

YSLME Phase II Project

Atlas
of Demonstration zone of Integrated
Ecosystem-based Investigation on Wetland of
Jiaozhou Bay of Qingdao

North China Sea Environmental Monitoring Center, State Oceanic Administration
First institute of oceanography, Ministry of Natural Resources
Qingdao Agricultural University
Ocean University of China
Qingdao Bird Watching Association
Qingdao Shipowners Association

December 2019

Contents

1 BACKGROUND OF JIAOZHOU BAY	1
2 WETLAND VEGETATION OF JIAOZHOU BAY	4
3 WETLAND BIRDS OF JIAOZHOU BAY.....	26
4 ACTIVITIES	54

1 Background of Jiaozhou Bay



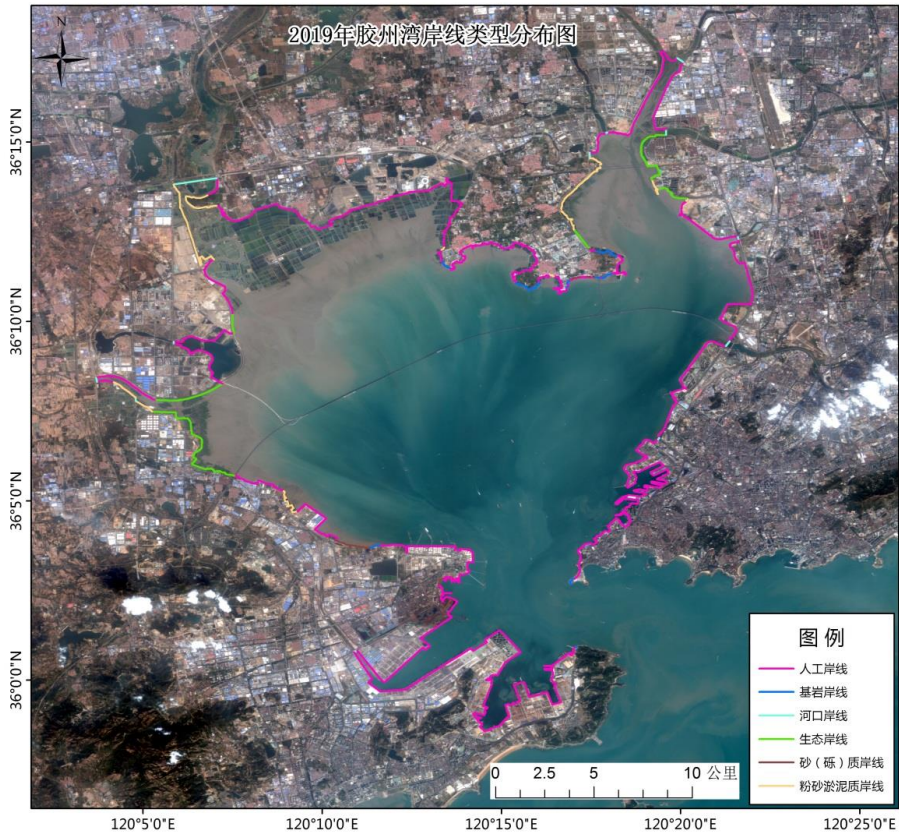
Remote Sensing Image of Jiaozhou Bay, Qingdao



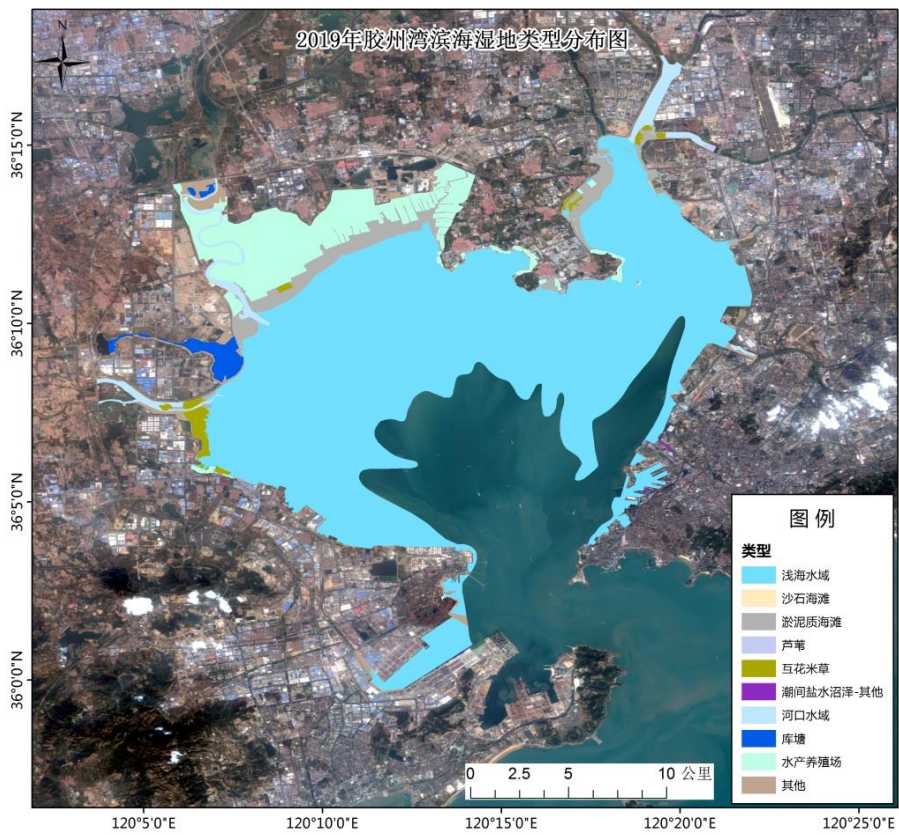
Qingdao Jiaozhou Bay National Ocean Park



Jiaozhou Bay national Ocean Park

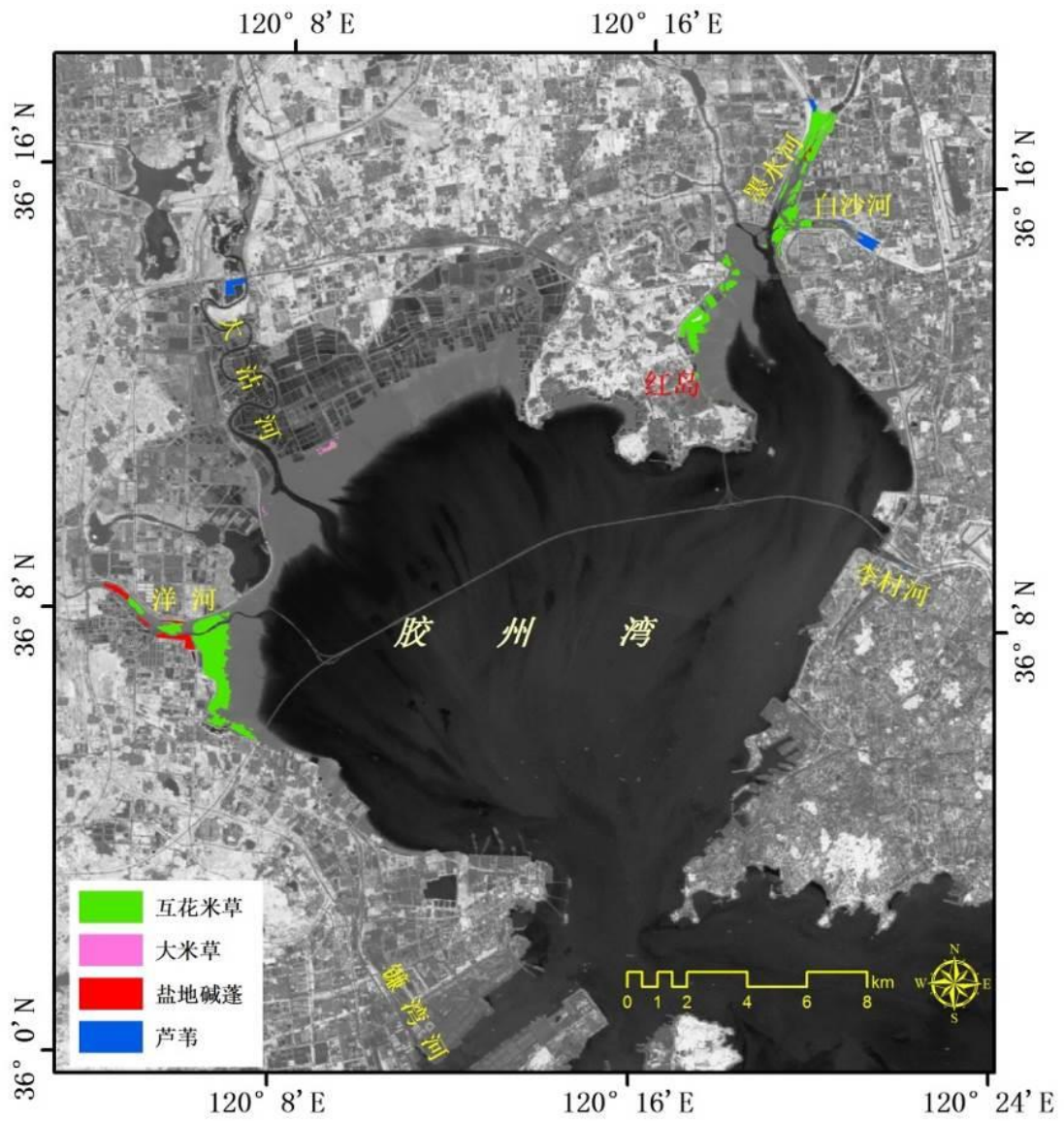


Coastline types of Jiaozhou Bay in 2019



Wetland types of Jiaozhou Bay in 2019

2 Wetland vegetation of Jiaozhou Bay



Remote Sensing Image of major vegetation types in Jiaozhou Bay in autumn



Field investigation



Field investigation



Field investigation on wetland vegetation



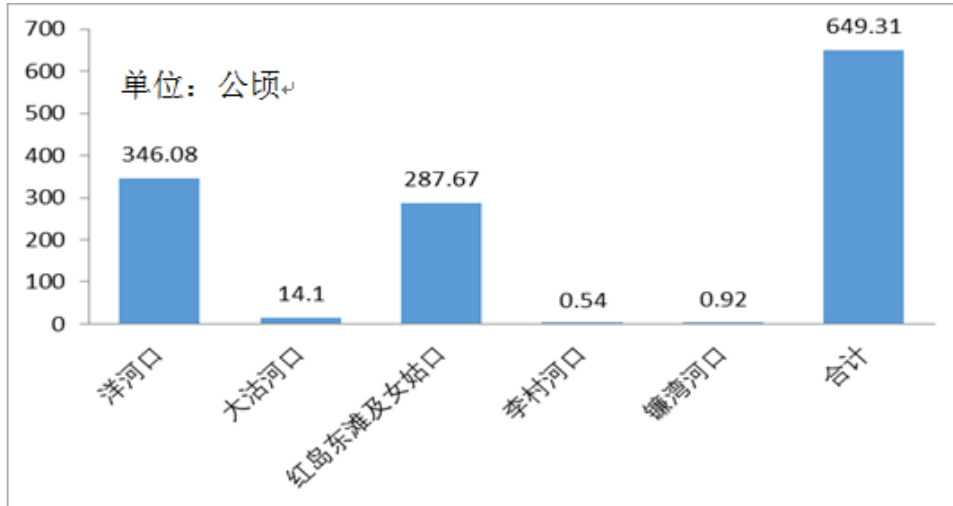
Field investigation on wetland vegetation



Field investigation on wetland vegetation



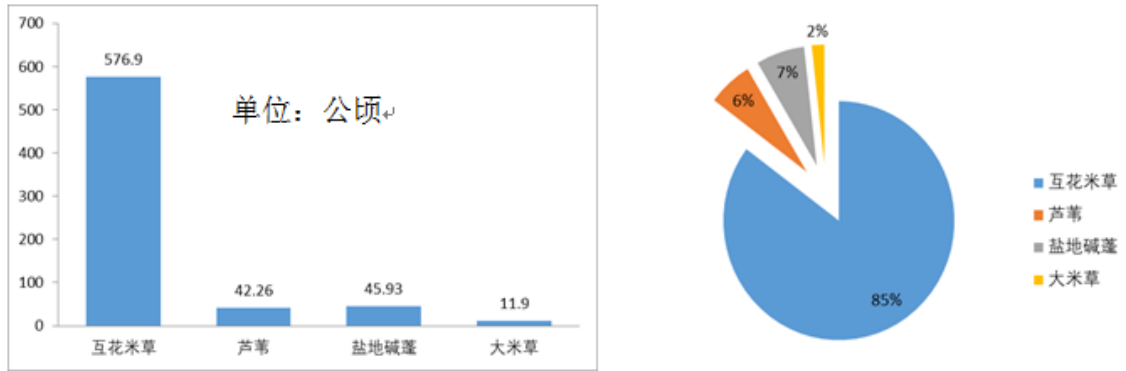
Field investigation on wetland vegetation



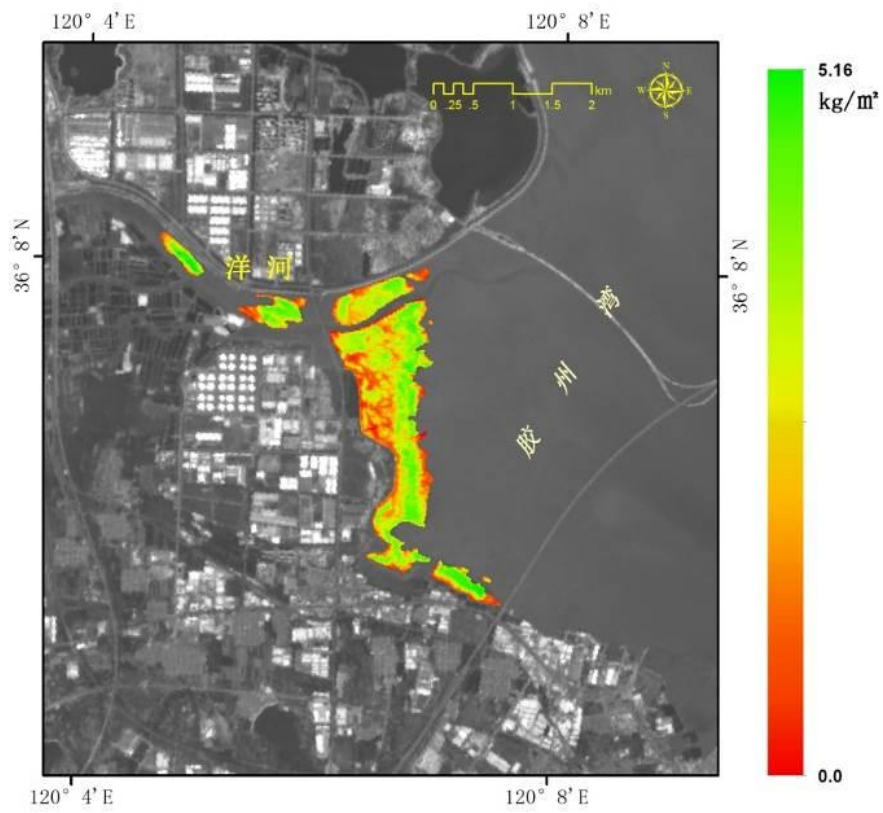
Distribution of wetland vegetation in Jiaozhou Bay in autumn



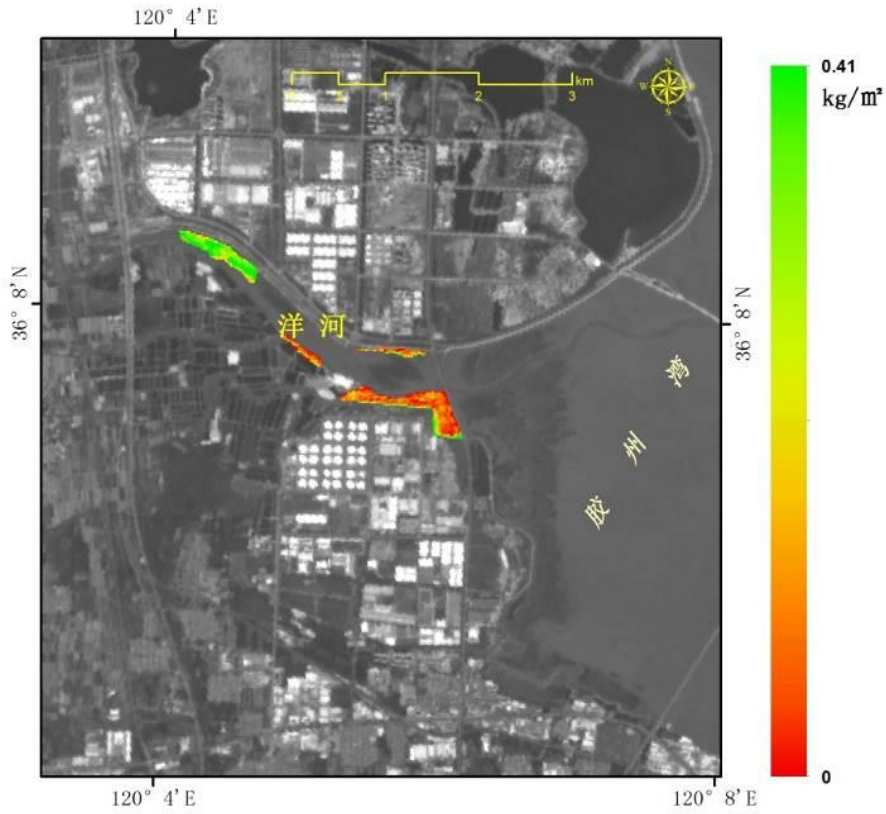
UAV Images of *Suaeda salsa* and *Spartina alterniflora* at the Yanghe River Estuary and within the river channel



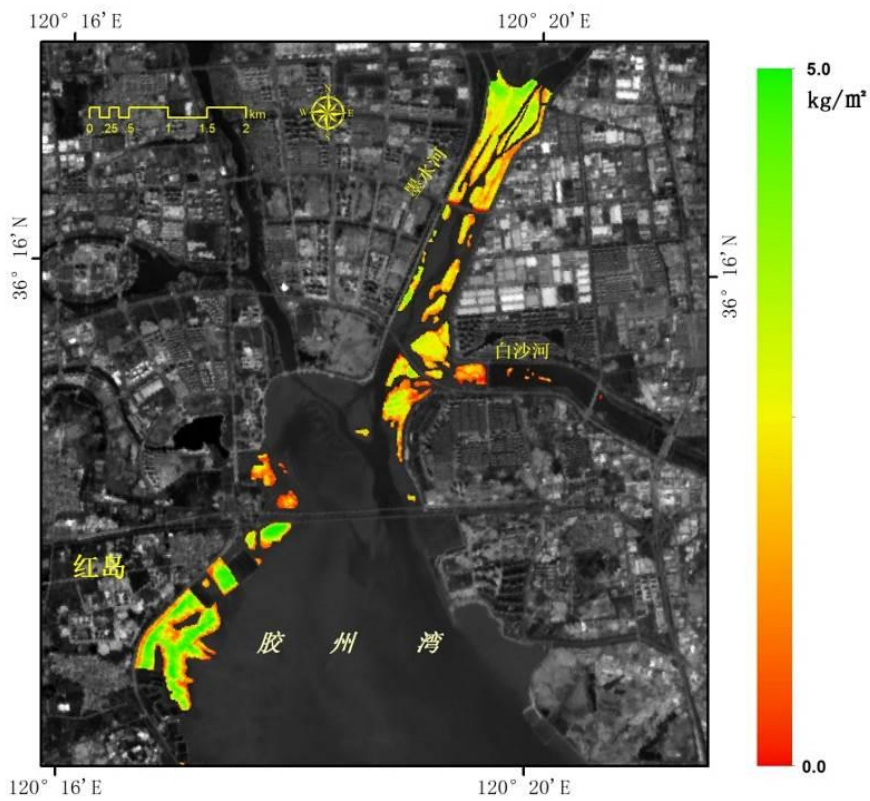
Statistics of the area of major vegetation types in Jiaozhou Bay in autumn



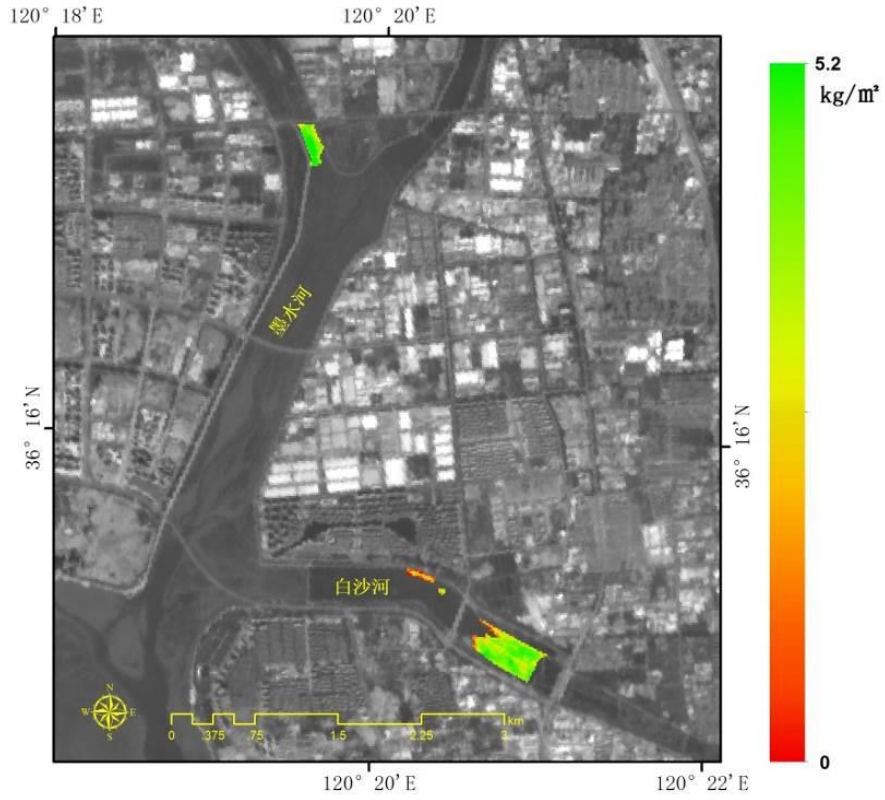
Estimation on the biomass of *Spartina alterniflora* as Yanghe River Estuary



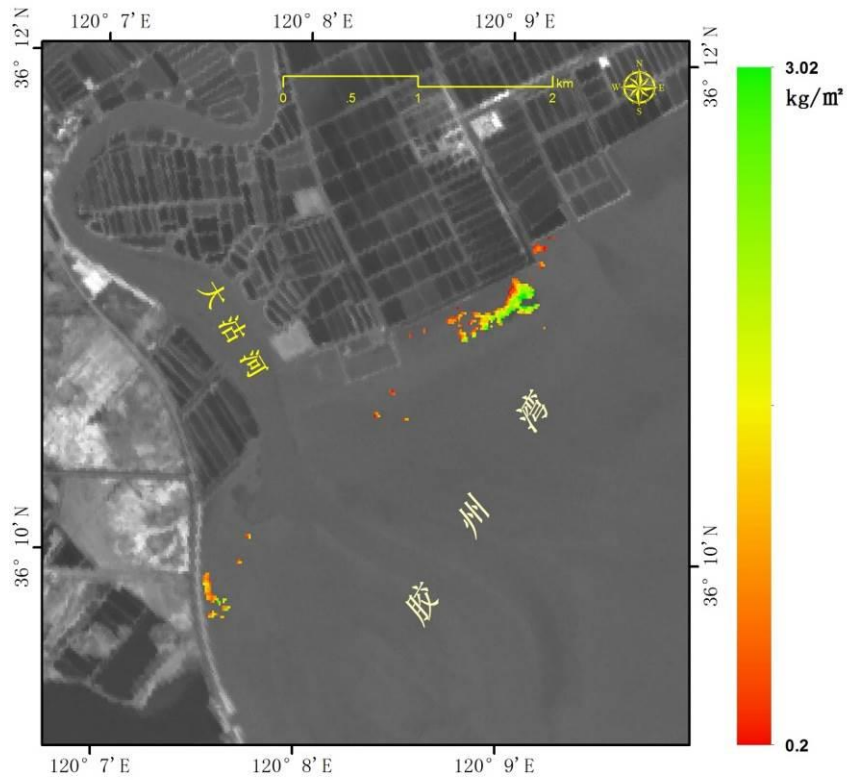
Estimation on biomass of *Suaeda salsa* in Yanghe River Estuary



Estimation on the biomass of vegetation in Dongtan and biomass estimation by remote sensing in Dongtan and Nugukou of Hongdao



Estimation on biomass of *Phragmites communis* at Moshui River and Baisha River Estuaries



Estimation on biomass of *Spartina anglica* at Dagu River Estuary



Kalimeris integrifolia



Suaeda salsa



Solanum nigrum



Cephalanoplos setosum



C. chinense



Tamarix chinensis Lou



Jimsonweed



Suaeda glauca

Dominant native species and typical plant community in Jiaozhou Bay wetland (1)



Sapium sebiferum (L.) Roxb



Broussonetia papyrifera



Liriope spicata (Thunb.) Lour.



Albizia julibrissin Durazz.



Malus micromalus



Photinia serrulata Lindl



Spiraea japonica L. f.



Jasminum nudiflorum Lindl.

Dominant native species and typical plant community in Jiaozhou Bay wetland (2)



Spartina alterniflora



Alternanthera philoxeroides



Conyza canadensis



Ipomoea purpurea



artemisiifolia



Trifolium pratense



Trifolium repens



Spartina anglica



Phytolacca americana



Datura innoxia



Robinia pseudoacacia



Nasturtium



Chenopodium glaucum



Inca peacock grass

Typical invasive species in Jiaozhou Bay wetland



Key protection of wild plants in Jiaozhou Bay wetland (*Glycine soja*)



Phragmites communis at Licun River Estuary



Phragmites communis at Baisha River Estuary



Cattail at Baisha River Estuary



Suaeda salsa at Moshui River Estuary



Spartina anglica on the beach of Hongdao



Spartina anglica at Dagu River Estuary

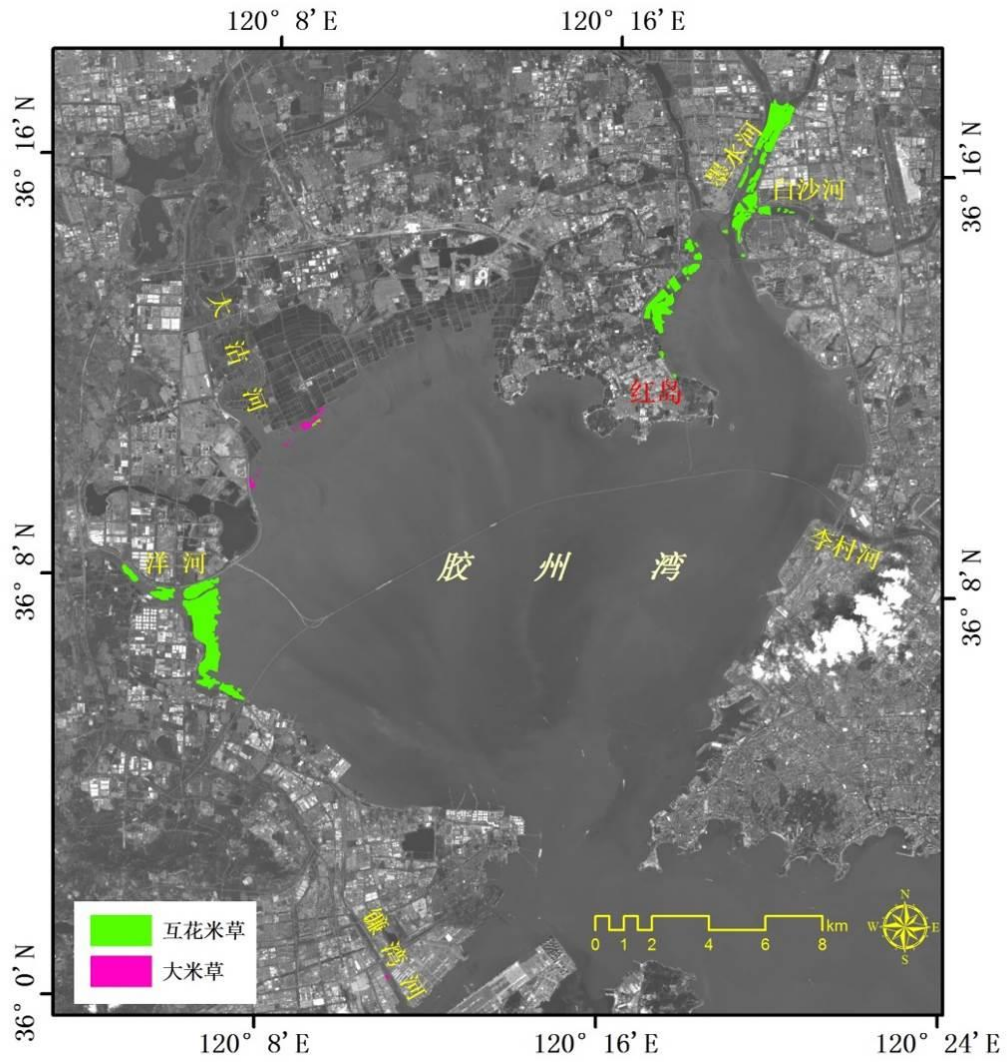


Spartina alterniflora at Yanghe River Estuary

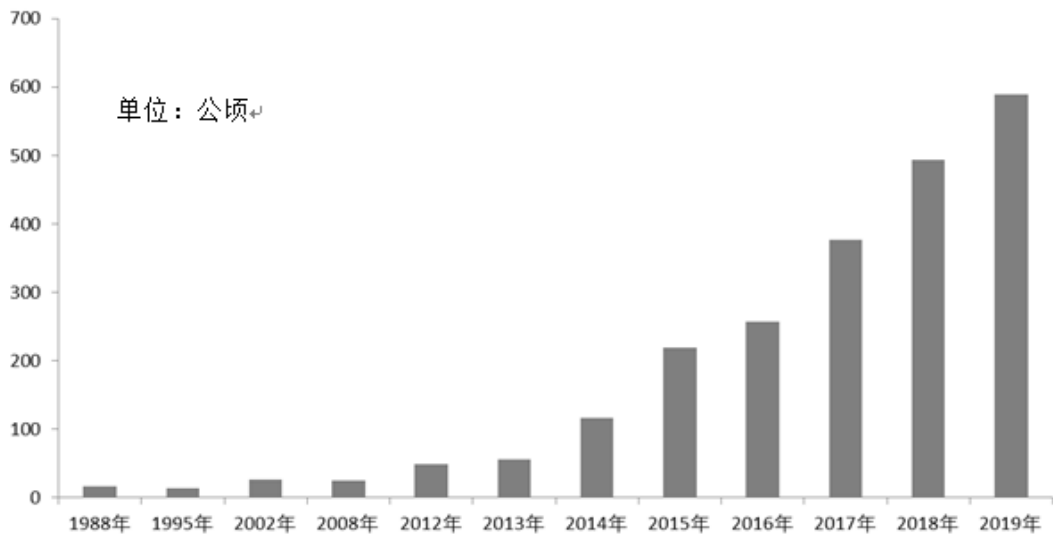


Suaeda salsa at Yanghe River Estuary

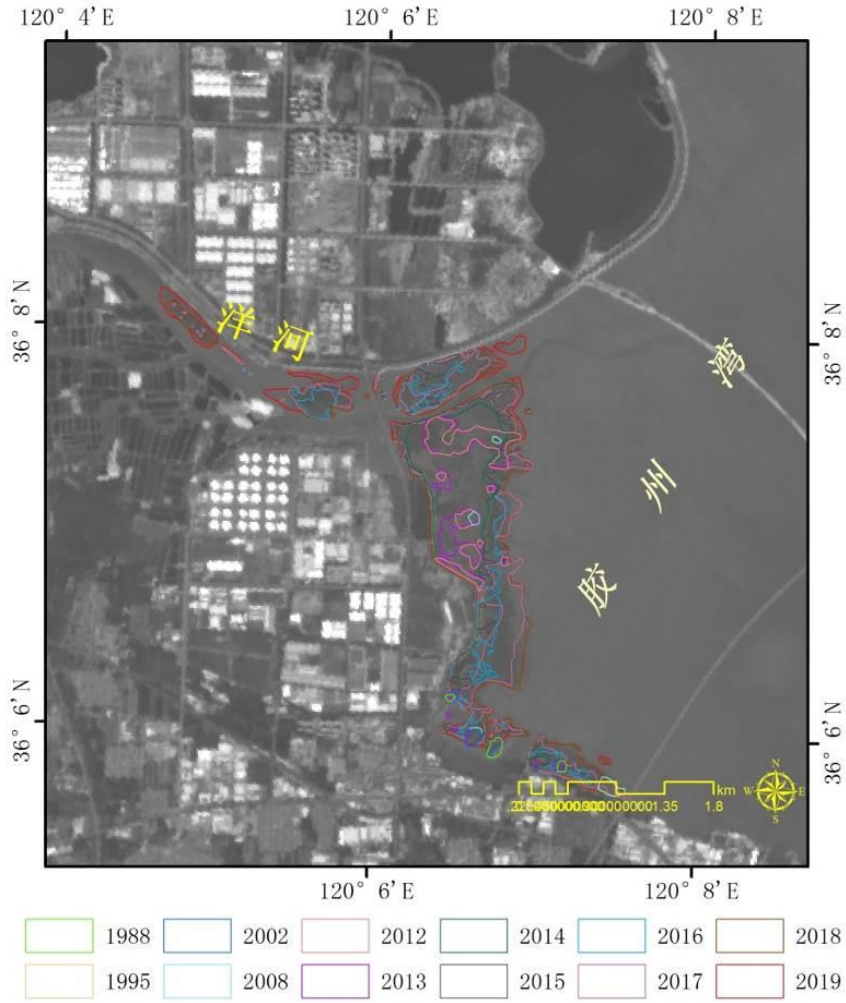
Site photos of wetland vegetation in Jiaozhou Bay



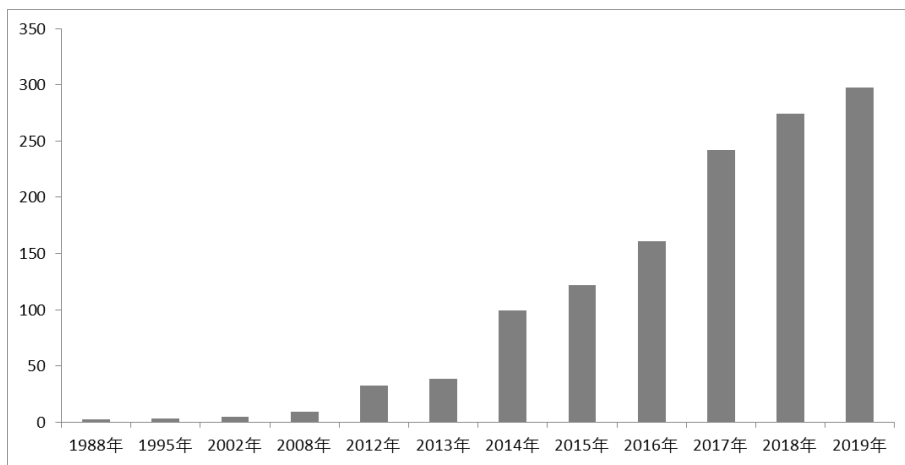
Distribution of *Spartina alterniflora* and *Spartina anglica* in Jiaozhou Bay in 2019



Statistics of the area of *Spartina alterniflora* in Jiaozhou Bay from 1988 to 2019



Dynamic monitoring on *Spartina alterniflora* at Yanghe River Estuary and its surrounding tidal flats



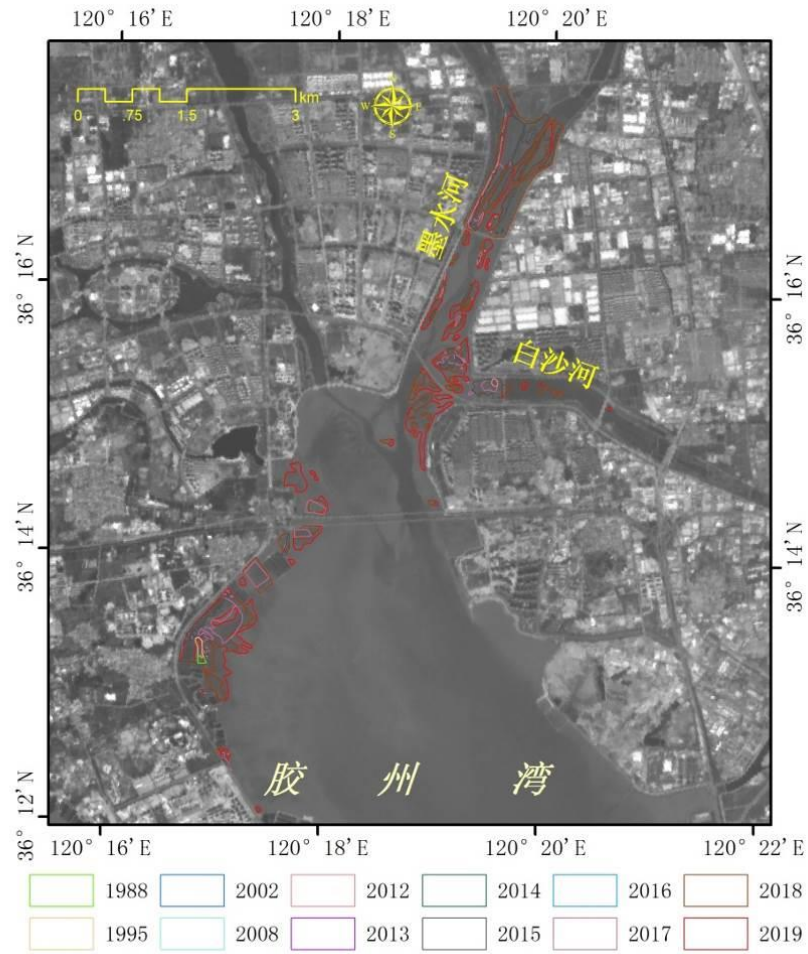
Statistics of the area of *Spartina alterniflora* at Yanghe River Estuary from 1988 to 2019



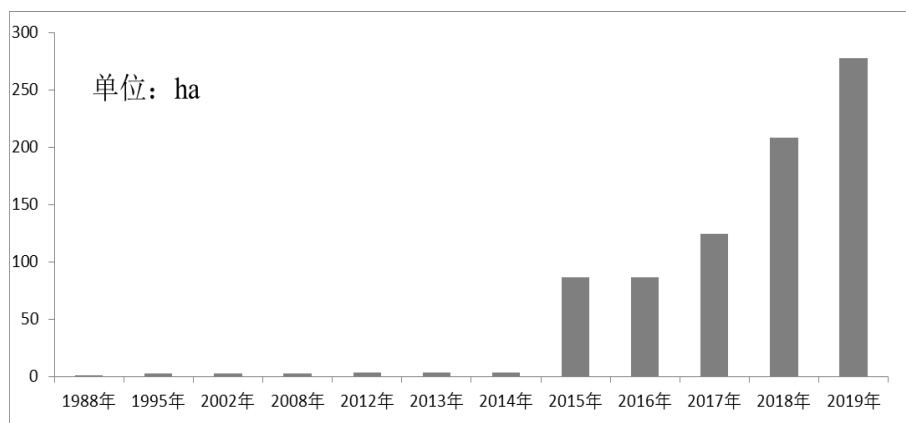
A large area of *Spartina alterniflora* at Yanghe River Estuary



Yanghe river *Spartina alterniflora*



Monitoring results of *Spartina alterniflora* in mudflats, Moshui River and Baisha River Estuary in the east of Hongdao



Statistics of *Spartina alterniflora* distribution area in the east of Hongdao, Nangukou and nearby estuary from 1988 to 2019



Spartina alterniflora dense growing area in Hongdao tidal flats



Hongdao mudflat *Spartina anglica* and *Spartina alterniflora*



Hongdao mudflat *Spartina alterniflora* (2017)



Hongdao mudflat *Spartina alterniflora* (2019)

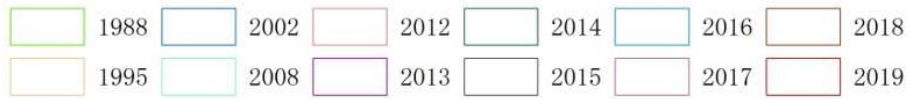
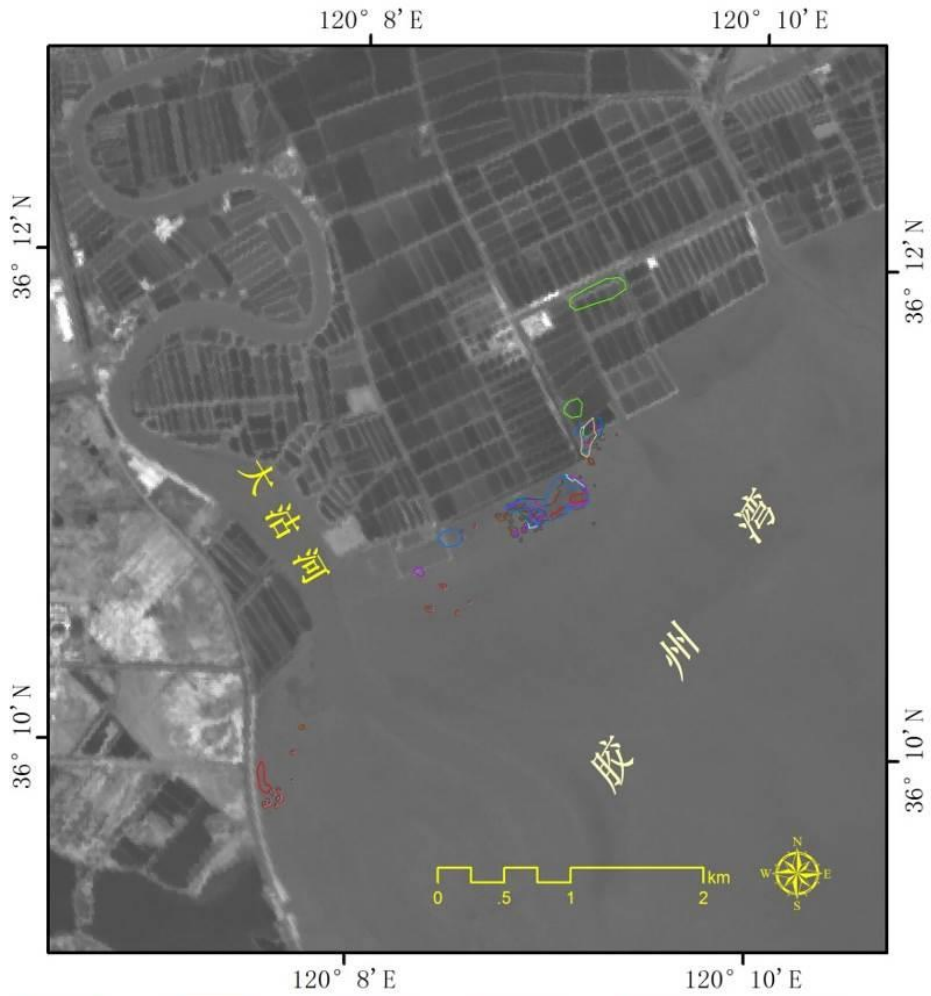
The initial invasion area of *Spartina alterniflora* at the white sand estuary



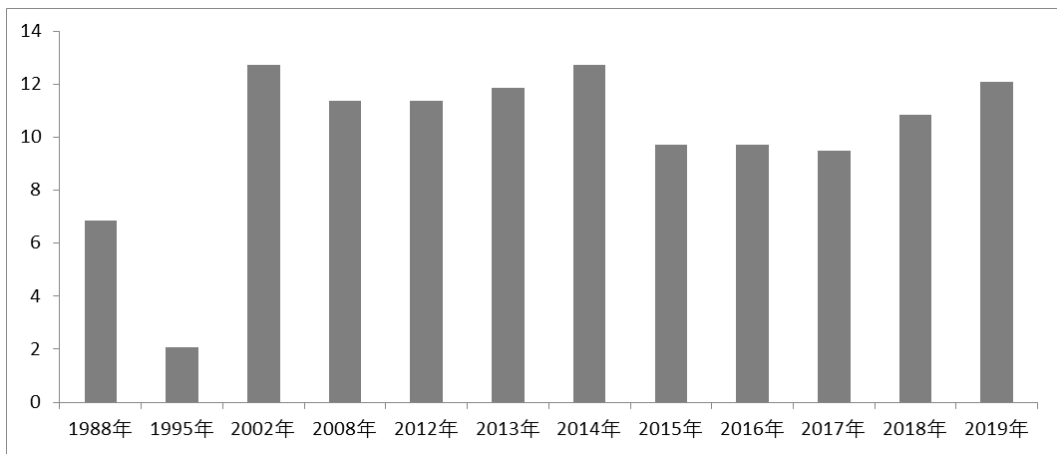
The initial invasion area of *Spartina alterniflora* at the Baisha estuary



Spartina alterniflora at the Baisha estuary has covered a large area



Remote sensing monitoring results of *Spartina anglica* in Dagu estuary from 1988 to 2019



Spartina anglica area statistics of Dagu estuary from 1988 to 2018 (unit: ha)

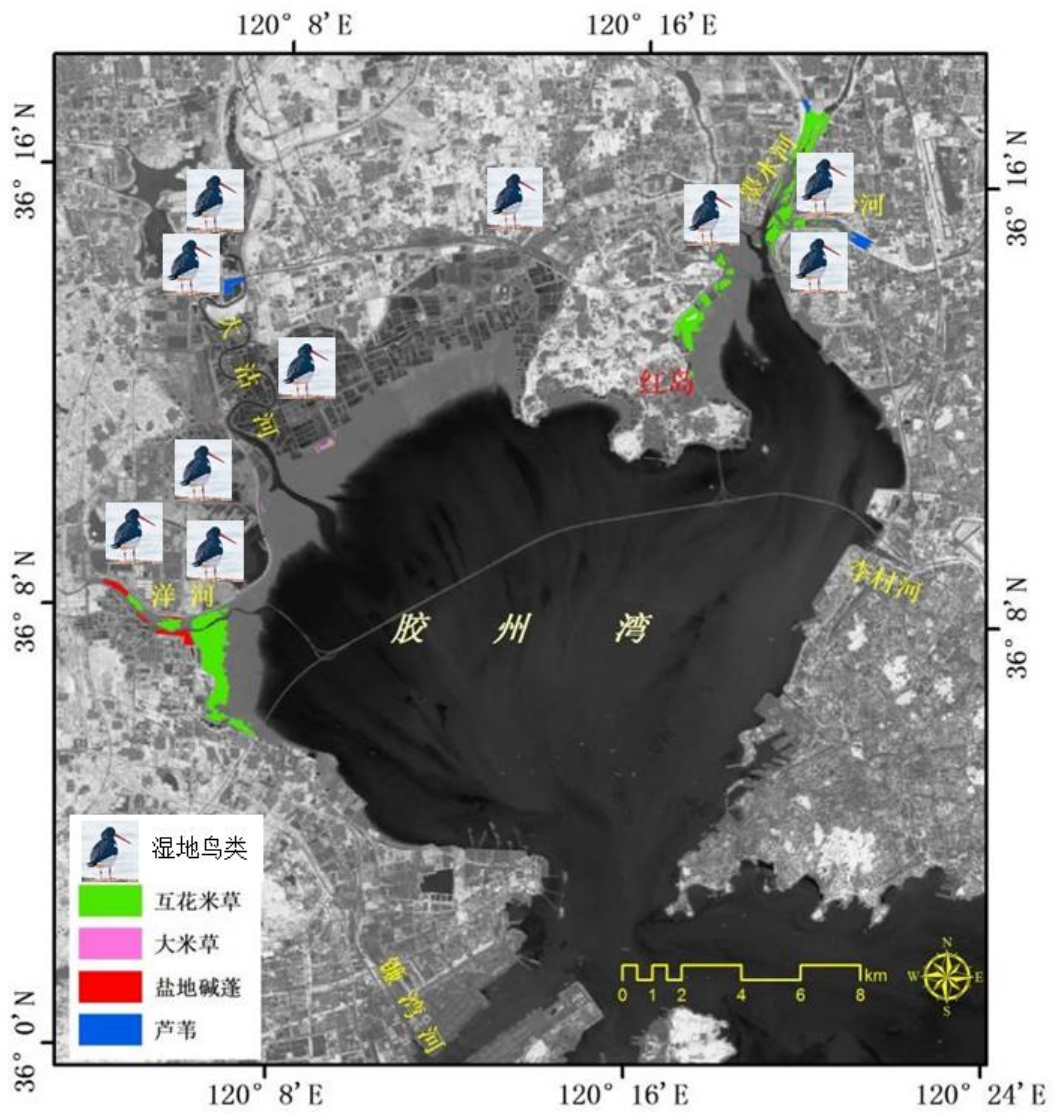


Spartina anglica of Dagu estuary



Spartina anglica and *Spartina alterniflora* of Dagu estuary

3 Wetland birds of Jiaozhou Bay



Distribution diagram of wetland birds in Jiaozhou Bay



Wintering waterbird habitat at Dagu estuary



East wind salt field overwintering water bird habitat



Abandoned breeding ponds in the Yuejin estuary are habitat for water birds



Big sand bird habitat



Habitat of white sand estuary in spring and summer



Survey of birds in wetland in Jiaozhou Bay



Survey of birds in wetland in Jiaozhou Bay



Survey of birds in wetland in Jiaozhou Bay



Survey of birds in wetland in Jiaozhou Bay



Survey of birds in wetland in Jiaozhou Bay



Thalasseus bernsteini



Aythya baeri



Calidris alpina



Calidris canutus



Numenius arquata



Limosa lapponica



Calidris tenuirostris



Numenius madagascariensis



Arenaria interpres



Recurvirostra avosetta



Calidris ruficollis



Phalaropus lobatus



Philomachus pugnax



Charadrius dubius



Glareola maldivarum



Xenus cinereus



Numenius arquata



Calonectris leucomelas



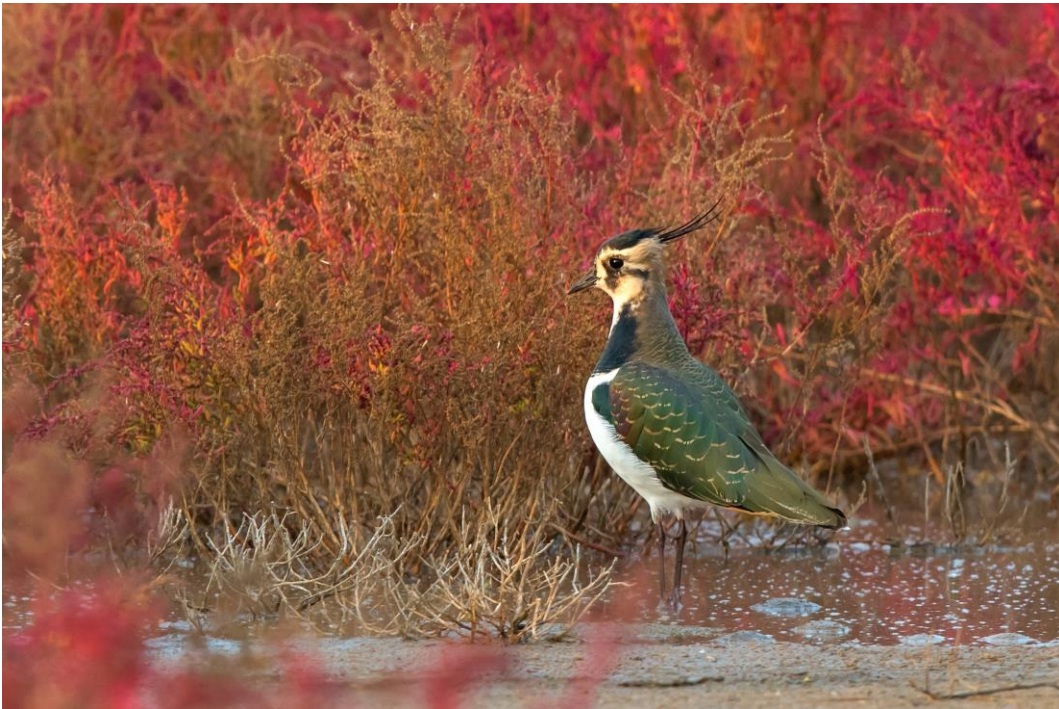
Grus leucogeranus



Anas querquedula



Cygnus Cygnus



Vanellus vanellus



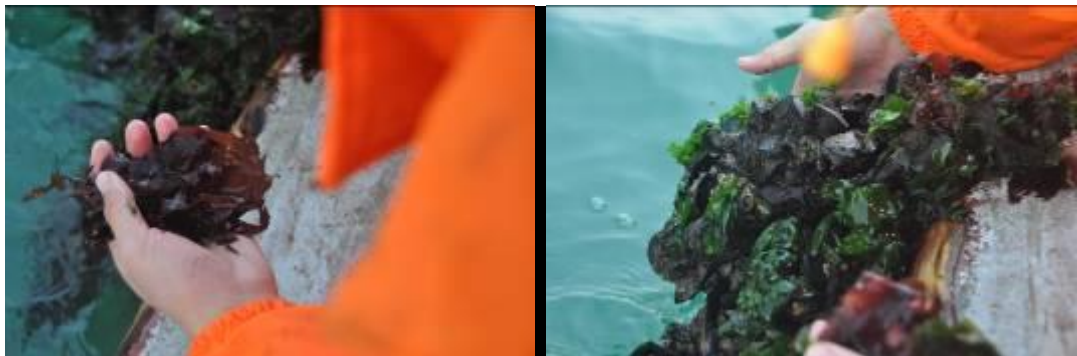
Sunset bird waves in Jiaozhou Bay



Calidris alpina wintering in Dagu estuary beach



Haematopus ostralegus wintering in Dagu estuary





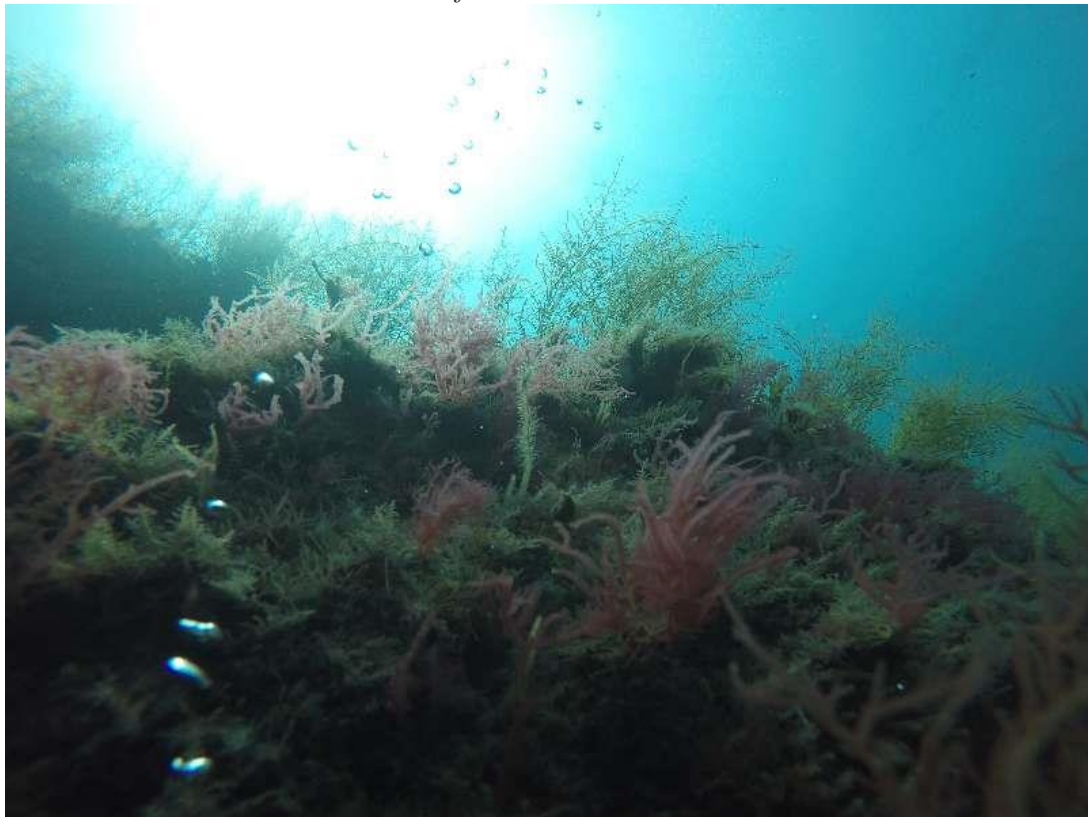
Representative macroalgae of Jiaozhou Bay



Undaria pinnatifida near Dagong Island



Chorda filum near Chaolian Island



Scagassum near Chaolian Island



Bryozoa (Chaolian Island)



Rhopilema esculentum (Chaolian Island)



Sebastiscus marmoratus (Chaolian Island)



Sebastes nigricans and Asterinidae (Chaolian Island)



Shrimp (Chaolian Island)



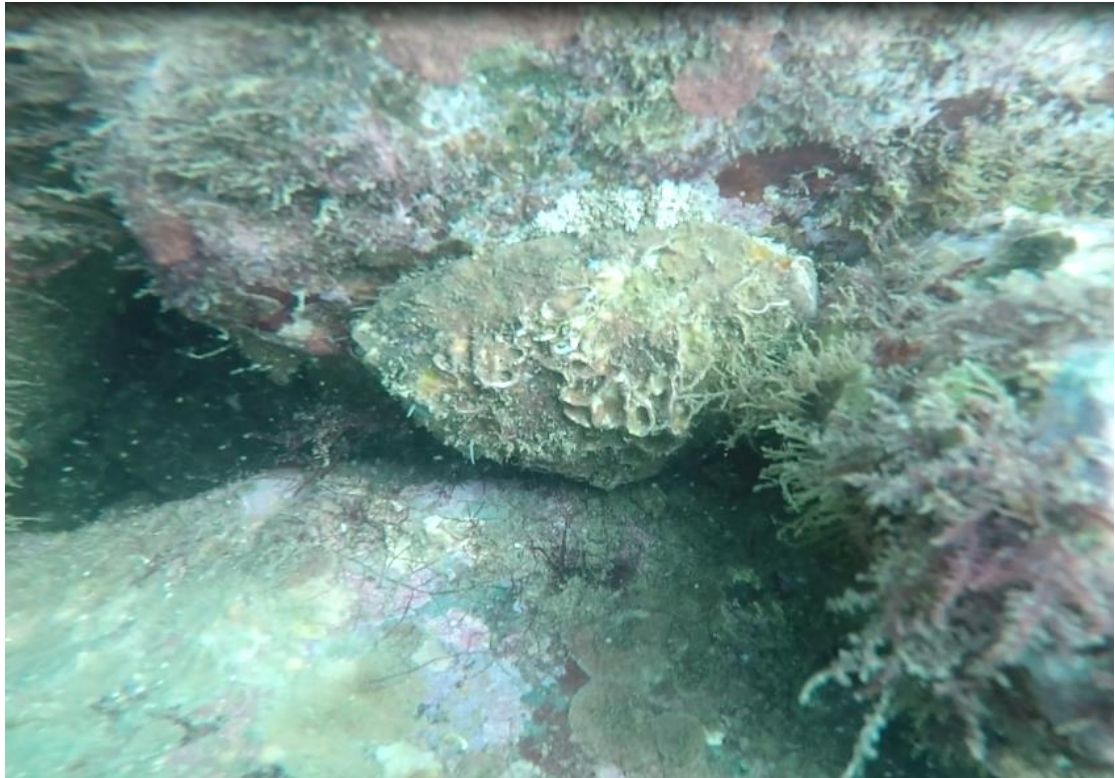
Syngnathus sp. (Chaolian Island)



Glossodoris sp. (Chaolian Island)



Thamnaconus sp. (Chaolian Island)



Haliotis discus (Chaolian Island)



Rapana venosa (Chaolian Island)

4 Activities



Project Launch Meeting



World Oceans Day and National Oceans Day publicity activities in 2019



Technicians lead the students to sample Marine life



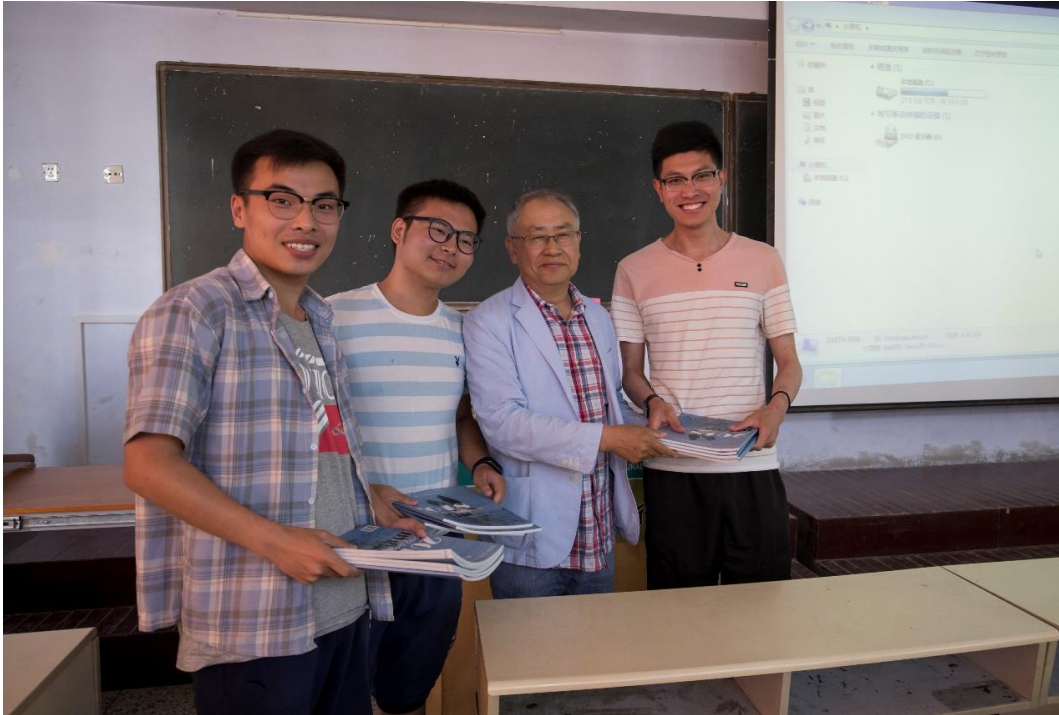
Technicians teach students about phytoplankton surveys and red tides



Popular Science Publicizing of Wetland Bird Protection in Qingdao Agriculture University



Students from Qingdao Agricultural University are listening



The Bird Watching Association presented the annual magazine to the students of Qingdao Agricultural University



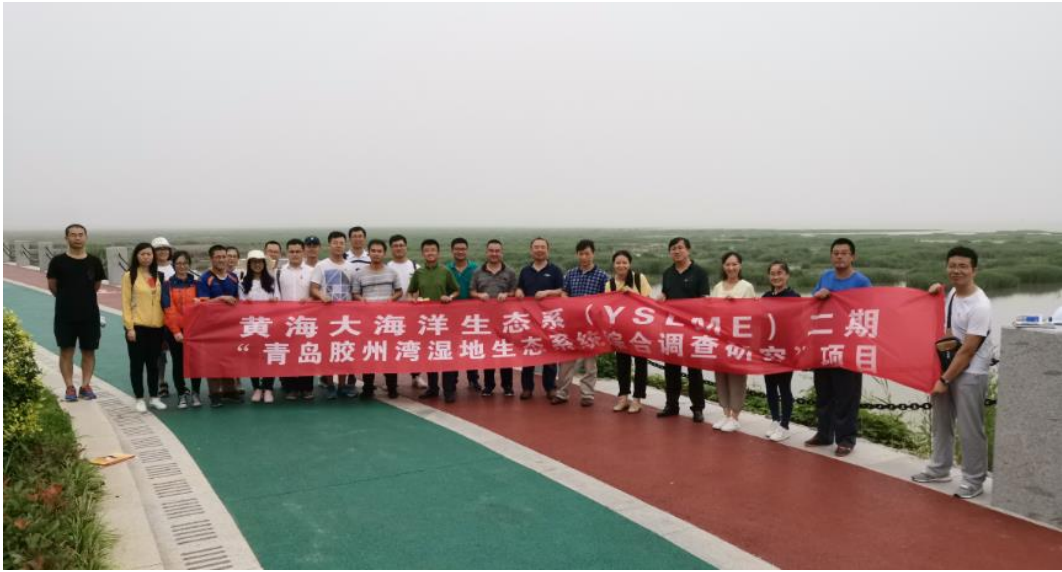
Secretary general Yu Tao delivered a lecture



The children listened attentively



Secretary general Yu Tao presented the bird club annual to the students after class



Ecological investigation and practice activities of Jiaozhou Bay wetland——*Spartina alterniflora* investigation and practice



Ecological investigation and practice activities of Jiaozhou Bay wetland——*Spartina alterniflora* investigation and practice



Ecological investigation and practice activities of Jiaozhou Bay wetland——*Spartina alterniflora* investigation and practice



President Xue Lin was on the spot to explain and guide the students to observing the birds



Secretary general Yu Tao led the students to watch birds



The students were enthusiastic about the bird-watching experience



President Xue led the students to promote the birds to farmers



All the teachers and students taking part in the bird watching and patrol activities



Mr. He Xiaomei, the teacher of the bird club, distributed binoculars to the students



Teacher Xu Keyang guided the students to watch birds



Xu Keyang, vice President of ccpit xiamen explained on the spot



Students use mobile phones to photograph birds in their field of vision



For the first time, a child sees a magical bird in a monocular field



The students watched the birds carefully



The students presented a leaflet to the construction worker about bird protection



Students handed out bird protection leaflets to the housekeeper



Group photo of all teachers and students



Board the ship ready to go



Take a boat out to the island



Xu Keyang, vice-chairman of ccpit xiamen, introduced the event



Xu teacher on-site guide citizens watching birds



Found the bird



Group photo



Underwater ecosystem diving survey in Dagong island



Biological samples collected in the underwater ecosystem survey of Dagong island