Study on Ecological Protection Compensation Mechanism of Marine Protected Areas in China

Dr. Keliang Chen

Third Institute of Oceanography, MNR, China

Email: klchen@tio.org.cn

Outline

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1. Introduction

Payments for Ecosystem Services (PES)

- PES has been broadly described as “a general name for a variety of arrangements through which the beneficiaries of ecosystem services pay the providers of those services” (P. ten Brink et al. 2011, p. 6);

Eco-protection compensation in China

- The term ‘ecological protection compensation’ as it is used in Chinese legislation and regulation differs from the concept of PES. It primarily relies on subsidies and direct payments from the state and intra-governmental funds transfers based-on ecosystem services value, eco-protection costs and development opportunity costs.

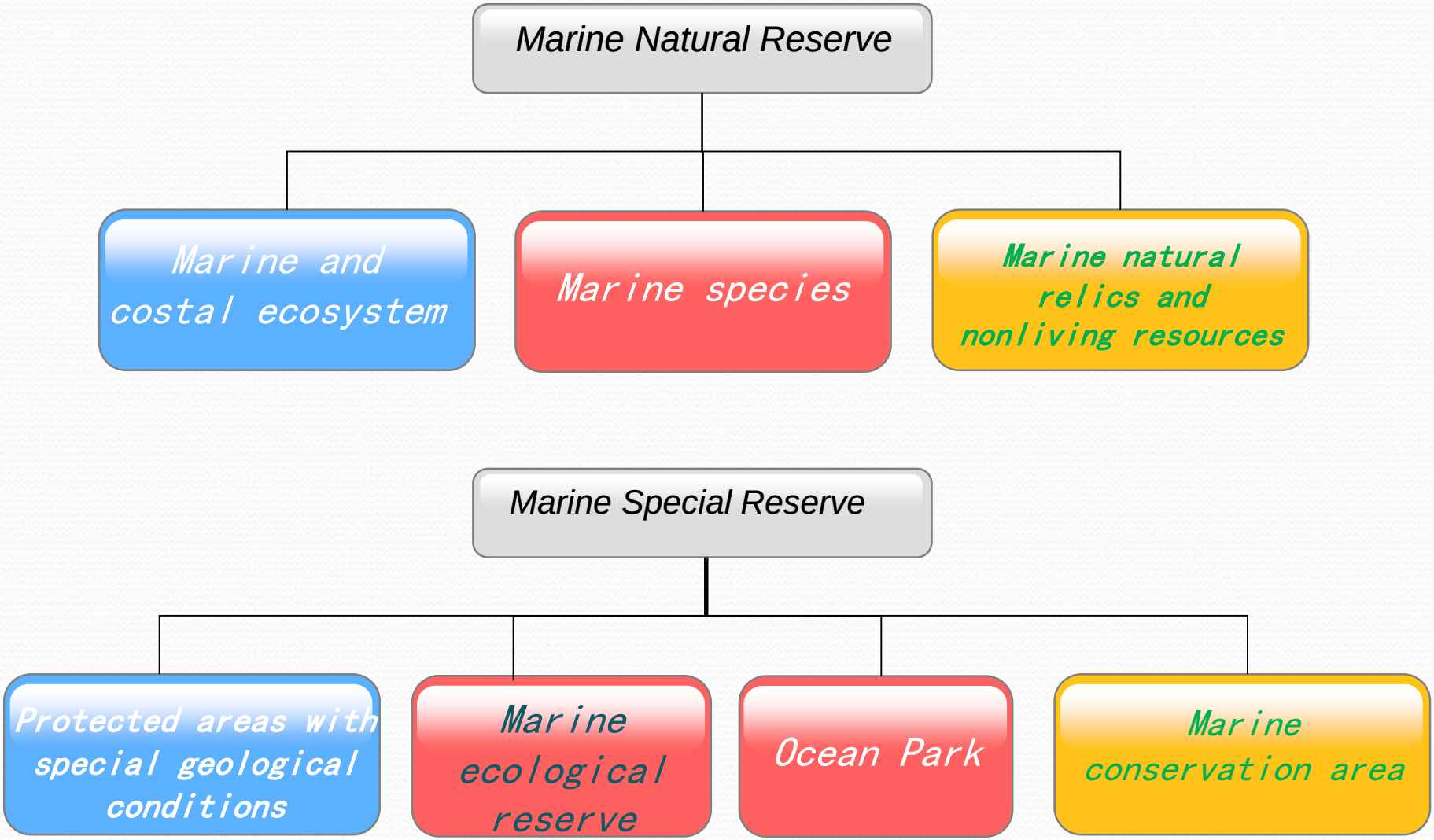
2、MPAs Situation in China

MPAs

A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values (IUCN 2008).

“There are several kinds of protected areas, which vary by level of protection depending on the laws of each country. The term "protected area" also includes Marine Protected Areas.” (Wikipedia 2011)

Overview of MPAs in China



Overview of MPAs in China

2016 statistics showed that:

More than 250 various MPAs

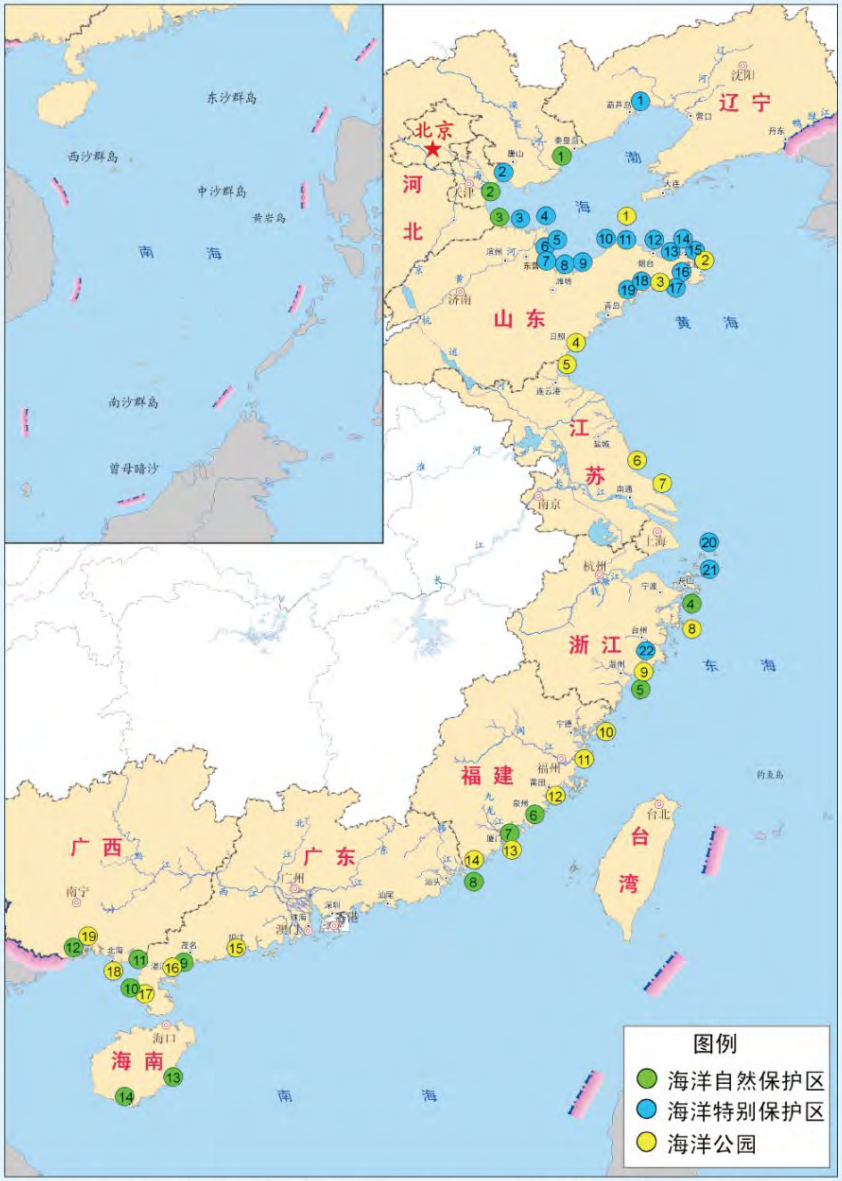
Oceanic Department: 82 Marine Natural Reserves and 97 Marine Special Reserves

34 National Marine Natural Reserves

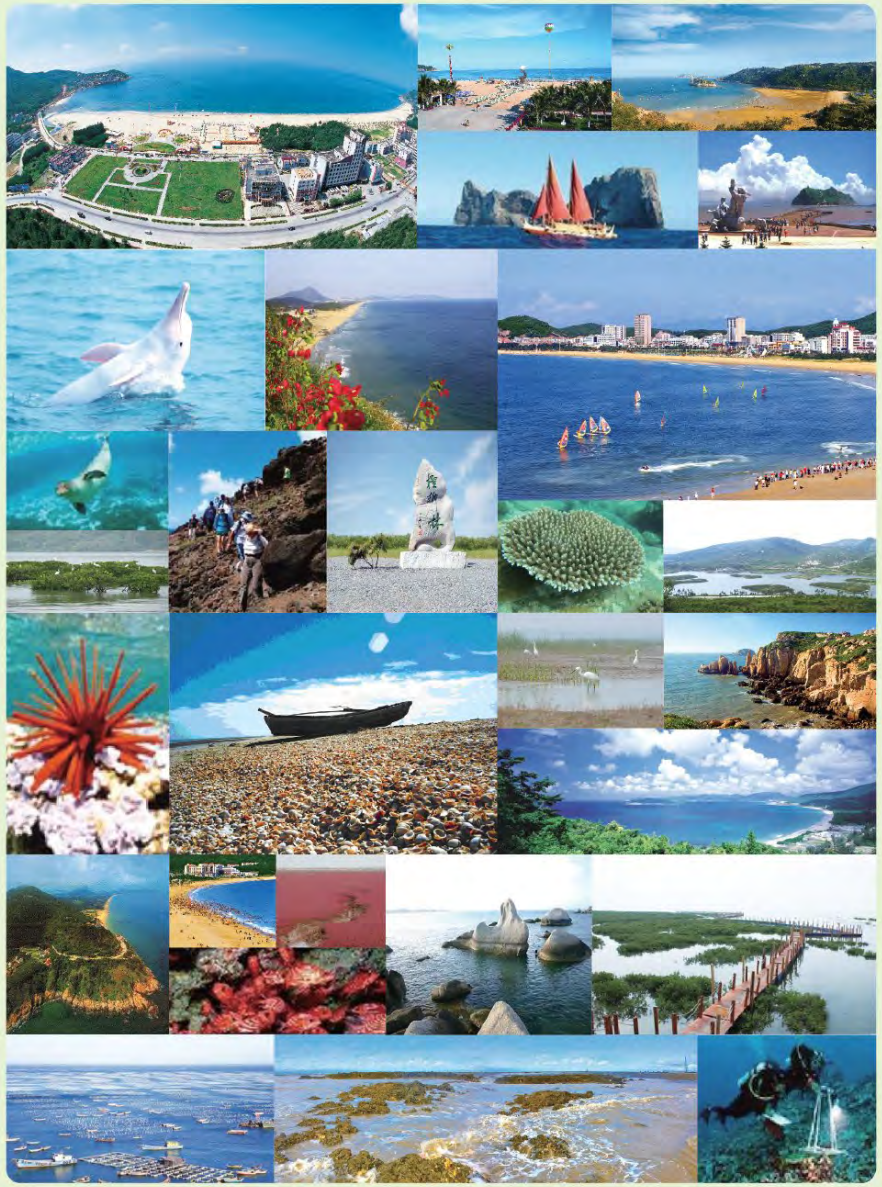
18,000 km^2

63 National Marine Special Reserves

8,000 km^2



国家级海洋自然/特别保护区（海洋公园）分布图



MPAs Distribution Map, from Liu Ying, Ministry of Ecology & Environment, PRC

Pressure on MPAs

- **Faced with some pressures like limited resources, severe pollution and degenerated ecosystem.**
- **With the construction of all kinds of MPAs, stakeholders including local government, company and residents payed extra protection costs or lost opportunities of economy development,**
- **Affected financial revenue of local government.**

Aim of Eco-protection Compensation for MPAs

- Based on the environment effectiveness and social equity, eco-protection compensation mechanism can regulate the relationship of rights and duty among stakeholders and improve their positivity and activity to protect MPAs through administration and market measures.

3、Eco-protection compensation standards of MPAs

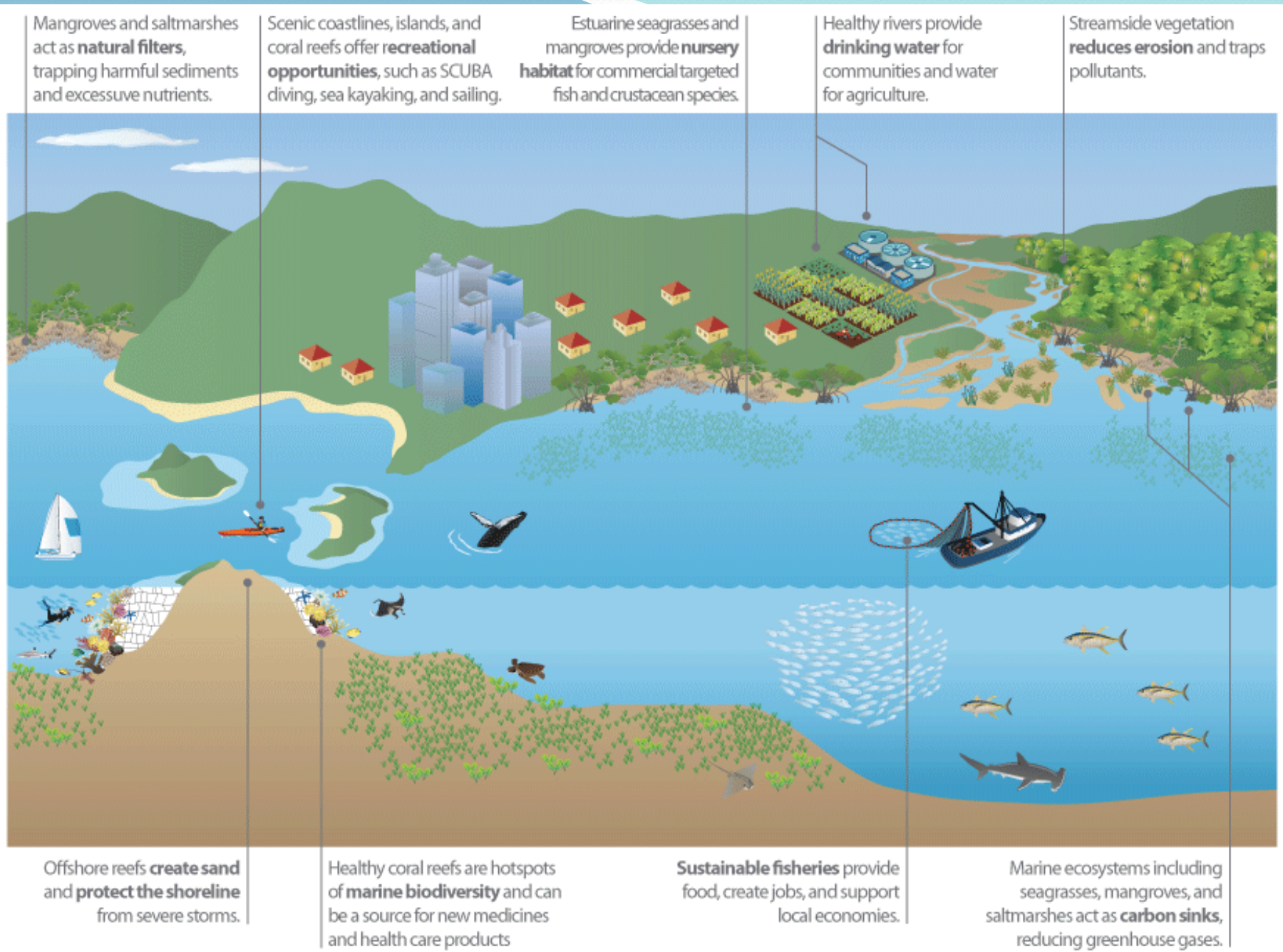
ES categories

(1)provisioning services (e.g., of seafood, timber),

(2)regulating services (e.g., of climate, floods, water quality),

(3)supporting services (of other services, e.g., pollination for food production, nutrient cycling) ,

(4)and cultural services (e.g., recreation, spiritual value).



ES of MPAs, from Zhang Yan, International Union for Conservation of Nature (IUCN)

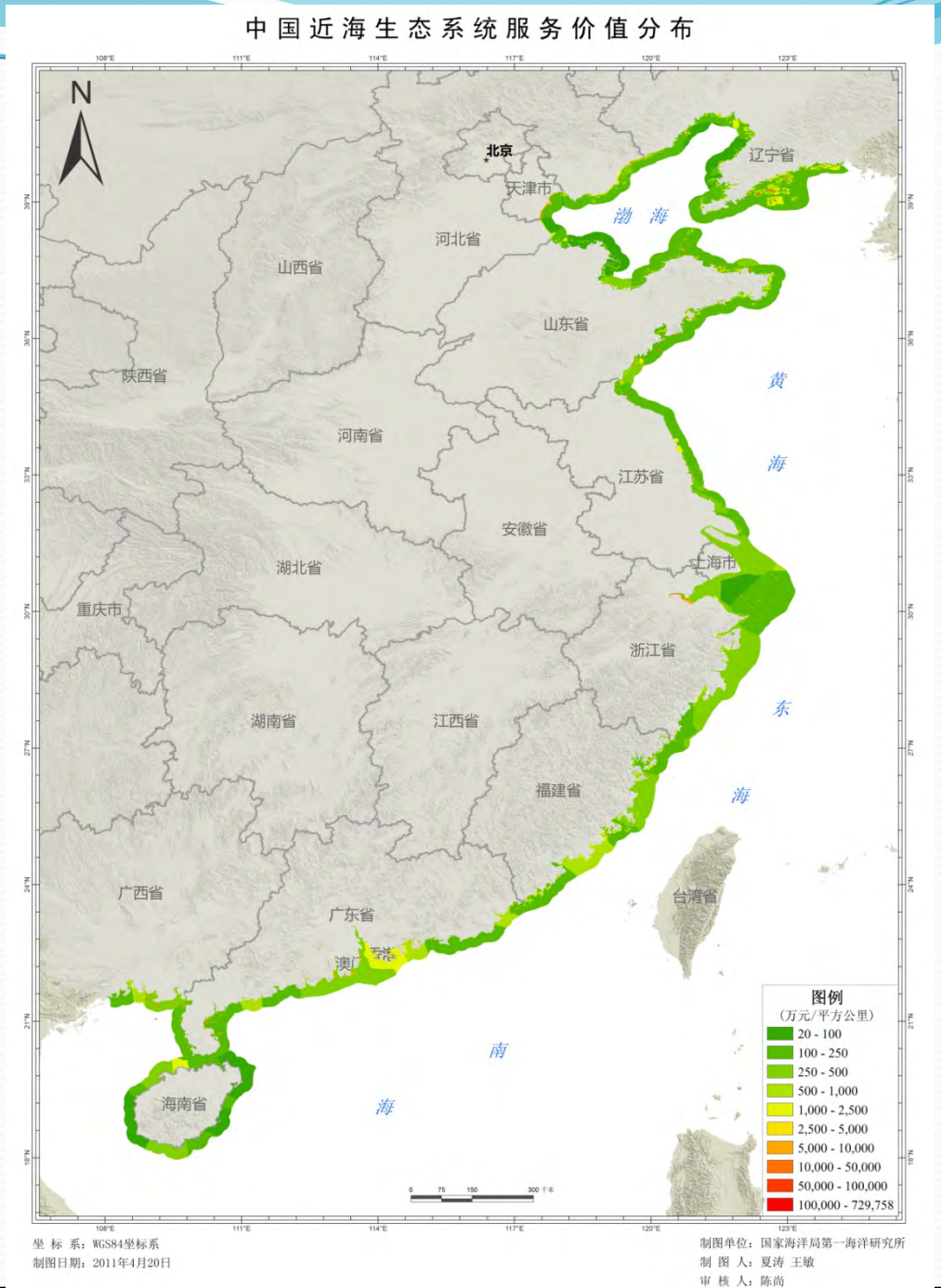
Coastal ES value of China in 2008

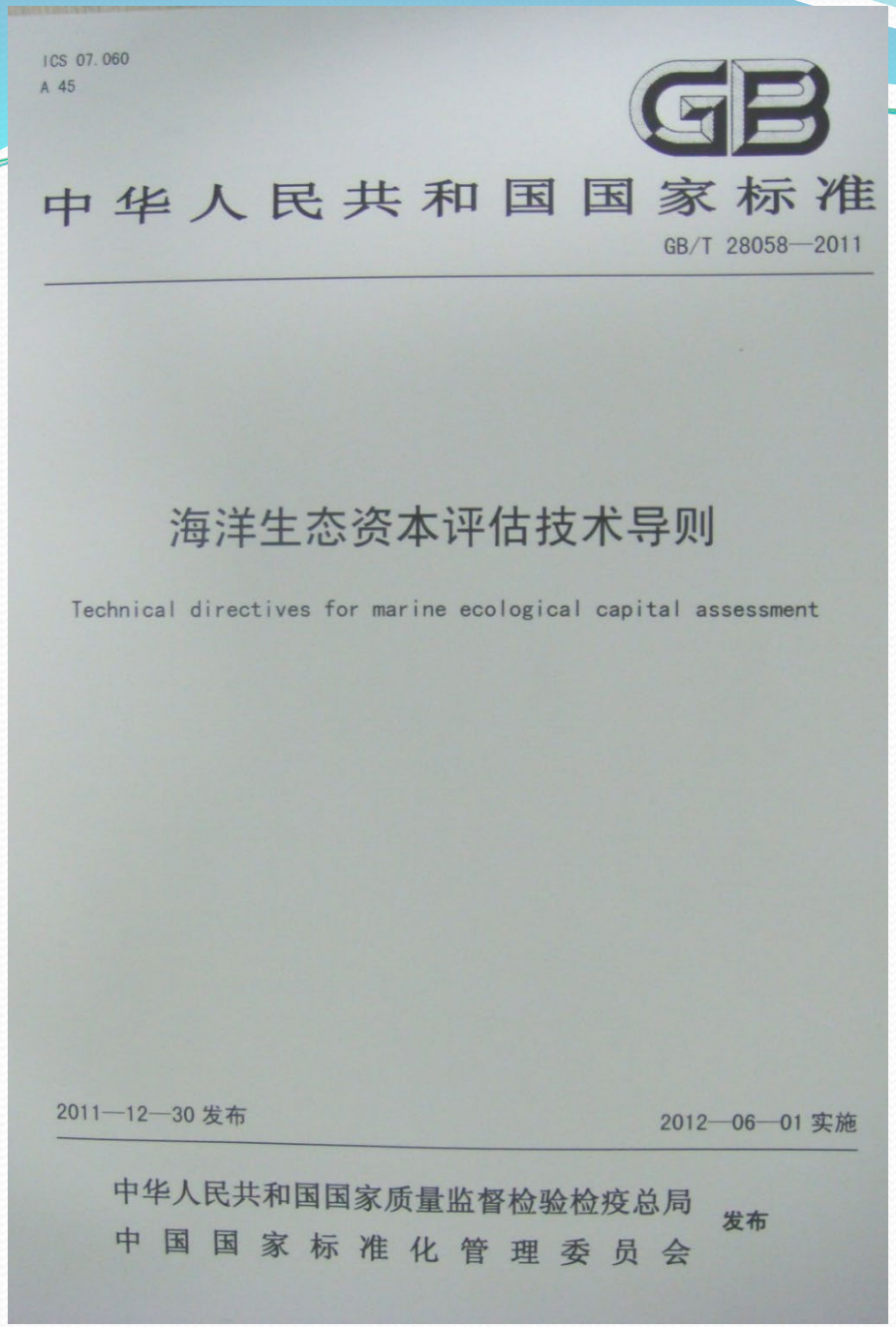
（12 miles in shallow sea）

Location	Areas （10,000 km2）	ES value （billion US $ / a）	Average (million US $ /(km2·a)
Bohai Sea	3.44	30.99	0.90
Huanghai Sea	4.35	47.35	1.09
East China Sea	5.67	27.56	0.49
South China Sea	5.85	43.00	0.73
Total	19.31	148.92	0.80

The Gross Ocean Product (GOP) was **430** billion US $, 9.87% of GDP in 2008.
(data from Chen Shang in First Institute of Oceanography）

Spatial Distribution of Coastal Ecosystem Services Value in China (Chen Shang, 2008)





Technical directives of marine ecological capital assessment, National standard Chen Shang et al., 2011

Difference/Comparison

Scientists	Coastal areas	Year	ES Value	Average value	Scope
Chen Shang	193100 km^2	2008	0.15 trillion $	0.8 million $ km^{-2} yr^{-1}	China
Chen Zhongxin	350000 km^2	2000	0.14 trillion $	0.4 million $ km^{-2} yr^{-1}	China
Costanza Robert	31020000 km^2	1994	12.6 trillion $	0.4 million $ km^{-2} yr^{-1}	World

- *In terms of Chen Zhongxin's result, the China/World proportion is 1.1% according to the methods and standards from Costanza Rebert;*
- *Chen Shang's methods are different from other two scientists.*

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海洋保护区生态保护补偿评估技术导则

Technical guides for assessment on ecological protection compensation of marine protected area

（报批稿）

（本稿完成日期：2018年8月15日）

XXXX－XX－XX 发布　　XXXX－XX－XX 实施

国家海洋局　　发布

- The standard draft for approval was submitted last month.

Technical guides for assessment on ecological protection compensation for MPAs

At present, assessment methods of eco-protection compensation mainly include Ecosystem Service Valuation (ESV), Willing to Pay（WTP）, and Cost Approach (CA) . Every method has their own characteristics, different theoretical basis and application conditions, and the accounting results are usually very different.

ESV

ESV method takes the ecosystem service value provided by the process of ecological protection as the calculation basis of compensation. Through this method, the maximization of ecological benefits can be realized (that is, the marginal external cost equals the marginal external benefit).

The difficulty is to determine and evaluate the main ecosystem services' value in protected areas.

WTP

- WTP is to ask people's willingness to pay for a certain environmental benefit improvement or resource protection measures, or to accept compensation for the loss of environmental or resource quality under the simulated market conditions by questionnaire.
- The basic data of WTP is easy to obtain and highly operable, but influenced by subjective factors, the accuracy of the results is usually not satisfactory, and it is difficult to coordinate the asymmetric problem of the willingness to pay and the willingness to accept.

Cost Approach (CA)

Cost Approach (CA) according to the direct economic loss, the construction investment and development opportunity cost (DOC) of the ecological protection and construction process of compensation is widely used in practice, although the economic cost of ecological construction can not bring the same amount of ecological benefits.

But the level of the compensation is matched with the existing financial revenue and the feasibility and validity of eco-protection compensation implementation can be accepted.

- **Therefore, this guideline used CA as the general method of marine eco-protection compensation evaluation for MPAs.**

4. Marine Eco-protection compensation Cases in China

Analysis and comparative studies from three levels have been done on the policies, experiences and problems of marine eco-protection compensation for MPAs in China.

(1) National level

(2) Provincial level（Shandong and Guangdong）

(3) City level (Xiamen)

National level

- *Marine Environmental Protection Law (revised on Nov,7 2016)* of the People's Republic of China is, "The state shall establish and improve marine eco-protection compensation system".
- *The implementation program of the construction of marine ecological civilization* (2015-2020) was issued by State Oceanic Administration in 2015 proposed the establishment of marine eco-compensation mechanism.
- *Opinions of the General Office of the State Council, PRC on Improving the Compensation Mechanism for Ecological Protection*（April 28, 2016). The state will establish eco-protection compensation in national marine natural reserves and marine special reserves.

Shangdong Province

- “Shandong Provincial Administration Measures for Marine Eco-compensation” in 2016.
- Ecological restoration projects : 1) marine breeding and releasing, 2) construction and maintaining of MPAs, 3) artificial reefs.

Guangdong Province

- Guangdong Provincial Oceanic and Fishery Bureau used the "12th Five-year Plan on Marine Protection in Guangdong" to propose the establishment of a reasonable marine eco-compensation mechanism in 2013.
- Eco-compensation projects were as follows: 1) marine breeding and releasing, 2) construction and maintaining of MPAs, 3) artificial reefs. (Sea-related companies' investment, Govern by government)
- The Hongkong-Zhuhai-Macao Bridge (estimated total investment US $ 11.73 billion) provided marine eco-protection compensation fees for the marine living resources of US $ 30.24 million.

Hongkong-Zhuhai-Macao Bridge

- Commissioning date of the Hong Kong-Zhuhai-Macao Bridge (55 km): 24 October 2018 at 9am

Xiamen City in Fujinan Province

1.As for the pollution prevention and control for the Jiulongjiang River Watershed, the annual eco-compensation in the form of funds was transferred to the upstream region by the Xiamen government (US $ 4-5 million /a).

2. Group of the cross-sea bridge project provided eco-protection compensation fee to Xiamen government. (US $ 0.75 million totally).

Compensation between Bay and Watershed

The Jiulongjiang River Watershed

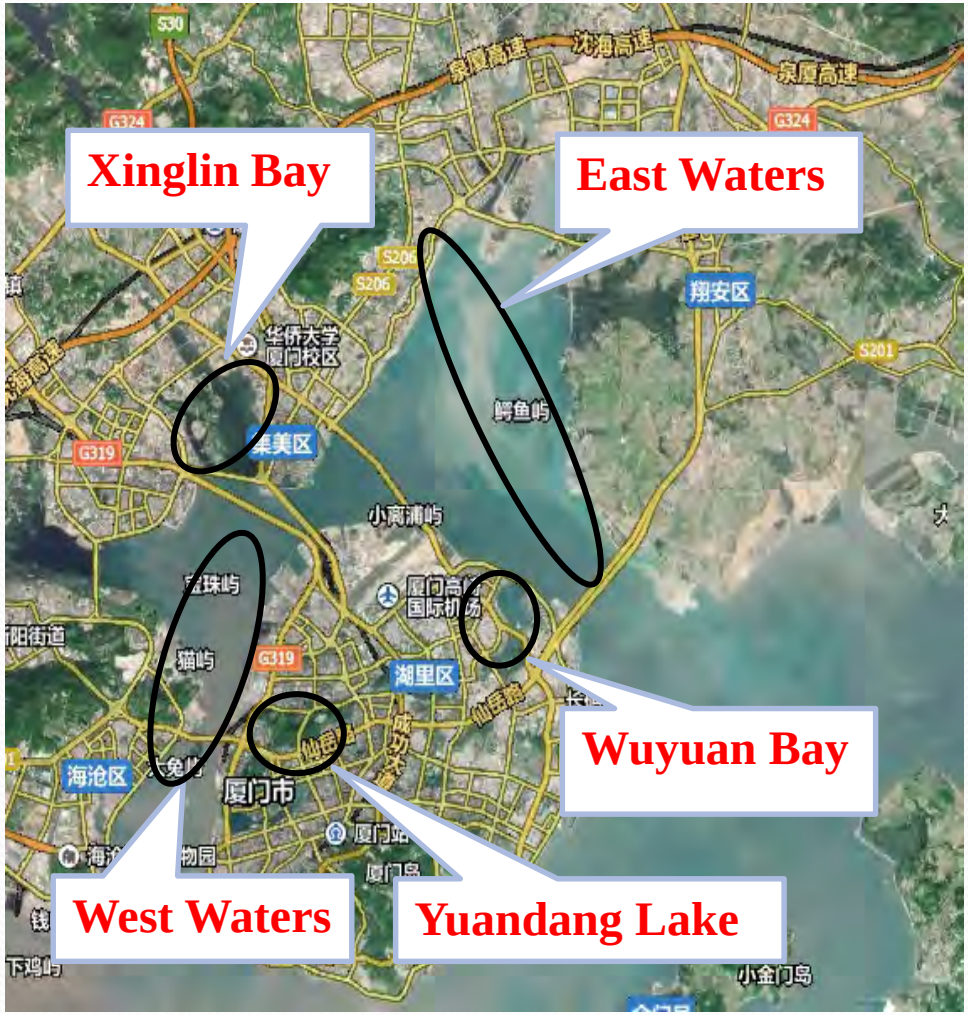
The cross-sea bridge in Xiamen

Compensation fee from the bridge project

3. Xiamen Marine Ecological Compensation Regulation was issued by Xiamen government in April, 2018.

The eco-compensation fees were used in following projects as follows: 1)remediation projects, 2) transplantation of mangrove, 3) construction of marine protected areas (Ocean Park).

Eco-compensation on remediation projects



Perform comprehensive remediation of West Waters since 2002

Promote comprehensive remediation of Wuyuanwan wetland from 2002

Implement comprehensive remediation of Xinglin Bay since 2005

Carry out comprehensive remediation of East Waters since 2006

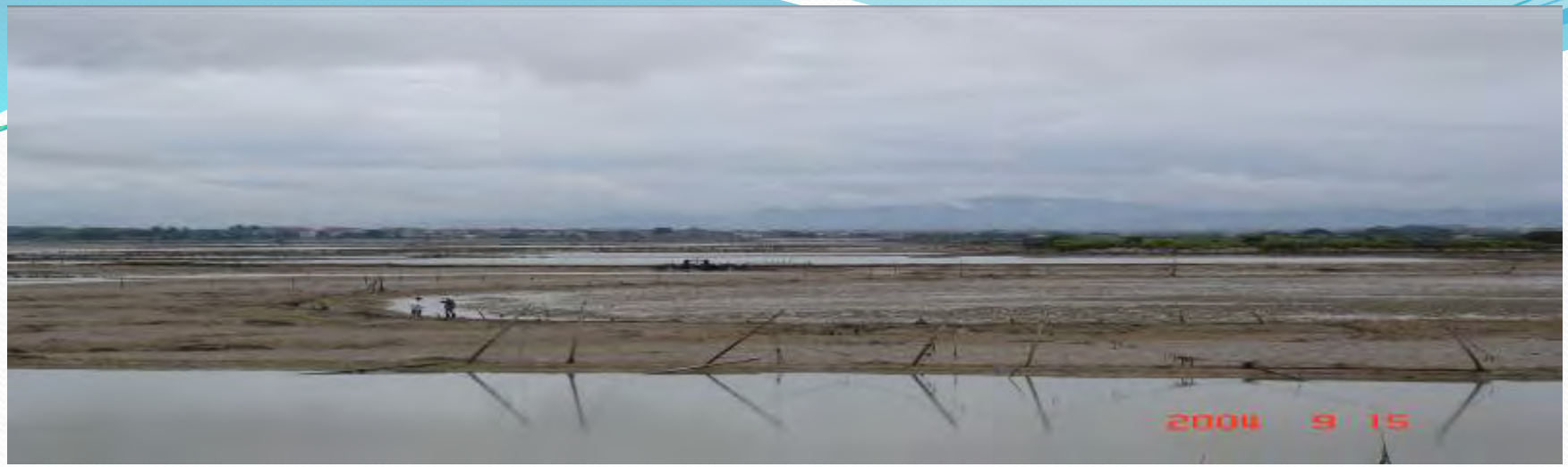
Implement comprehensive remediation of Yuandang Lake since 1990s

Xinglin Bay

Before

After

Reconstruction of mangrove ecosystem



Before planting in Shanting mangrove experimental area, Maxiang town, Xiang'an district, Xiamen

After planting (8 ha)

Construction of National Ocean Park

4. Compensation Implementation Measures of Marine Aquaculture Dismantling in Xiamen was issued in 2013 (mudflat aquaculture 15000 us $/hm^2, shallow water aquaculture 12500 us $/hm^2) .

70 km^2 sea areas has been completed for remediation which cost US $ 40 million since 2002 involving 8 towns and 4 districts, more than 31000 people. More than 55000 net cages were dismantled. 1840 hm^2 marine aquaculture areas were cleared.

Before

After

Workshops with local governmental administrators

5. Summary

(1) The MPAs situation and development policies in China make the marine eco-protection compensation work become very important and urgent. And the technologies and policies of the marine eco-protection compensation are in the developing progress.

(2) Although practices on marine eco-protection compensation in China are inadequate, some practices played good roles in China, currently the public and the government pay more attention to the marine eco-protection compensation gradually.

Some other provinces are actively trying to do the marine eco-compensation, such as Fujian, Zhejiang and other coastal provinces through legislation and planning.

(3) National Marine Eco-protection Compensation Regulation should be established involved in stakeholders who have lost the development opportunities for marine ecosystem protection in MPAs.

(4) The more practical evaluation method, standards and procedure of the marine eco-protection compensation for MPAs should be established soon.

(5) From China's national context, to take government financial transfer is effective on the management of marine eco–protection compensation for MPAs.

(6) The resources of marine eco-protection compensation funding for MPAs are affected obviously by policies. The sustainability of funding sources should be an emphasis.


Thank you for your attention