



# YSLME MPA NETWORKING WORKSHOP

14-16 January 2019 • Dalian, Liaoning, PR China

## MPA Network strengthened in the Yellow Sea of China

**Linlin Zhao**

First Institute of Oceanography, MNR



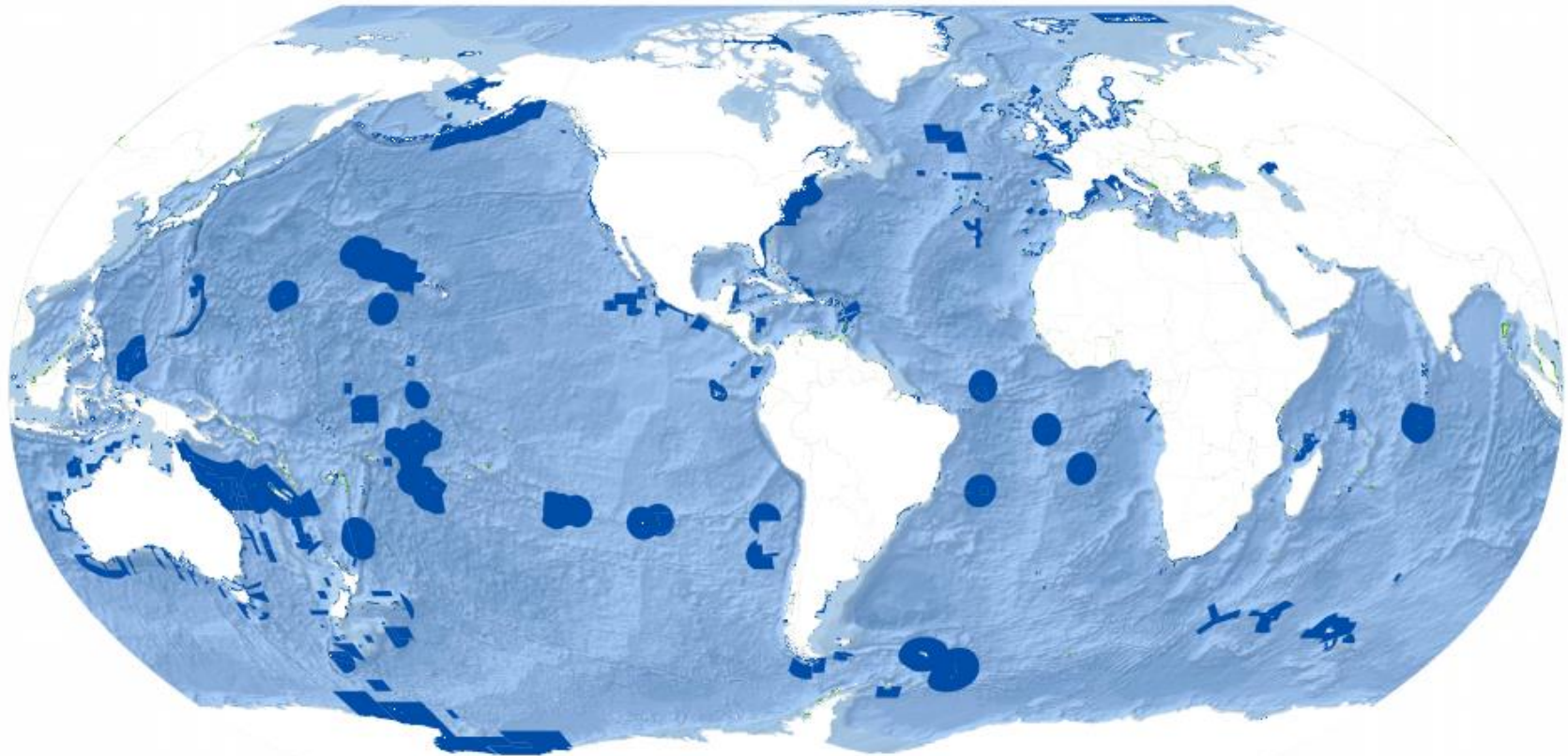
# Content

- **MPAs in the Yellow Sea of China**
- **Relevance of existing zoning schemes with MPAs**
- **Connectivity with existing MPAs**
- **Suggestion**





# Official MPA Map



Source: UNEP-WCMC and IUCN (2019). Protected Planet: The World Database on Protected Areas (WDPA) [On-line], December 2019, Cambridge, UK: UNEP-WCMC. Available at [www.protectedplanet.net](http://www.protectedplanet.net)

**7.63% of the global ocean covered by protected areas**  
**2.57% of the global ocean covered by no-take protected areas**



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# MPAs in the Yellow Sea of China

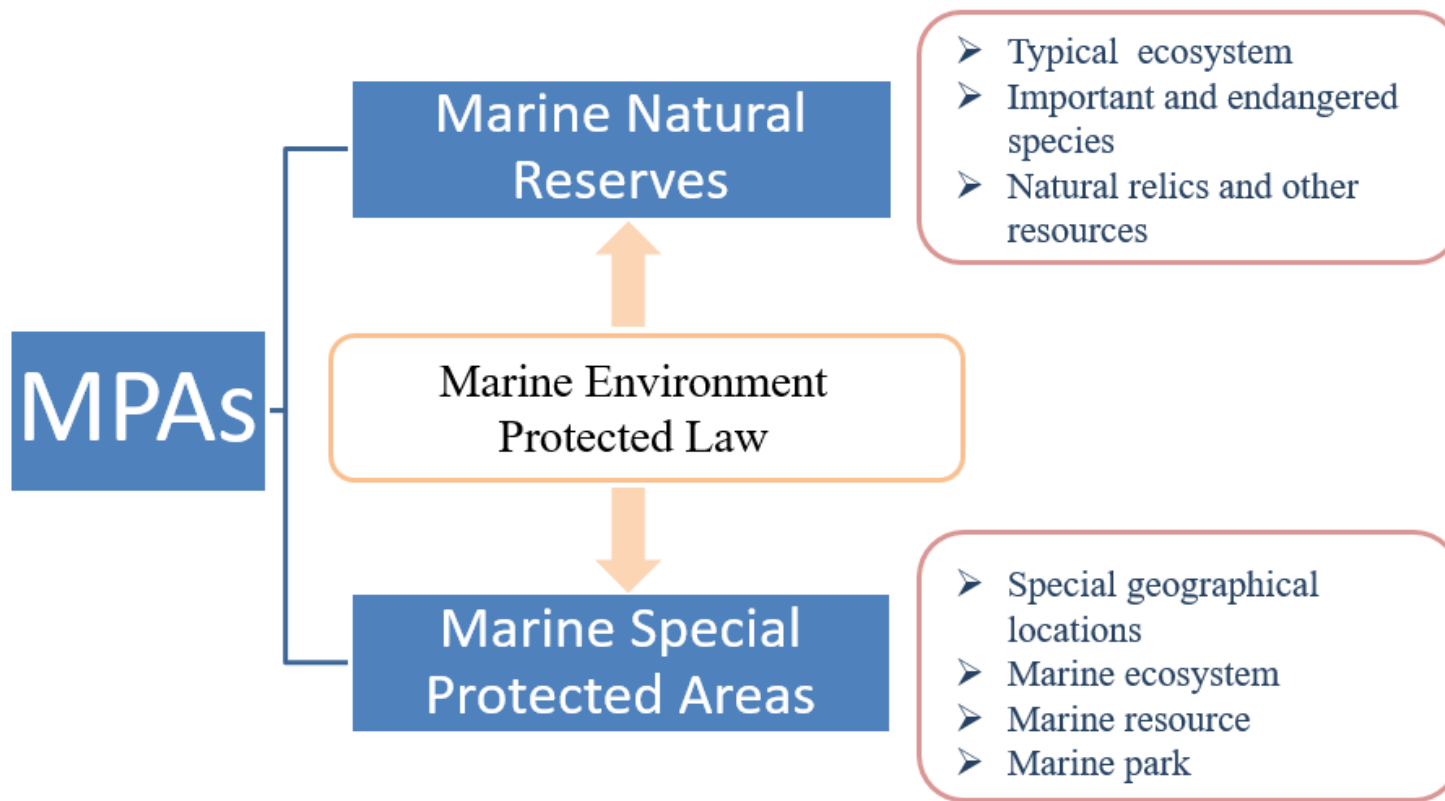
- Areas: 380, 275 km<sup>2</sup>
- Important marine ecosystem:
  - ✓ Critical species and habitats
  - ✓ Diversity of mammals species
  - ✓ Diversity of bird species
  - ✓ Diversity of fish species
  - ✓ Diversity of coastal plant species and community types





# MPAs in the Yellow Sea of China

## MPA system in China



# MPAs in the Yellow Sea of China

## National MPAs

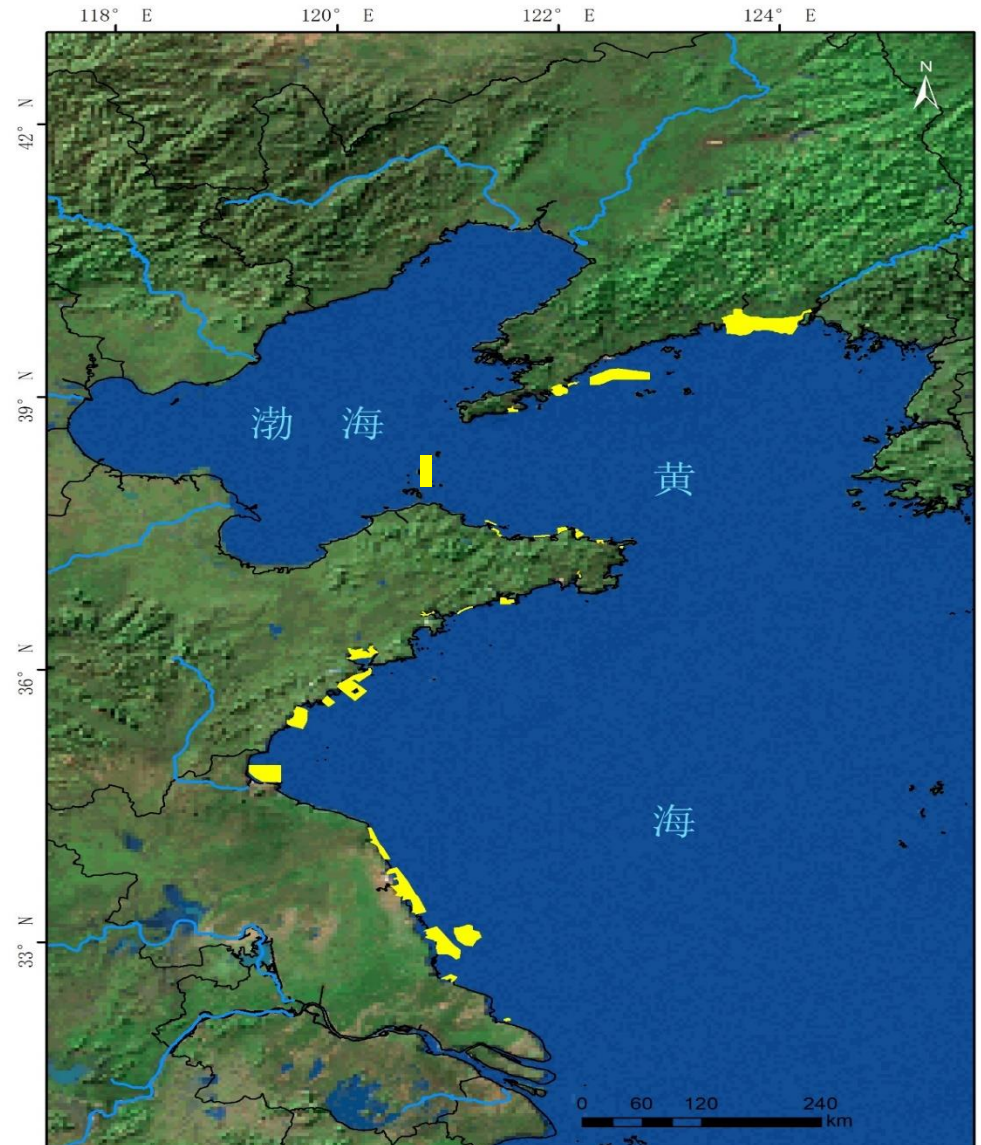
Total number: 31

Total areas: 8,056 km<sup>2</sup>

Marine natural reserve: 6,  
5500 km<sup>2</sup>

Marine special protected area:  
25, 2500km<sup>2</sup>

Liaoning (5), Shandong (21),  
Jiangsu (5)



# Relevance of existing zoning schemes with MPAs

- **Marine Functional Zoning (MFZ):** the most commonly used marine spatial planning approach, where marine areas are divided into basic marine functional areas of different types in accordance with the requirements for maritime spatial location, natural resources, environmental conditions, exploitation and utilization, as well as taking into account the economic and societal requirements for national or regional sustainable development, thus providing a basis for the development, protection and management of the ocean.
- **Marine Ecological Redline (MER):** maintain the health and safety of the marine ecology, focusing on the protection of important ecologically functional areas, ecologically sensitive areas and ecologically fragile areas, by the implementation of strict controls and legal protection.



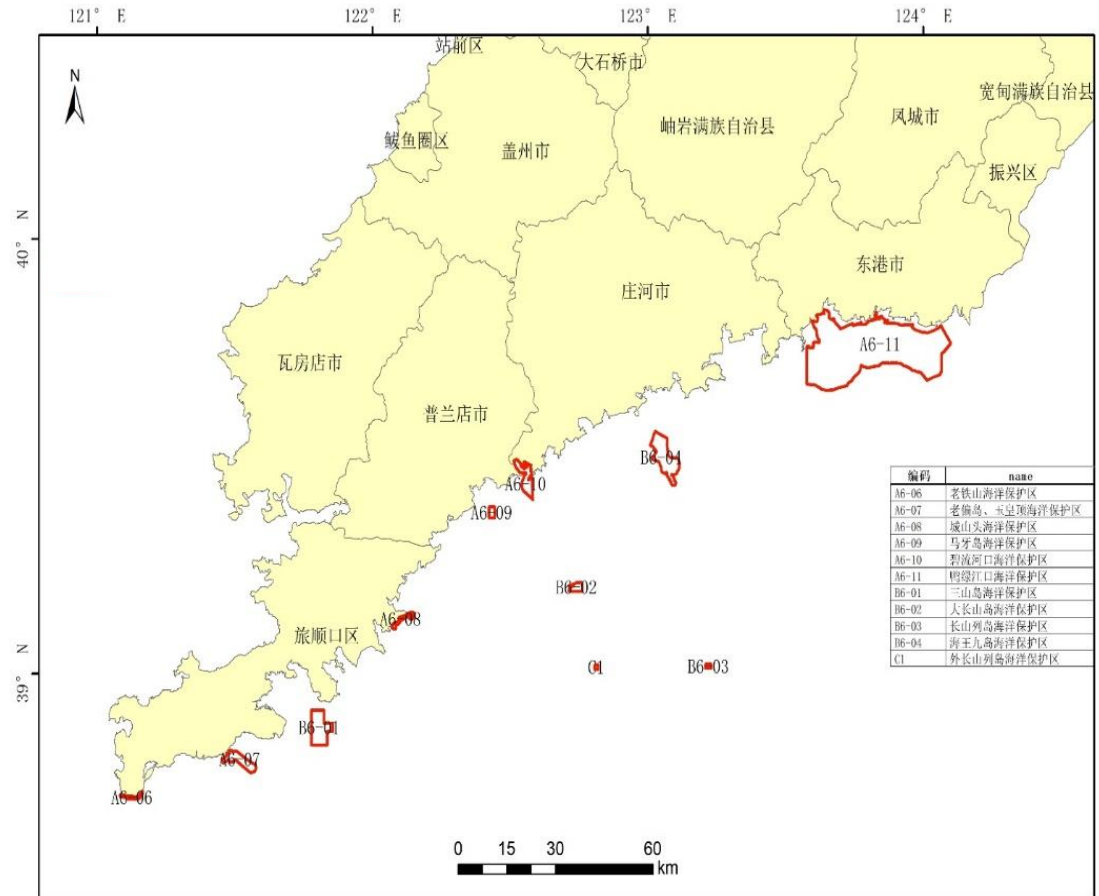
# Relevance of existing zoning schemes with MPAs

## ➤ Marine Functional Zoning (MFZ) of Liaoning Province

### ➤ Eight types:

- ✓ agriculture and fishery zone,
- ✓ port and shipping zone
- ✓ construction zone
- ✓ mineral and energy zone
- ✓ tourism and recreation zone,
- ✓ **marine protected area**
- ✓ special functional zone
- ✓ reserved zone

➤ Total area: 716 km<sup>2</sup>

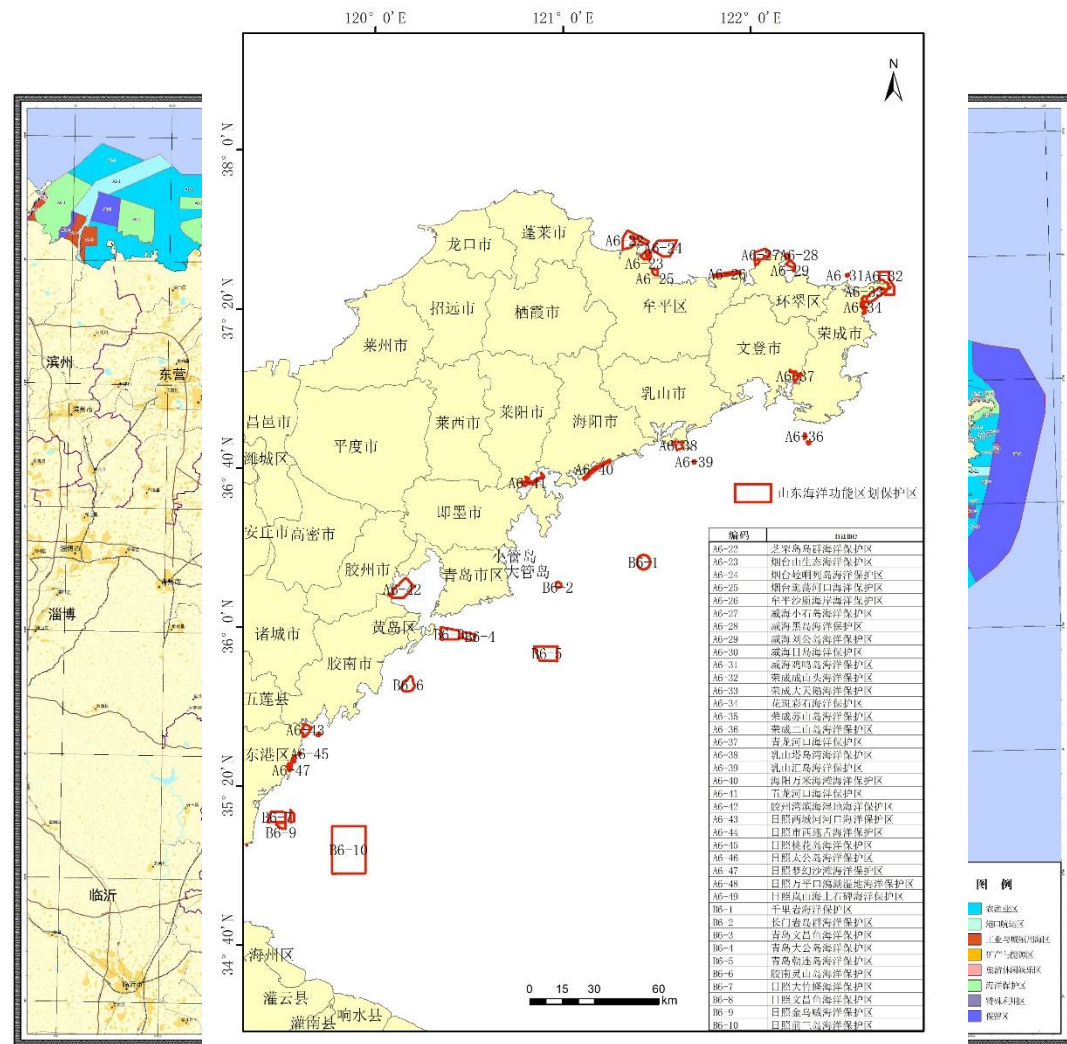




# Relevance of existing zoning schemes with MPAs

➤ Marine Functional Zoning (MFZ) of Shandong Province

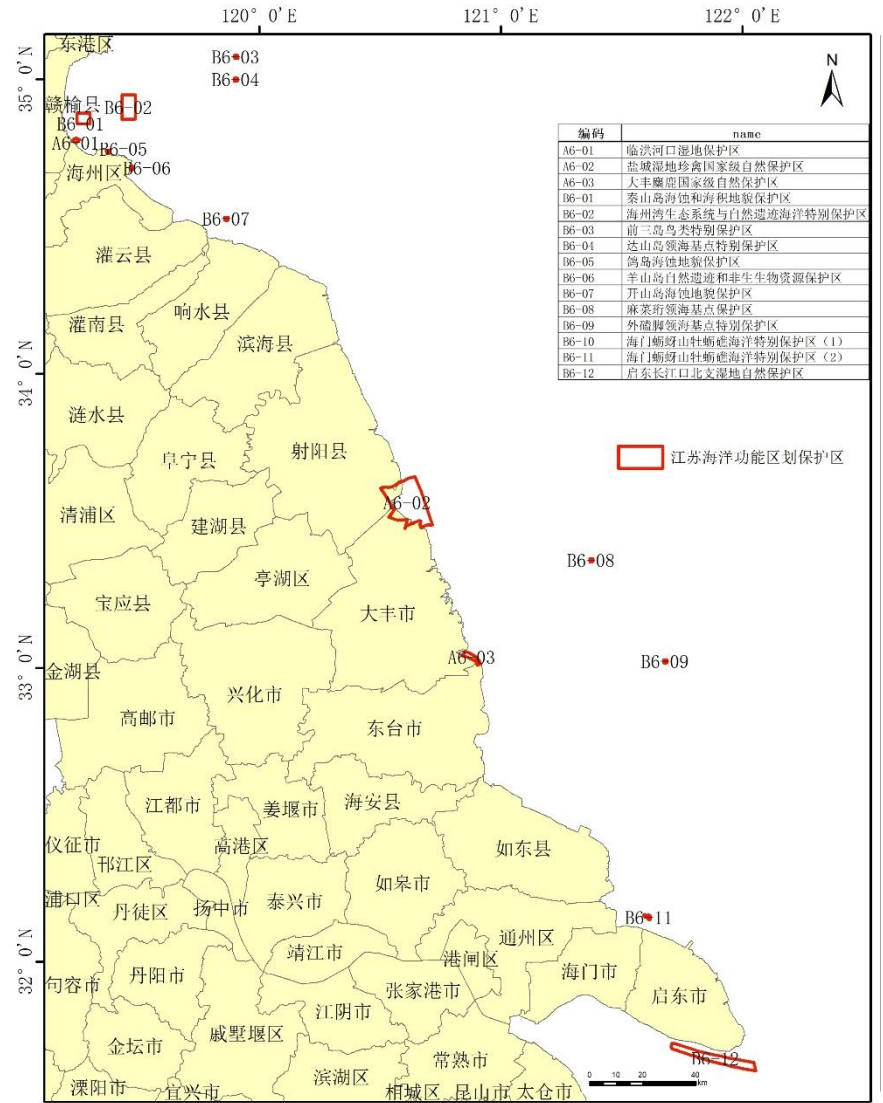
➤ Total area : 973 km<sup>2</sup>



# Relevance of existing zoning schemes with MPAs

## ➤ Marine Functional Zoning (MFZ) of Jiangsu Province

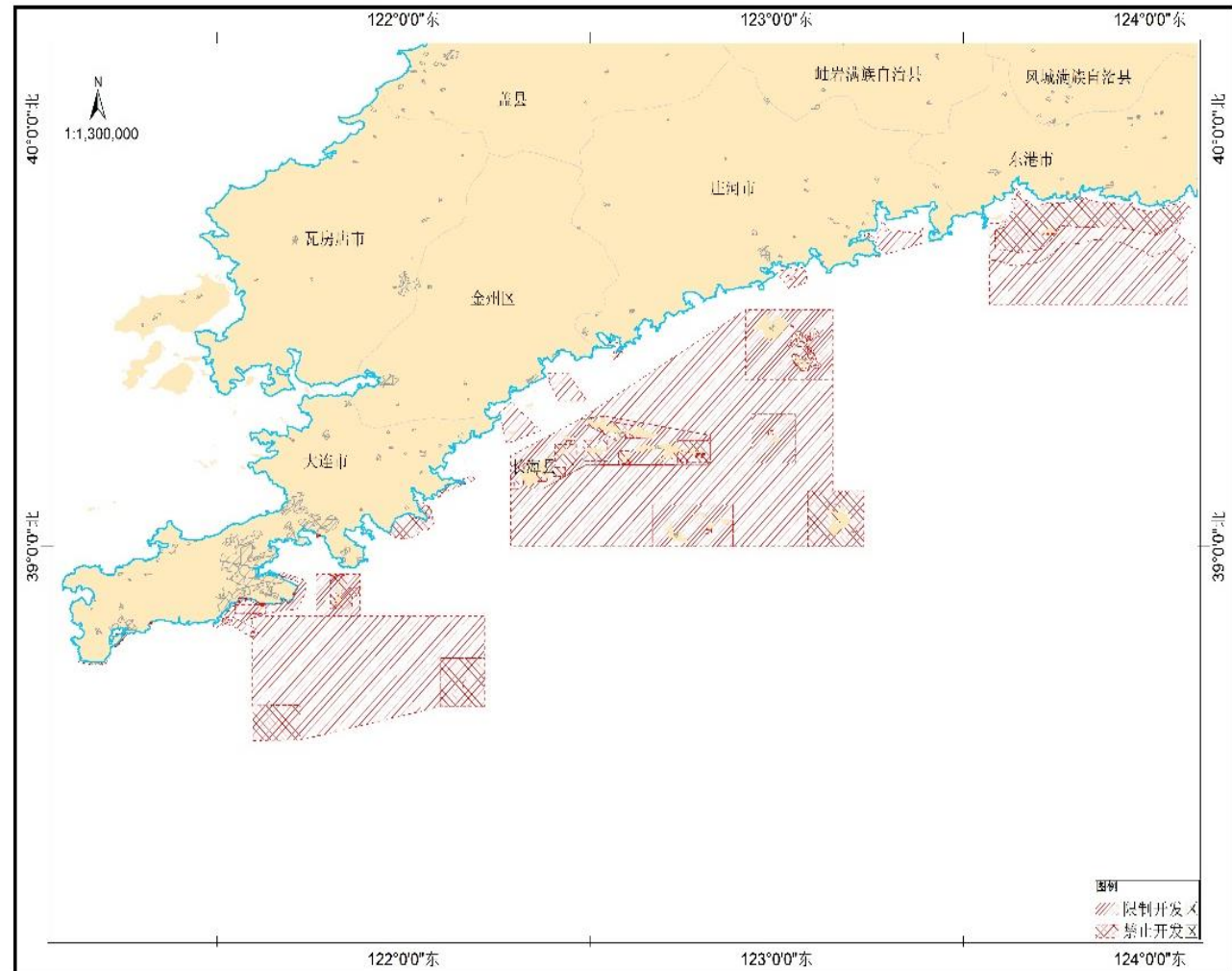
➤ Total area: 385 km<sup>2</sup>



# Relevance of existing zoning schemes with MPAs

➤ Marine Ecological Redline (MER) of Liaoning Province

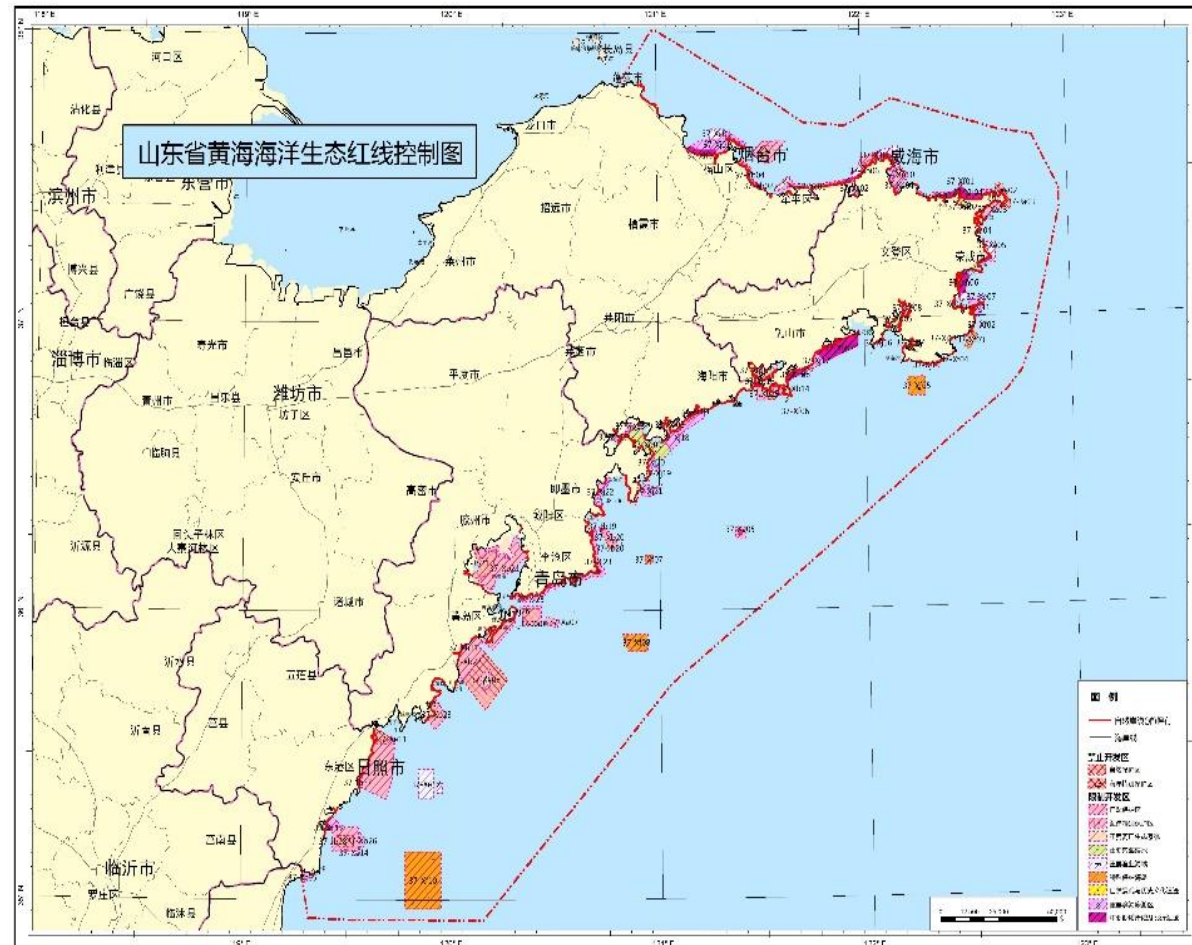
➤ Total area: 6 800 km<sup>2</sup>



# Relevance of existing zoning schemes with MPAs

➤ Marine Ecological Redline (MER) of Shandong Province

➤ Total area: 3 100 km<sup>2</sup>

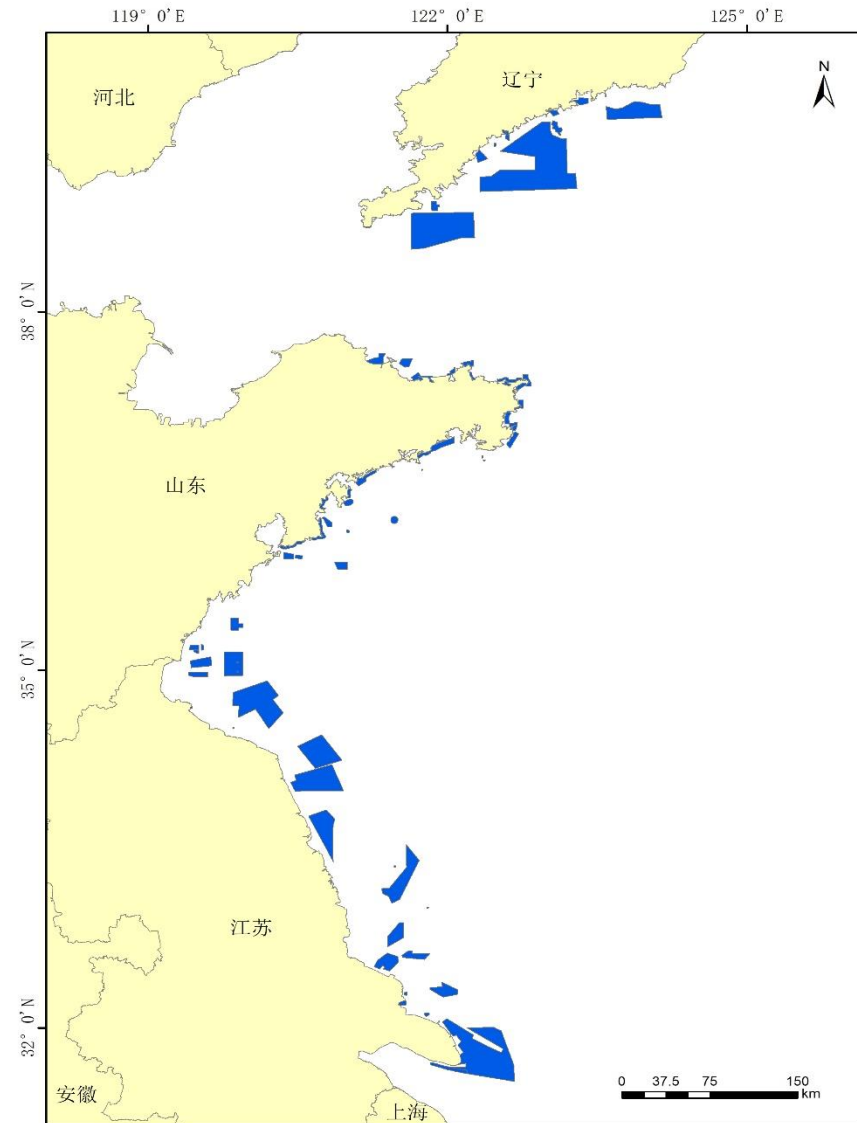






# Relevance of existing zoning schemes with MPAs

- conservation gap analysis
- ✓ Overlay protected areas in MFZ with MER
- ✓ Subtract existing MPAs
- Total areas of potential MPAs: 13 042 km<sup>2</sup>



# Connectivity with existing MPAs

- **Ecological connectivity** is key concept in seascape and conservation biology.
- Marine ecosystem is a open system with high level connectivity.
- ✓ **Population connectivity**
- ✓ **Genetic connectivity**
- ✓ **Community connectivity**
- ✓ **Ecosystem connectivity**
- Target is whole ecosystem





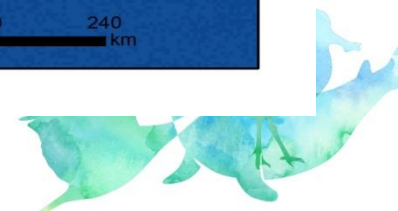
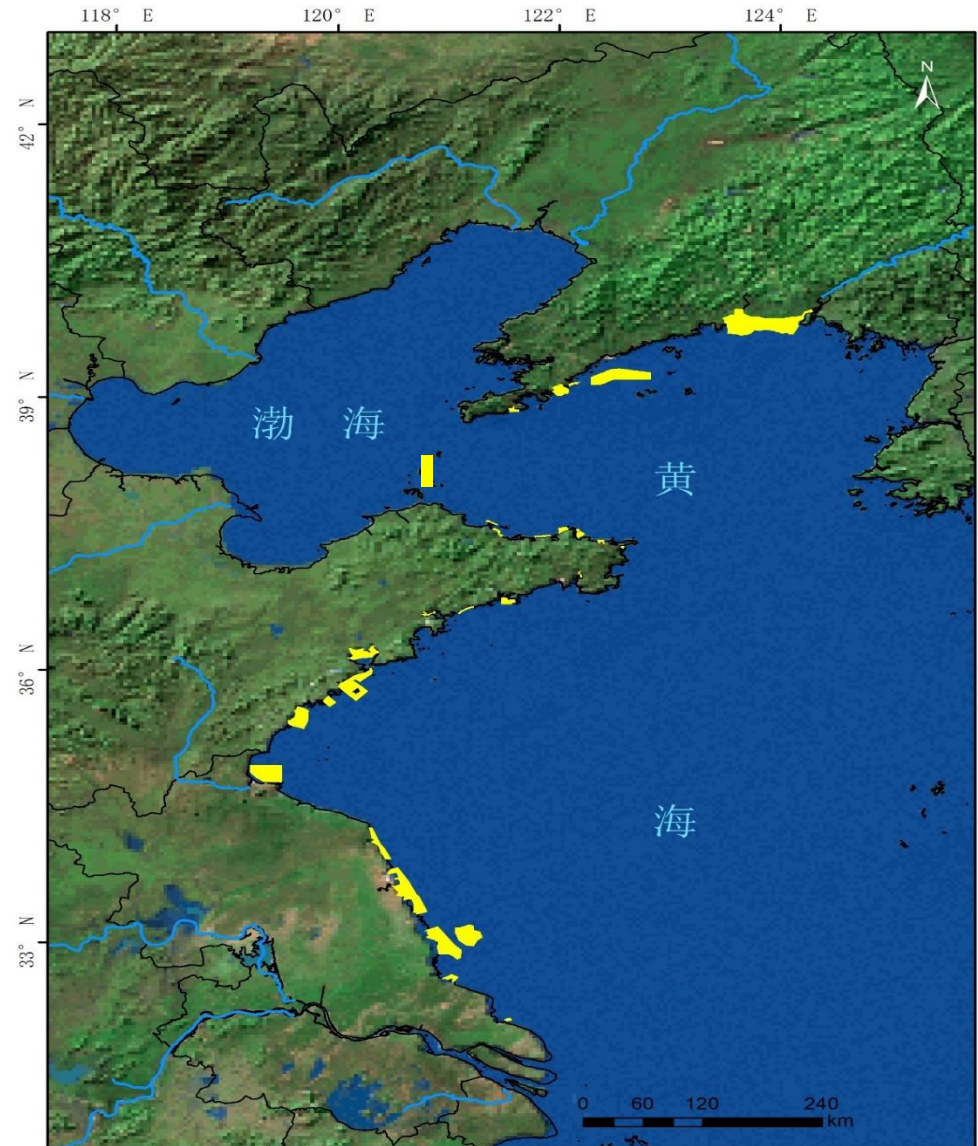
# Connectivity with ex

- Index Probability of Connection (Hortal and Saura (2006) based on)

$$PC = \frac{\sum_{i=1}^n \sum_{j=1}^n a_i \cdot a_j \cdot p_{ij}^*}{A_L^2}$$

In the formula: n represents the number of habitat patches,  $a_i$  represent the area of patch i,  $p_{ij}$  represent the maximum probability of direct connectivity between patch i and j, and  $A_L$  represent the area of the entire region.  $p_{ij}^*$  represent the area of the entire region based on the likelihood model, and the large  $p_{ij}^*$  represent the large connectivity between habitat patch i and j.

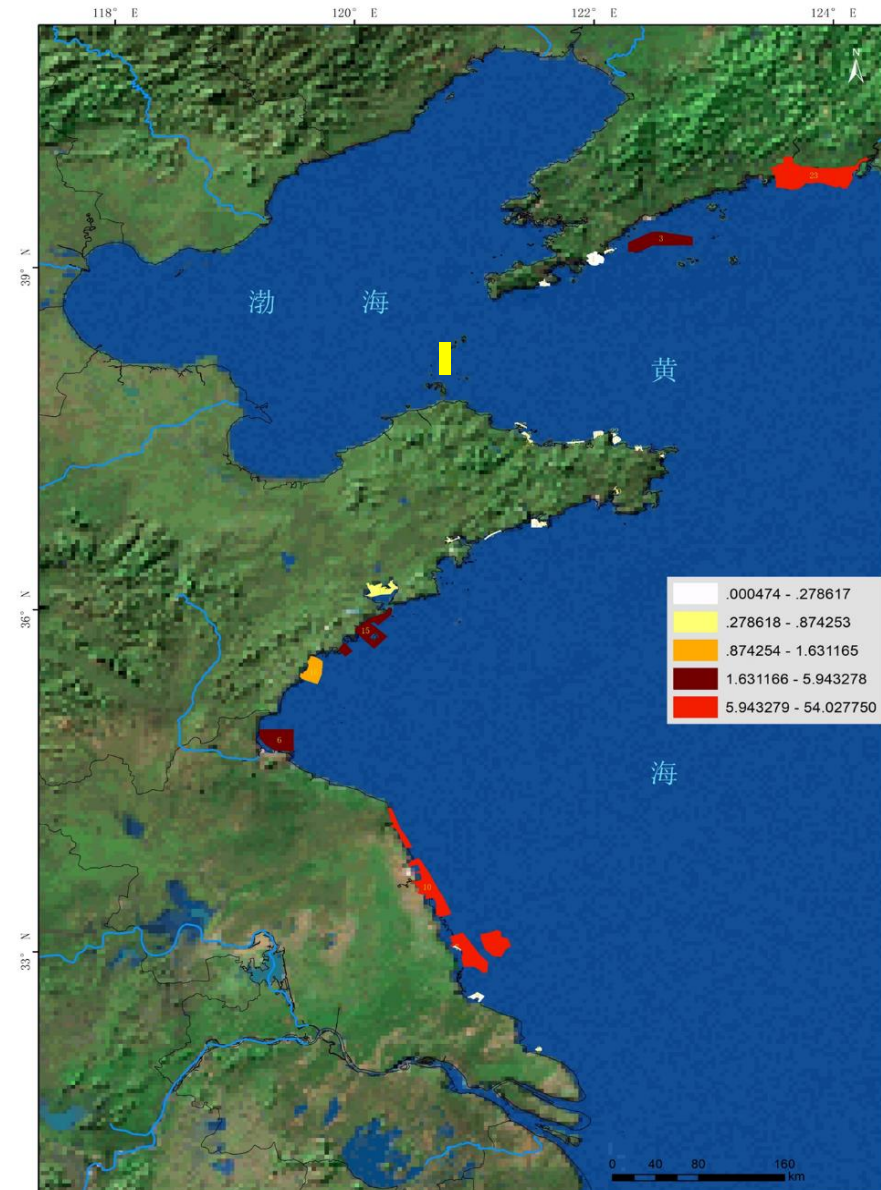
Index calculation is in software (Saura, 2007)





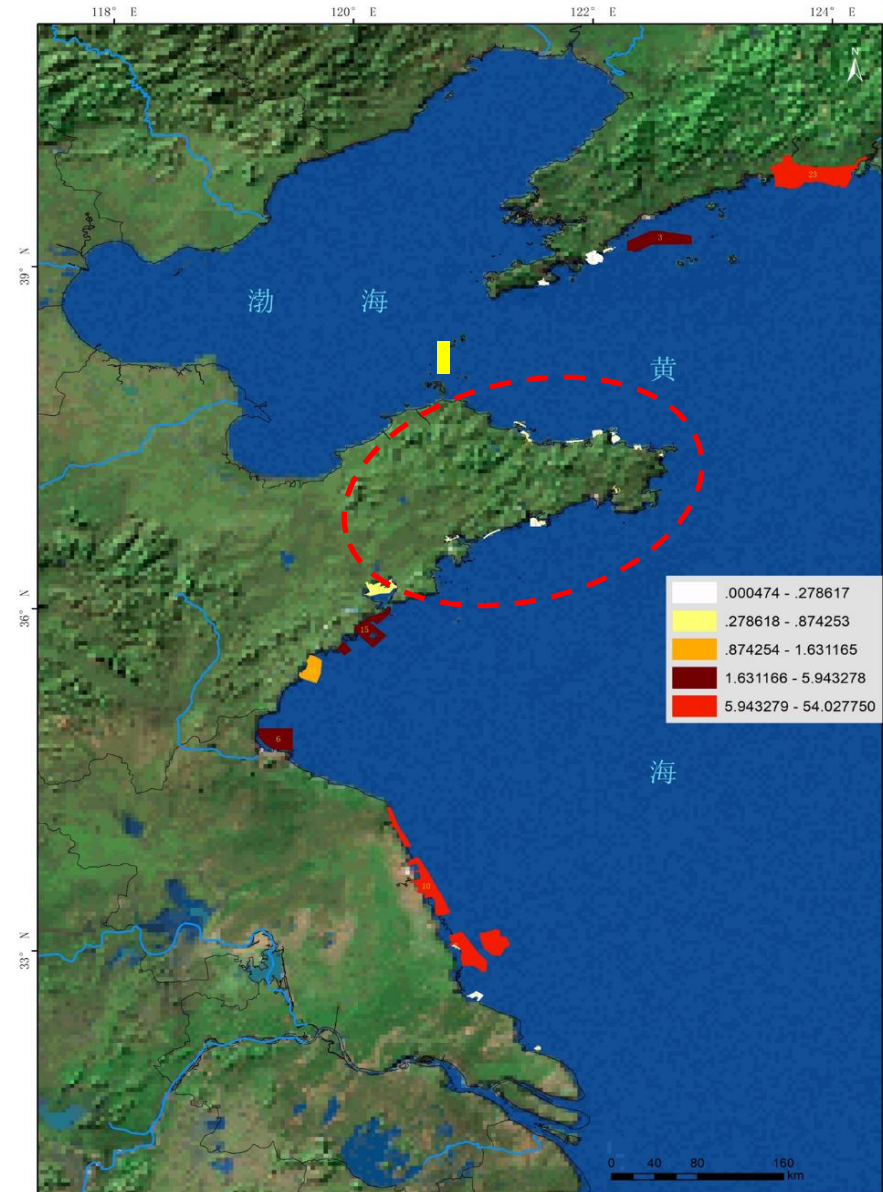
# Relevance of existing zoning schemes with MPAs

- the connectivity value of the 31 marine protected areas in the Yellow Sea is between 0.0005 and 54.0278. The highest one is the Jiangsu Yancheng Wetland National Nature Reserve·Rare Birds with a connected importance value of 54.0278, while the connectivity of protected areas around the Shandong peninsula is generally low.



# Suggestion

- Establish new marine protected areas to improve the network of protected areas
- Strengthen connectivity of MPA







# Thanks!

