NENU X CQN X EdUHK Joint-U Ecological Studies in Jilin Province in 2019

Comparison of Ecological Management between Xianghai and Mai Po

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Objective

1. Identify the ecological value of Xianghai Nature Reserve and Mai Po Nature Reserve
2. Compare the ecological management between two places
3. Suggestions in ecological management for two places

Ecological Management in Xianghai

Xianghai Nature Reserve:

1. 3 areas to 2 areas

- Core area, buffer area, experiment area, will be combined to core area and control area

2. Areas' distribution was introduced

- 4 main core area for special protect of 4 species which include *Gruidae* (鶴科), *Grus leugeranus* (東方白鶴), *Otididae*(大鴇), and *Ulmus macrocarpa* (蒙古黃榆).

Mai Po Nature Reserve

1. Managed by NGO

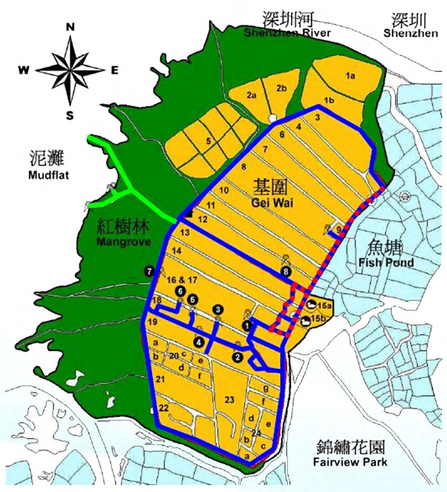
- Non-government organization, World Wild Fund, is main organization manage the Nature Reserve.

2. Managed layer by layer

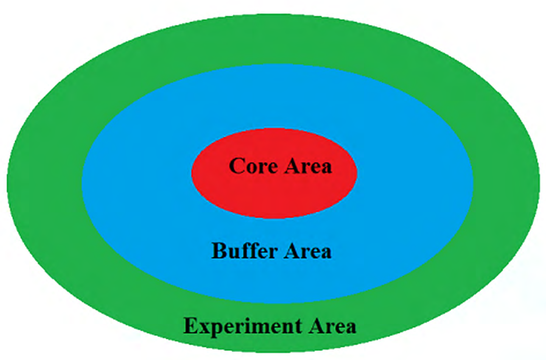
- The site has divided into core zone, public assess zone, biodiversity zone, wise-use zone and private land zone.
- The core zone even further divided into 4 parts, mudflat, mangrove, Gei Wai and Fish pond.

3. Variety of Education Programma

- Such as having partnership with Secondary and primary school, volunteer work, experiential learning, etc.



The 3 Areas Distribution Ecological Management Model:



Ecological Value

	Mai Po Nature Reserve	Xianghai Nature Reserve
Area (Geographical location):	1,500-hectrare	104567-hectrare
No. of Species:	• 400 species of birds • 100 butterfly species and 300 moth species • 50 of dragonfly and damselfly species • 40 crabs species • 10 shrimp species • 80 aquatic invertebrates excluding insects • 320 plants species • 30 mammal species • 50 fish species • 20 reptile species • 8 amphibians species	• 595 species of plants • 300 species of vertebrates - including 293 species of birds 37 species of mammals 8 species of reptiles, 5 species of amphibians 29 species of fish
Ecosystem (habitat):	• Gei wai (基圍) • Freshwater ponds • Inter-tidal mudflats • Mangroves • Reedbeds • Fishponds	Yulin Dune (沙丘榆林) Lake (湖泊水域) Reed marsh (蒲草葦蕩) Aneurotepidimu chinense Grassland (羊草草原)
Further impact to the surrounding places	• Mainly for human activities including nearby trunk roads, and primary or secondary distributors. Nearby noisy commercial, community or recreational activities. Existing and past land uses of the project site and environ	• Human activities including Cultivated land, livestock, Reclamation for farmland, and development of the village in the Xianghai Nature Reserve (building of Reservoir etc.) • Rainfall which there is a positive relationship between the annual rainfall and the wetland area.

Result from the table (WWF-Hong Kong, n.d. & Zhu, Wu, Li & Xiong, 2017):

Although the total area of Mai Po Nature Reserve is less than the Xianghai Nature Reserve around 70times the species, and ecosystem are richer than the Xianghai Nature Reserve

However, the further impact to the surrounding places of Mai Po Nature Reserve are more as the development level of the city in Hong Kong and Jilin is different.

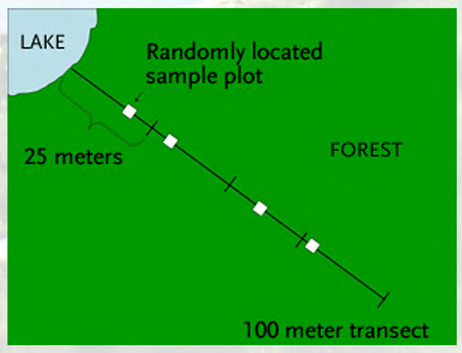
Methods used to Conduct the Ecological Survey

1. Line Transects:

- Using a net to catch the insects in sample point, butterfly, bee, grasshopper have been caught for the evaluation of the degration of salty land.

2. 1x1m Quadrat Counting Methods

- Setting a 1x1m quadrat in a random area, the types of plants,coverage of specific type of plant, the size of plants have been counted.



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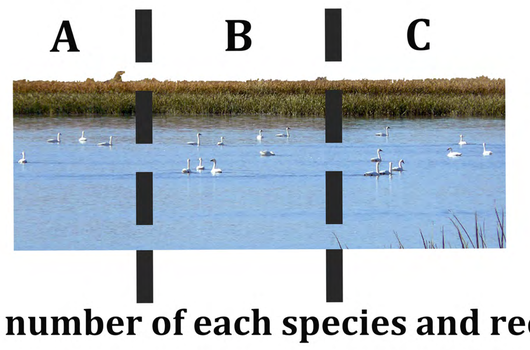
Other Method - Basic Counting for Bird

1. Set the spotting scope to the target area

2. Divided the areas into several regions



3. Count the number of each species and record it

Therefore, there were 7 *Emden duck* in region B ...

4. If the area is too big or large pouplation, then we count the number of species in one region first, and times the number of regions that with the present of the species.

Difficulties faced in Nature Reserve

Difficulties faced in Xianghai Nature Reserve

1. Climate aridification leads to water shortage

There is not much rainfall in Jilin while a large amount of surface water, soil water and phreatic water are evaporated. The average precipitation has as little as 400-500 mm while the evaporation is 1500-1900 mm per year which is 3.5-4.75 times the precipitation which greatly affects the local water resources system. Additionally, with the effect of global warming, the climate aridification crisis is growing serious as the average precipitation has decreased as much as 1/3 compared to 20 years before.

2. Insufficient upstream water supply and impact of hydraulic engineering facilities

Xianghai nature reserve mainly depends on the supply of the Huolin River (霍林河) and the Emutai River (額穆泰河) as the water source. Both rivers are seasonal rivers that the wetland is only recharged during the flood period. Especially the construction of the Baiyunhua Reservoir (白雲花水庫) in the upper stream of Huolin River has caused a great impact on the downstream as it increases the amount of irrigation water in the middle and upper stream during April to June each year which reduces the water flow to the downstream. In other words, the water volume of the wetland would be decreased.

Difficulties faced in Mai Po Nature Reserve

1. Pollutant from Shenzhen River

The chemical pollutant, plastic, micro-plastic pollutant in the river was flow to the Mai Po Nature reserve (coastal areas), causing algae bloom and coral bleaching. The dominant chemical pollutant (phosphorous and Nitrogen) nitrify the specific type of phytoplankton or algae, return algae bloom occur more frequently. Besides, the plastic pollutants may cause suffocation or poison the small animal living in the mangrove area. As a result, reduce the biodiversity in Mai Po Nature Reserve.

2. Illegal catching in Nature reserve

A large number of fishermen from mainland catch the marine organisms in Nature Reserve in several month before, this reduced the population of protected marine organism. The disturbery catching had damaged the habitats in the core zone, wise-use zone and biodiversity, affect the growth and reproduction of some endanger species. Besides, the frequent human activities in nature reserve also affect the population of migrating birds and passage migrants and even some resident species such as the Oritental Magpie Robin or Brown Shrike, etc. In long term, affecting the biodiversity of the nature reserve.

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Suggestion

There are several ways to improve the ecological management for both places:

1. Introduce a stricter Environmental Impact Assessment (EIA)

By introducing a stricter Environmental Impact Assessment, the activities that may potentially damage the habitats of endanger animals or places with high ecological value can be eliminated, or at least classified as illegal in order to stop further deterioration of the environment.

2. Introduce a higher or more seriousness punishment to the illegal action

By introducing a more seriousness punishment to the illegal action can raise a deterrence effect to the public.

3. Cooperation with other province

As the area of nature reserve maybe across several provinces or countries, it is necessary to cooperate with other provinces or countries. More cooperation with other province can help to solve the problematic issues easier, such as signing the agreements or ordinance related the investigation, promotion or law enforcement of the nature reserve

3. Introduce the concept of Sponge city

With the help of good water system in the city, nature reserve will not be affected by the pollutant created from the city. This shorten the distance between developed city and the nature reserve, citizens can have more opportunities to in touch with the nature reserve, at the same time, the city can act as a support for holding the water for the nature reserve.

Factors to be consided:

1. Urban Development
2. Seriousness of the problem
3. Money (Cost)
4. Evironmental (landscape) features