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

North China Sea Environmental Monitoring Center (NCSEMC), SOA
March. 2019
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1. **Proponent and collaborating partners**

**Proponent:**
North China Sea Environmental Monitoring Center (NCSEMC), SOA

**Proposed collaborating partners:**

- **Ocean University of China**
  Participate in seagrass bed survey and responsible for underwater sampling.

- **Qingdao Agricultural University**
  Responsible for organizing public welfare activities of wetland vegetation investigation.

- **First Institute of Oceanography, Ministry of Natural Resources**
  Responsible for remote sensing monitoring of Jiaozhou Bay wetland and wetland vegetation.

- **Qingdao Birdwatching Association**
  Participate in bird survey and organize public welfare activities such as bird monitoring, etc.

- **Qingdao Shipowner’s Association**
  Participate in seagrass bed survey and responsible for diving survey.
North China Sea Environmental Monitoring Center (NCSEMC), SOA now affiliated to Ministry of Natural Resources of the PRC

- Established in 1965.
- Responsible sea area from Yalu River Estuary, Liaoning Province to Xiuzhen River Estuary, Jiangsu Province, including Bohai Sea and north and central part of Yellow Sea.
- Coastline: 6086.6km (Mainland).
Main tasks of NCSEMC

- Monitoring, Investigation and Assessment on Marine Ecosystem
- Marine ecological restoration
- Investigation of islands
- Monitoring, prewarning and treatment on Marine Emergency Events & Ecological Disasters
- Examination and Identification of Water Quality, Sediment, Biology and Oil Fingerprint
- Relevant Applied Researches
2. Background and justification

- The Jiaozhou Bay bordering on the West of the South Yellow Sea (120° 05'36"~120° 19'01"E, 36° 07'07"~ 36° 15'17"N), is a semi-enclosed natural bay with total area of 370.6km² and an average water depth of 7m.

- There are some rare species and valuable ecosystems in the Jiaozhou Bay Region, such as Amphioxus and seagrass bed.

- Jiaozhou Bay is one of the key Eco-Monitoring Zones in National Marine Monitoring Plan of China.
Jiaozhou Bay wetland Ecosystem

- Jiaozhou Bay wetland with the area of about 260km² has been included in the key wetland protection list of China.
- The biological resources are diversified, including 74 species of plants, 337 species of birds, 162 species of planktons, 163 species of benthos and 106 species of nektons.
- The Jiaozhou Bay wetland is amongst the most important stopover areas in Asia-Pacific region for migratory birds and is also selected by WWF as an important bird area in its “Ecoregions 2000” program. There are some precious species of birds, such as Chinese Crested Tern (designated CR by IUCN).
NCSEMC has carried out the environmental monitoring in the coastal area of Qingdao for about 20 years, and obtained large amounts of environmental data. In recent years, NCSEMC initiated to cooperate with other universities, institutes and NGOs to conduct the investigation on the ecosystem of Jiaozhou Bay.
The Municipality of Qingdao has been paying high attention to the ecosystem protection and restoration of Jiaozhou Bay.

The ecosystem problems of Jiaozhou Bay Region
- seagrass beds almost disappeared,
- the number of Amphioxus reduced,
  - *The distribution of Spartina alterniflora* increased

Therefore, it is necessary to conduct integrated investigation to master the overall status and the variation trend of the ecosystem of Jiaozhou Bay Region so as to provide an effective and scientific basis to support the policy and decision-making.
Correlation with YSLME-II program

- This project accorded with the component 4 of the YSLME Phase II Project addresses “improving the ecosystem carrying capacity with respect to supporting services”, and in Outcome 4.1 of Component 4 entitled “maintenance of current habitats and the monitoring and mitigation of the impacts of reclamation”.

3. Objectives, Outputs and Methods

Objectives
The main objectives of this project are to conduct the integrated investigation on the wetland ecosystem of Jiaozhou Bay, to master the overall status and the variation trend of the typical ecosystem of Jiaozhou Bay wetland, to reinforce the public awareness of participation in protection and monitoring of the wetland ecosystem, to establish a wetland ecosystem monitoring mode combining professional monitoring institutions and public participation and to provide the municipal government of Qingdao with the fundamental information for policy- and decision making of the governments.
Expected Outputs
The study is expected to deliver the following results:
- Report on the status of the wetland ecosystem of Jiaozhou Bay
- Atlas of the integrated investigation on wetland ecosystem of Jiaozhou bay
- Suggestion and countermeasures for the ecological protection of Jiaozhou Bay
- Establishment of the integrated ecosystem-based monitoring system of Jiaozhou Bay: discussion on the mode of public participation

Methods
1. Investigation on wetland ecosystem and surrounding waters of Jiaozhou Bay
   (1) Birds
   (2) Seagrass Bed
   (3) Rare species (Amphioxus)
   (4) Wetland vegetation
2. Public propaganda and public participation activities
   (1) Popular science propaganda
   (2) Citizen participation in monitoring activities
(1) Birds

**Indicators:** Species, numbers and distributions of the breeding birds, migratory birds.

**Areas:** 7 areas will be selected to carry out the observation.

**Methods:** Line transect method and point counts method are adopted to observe the birds according to field conditions. Use long lens (nikon 600mm) and telescope (Swarovski optical telescope) for bird watching.

**Frequency:** At least 5 times observations from April to November.
(2) Seagrass Bed

**Indicators:** Seagrass distribution, seagrass community, benthos, sediments and etc.

**Areas:** 2 areas of the Sixth Bathing Beach and Huiquan Bay.

**Methods:** Multiple measures will be used to the investigation, including underwater robot navigation observation, underwater camera fixed-point observation, fixed-point sampling analysis, satellite remote sensing and etc. Some samples are collected for specimen preparation.

**Frequency:** Once or twice from June to August.

**指标**：海草床分布情况、海草群落、底栖动物、沉积环境。

**区域**：选择汇泉湾、第六海水浴场2处调查地点。

**方法**：水下机器人走航观测、水下摄像定点观测、定点取样分析、卫星遥感等方法结合使用，同时采集相关样品进行标本制作。

**频率**：6-8月期间视情况开展1-2次海草床调查。
(3) Rare species (Amphioxus)

**Indicators:** Species, quantity, body length, age, distribution range of Amphioxus, and plankton, benthos, sediments, etc.

**Areas:** 2 areas of the Taiping Bay and Fushan Ba.

**Methods:** Survey will be conducted in the method of area sampling referring to *The specification for marine monitoring*. The fixed-point sampling analysis will also be used to observe the behavior of Amphioxus.

**Frequency:** At least 2 investigation of Amphioxus will be conducted in May and August.

指标：文昌鱼的种类、数量、体长、年龄、分布范围，以及浮游生物、底栖生物、沉积环境等。

区域：选择太平湾、浮山湾2处调查地点。

方法：采用定点采样的方法进行调查。也将尝试使用水下固定摄像系统观测文昌鱼行为。

频率：5月和8月至少开展2次文昌鱼调查。
(4) Wetland vegetation

**Indicators:** Vegetation species, plant height, biomass and coverage rate of Jiaozhou Bay wetland.

**Areas:** Remote sensing monitoring covers the entire Jiaozhou Bay. Field investigation mainly carried out in 6 zones.

**Methods:** Satellite images, aerial image and field surveys (Sample strip method).

**Frequency:** Twice from May to August.

**指标:** 植被种类、株高、生物量、覆盖率。

**区域:** 遥感监测覆盖整个胶州湾, 实地调查主要选择6处区域进行。

**方法:** 卫星影像、航空照片、野外调查（样带法）。

**频率:** 植被调查进行2次, 于5-8月进行。
2. Public propaganda and public participation activities

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<tr>
<th>科普宣传</th>
<th>Popular science propaganda</th>
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<tr>
<td>• Large-scale of popular science propaganda</td>
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<tr>
<td>• Distribute brochures introducing Jiaozhou Bay Ecosystem</td>
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<td>• Create a WeChat account to propagandize wetland knowledge</td>
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<th>观鸟活动</th>
<th>Birds observation activities</th>
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<td>• 3-4 times birds monitoring activities in Jiaozhou Bay and Dagong Island</td>
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<th>护鸟活动</th>
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<td>• 3-4 times Bird patrols activities in Jiaozhou Bay</td>
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<th>湿地植被观测</th>
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<td>• 1-2 times Wetland vegetation monitoring activities in Jiaozhou Bay and Dagong Island</td>
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<tr>
<th>海草床观测活动</th>
<th>Seagrass bed monitoring activities</th>
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<td>• 2 times Seagrass bed monitoring activities in Huiquan Bay</td>
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<tr>
<th>湿地保护研讨会</th>
<th>Seminar on wetland ecosystem Protection</th>
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<td>• Hold in May.</td>
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<td>• The meeting will conduct research on wetland birds, vegetation, rare organisms, alien species, wetland conservation and ecological restoration, and conduct on-site survey</td>
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(1) Popular science propaganda

- Distribute brochures introducing Jiaozhou Bay Ecosystem (胶州湾生态系统保护宣传图册): 1000 brochures introducing Jiaozhou Bay, covering birds, rare species will be designed and distributed to the public, schools, coastal enterprises, fishermen, and etc. during activity, to improve the public awareness on ecological protection.

- Large-scale of popular science propaganda will be carried out in the park and local community of Jiaozhou Bay, on Jun. 8th, 2019, the World Ocean Day.

- Create a WeChat account to propagandize wetland knowledge: The account will regularly update the information of wetland monitoring and patrol.
(2) Citizen participation in monitoring activities

- **Birds observation activities in Jiaozhou Bay (湿地观鸟):**
  - Time: 3 times in May, June and July. 1 day per event.
  - Location: Jiaozhou Bay and Dagu River Estuary
  - Participants: Qingdao Bird Watching Association, parents-child and teenager. 30 people per event, along with 2 bird experts.
  - Activities: Monitoring practice under the guidance of experts.

- **Bird observation activities in islands (海岛观鸟):**
  - Time: 1 time in May or July. 3 days per event.
  - Location: Dagong Island near Jiaozhou Bay.
  - Participants: Qingdao Bird Watching Association; bird watching enthusiast, 10~20 people per event, along with 2 experts.
  - Activities: Monitoring practice under the guidance of experts.

- **Bird patrols activities (鸟类巡护):**
  - Time: 4 times in April, May, June and July. 1 day per event.
  - Location: Jiaozhou Bay wetland.
  - Participants: Qingdao Bird Watching Association; Hongdao Community, volunteers. 30 people per event, along with 2 bird experts.
  - Activities: Identify and record the threats to wetland birds, such as illegal net, real estate development, solid waste pollution, etc.
(2) Citizen participation in monitoring activities

- **Wetland vegetation monitoring activities in Jiaozhou Bay (胶州湾湿地植被监测活动):**
  - Time: One time from May to June, 1 day/time.
  - Location: Jiaozhou Bay Wetland.
  - Participants: Qingdao Agricultural University, FIO and citizens. 20 participants, including 2 experts.
  - Activities: Monitoring practice under the guidance of experts.

- **Island wetland vegetation monitoring activities (海岛湿地植被监测活动):**
  - Time: one time from May to July, 3 day/time.
  - Location: Dagong Island near the Jiaozhou Bay.
  - Participants: Qingdao Agricultural University and college students, 10-20 participants, including 2 plant experts.
  - Activities: Monitoring practice under the guidance of experts.
(2) Citizen participation in monitoring activities

- **Seagrass bed investigation activities** (海草床监测活动):
  - Time: 2 times in June and July, 1 day/time.
  - Location: Huiquan Bay;
  - Participants: OUC, Qingdao Shipowner’s Association and citizens. 20 participants, including 2 diving instructors and 2 oceanographic experts.
  - Activities: Monitoring and diving practice under the guidance of experts.

(3) **Seminar on wetland Ecosystem Protection**

- **Seminar on wetland ecosystem monitoring, ecosystem problems, restoration and policy**:
  - Hold in May.
  - The meeting will conduct research on wetland birds, vegetation, rare organisms, alien species, wetland conservation and ecological restoration, and conduct on-site survey.
Activities and Timing

The study, in close collaboration with other national research teams and Non-governmental organizations, will conduct the following activities:

1. Collecting historical data on the wetland ecosystem of Jiaozhou Bay;
2. Observations on the species, quantity and distribution of birds in the Jiaozhou Bay wetland;
3. Investigation on the area and type of wetlands in Jiaozhou Bay and the types, density and distribution of wetland vegetation;
4. Investigation on the species and distribution of seagrass beds in the adjacent waters of Jiaozhou Bay;
5. Investigation on the number of rare species (Amphioxus) in the adjacent waters of Jiaozhou Bay;
6. Public monitoring activities for birds, wetlands and seagrass beds in Jiaozhou Bay and adjacent sea areas;
7. Popular science propaganda activities of the ecosystem of Jiaozhou Bay Wetland;
8. Dealing with data and making comprehensively analysis on the current status, variation trends and mode of public participation of the typical ecosystem of Jiaozhou Bay wetland. Compiling the final reporton.

Timing

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## Financial Proposal

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<td>(d)</td>
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<td>D</td>
<td>Collaboration Fee</td>
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<tr>
<td>(a)</td>
<td>Qingdao Agricultural University</td>
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<td>First institute of oceanography, MNR</td>
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<td>Ocean University of China</td>
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Thanks!