South China Institute of
Environmental Sciences, MEE

2021

SCS SAP Regional Working Group on Seagrass

Distribution, Status and Restoration Progress of Seagrasses in China

Reported by：SUI Haozhi

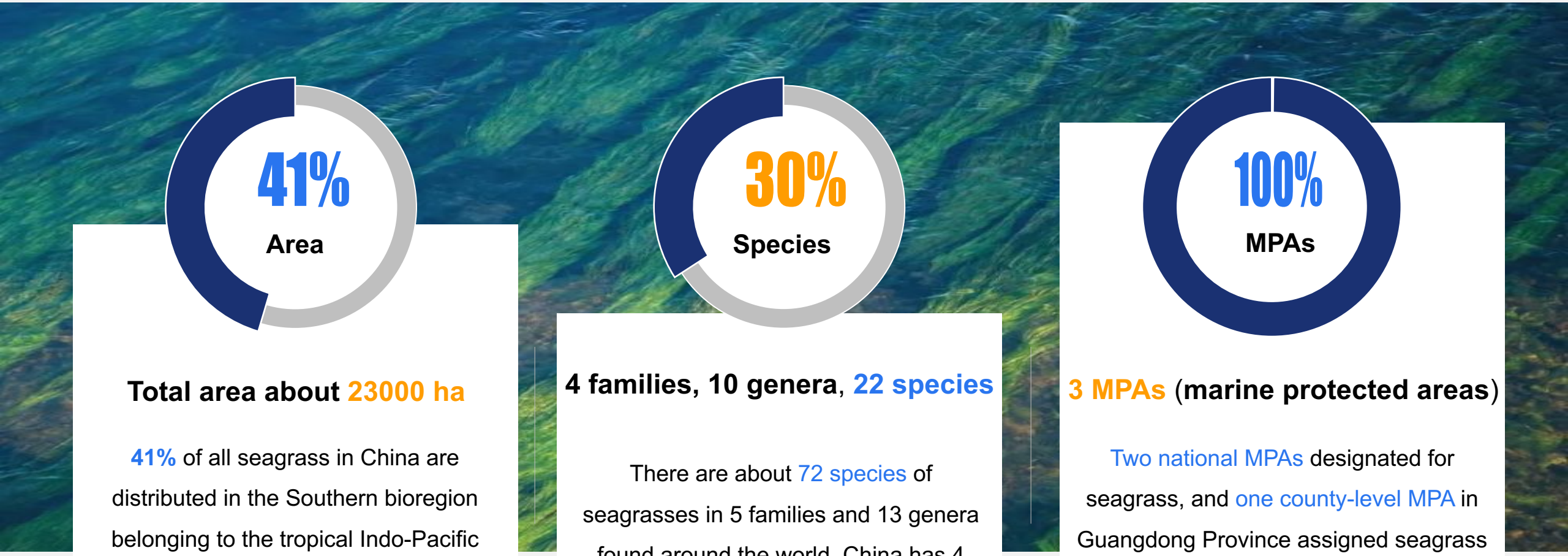
3 December 2021

Contents

01

Geographical Distribution and Status of Seagrasses in China

Distribution and Status of Seagrasses



Total area about 23000 ha

41% of all seagrass in China are distributed in the Southern bioregion belonging to the tropical Indo-Pacific bioregion of global seagrass distribution. Mainly in Hainan, Guangdong, Guangxi. (http://www.mnr.gov.cn)

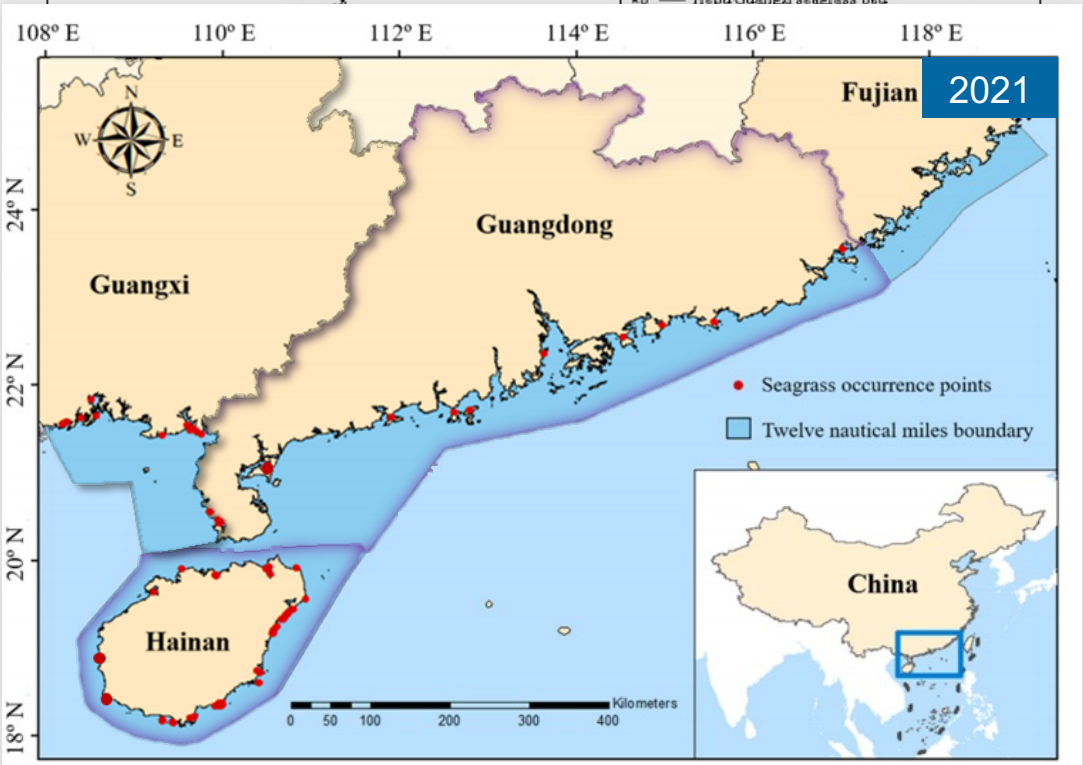
4 families, 10 genera, 22 species

There are about 72 species of seagrasses in 5 families and 13 genera found around the world. China has 4 families, 10 genera and a total of 22 species of seagrasses (Zheng et al., 2013b).

3 MPAs (marine protected areas)

Two national MPAs designated for seagrass, and one county-level MPA in Guangdong Province assigned seagrass as its protection object. The total area of the three MPAs was only 409.53 ha (Hu et.al., 2021).

Distribution and Status — **Quantity**



Seagrasses distribution in South China

Hainan

- 2008: **4** → 2021: **16** (>1 ha)
- Newly discovered：Yelin Bay, Gaolong Bay, Fengjiawan,Tanmen, Chiling, Huachang Bay, Laoye, Houhai, Tielu, Ximaozhou, Luhuitoui, Hongpai

Guangdong

- 2008: **3** → 2021: **20** (>1 ha)
- Newly discovered：Yifengxi, Lianxia, Nanao, Hengqin, Sanzao, Xinfeng, Xitou, Shuidong, Nansan, Dongshan, Xinniao, Haian, Zhelin, Baisha, Kaozhouyang, Daya Bay, Xiangzhou

Guangxi

- 2008: **2** → 2021: **7** (>1 ha)
- Newly discovered：Wuni, Chuanjiang, Zhibaoling, Dandou, Dongzhai

(Jiang Z et al., 2017)

Distribution and Status — **Area**

Hainan

2008: **817** ha → 2021: **4920** ha

Guangdong

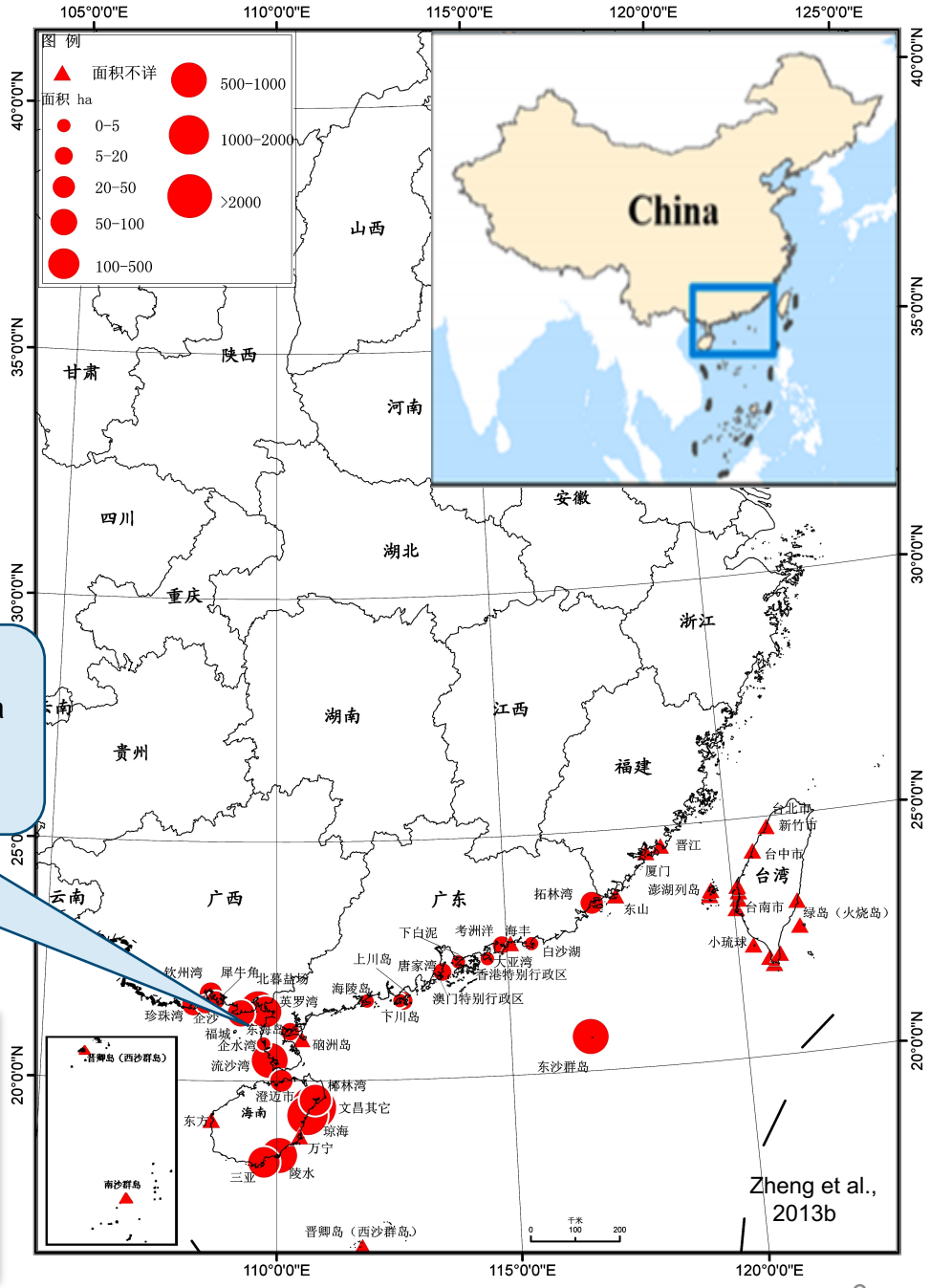
2008: **910** ha → 2021: **1586** ha

Guangxi

2008: **690** ha → 2021: **772** ha

- Destructive dredging and fishing.
- Increasing aquaculture activities.
- Wharf construction and reclamation activities.
- Pollution of industrial and domestic discharges on water and substrate quality.

Yingluo Port, Hepu: the area of seagrass has decreased from 267 ha (1994) to 32 ha (2000) and 0.1 ha (2001), and is in danger of disappearing completely.



Zheng et al., 2013b




(Jiang et al., 2020; Zhong et al., 2019; Wu et al., 2021; Fan et al., 2011)

Distribution and Status — **Species**

表1　中国海草种类及其分布
Table 1　The seagrass species and their distributions in China

序号 No.	种类 Species	海南 Hainan	广东 Guangdong	广西 Guangxi
1	丝粉藻 *Cymodocea rotundata*	+	+	
2	齿叶丝粉藻 *C. serrulata*	+		
3	二药藻 *Halodule uninervis*	+	+	+
4	羽叶二药藻 *H. pinifolia*	+	+	+
5	针叶藻 *Syringodium isoetifolium*	+	+*	+*
6	全楔草 *Thalassodendron ciliatum*	+*	+*	
7	海菖蒲 *Enhalus acoroides*	+		
8	泰来藻 *Thalassia hemprichii*	+	+	
9	喜盐草 *Halophila ovalis*	+	+	+
10	小喜盐草 *H. minor*	+		+
11	毛叶喜盐草 *H. decipiens*	+*		
12	贝克喜盐草 *H. beccarii*	+	+	+
13	矮大叶藻 *Zostera japonica*	+	+	+
14	丛生大叶藻 *Z. caespitosa*			
15	宽叶大叶藻 *Z. asiatica*			
16	具茎大叶藻 *Z. caulescens*			
17	大叶藻 *Z. marina*			
18	黑纤维虾海藻 *Phyllospadix japonicus*			
19	红纤维虾海藻 *P. iwatensis*			
20	川蔓藻 *Ruppia maritima*	+	+	+
21	长梗川蔓藻 *R. cirrhosa*		+	
22	宽叶川蔓藻 *R. megacarpa*			
	种类合计 Total	14	11	8

4 families, 10 genera, 22 species

- **9 genera, 15 species** in South China.
- 3 genera, 9 species in Bohai and Yellow Sea.
- ***Thalassia hemprichii*** is the dominant species in Hainan.

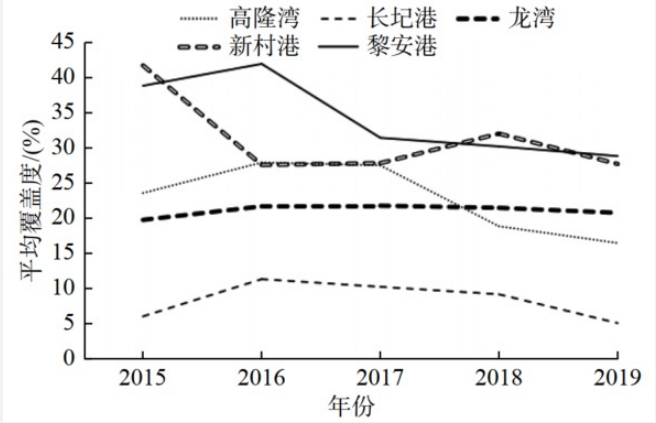
- ***Halophila ovalis*** is the dominant species in Guangdong and Guangxi.

- The **diversity of seagrasses** has been severely lost.
- The historically recorded species were not found in the corresponding provinces during current survey.

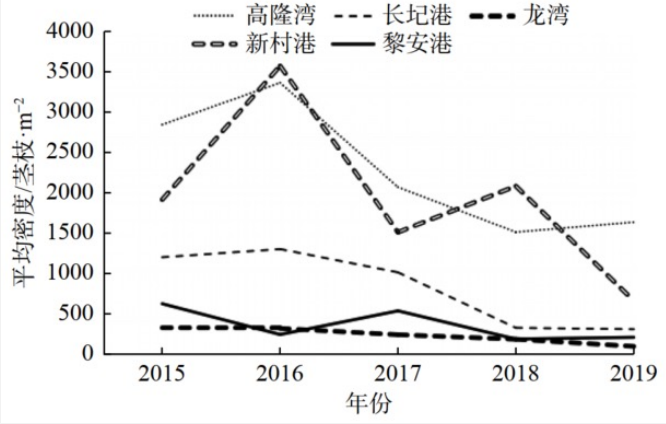
(Zheng et al., 2013b)

Distribution and Status — **Coverage, Density and Biomass**

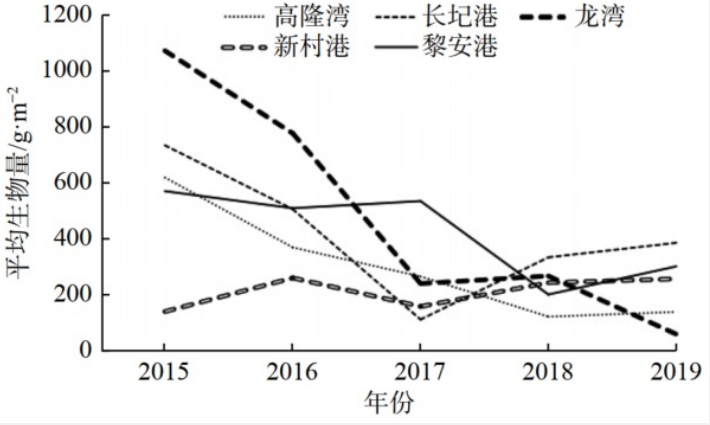
- Continuous monitoring data from 2015 to 2019:
- Seagrasses have clearly degraded from **continuous distribution** to **patchy** and then **sporadic**.



Coverage of seagrass



Density of seagrass



Biomass of seagrass

- The average coverage was 23%, showing a decreasing trend from **26% in 2015 to 17% in 2019**;
- The average density decreased from **1035 stems/m^2** to **579 stems/m^2**;
- The average biomass decreased from **625 g/m^2** to **226 g/m^2** (Wu et al., 2021).

02

Conservation and restoration Progress of seagrasses in South China

Conservation Policy

ENGLISH.GOV.CN
THE STATE COUNCIL
THE PEOPLE'S REPUBLIC OF CHINA

HOME | STATE COUNCIL | PREMIER | NEWS | POLICIES

HOME >> POLICIES >> LATEST RELEASES

China to complete drawing ecological 'red line' by 2020

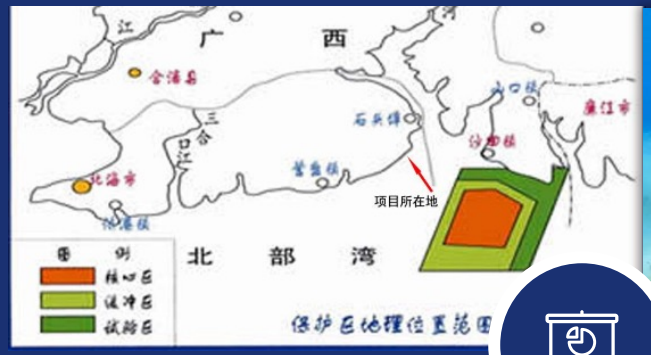
Updated: Feb 7,2017 7:49 PM Xinhua

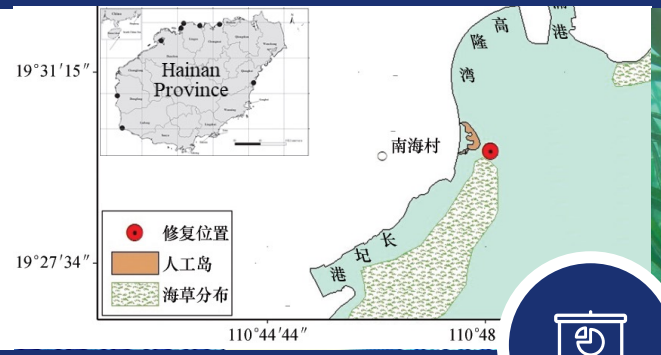
In 2017, China issued a guideline on an **ecological "red line"**.

Specifying **control measures** for seagrass ecological red line area, including:

- Prohibiting reclamation and mineral resources development;
- Restricting shellfish dredging activities;
- Prohibiting seine aquaculture, bottom trawling and illegal fishing;
- Protecting existing seagrass resources and their ecosystems;
- Strengthening the restoration of damaged seagrasses ecosystems.

Typical Restoration Project of Seagrasses





Hepu, Guangxi

Joint Laboratory for Subtropical Seagrass Restoration

Date of establishment: 21 April 2021

Study area: Beibu Gulf, Hepu Dugong National Nature Reserve

Species: 4 families, 4 genera, 7 species, with *H. ovalis* and *H. beccarii* accounting for over 90% of the total

132km²	108km²	110km²	27.21ha
core zone	experiment zone	buffer zone	Average annual seagrass area

&

Gaolong Bay, Hainan

Hainan Academy of Ocean and Fisheries Sciences

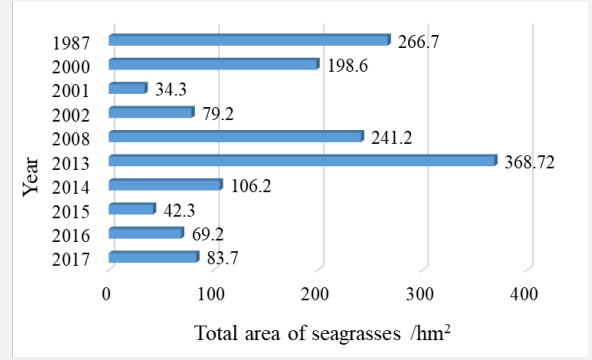
Demonstrative restoration project: 2018 - 2021

Study area: degraded seagrass area in Gaolong Bay

Single spaced transplanting of *Enhalus acoroides* and *T. hemprichii*

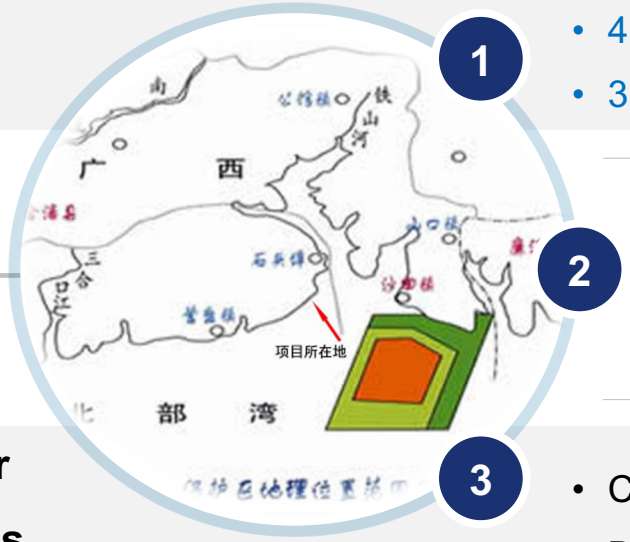
>0.06ha	72%	13%	3 times
Restoration of seagrass area	Average survival rate	Average coverage	Plants height

Typical Restoration Project of Seagrasses



- The seagrass breeding bases open in September 2019.
- 4 seasonal surveys of seagrasses per year.
- 3 monitoring of water quality during dry, rich and flat periods per year.

Hepu



- Jointly established with State Key Laboratory of Marine Resources Utilization in South China Sea (Hainan University).
- Research on conservation and breeding of seagrasses, with the goal of "restoring seagrasses and bringing dugongs home".

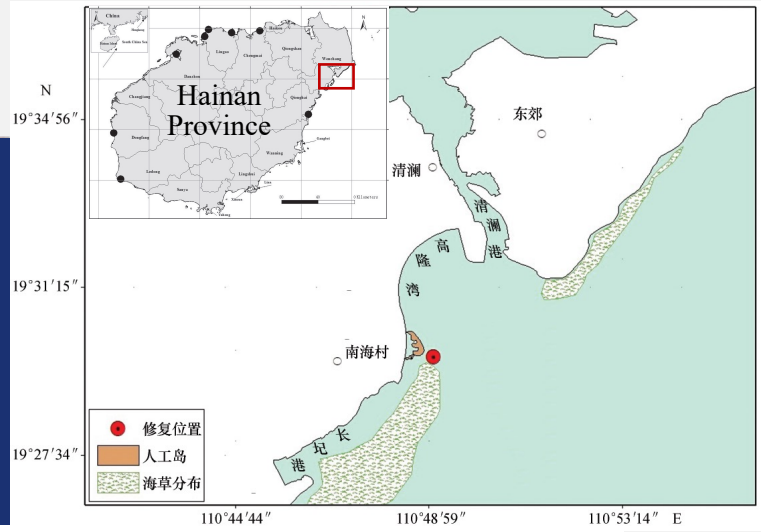
Joint Laboratory for Subtropical Seagrass Restoration

- Combining Lab control experiment & Field simulation experiment
- Building up an ‘ lab-pond-field ’ restoration technology system.

Typical Restoration Project of Seagrasses

Hainan

- Hainan Academy of Ocean and Fisheries Sciences
- First successful case of seagrass restoration in Hainan.
- Main considerations: water quality, sedimentation, and hydrodynamics.

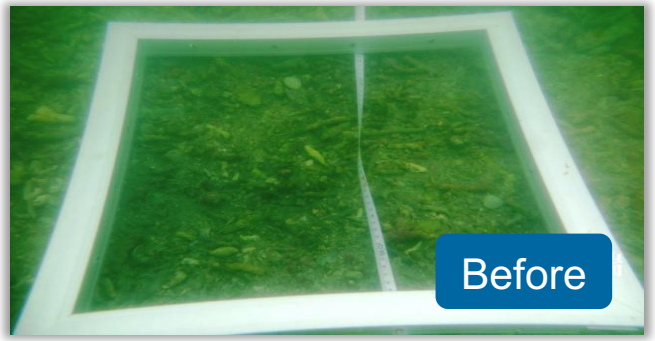


Before

- Bare beach.
- Substrate: coral debris and sediment.
- Good water self-cleaning base.
- Suitable bioturbation, salinity and transparency.
- Pre-experiments to select suitable species.

After

- Restoration more than **0.06** ha.
- *T. hemprichii*: average survival rate 56%， average tiller rate 23%， average coverage 4%， height from 5 cm to about 15 cm.
- *E. acoroides*: average survival rate 89%， average tiller rate 3%， average coverage 22%， height from 25 cm to about 70 cm.



03

Research Institutions in South China

Research Institutions

National Institutions

1. South China Institute of Environmental Sciences, Ministry of Ecology and Environment
2. South China Sea Institute of Oceanography, Chinese Academy of Sciences
3. Guangxi Hepu state dugong natural reserve
4. third institute of Oceanography, Ministry of Natural Resources
5. Hainan University
6. State Key Laboratory of Tropical Oceanography
7. State Key Laboratory of Marine Resources Utilization in South China Sea

Provincial Institutions

1. Guangxi Marine Environment Monitoring Center station
2. Guangxi Marine Environment and Coastal Wetland Research Center
3. Hainan Academy of Marine and Fishery Sciences
4. North Sea Marine Environment Monitoring Centre Station
5. Joint Laboratory for Subtropical Seagrass Restoration
6. Hainan Tropical Ocean University

04

Seagrass Management Plans

Management Plans

Policies

1. **Legislation and Administration**
   - Establishing Regulations on Administration for Seagrass Protection, making the protection legally enforceable.
2. **Active Marketing and Education**
   - Instilling in the public consciousness of environmental protection by movies, TV programmers, posters…
3. **Control of human activities**
   - Reducing the destroy and pollution from aquaculture, fishery, construction work and dismantling of ships.

Research

1. **Deep Research and More Researchers**
   - Supporting scientific research on seagrass, strengthening international academic exchange…
2. **Ecological Restoration on Seagrasses**
   - Conducting experiments on artificial restoration and exploring the feasibility of natural restoration.
3. **Database of Seagrass**
   - Collecting, saving, and updating the existing data and information regularly with high integrity and accuracy.

South China Institute of
Environmental Sciences, MEE

2021

SCS SAP Regional Working Group on Seagrass

Thank you !