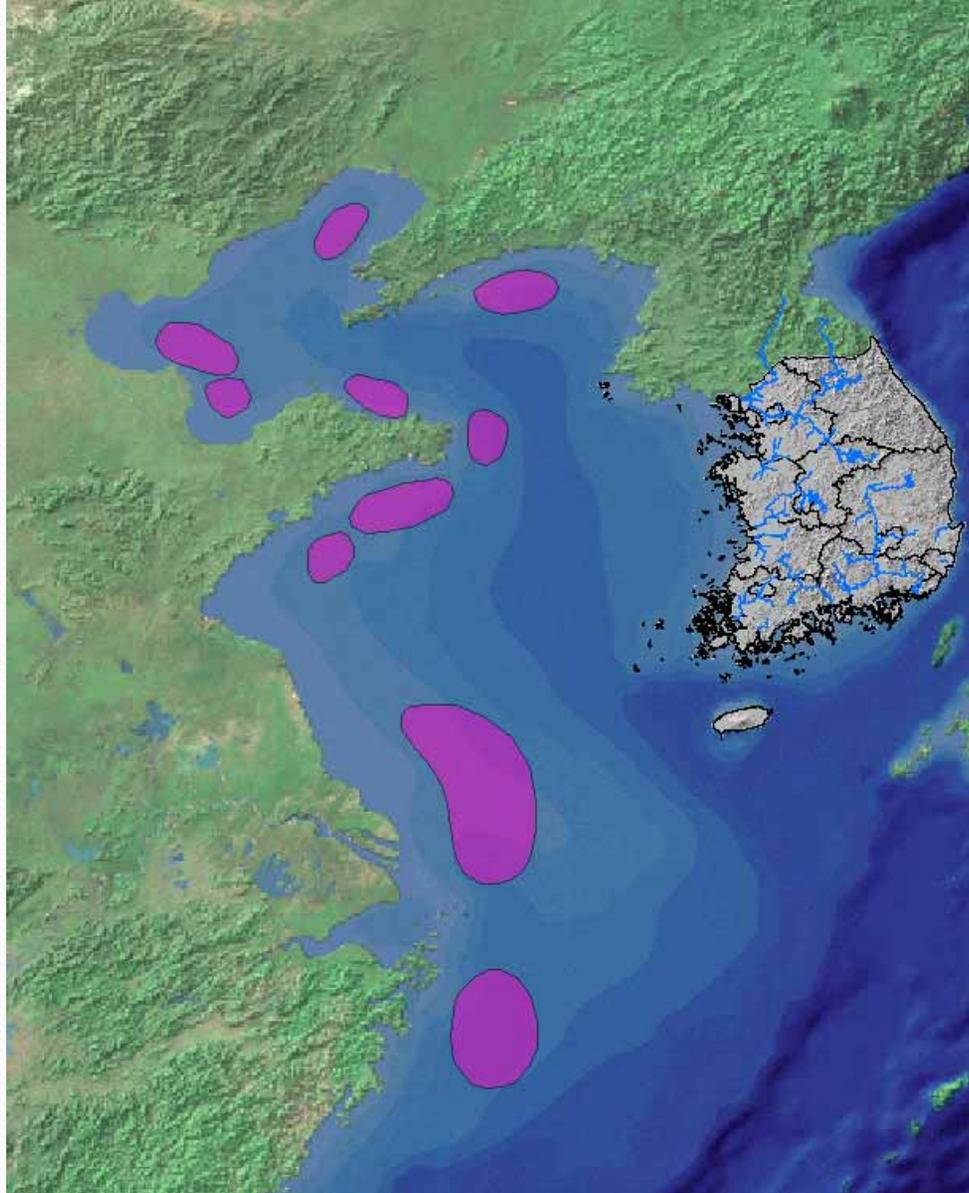
YSEPP / Korea Species / Fish

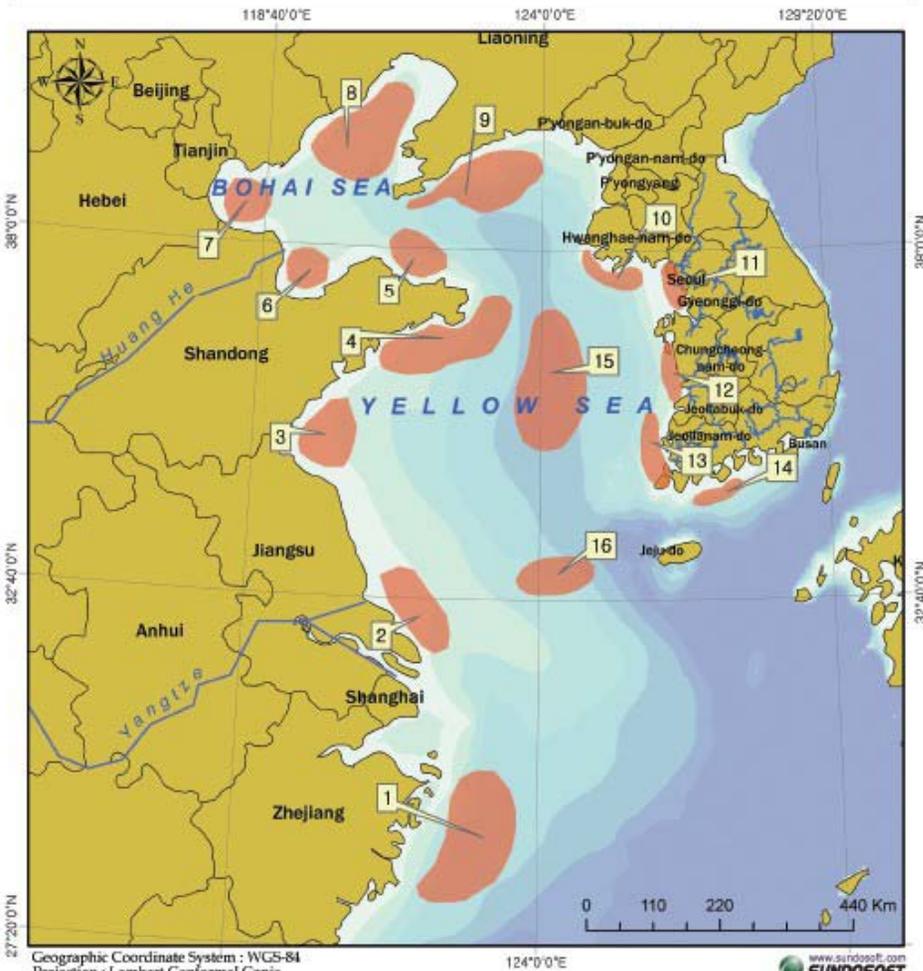
- *Scomberomorus niphonius* 삼치



YSEPP / China Species / Fish

- *Scomberomorus niphonius*





Geographic Coordinate System : WGS-84
Projection : Lambert Conformal Conic



Bathymetry

- Under 200m
- 200m - 100m
- 100m - 90m
- 90m - 70m
- 70m - 50m
- 50m - 30m
- 30m - 10m
- 10m - 0m

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

- 16 areas were determined as ecologically important habitats in the Yellow Sea for fish based on considering spawning or main distribution areas among Chinese, Japanese and Korean scientists.
- The fisheries dimension emerged as a very high priority.



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



118°40'0"E 124°0'0"E 129°20'0"E



Geographic Coordinate System : WGS-84
Projection : Lambert Conformal Conic

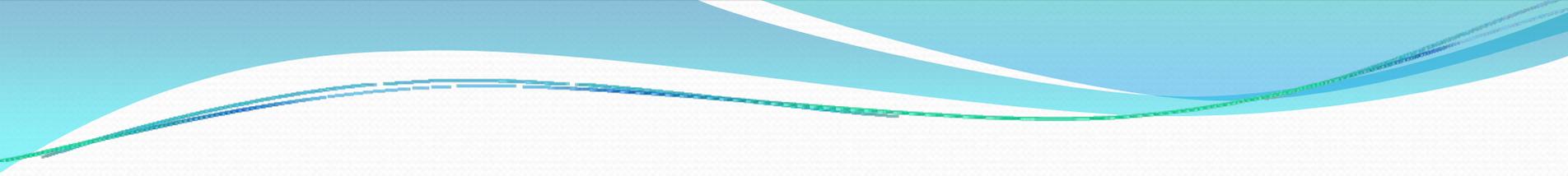
Bathymetry		Potential Priority Area					
No	Area Name of PPAs	No	Area Name of PPAs	No	Area Name of PPAs	No	Area Name of PPAs
1	Zhouzhan Archipelago	7	Yonsei	13	Chonghae Islands	19	Huksa-do Island
2	Wetland in Yangtze Estuary	8	Huanghe-Liaohewan	14	Yalujiang Estuary	20	Yeongsong Estuary
3	Southern Jiangsu Coast	9	Bohaiwan	15	Boengyeongdo-Yeongyeongdo Islands	21	Boeong-Yeop Boys
4	Northern Jiangsu Coast	10	Ginghuangdo	16	Gyeonggi Bay	22	Jeju-do Island
5	Hai Zhou Bay	11	Liaohu River Estuary	17	Changsu Bay	23	Yellow Sea Cold Water Mass
6	Ging-Itx	12	Huiyangdao - Chongqing Islands	18	Gwangang-Myeongyeong-Donggyong Estuaries		

- 23 areas were chosen as priorities for six Taxonomic groups among the three countries' scientists.
- over 80% of these being crucial fish habitats

For six Taxonomic groups Including fish, Mollusks, Mammals, Birds, Coastal Plants and Algae

Future work

- Fishing in this area may be more closely regulated to achieve longer-term benefits from fisheries and for ecosystem-based management.
 - closed areas, MPA
- Delineate the boundaries of an area in which EBM may be applied
- EBM can, is and should be done wherever there is fishing.



Thank you for attention!!