Review Report of China NEAMPAN sites

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Contents of the review report

1. Review of management plans / strategies of the selected NEAMPAN site

MPA management plan (related to outline 1.1-1.4)

1.1 Background of MPA management plan

1.2 Objective of MPA management plan

1.3 Key contents of the management plans

1.4 Basic information of the NEAMPAN sites

	MNR	MSPA	AGRCZ
Key legislation	• Marine Environment Protection Law of PRC, Article 21. • National standard (GB/T17504-1998) • Principles of type and level of classification of marine nature reserves • National Standard (GB/T 19571-2004) • Technical specifications of marine nature reserve management	• Marine Environment Protection Law of PRC, Article 23. • National Standard (GB/T 25054-2010) • Selection technology guidelines of marine special protection areas • Marine industry standards (HY/T118-2010) • Technical guidelines for the preparation of overall planning, function zoning in marine special protection areas	Fisheries Law of PRC, Article 29.
Nature of the MPAs	Typical ecosystem,	Special geographical location, Ocean park	Important habitat for protected aquatic organisms.
Objectives	Protection of nature	Sustainable use of resources	Protection of germplastic resources and their habitat
Restriction of human activities	Human entry to core area is strictly prohibited in core area.	No construction activity in key protected area.	Human disturbance to core area is strictly prohibited. Fishing activity are allowed outside the core area. Fishing activity must obey Fisheries Law.
Target of management	• Natural relics and other resources. • Ecosystem: mangrove, coral reef, salt marsh, estuary, bay, island, lagoon et al. • Endangered species: amphioxus, spotted seals, dolphins, sea turtles and other rare and endangered marine species • Others: rare marine natural heritage	• Marine resources • Marine ecosystem • Marine Park • Geographic site	Important habitats for: national and local protected aquatic organisms, important endemic aquatic organisms, protospecies for important aquatic organisms and other organisms of high economic values and genetic breeding values.
Administration	National Forestry and Grassland Administration, Ministry of Natural Resources		Ministry of Agriculture and Rural Affairs of the People's Republic of China

Key contents of MNR management plan

- Foreword
- 1. Basic overview
- 2. The Goal of Protection for National Nature Reserve
- 3. Major Constraints on Protection Objectives
- 4. Objectives of Planning Period
- 5. Main Contents of the Management Plan
- 6. Key Projects Planning
- 7. Measures for Implementing the Plan
- 8. Benefit Analysis

Key contents of MSPA management plan

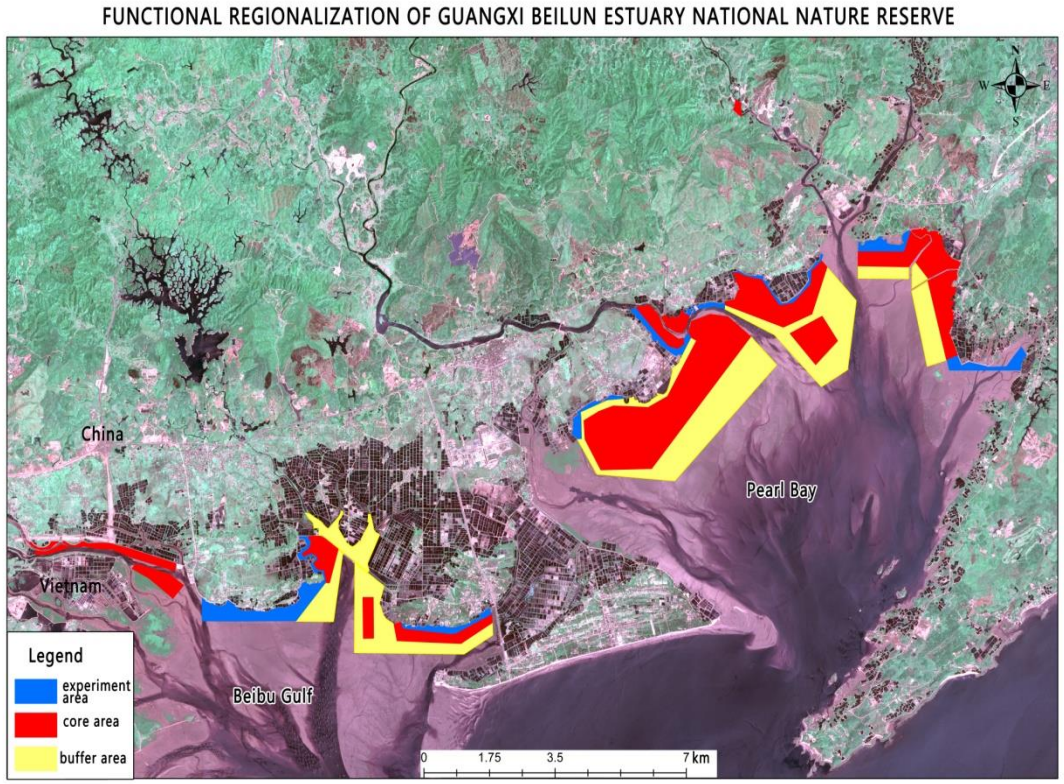
- Foreword
- 1. General Information
- 2. General Situation of Natural Environment, Marine Resources and Social Economy
- 3. Current Situation and Existing Problems of the Construction of MSPA
- 4. Guidelines, Basic Principles and Development Objectives of Planning
- 5. Overall Layout and Inner Zoning
- 6. Key Planning Projects
- 7. Measures Guarantee for Implementation of Planning
- 8. Comprehensive Benefit Evaluation
- 9. Planning Compilation, Demonstration and Approval
- Reference and Appendix

NEAMPAN sites in China

No.	MPA's Name	Location	Area (hm^2)	Protected Targets
1	Nanji Islands National Marine Nature Reserve	Pingyang, Zhejing	20106	Marine shellfish and algae as well as their habitats
2	Shankou Mangrove National Marine Nature Reserve	Hepu, Guangxi	8000	Mangrove ecosystem
3	Beilun Estuary National Marine Nature Reserve	Fangchenggang, Guangxi	30000	Mangrove ecosystem
4	National Nature Reserve of Dazhou Island Marine Ecosystems	Wanning, Hainan	7000	Swiftlet, its habitat and the marine ecological system
5	Sanya Coral Reef National Nature Reserve	Sanya, Hainan	4000	Coral reef and the marine ecological system
6	Changyi National Marine Ecology Special Protected Area	Changyi, Shandong	2929	Tamarix chinensis, marine organisms and coastal wetland ecosystems

NEAMPAN sites in China

1. Beilun Estuary National Marine Nature Reserve



Year designated: 2000

Conservation status: MNR

Area: 30,000 hm^2

Range:21° 31'00″- 21° 37' 30″N

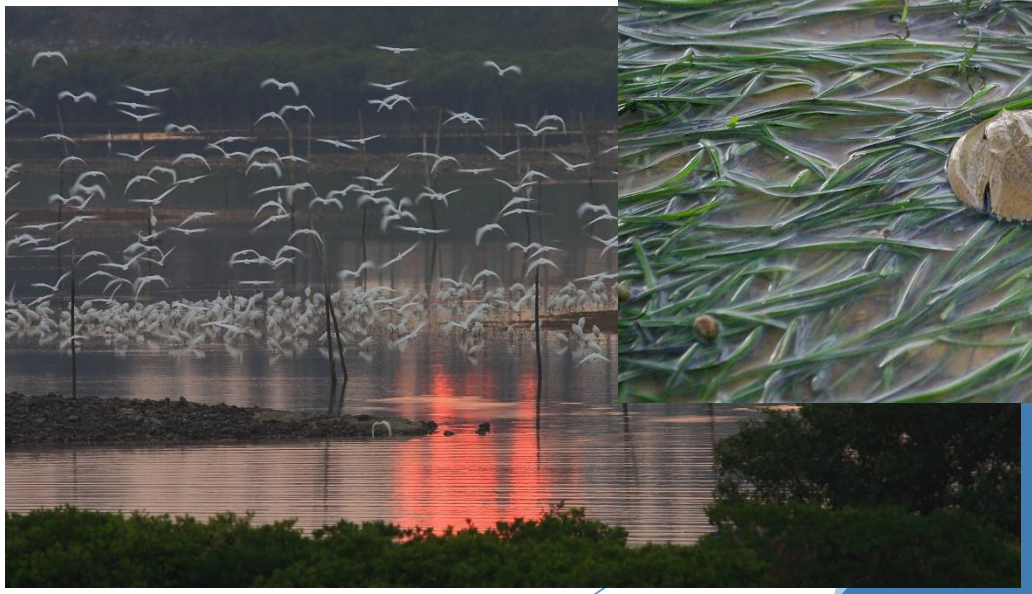
108° 00'30″ - 108° 16'30″ E

Location: Fangchenggang, Guangxi Province

Key Protected species: Mangrove ecosystem, Coastal wetlands ecosystem, and Seagrass beds ecosystem

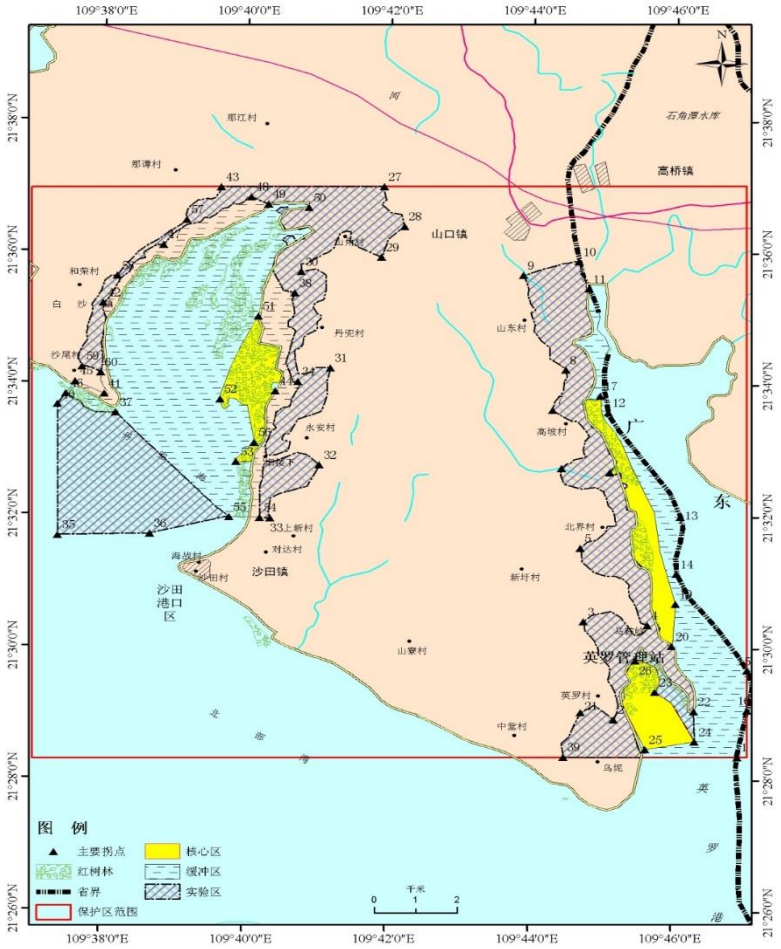
NEAMPAN sites in China

There was 3337.9 hm^2 mangrove forest in 1990s, and reduced to 1131hm^2, because of aquaculture, harbor, bank, and reclamation.



NEAMPAN sites in China

2. Shankou Mangrove National Marine Nature Reserve



Year designated: 1990

Conservation status: MNR

Area: 8000 hm^2

Range:109° 37′00″E-109° 47′00″E，21° 28′22″N-21° 37′00″N

Location: Beihai, Guangxi Province

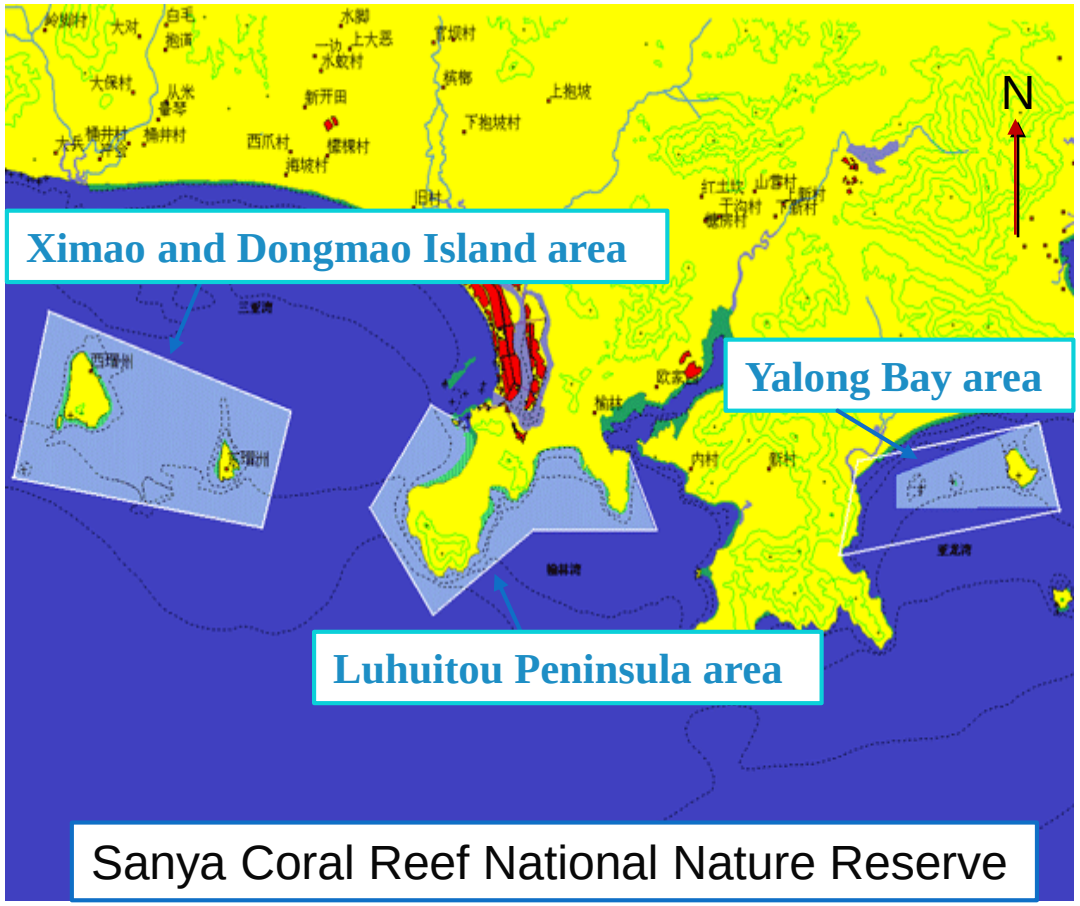
Key Protected species: Mangrove ecosystem,

NEAMPAN sites in China

15 species mangrove, 13 species protected birds, dugong etc.

NEAMPAN sites in China

3. Sanya Coral Reef National Nature Reserve



Year designated: 1990

Conservation status: MNR

Area: 8500 hm^2

Range:109° 20′50″E-109° 40′30″E 、00000018° 10′30″N-18° 15′30″N

Location: Sanya, Hainan Province

Key Protected species: Coral reef and the marine ecological system

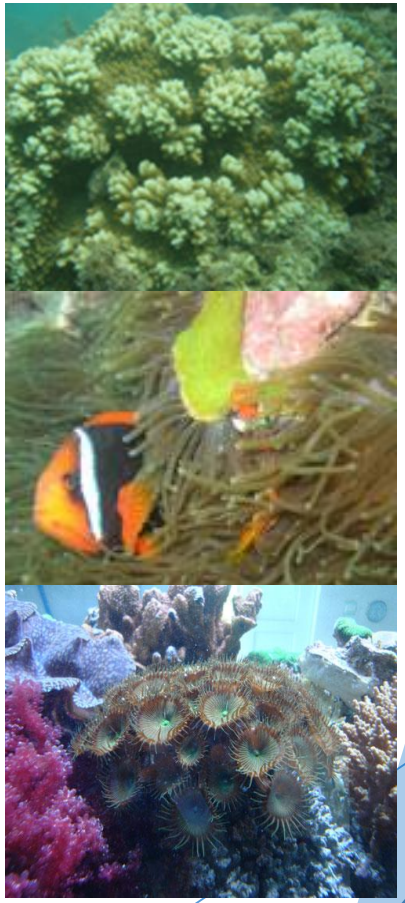
NEAMPAN sites in China

Feature of nature reserve

tropical oceanic monsoon climate

low latitude

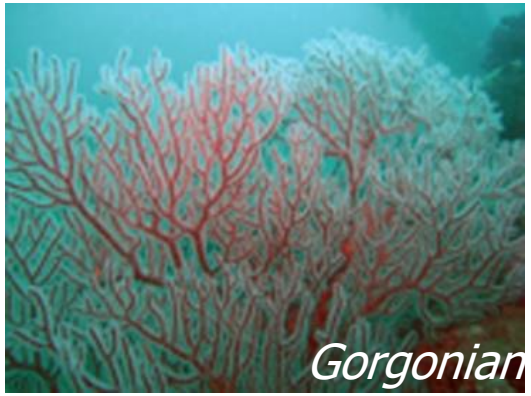
appropriate hydrologic properties

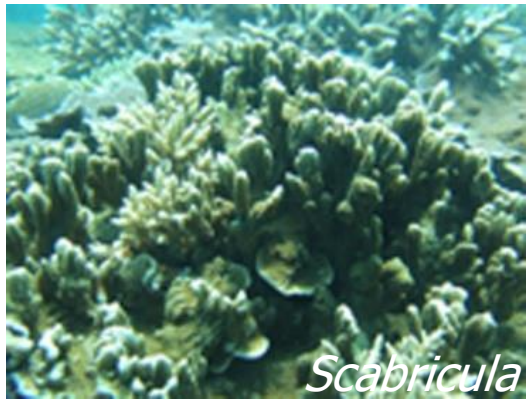


- **Coral Reefs**
- **Marine organism living with coral reef**

NEAMPAN sites in China

Part of main coral species





Sanya Coral Reef National Nature Reserve http://www.sycoral.com.cn/

NEAMPAN sites in China

4. National Nature Reserve of Dazhou Island Marine Ecosystems

Year designated: 1990

Conservation status: MNR

Area: 7000 hm^2

Range:110° 26′50″E-110° 32′06″E 、18° 37′06″N-18° 43′54″N

Location: Wanning, Hainan Province

Key Protected species: Swiftlet, its habitat and the marine ecological system

NEAMPAN sites in China

Feature of nature reserve

- **Typical marine ecosystem of Island**

  Be abundant of plant resources

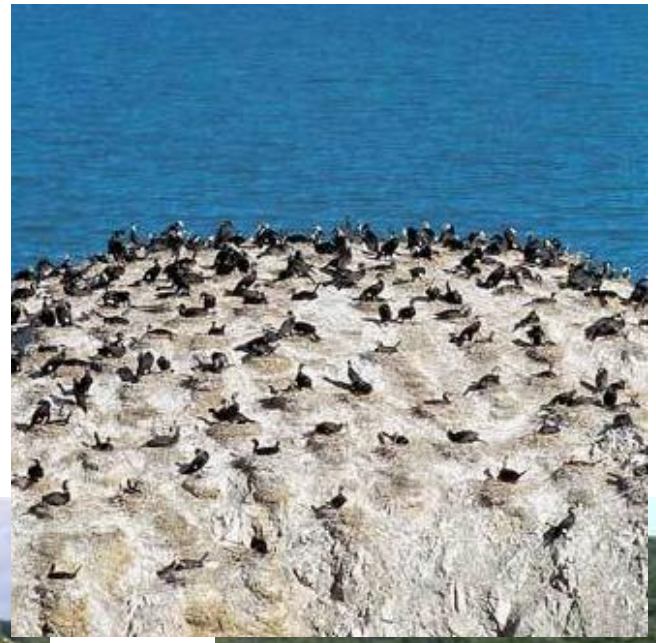
  Be rich of animal resources, especially the swiftlet

  Marine organism around the Island

- **Swiftlet has been the endangered species. Dazhou Island provides them habitat environment.**
- **Swiftlet’ s nests are famous as the eastern curiosity and rare medicine.**

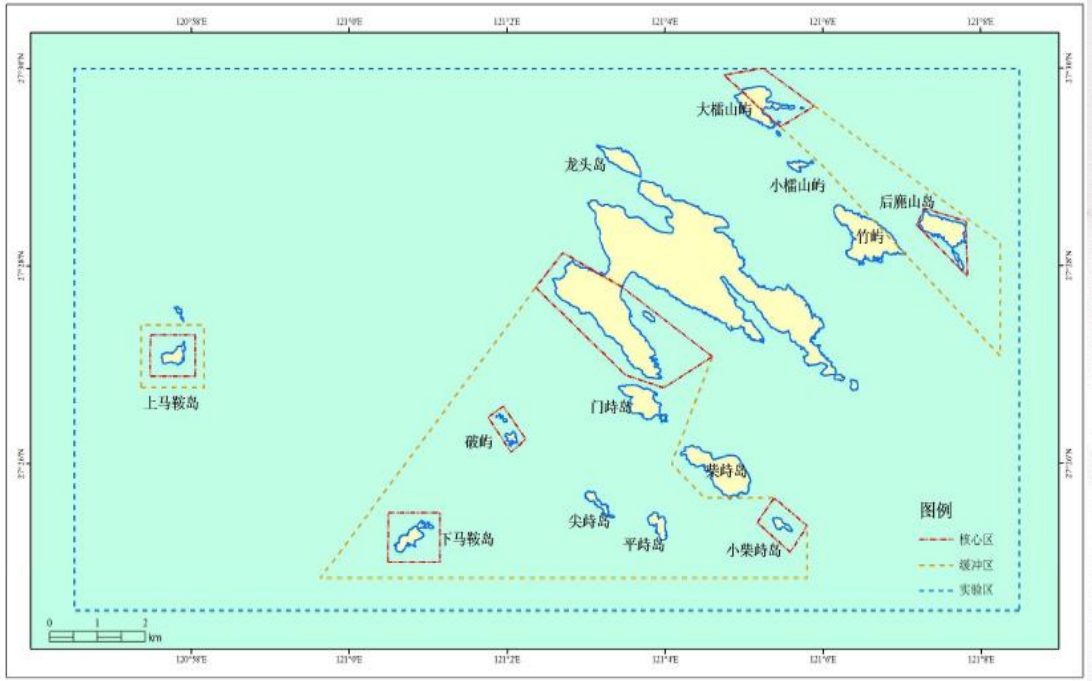
NEAMPAN sites in China

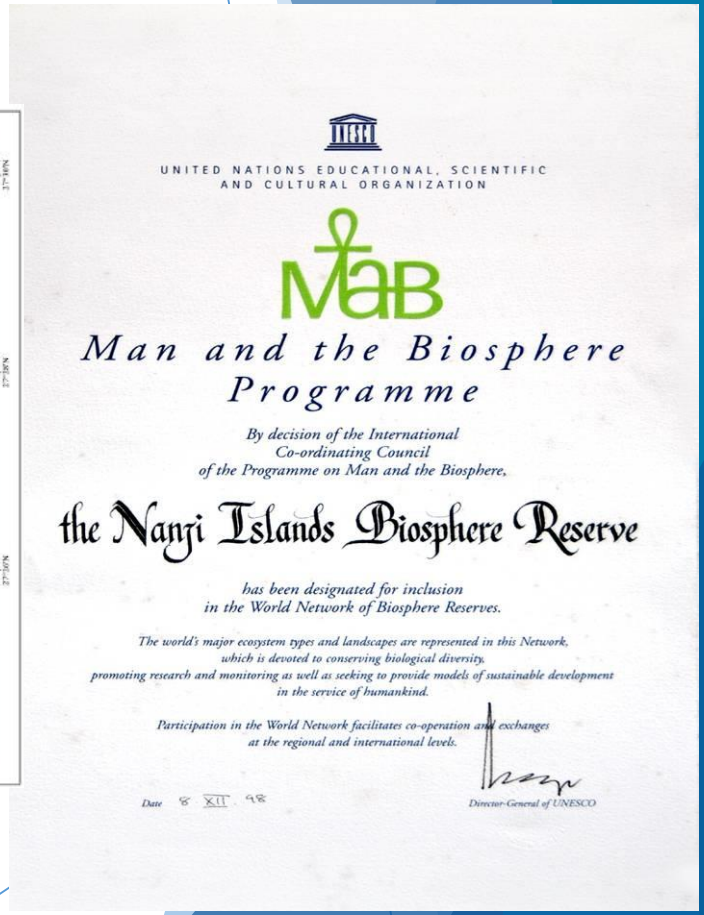
Swiftlet and the marine ecological environment



NEAMPAN sites in China

5. Nanji Islands National Marine Nature Reserve





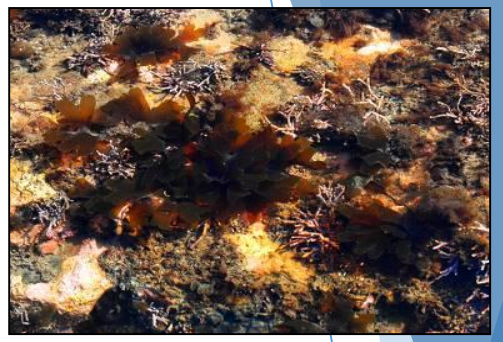
201.06 km^2, including 189.93 km^2 of sea waters

NEAMPAN sites in China

- **Target: marine shellfish and algae, birds and ecosystem**
- **1876 marine species in total**
- **Shellfish:**
  - 427 species, 15% of known species of shellfish in China
  - 36 species are endemic species
- **Algae:**
  - 637 species (seaweeds 178 species, microalgae 459 species), 25% of known species of algae in China
  - reported 3 new species and 22 rare species

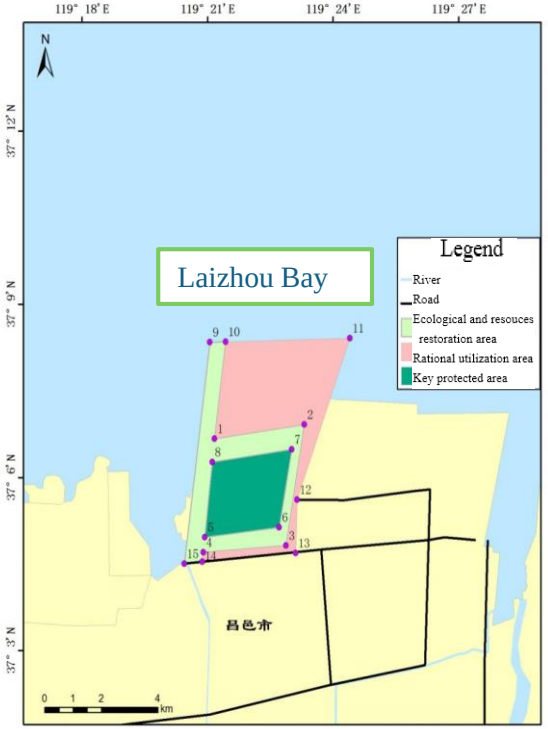
- **Fish 397 species, crustaceans 257 species, and other 158 species**
- **Kingdom of shellfish and algae, and most important gene pool for marine organism in China**

NEAMPAN sites in China



NEAMPAN sites in China

6. Changyi National Marine Ecology Special Protected Area



Year designated: 2007

Conservation status: MSPA

Area: 2929.28 hm^2

Range: 119° 20′09.30″E-119° 24′13.21″E 、000000037° 04′25.74″N-37° 08′15.47″N

Location: Changyi, Shandong Province

Key Protected species: tamarisk (*Tamarix chinensis*), marine organisms and coastal wetland ecosystems

Natural wild tamarisk forest 2070 hm^2, 71% of the total MPA, the only tamarisk forest area in China coast North mangrove

NEAMPAN sites in China

- **Diversity of wetland types**
  - Shallow sea
  - Tideland
  - Saltmarsh
  - Tamarisk wetland
- **Be abundant of biological resources**
  - Marine organism
  - Terrestrial plant
  - Birds

半滑舌鳎

鳜虎鱼

图 2.4 海洋生物—鱼类

三疣梭子蟹

对 虾

图 2.5 海洋生物—虾蟹类

NEAMPAN sites in China


Tamarisk


Suaeda salsa


White Swan

Tamarisk

Terrestrial plant

Wild animal and birds


Tamarisk


Setaria


Wild geese

2. Monitoring and assessment of designated MPAs

2.1 Monitoring parameters

2.2 Assessment of data

2.3 Links between monitoring/assessment results and management

Monitoring parameters for different types of MPAs

endangered marine organism

Protected Target	Monitoring Parameter	Monitoring Parameter of Affecting Factors *			
		Water Quality	Sediment Quality	Biological Quality	Others
Lancelet （Amphioxus）	Density, and biomass	pH, DO, COD, DIP, DIN, petroleum, and heavy metals	Granularity, DOC, petroleum, and heavy metals	—	Biodiversity index, and human factors
Songjiang Perch （Trachidermus）	Density, and biomass	pH, DO, COD, DIP, DIN, petroleum, and heavy metals	DOC, petroleum, and heavy metals	Colibacillus. Petroleum, and heavy metals	
Coral (Anthozoa)	Coverage of live corals, species, and death rate	pH, TSS, DO, COD, DIP, DIN, petroleum, and heavy metals	DOC, petroleum, and heavy metals	—	
Cowfish (Neophocaena)	Quantity, and frequency	—	—	—	
Sea turtle (Chelonia mydas)		pH, DO, COD, DIP, DIN, petroleum, and heavy metals	Granularity, DOC, petroleum, and heavy metals	—	
Swiftlet (Aerodramus)		—	—	—	
Chinese White Dolphin (Sousa chinensis)					

high valued animals

Protected Target	Monitoring Parameter	Monitoring Parameter of Affecting Factors *			
		Water Quality	Sediment Quality	Biological Quality	Others
Surf Clam Shell (*Mactra antiquata*)	Density, and biomass	pH, DO, COD, DIP, DIN, petroleum, and heavy metals	DOC, petroleum, and heavy metals	Colibacillus. Petroleum, and heavy metals	Biodiversity index, and human factors
Clam Worm (*Nereis succinea*)					
Sea Cucumber (*Stichopus japonicus*)					
Shellfish	Species, density, and biomass				
Razor Clam					
Fish					
Birds	Species, and quantity	–	–	–	Biodiversity index, and human factors

plants

Protected Target	Monitoring Parameter	Monitoring Parameter of Affecting Factors *			
		Water Quality	Sediment Quality	Biological Quality	Others
Mangrove (Rhizophora apiculata)	Species, density and area	–	DOC, petroleum, and heavy metals	–	Climate factors, pests, alien invasive species, and human factors
Chinese Tamarisk (Tamarix chinensis)	Density, and area				
Wild Daffodil (Narcissus tazetta chinensis)					
Algae (Sargassum fusiforme)					

marine natural landscape

Protected Target	Monitoring Parameter	Monitoring Parameter of Affecting Factors *			
		Water Quality	Sediment Quality	Biological Quality	Others
Chenier	Area, and integrity	–	–	–	Storm tide, ocean dynamic, and human factors
Coastal Dune	Area, and elevation				
Oyster Reef	Area, and integrity				
Submarine Ancient-forest					
Sand Beach					
Land-tied Island Sandbar					
Reef Island					

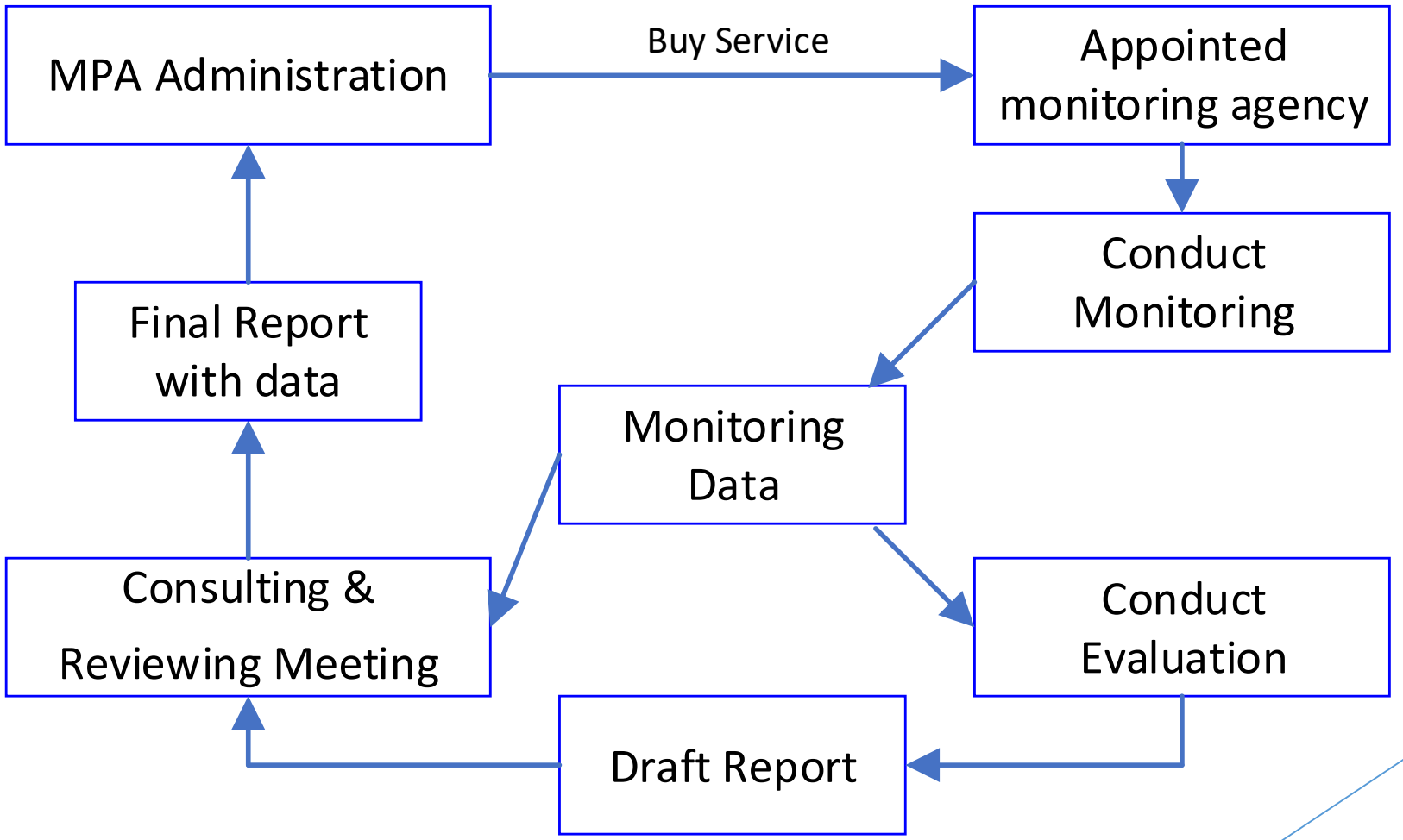
marine ecosystem

Protected Target	Monitoring Parameter	Monitoring Parameter of Affecting Factors *			
		Water Quality	Sediment Quality	Biological Quality	Others
Bay Island Estuary Coastal Wetland	Biodiversity, and typical species, density, and biomass	pH, DO, COD, DIP, DIN, petroleum, and heavy metals	DOC, petroleum, and heavy metals	—	Biodiversity index, and human factors
Seagrass bed	Species, density, coverage, and area	—	DOC, petroleum, and heavy metals	—	Climate factors, pests, alien invasive species, and human factors

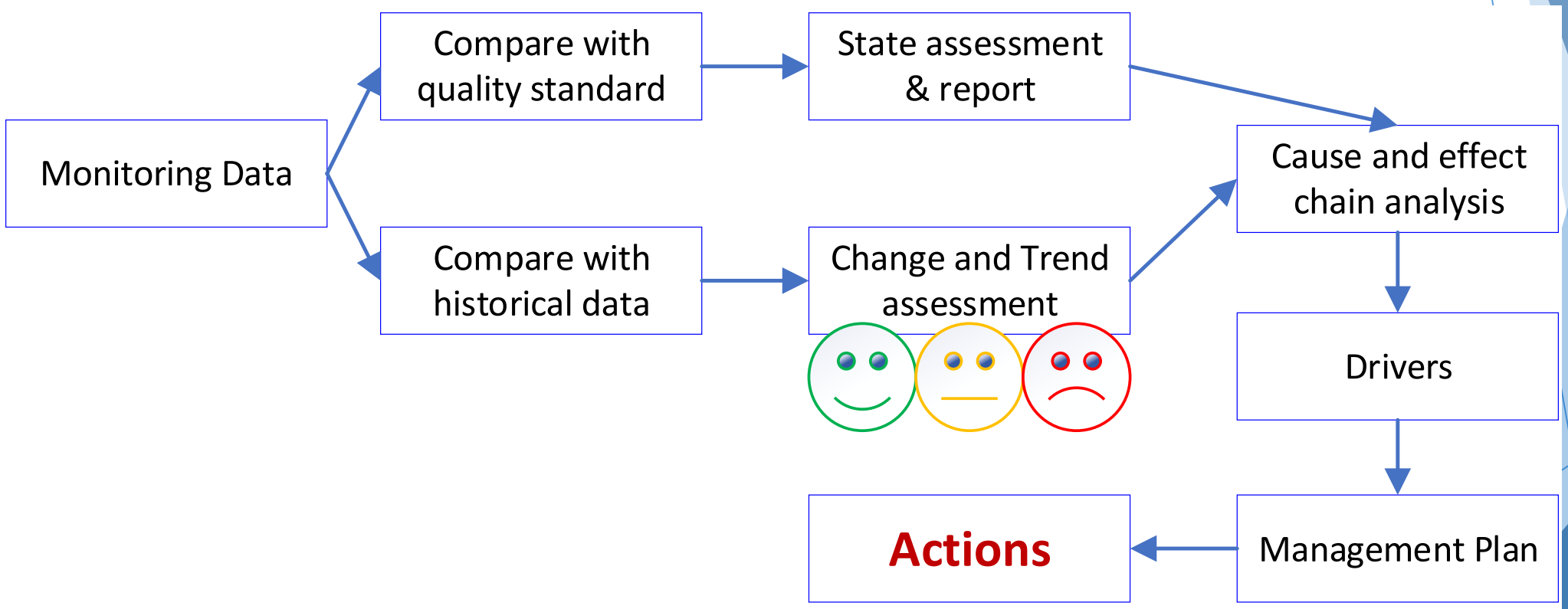
The monitoring parameters for NEAMPAN sites

No.	MPA's Name	Protected Targets	Monitoring parameters
1	Nanji Islands National Marine Nature Reserve	Marine shellfish and algae as well as their habitats	Density, biomass, and area plus water/sediment/ biological/other parameters in table 2.2 and 2.3
2	Shankou Mangrove National Marine Nature Reserve	Mangrove ecosystem	Species, density and area, plus sediment/other parameters in table 2.3.
3	Beilun Estuary National Marine Nature Reserve	Mangrove ecosystem	Species, density and area, plus sediment/other parameters in table 2.3.
4	National Nature Reserve of Dazhou Island Marine Ecosystems	Swiftlet, its habitat and the marine ecological system	Quantity, and frequency, plus water/sediment/other parameters in table 2.1
5	Sanya Coral Reef National Nature Reserve	Coral reef and the marine ecological system	Coverage of live corals, species, and death rate, plus water/sediment/other parameters in table 2.1
6	Changyi National Marine Ecology Special Protected Area	Tamarix chinensis, marine organisms and coastal wetland ecosystems	Density, and area, plus sediment/other parameters in table 2.3

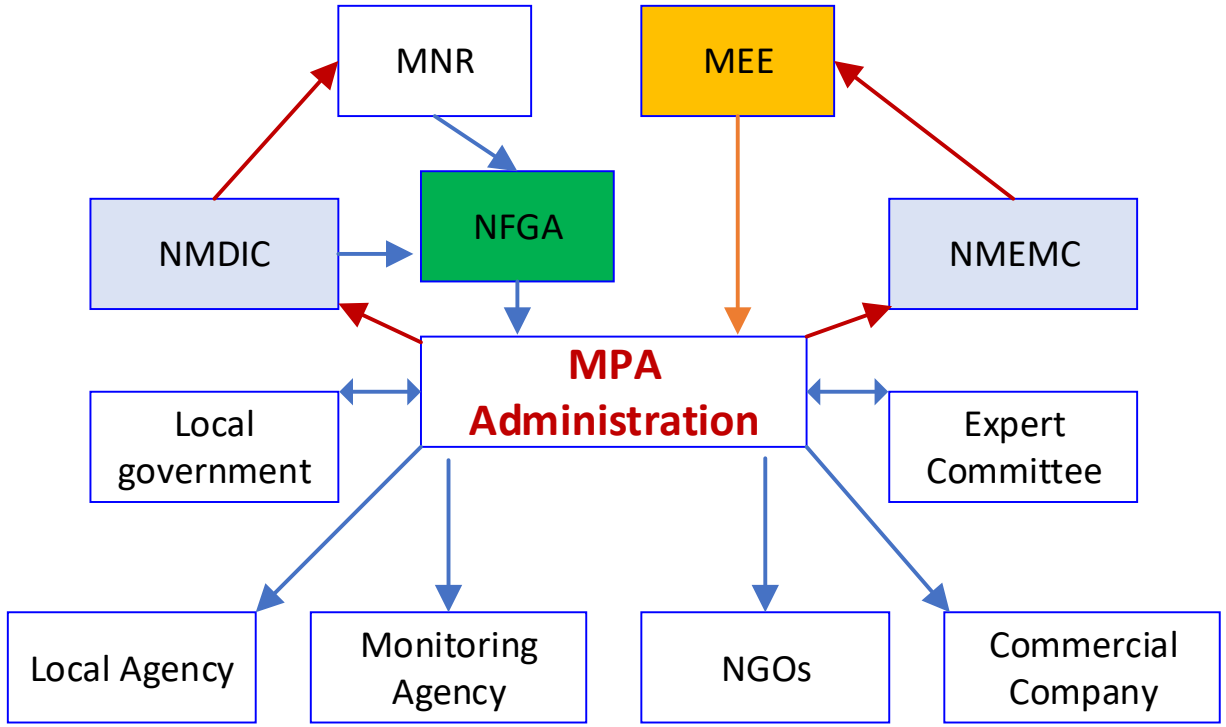
The process of the monitoring and evaluation of MPA



The use of monitoring data

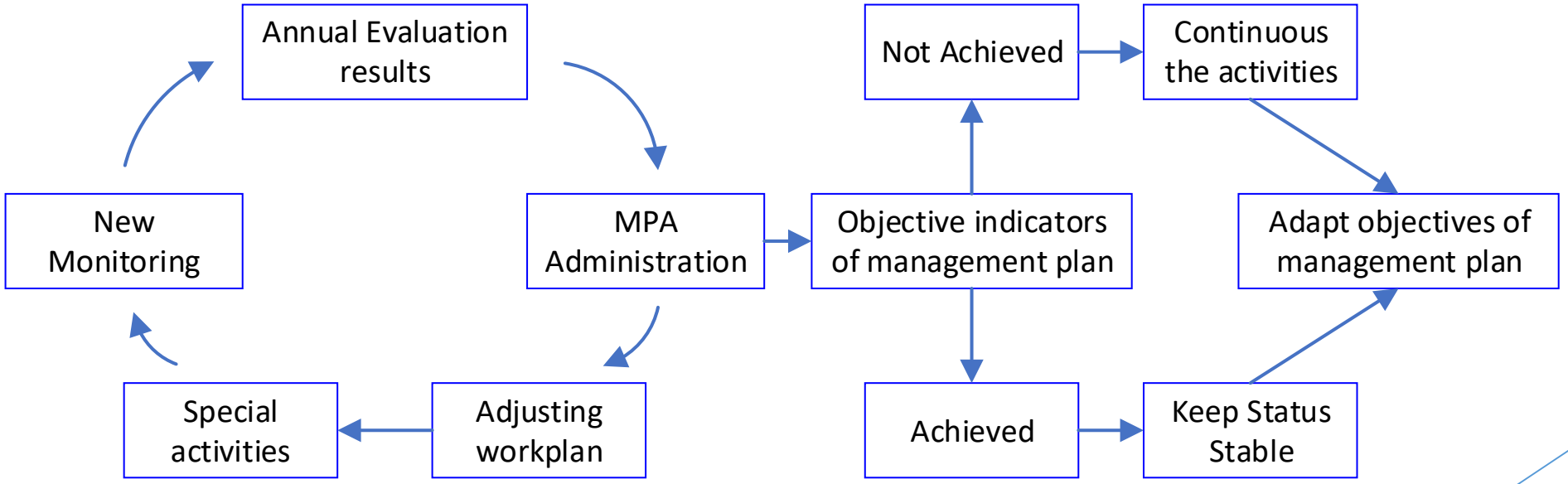


The institutions involved in monitoring and evaluation of MPA



3. Feedback of assessment results to management plans and practices

The relations of evaluation results and objective indicators of management plan



4. Case studies

4.1 Nanji Islands National Marine Nature Reserve

4.2 Changyi National Marine Ecology Special Protected Area

Nanji Islands National Marine Nature Reserve

Master plan objective

（1）to protect the natural ecological habitats and islands for the marine shellfish, algae, birds, and wild island flora;

（2）to protect the endangered species for survival and reproduction;

（3）to protect natural resource, biodiversity, and ecosystem stability from human disturbance;

（4）to harmonize the relations between short-term and long-term, partial and overall, MPA and local community, human and nature, ecological benefits and economic benefits.

Nanji Islands National Marine Nature Reserve

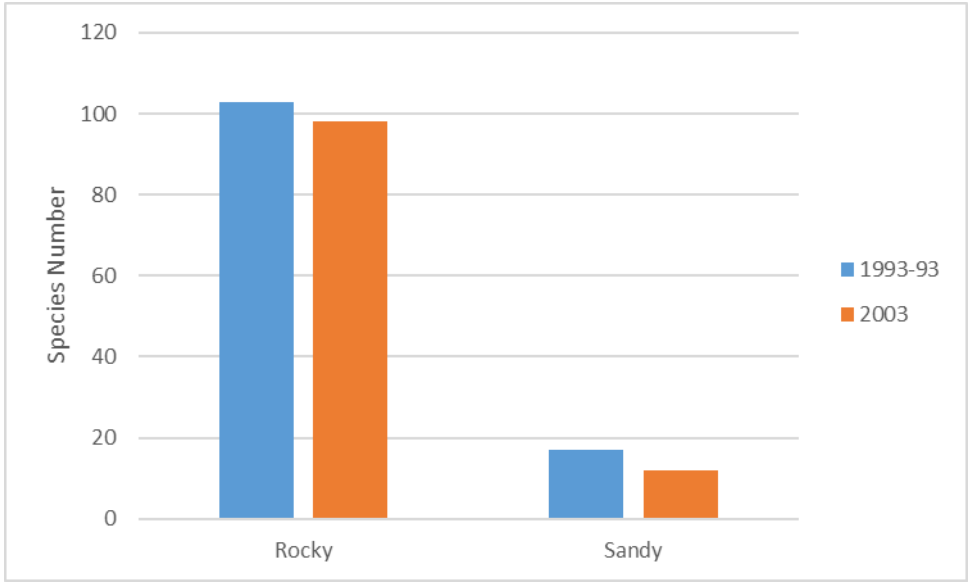
Master plan Contents

1. Infrastructure developing plan
2. Capacity building and patrolling plan
3. Human resource and administration plan
4. Public awareness and education plan
5. Scientific research and monitoring plan
6. Pollution control, ecosystem protection and restoration plan
7. Mariculture developing plan
8. Ecotourism developing plan

Monitoring parameters of Nanji MNR

Items	Parameters	Sites
Habitats diversity	Sediment particle size	Sandy, muddy ecotypes
	Habitat	All
	Habitat water quality	Species with weak or no migration ability
	Geographic and geomorphic conditions	All
Biodiversity	Species diversity	All
	Biodiversity index	All
Community structure	Biomass and abundance	All
	Species composition	All
	Species with public attention	All

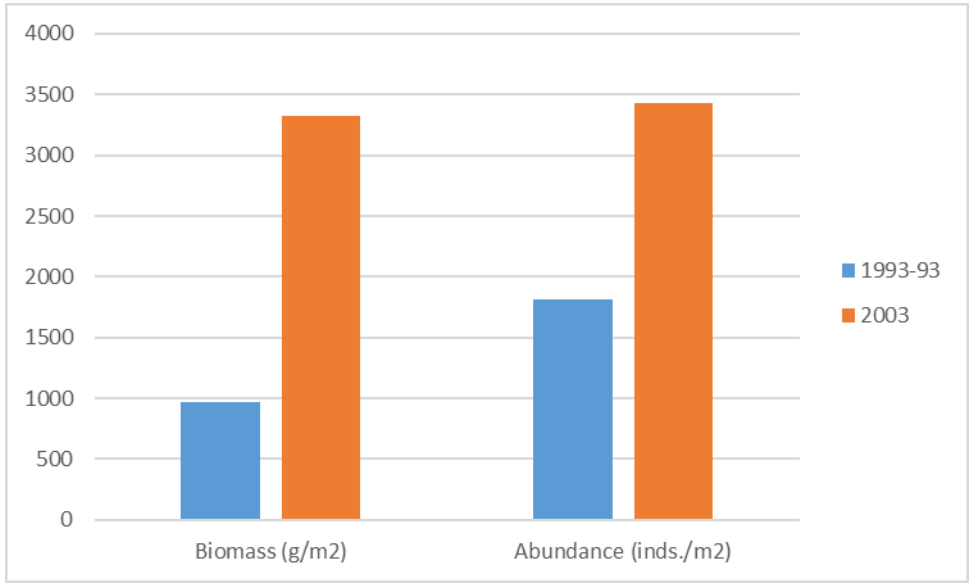
Monitoring results



Shellfish species number comparison between years and transections

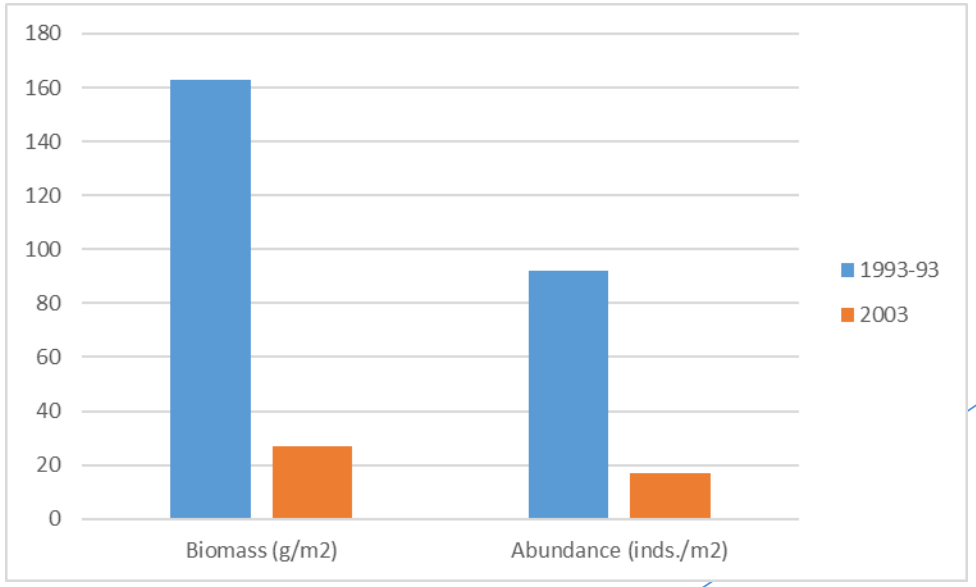
Shellfish and algae species number in three surveys

Year	Shellfish species number	Algae species number	Transection
1974-1976	122	94	4
1992-1993	143	121	14
2003-2004	105	85	10



Shellfish biomass and abundance in rocky transection

Shellfish biomass and abundance in sandy transection



Longterm variations in species number of algae in NJ-MNR

Year	Total species	Constructive species		Dominant species		Common species	
		No.of species	%	No.of species	%	No.of species	%
1959-1965	84	8	9.5	14	16.6	34	40.7
1980-1985	73	8	11.0	12	16.4	22	30.1
2000-2007	49	4	8.2	4	8.2	13	26.5

Threats identified

1. Overexploitation
2. Rapid development of tourism
3. Infrastructure construction
4. Mariculture
5. Natural environment quality degradation

Improved management measures

1. Extended fishing-off season
2. Tourist quantity control and updated management facilities
3. Ecological restoration
4. Marine ranching and eco-mariculture
5. Real time monitoring network

Changyi National Marine Ecology Special Protected Area

Master plan objective

（1）to protect the coastal wetland and its services, the habitat for living species, and the biodiversity;

（2）to recovery the tamarisk forest 70 ha, and the coverage increased by 2025;

（3）to increase the capacity building and infrastructure for the MPA’s patrolling, monitoring, education, research, and routine management;

（4）to sustainable develop the eco-agriculture industry and increase the local community income;

（5）to perfect the scientific research and monitoring data support for the restoration and management actions;

（6）to develop the co-management mechanism for MPA.

Changyi National Marine Ecology Special Protected Area

Master plan content

1. Capacity building planning
2. Infrastructure building planning
3. Resources sustainable use planning
4. Ecological industry developing
5. Scientific research and monitoring planning
6. Ecosystem protection and restoration planning
7. Public education and awareness promotion
8. Co-management planning

Changyi National Marine Ecology Special Protected Area

Monitoring and assessment

1. Infrastructure assessment
2. Management evaluation:
    - management body
    - regulation/protocol
    - routine working
    - capacity
3. Protected target assessment:
    - tamarisk coverage
    - ecological parameters

Monitoring parameters of ChangYi MSPA

Items	Parameters	Sites
Protected targets	Coverage of Tamarisk, biomass	intertidal
Habitat quality	Oil concentration in soil	intertidal
	Organic carbon in soil	intertidal
	Sulfide in soil	intertidal
	COD in seawater	intertidal
	Phosphate in seawater	intertidal
	Dissolved inorganic nitrogen in seawater	intertidal
	Oil concentration in seawater	intertidal

Monitoring results

Monitoring results of sea water quality in CY-MSPA

	COD (mg/L)	PO_4-P (mg/L)	DIN (mg/L)	Oil (mg/L)
2010	1.65～2.88	0.00744～0.0174	0.503～0.811	0.0240～0.0379
2011	1.83～3.00	0.0360～1.01	0.146～0.280	0.0285～0.0490
2012	1.37～1.90	0.002～0.003	0.698～0.772	0.0196～0.0258
2013	0.760～1.37	0.00500～0.0220	0.696～1.76	0.00406～0.287
2014	1.14～2.21	0.00500～0.0390	0.371～1.12	0.00911～0.0236
2015	1.37～2.21	0.00200～0.00500	0.345～1.32	0.0193～0.0388

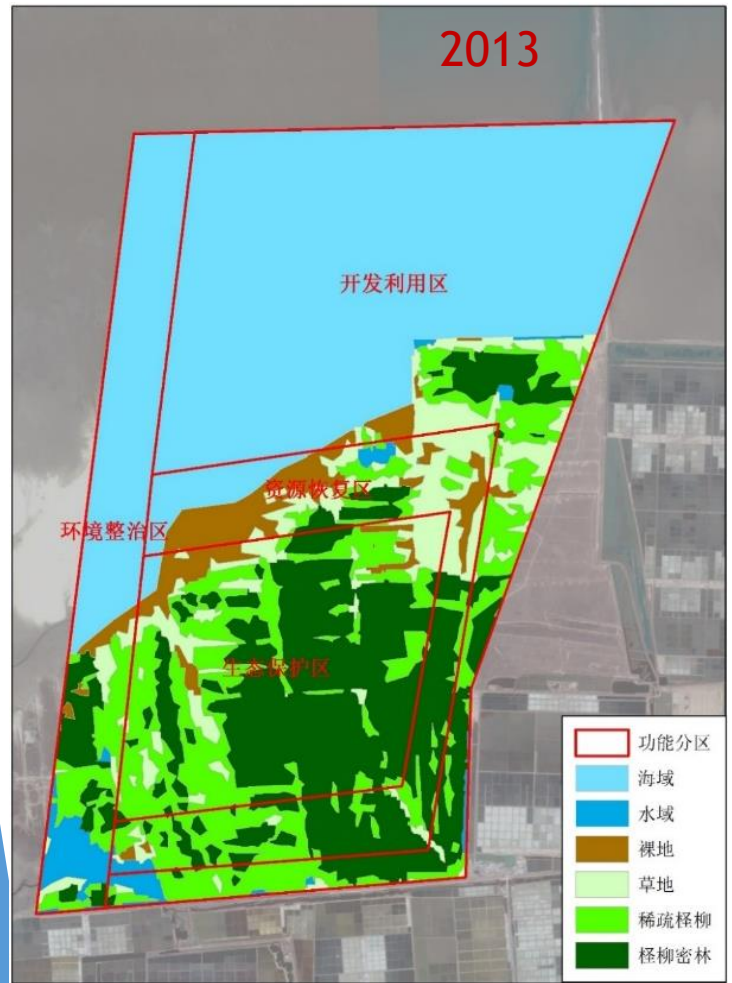
Monitoring results of sediment quality in CY-MSPA

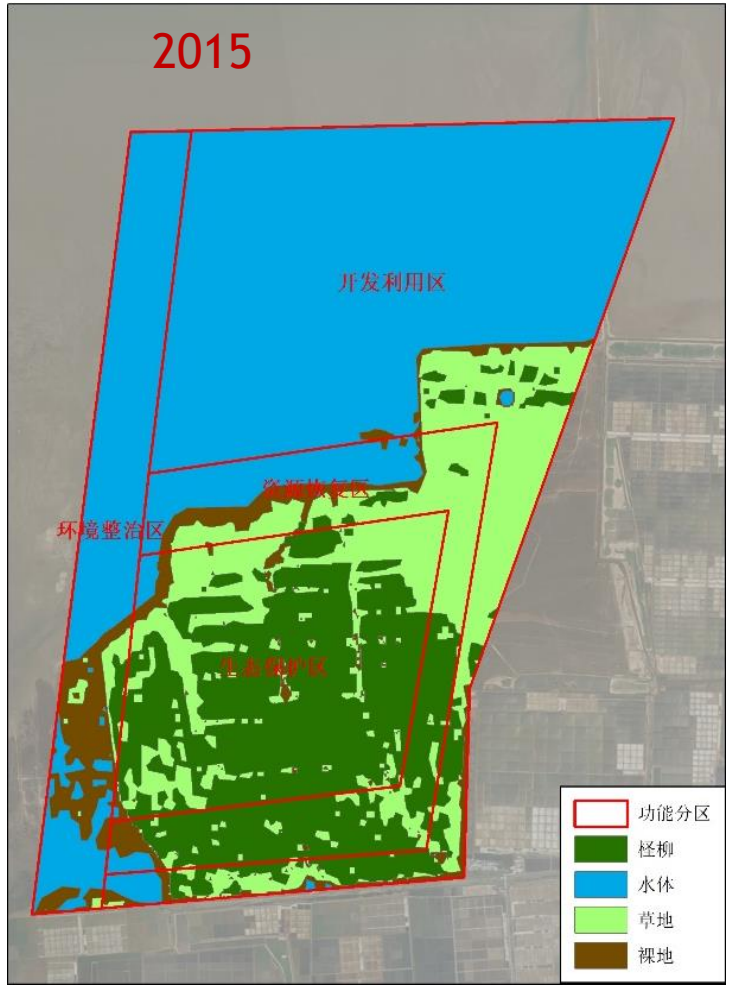
	Oil (mg/kg)	Organic carbon	Sulfide (mg/kg)
2010	28.0～67.3	0.0672～0.0398%	0.00～6.63
2011	32.3～38.6	0.0523～0.0945%	0.672～1.56
2012	----	0.015～0.027%	0.00～0.384
2013	0.00～7.40	0.0852～0.109%	0.469～4.07
2014	0.00～58.4	0.0578～0.282%	1.10～5.08
2015	7.12～17.70	0.0281～0.392%	6.80～48.10

Monitoring results

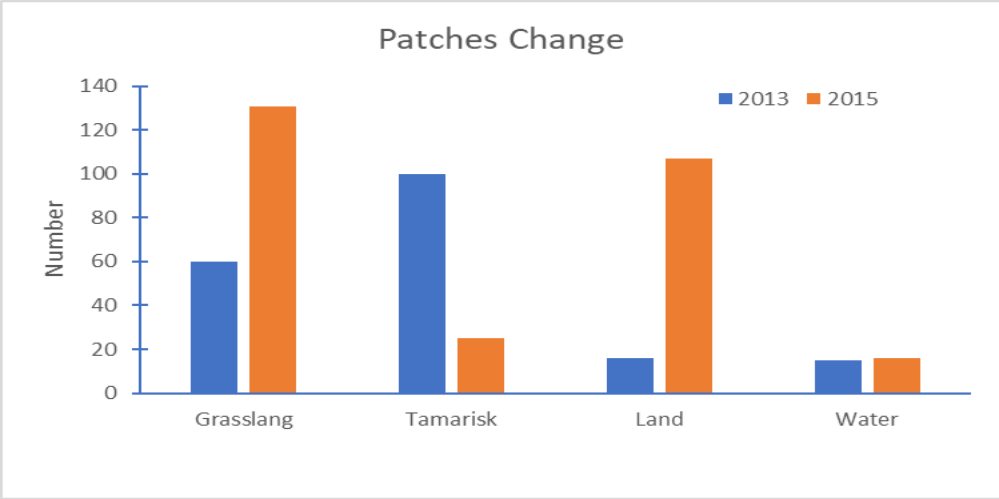
Monitoring results of Protected targets

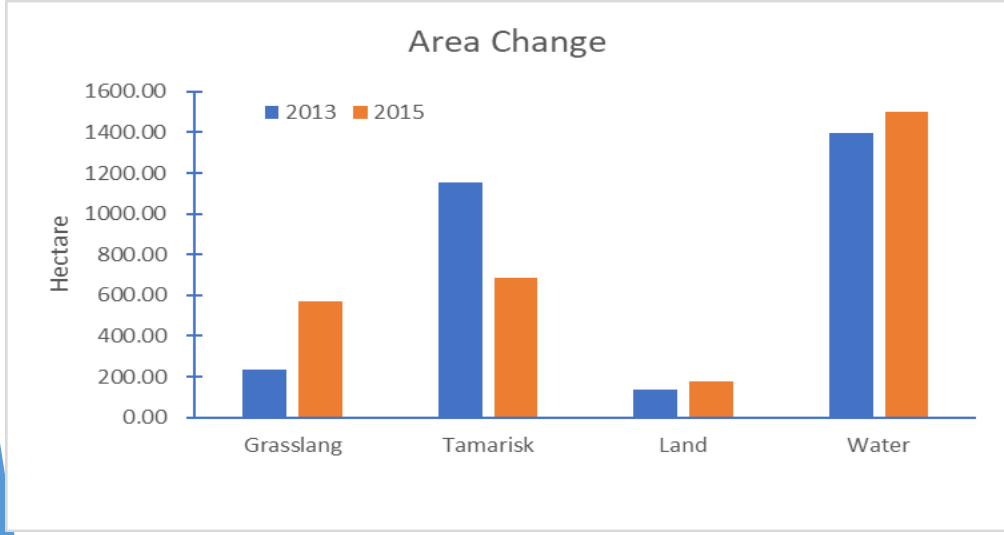
	Height (cm)	Diameter (cm)
2013	290-310	3.9-4.8
2014	340-380	4.2-4.9
2015	350-390	4.3-5.0

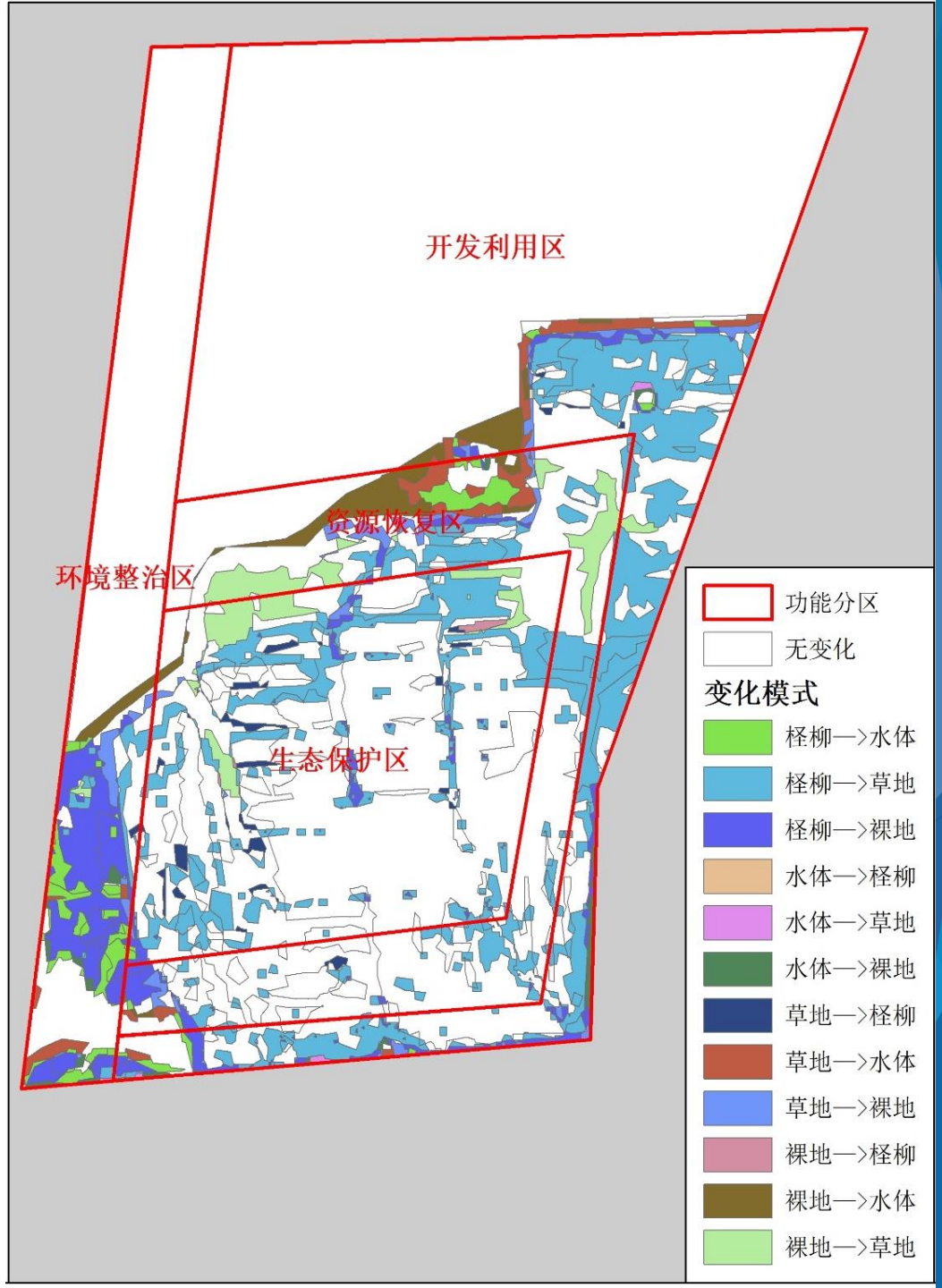




Monitoring results







Management improved

1. Ecological marine aquaculture
2. Ecological restoration
3. Ecotourism planning

Thanks for your attentions!