



Climate Change and MPAs in China

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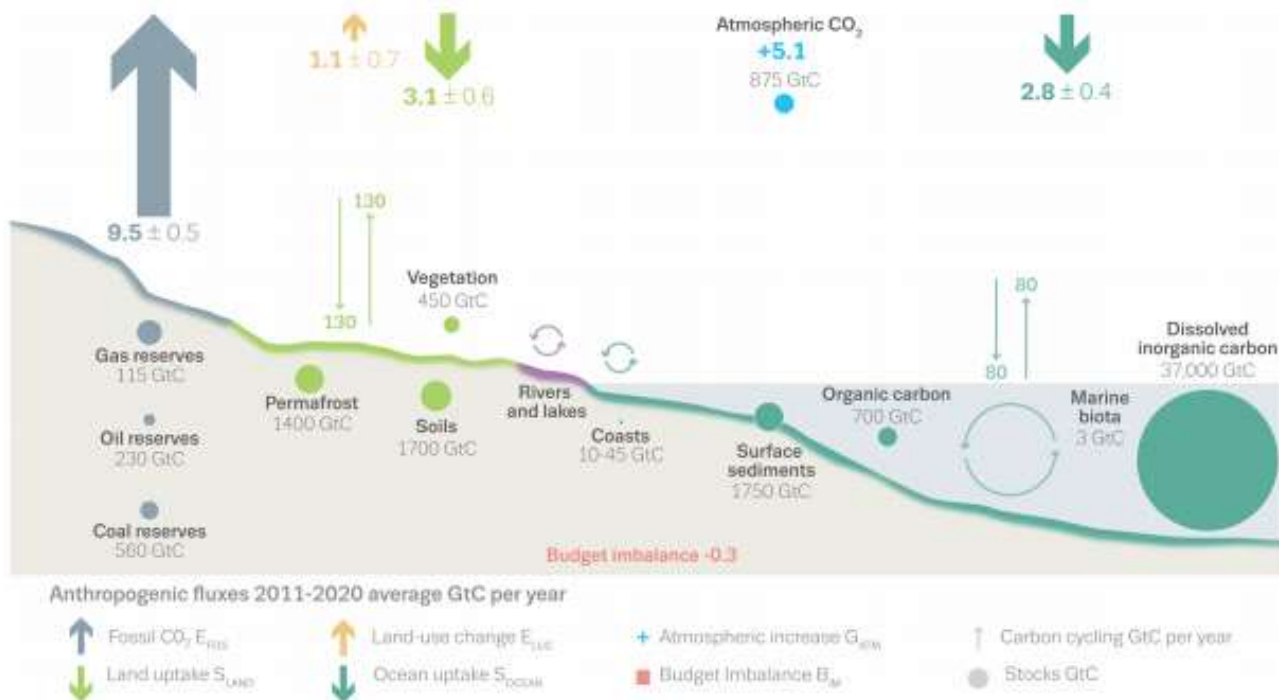
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Preface

The global carbon cycle

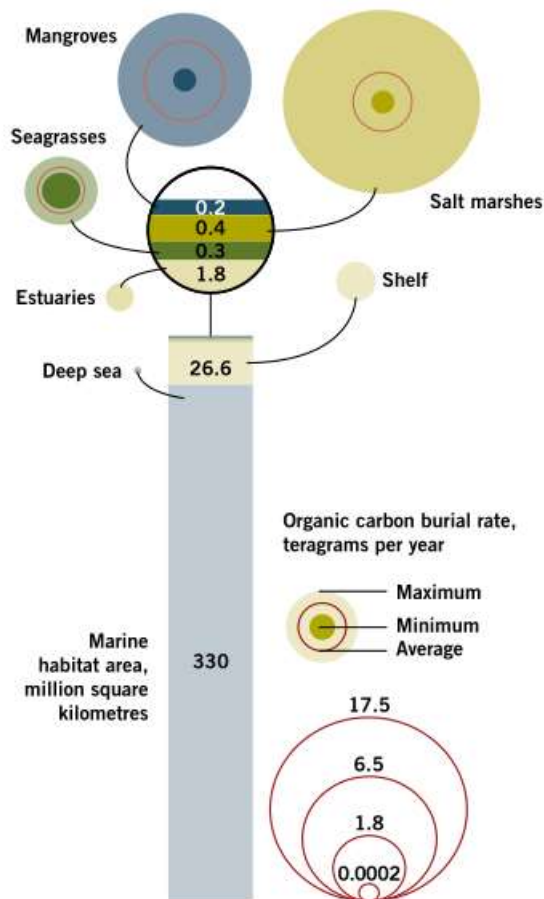


Source	%	Sink	%
Fossil CO ₂	89	Ocean	26
Land use change	11	Land	29
		Atmosphere	48

Global carbon budget 2021

Preface

Figure 1 Blue carbon sinks



Sources: Brock *et al.* 2012; Nellemann *et al.* 2009.

- Blue carbon is the carbon dioxide (CO₂) captured by the world's ocean and coastal ecosystem. Mangroves, tidal marshes, and seagrass store this carbon as biomass or in sediments. Its function as carbon sink is an important pathway to reduce atmospheric carbon dioxide (CO₂) concentration and mitigate global change.
- MPAs are important to help protect carbon sinks so that they can continue to sequester carbon, and also their carbon stores are not released back into the atmosphere from habitat loss and degradation due to human activities.

CEC. 2012, Guide for Planners and Managers to Design in a Changing Climate Resilient Marine Protected Area Networks



Preface

Necessity of MPA network construction to address climate change

- ❑ Blue **Carbon Sink** is an important function of MPAs. Ocean blue carbon can effectively alleviate the adverse effects of global warming.
- ❑ Isolated MPA has poor **ecological resilience** and insufficient ability to cope with climate changes;
- ❑ In the context of increasing **habitat fragmentation**, the populations that isolated MPA can support are often insufficient to sustain their own survival;
- ❑ Networks formed by multiple MPAs are extremely important for the conservation of **migratory species** by providing corridors and habitats;
- ❑ Networking multiple MPAs can **reduce the socioeconomic impact** of conservation;
- ❑ Benefit **the integration and sharing of resources**, especially scientific research, education, publicity and other resources;
- ❑ MPA: **Sentinel sites** to monitor changes.



Climate change: policies and achievements

Climate change is a challenge for all of humanity. The sustainable development of the Chinese nation and the future of the planet depend on tackling it successfully.

China attaches great importance to its response to climate change. As the largest developing country in the world, China has adopted a number of policies, measures and actions to tackle climate change and take part in global climate governance, despite the difficulties this creates for its own economic and social development. These efforts have achieved positive results.





Climate change: policies and achievements

China's New Responses to Climate Change

- ❑ Building a Strong Sense of Common Community (Joint effects of all countries for a shared future)
- ❑ Implementing the New Development Philosophy (development must be innovative, coordinated, green, open and shared)
- ❑ Taking a People-Centered Approach (China is pioneering a new approach that synergizes the efforts to fight climate change, develop the economy, generate employment, eliminate poverty, and protect the environment.)
- ❑ Striving for Carbon Dioxide Peaking and Carbon Neutrality

(Carbon peaking by 2030, carbon neutrality by 2060.

China has incorporated this decision into its overall economic and social development)

- ❑ Synergizing the Reduction of Pollution and Carbon Emissions (efforts to reduce pollution and carbon emissions are planned and carried out)





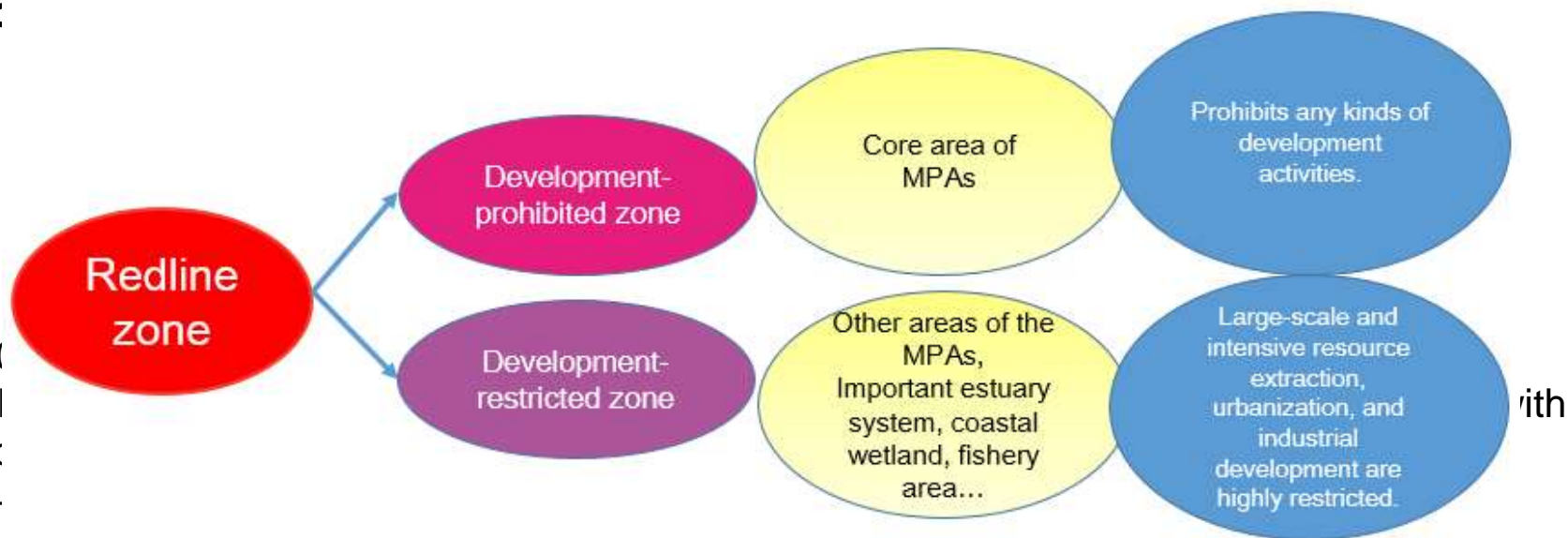
Climate change: policies and achievements

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Climate change has been selected by the UN as one of the 10 most nature-based solutions around the globe.



Yellow sea eco-redline designation in 3 Provinces.

Province	Number	Area (km ²)	%of YS area in that Province
Shandong	151	3134.84	10.1
Jiangsu	73	9676.07	27.83
Liaoning	52	6796.9	25.4



Climate change: policies and achievements

□ Establish a system of nature reserves with national parks as the main body

Incorporate important natural ecosystems with national representation into the national park system and implement strict protection

Community of shared life.
Mountains, rivers, forests, lakes, and grasses

Innovate the management system and mechanism of nature reserves, and implement unified setting, hierarchical management, and zoning management of nature reserves

Formation of a nature reserve management system with national parks as the main body, nature reserves as the foundation, and various natural parks as supplements

Climate change: policies and achievements

- ❑ Prohibited all coastal reclamation activities except those for major national projects (2018).
- ❑ Promoted the protection and restoration of ecosystems in areas with problems carried over from reclamation activities of the past and strictly protected natural shorelines.

- Blue Bay environmental improvement initiative,
- The coastal protection and restoration project,
- The comprehensive management of the Bohai Sea
(1200km coastal lines, 23,000 ha coastal wetland restored during 2016–2020)
- Special action for mangrove conservation and restoration.

Jiangsu Rudong Coastal wetland restoration, *Suaeda salsa* “Red beach”

Before



After





Climate change: policies and achievements

Timeline of wetland conservation in China

-1991

Marine Environmental Protection Law (1982)

This law is a marine environmental protection legislation, which can be regarded as an indirect provision for the conservation of coastal wetlands.

2003-2021

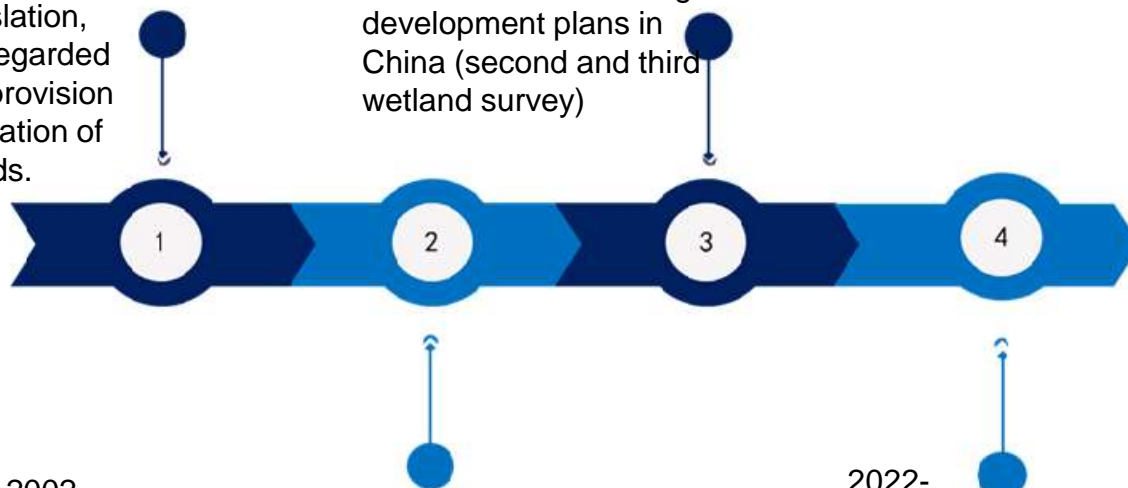
wetland conservation and management have been integrated into several national strategic development plans in China (second and third wetland survey)

1992-2002

in the year 1992, China joined the RAMSAR convention. Wetland conservation became a key issues of governmental work. Many wetland conservation related law/regulation were published, such as Nature Reserve Regulations (1994) and Measures for the Administration of Marine Nature Reserves (1995). In 2000, National Forestry Administration published the China Wetland Conservation Action Plan, which was the first national level wetland conservation plan.(first wetland resource survey)

2022-

"Wetland Protection Law of the People's Republic of China", which just took effect on June 1, 2022. Wetland protection has laws to follow. This is to strengthen the protection and restoration of wetlands. For the first time, China has enacted legislation on wetland protection. It is planned to establish a complete legal system for wetland protection based on the integrity and systematicness of the wetland ecosystem.





Climate change: policies and achievements

- Accounting methods for economic value of ocean carbon sink (in publicity stage, 2022)



- Zhanjiang, Guangdong Mangrove National Nature Reserve
- June 2021, the first blue carbon trading in China
- Significant meaning for establishing marine carbon sink trading system



Climate change: policies and achievements

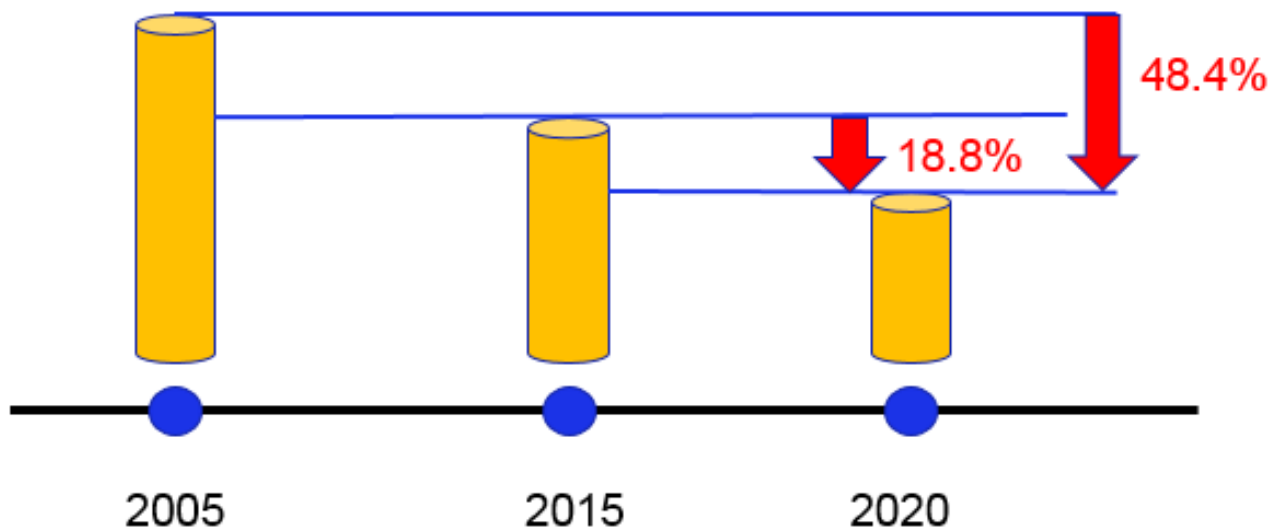
□ Conservation of endangered marine species

- 2021. New "List of National Key Protected Wild Animals"
- Marine species: **60** to **129**.
- Protection level: spotted seal first level.
- 2021. Strengthen the biodiversity protection. Up to **2025**, the protection rate of key protected wild animals and plants should reach **77%**





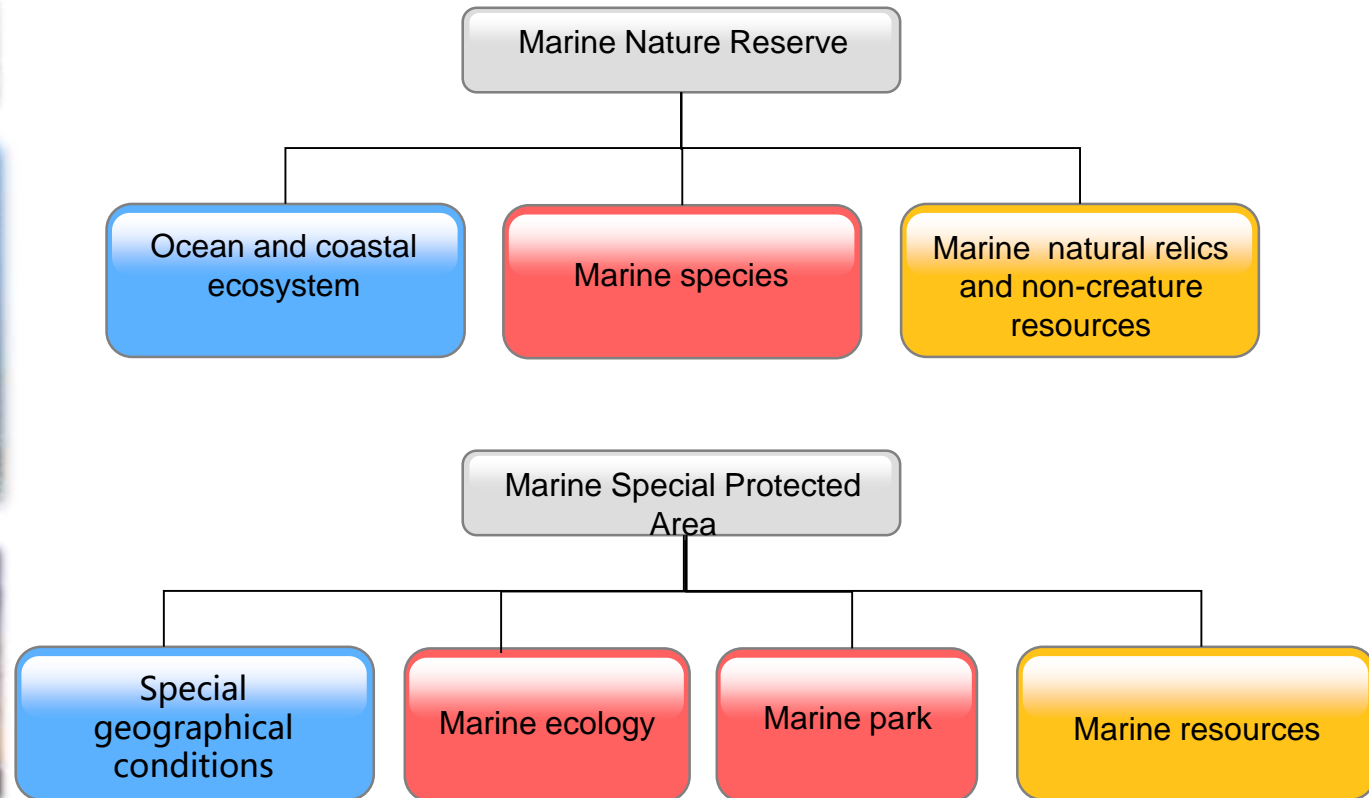
Climate change: policies and achievements



“China will cut carbon emissions per unit of GDP by 40 to 45 percent by 2020 from 2005 levels.”

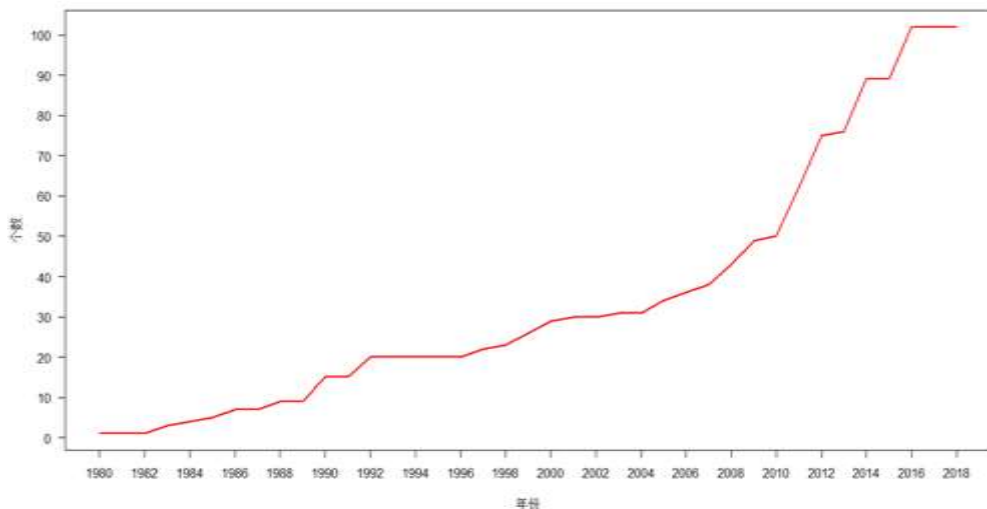
United Nations Climate Change Conference in Copenhagen, 2009

Climate change: policies and achievements

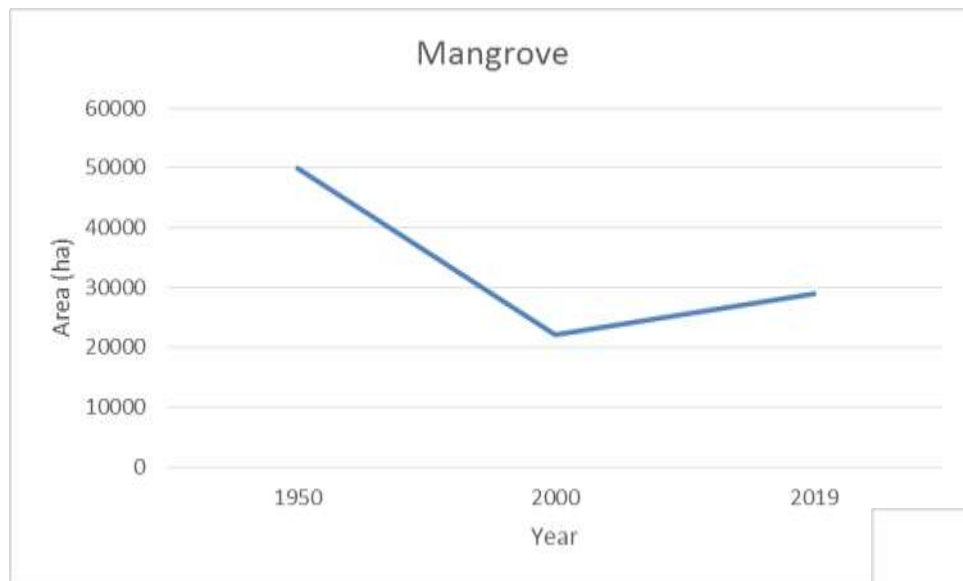


Climate change: policies and achievements

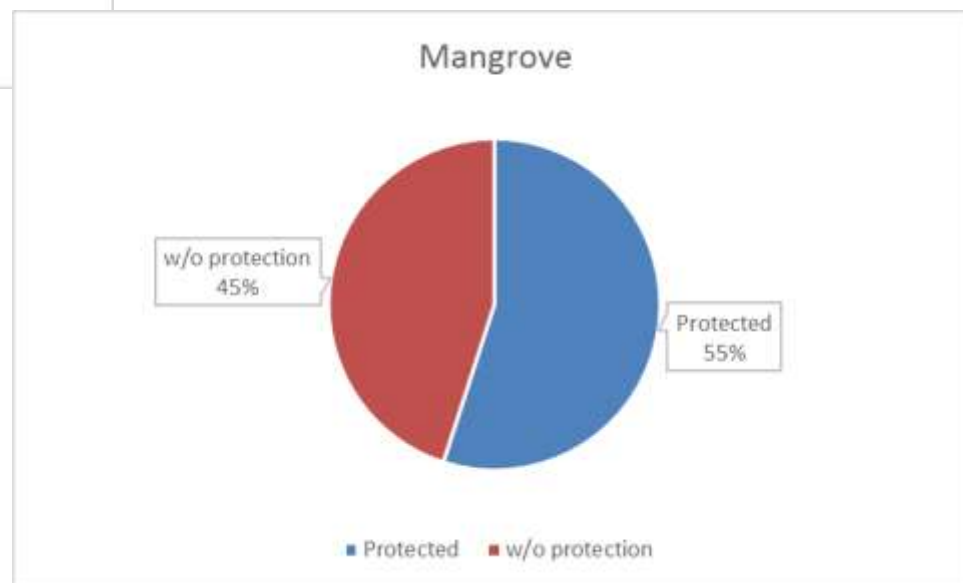
- ◆ 271
- ◆ 124 thousand km²
- ◆ 4.1% area of sea under jurisdiction
(1.12% in 2012)
- ◆ Coastal area



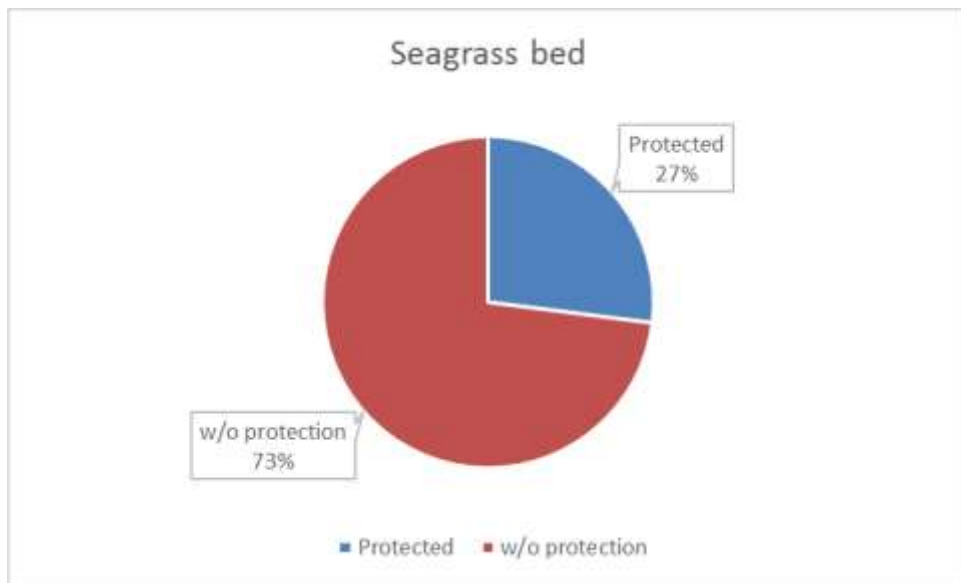
Climate change: policies and achievements



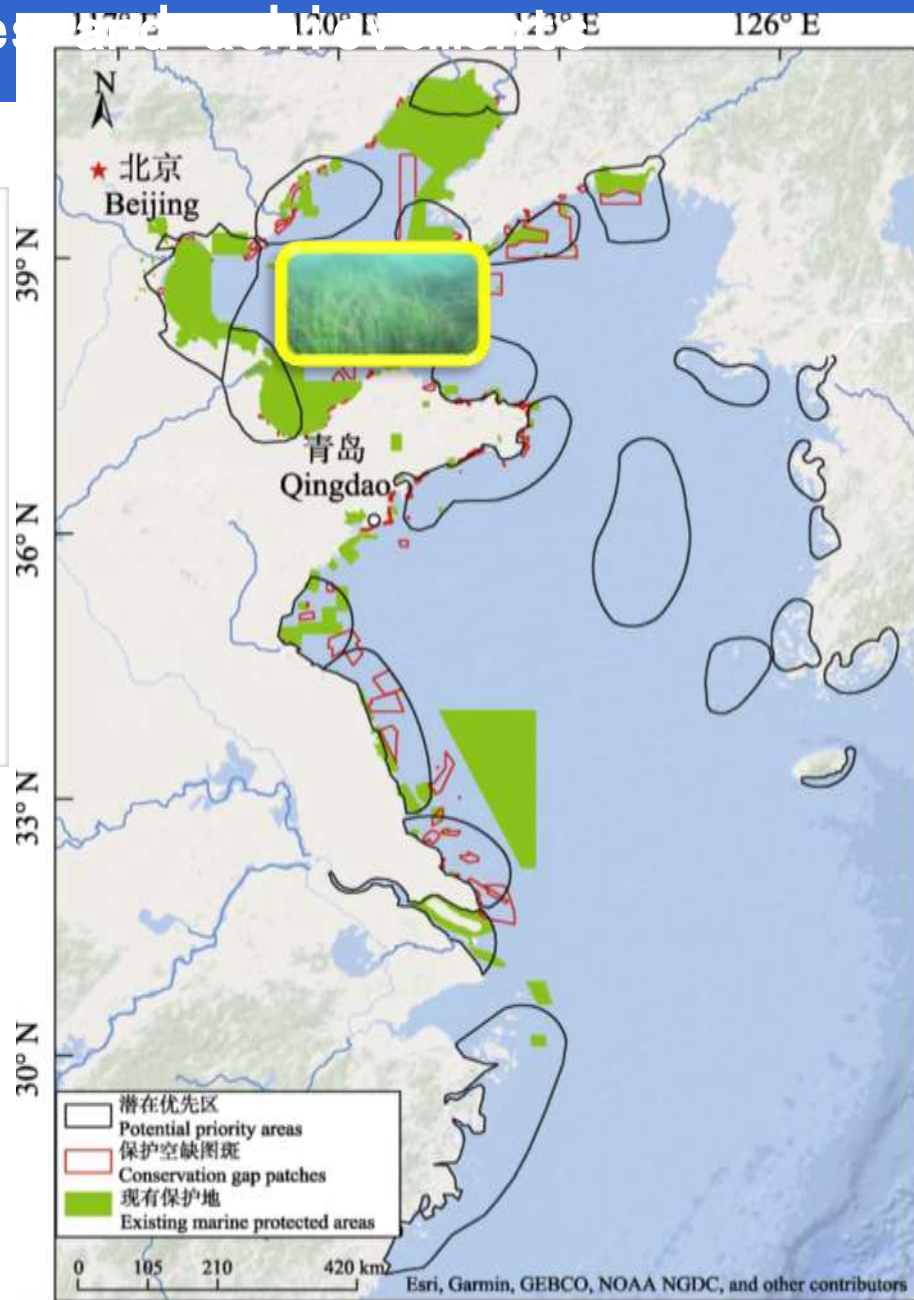
52 MPAs,
55% protection rate > 25% global
7000ha increased in 20 years



Climate change: policies



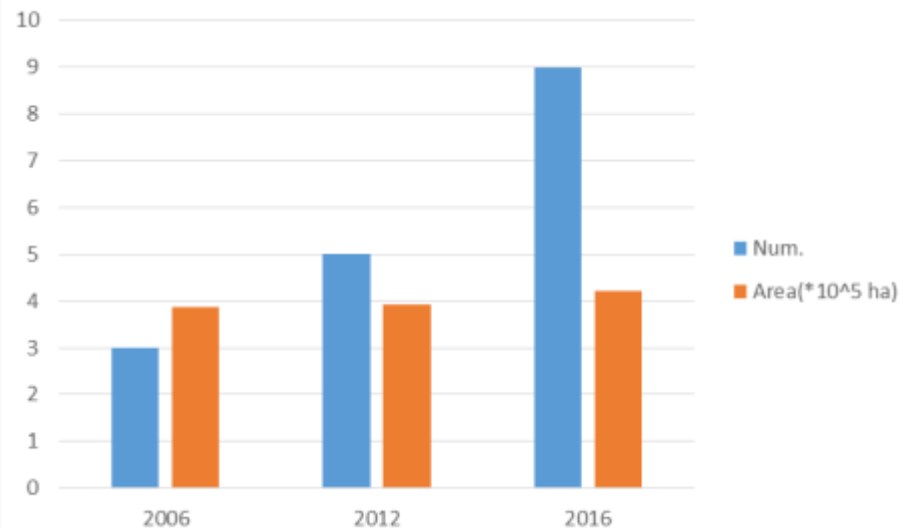
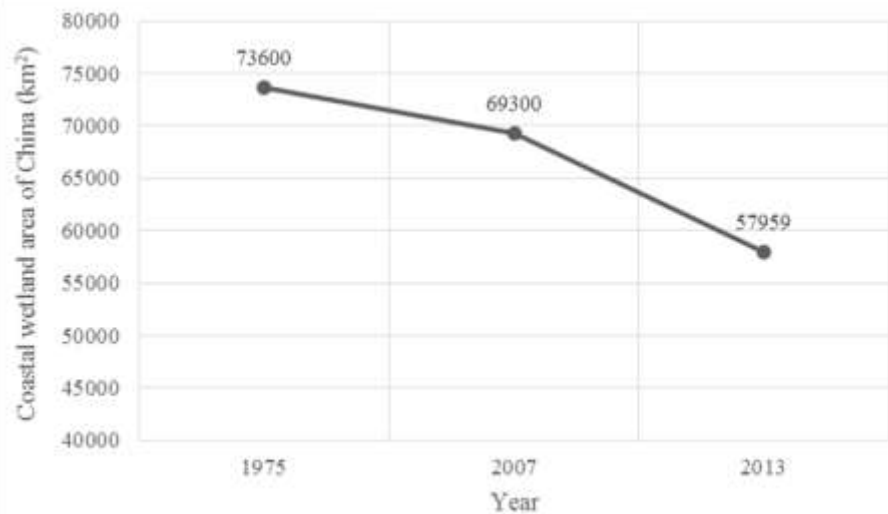
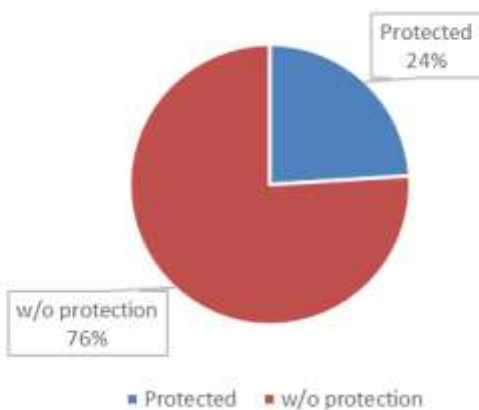
23000ha
 2 MPAs for sea grass bed
 3 MPAs also protect sea grass bed (Neampan site: Beilun Estuary Marine Nature Reserve)





Climate change: policies and achievements

coastal wetland



Climate change: policies and achievements

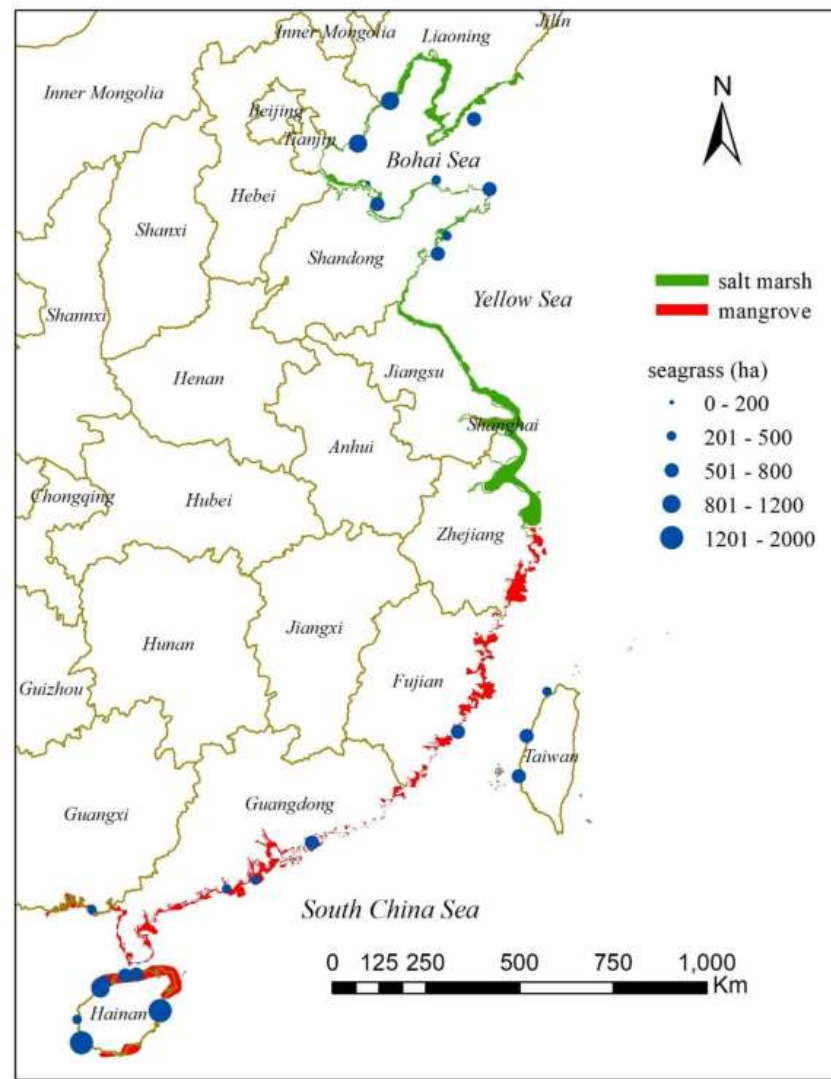
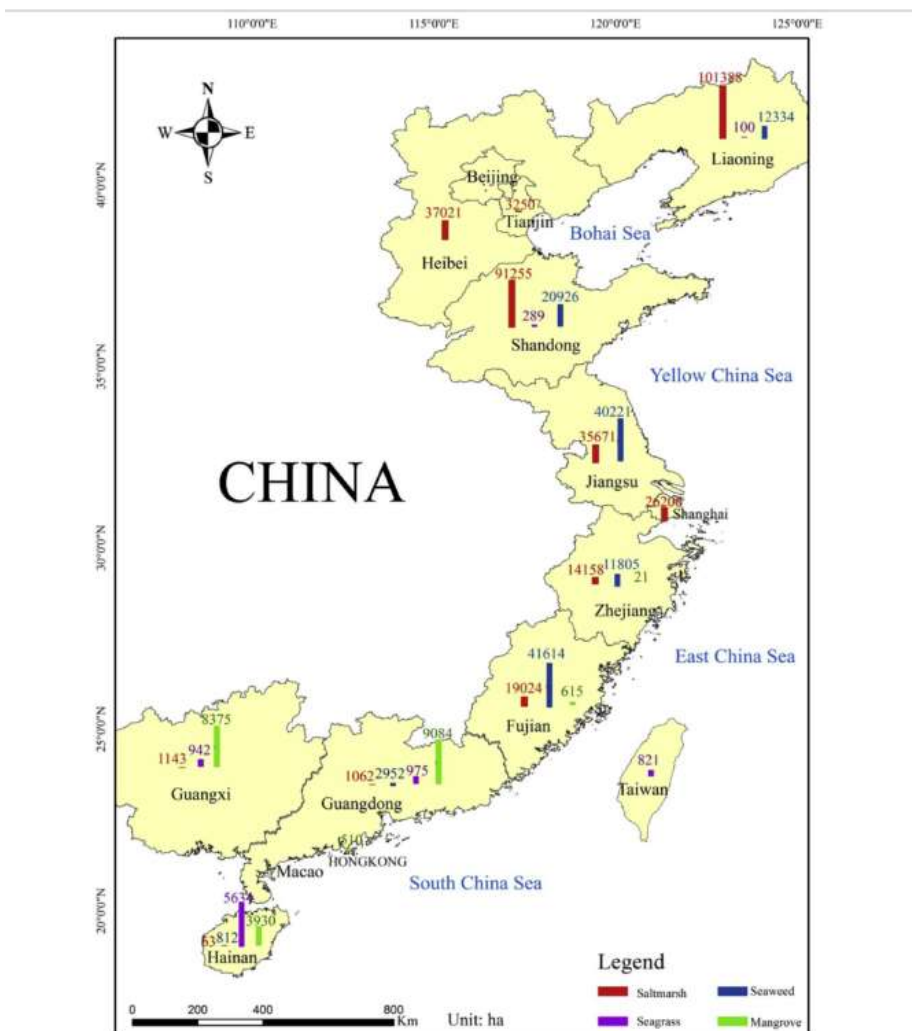


Fig. 1. Distribution of the area of Blue Carbon habitat in coastal provinces, China (figures in hectares). Data from Gu et al. (2018) for saltmarsh in 2015; China Fishery Statistical Yearbook 2016 (BFMA, 2016) for seaweed in 2015; Zheng et al. (2013) for seagrass from 1990 to 2010; Liao and Zhang (2014) for mangrove in 2001.

ies and achievements

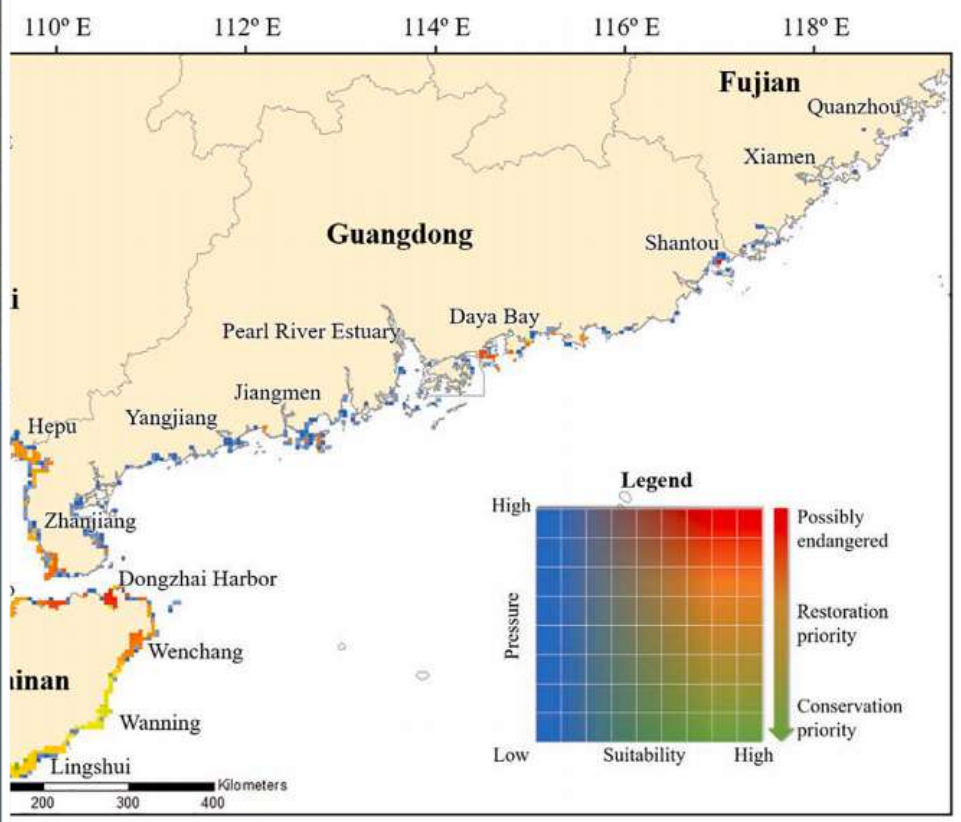
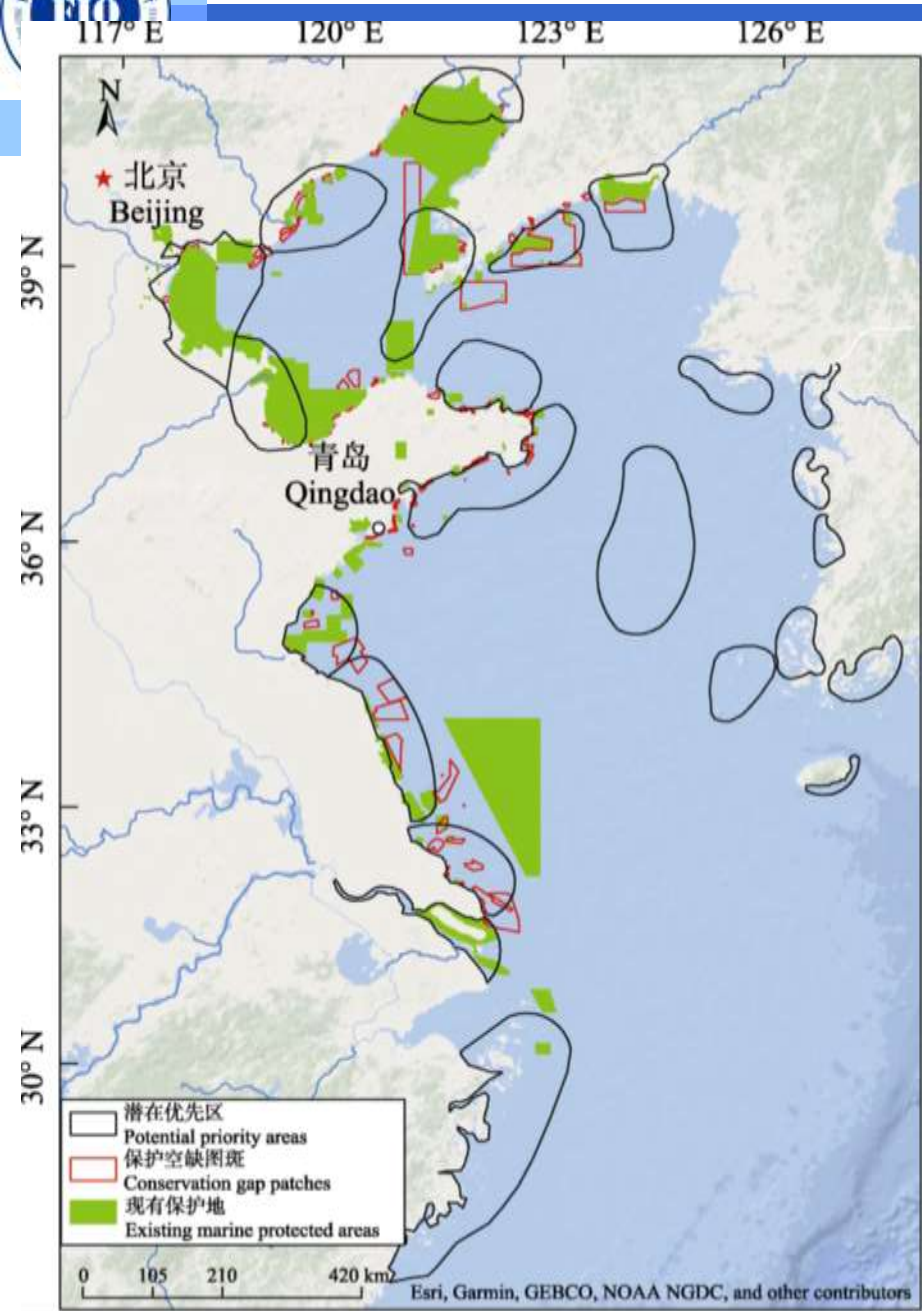


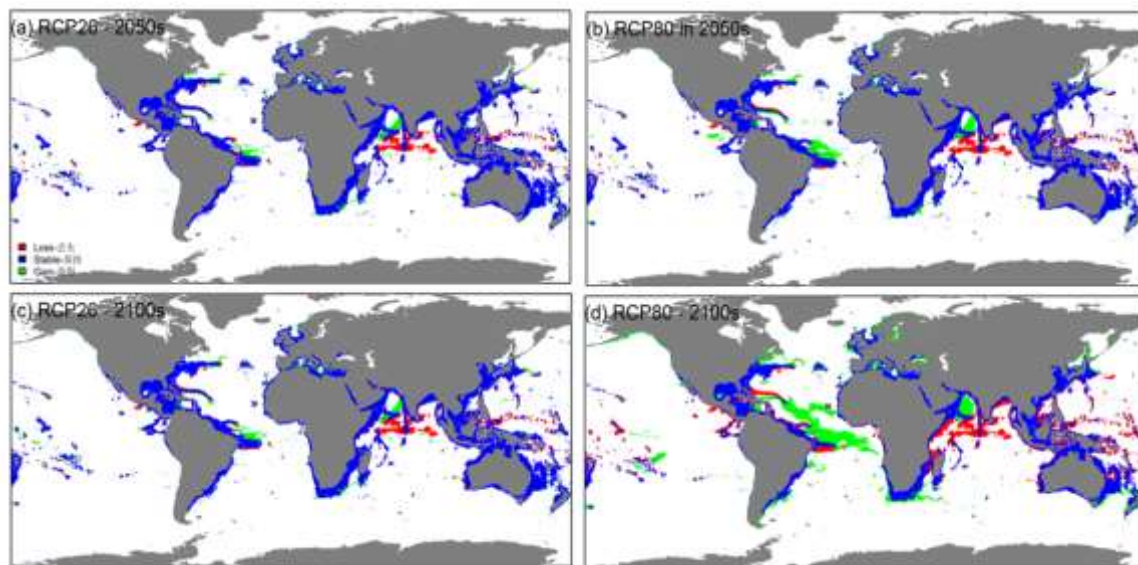
Fig. 8. Spatial pattern of conservation and restoration priorities.

Hu et al., 2021

Climate change: policies and achievements



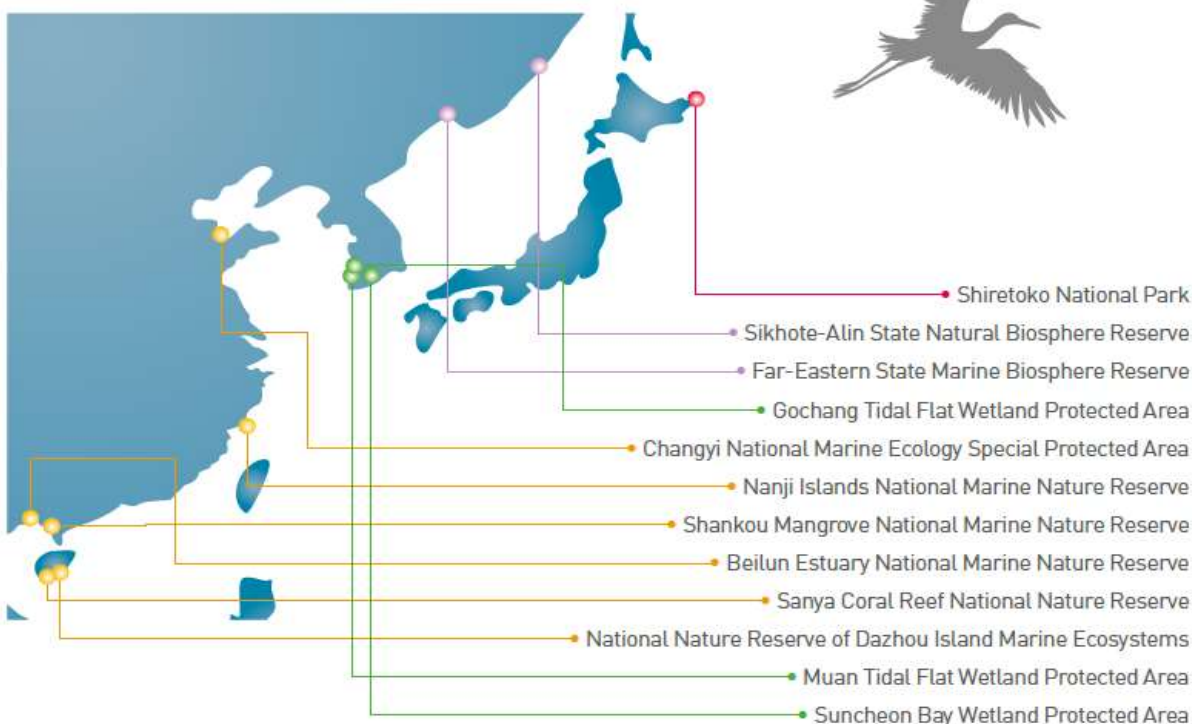
Green sea turtle,
IUCN endangered
China first class



The suitability change of green sea turtle habitat in 2050 under different climate change scenarios (Xing et al., 2021)

Future prospects


NEAMPAN
 North-East Asian
 Marine Protected Area Network



- A good example for MPA network to combat climate change.
- Mangrove, saltgrass marsh, seagrass, coastal wetland.

Future work suggestion:

- ❑ Assess the coastal blue carbon stock, carbon sequestration potential, quantify the contribution of NEAMPAN network to the mitigation of CC.
- ❑ Synergize the carbon sequestration and ecological service.
- ❑ Identify impacts of climate on blue carbon ecosystem overtime and space.
- ❑ Propose potential adaption measures.

A scenic sunset over a body of water. The sky is filled with dramatic, dark clouds, with a bright orange and yellow glow from the setting sun breaking through. The water reflects the colors of the sky. In the foreground, several small boats are silhouetted against the water. In the background, there are silhouettes of hills and a cliffside on the right. The overall mood is peaceful and serene.

Thanks!

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