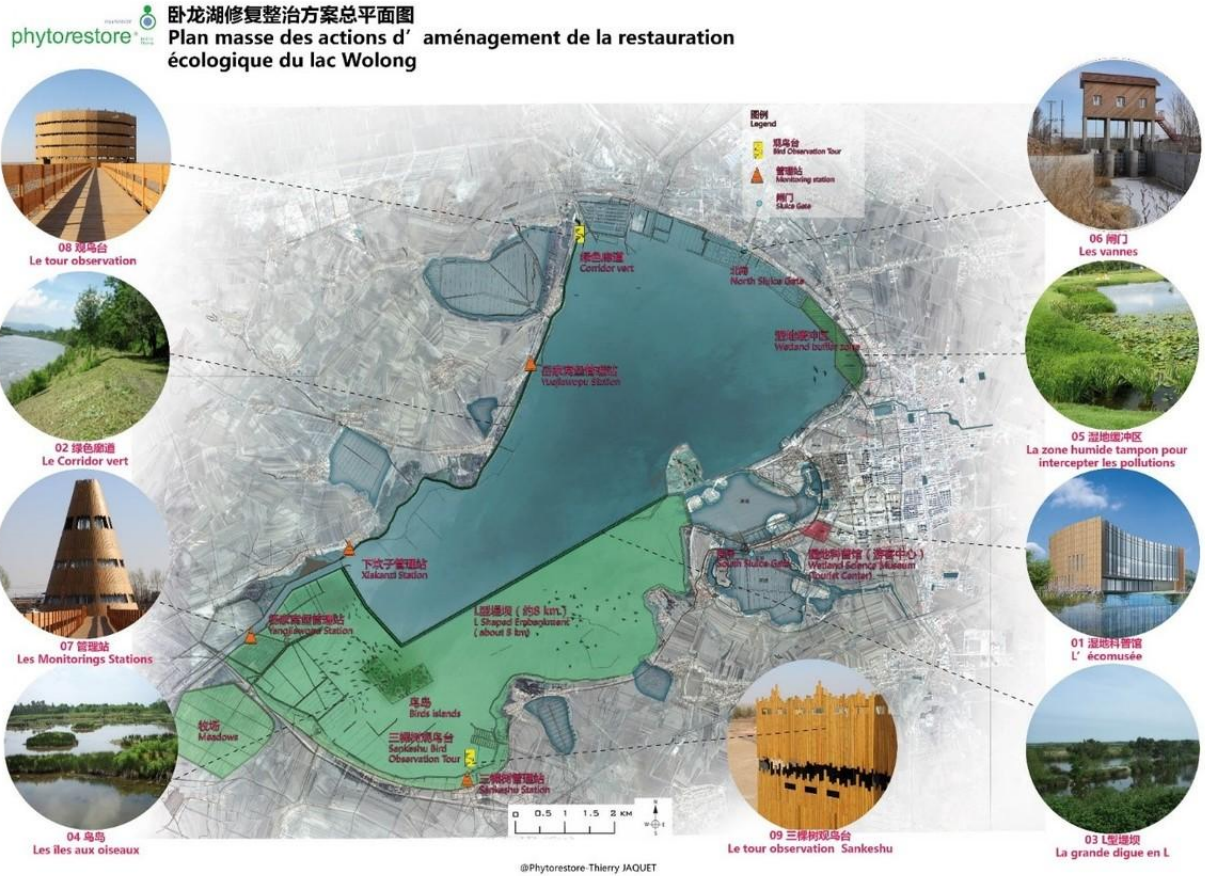


# Ecological restoration of Wolong Lake of Kangping

by blandine goussebayle / 2018-06-15 16:53:08 / Chine / 9047 / CN



**Year of commitment** : 2018

**Address 1 - street** :

**Diameter** : 6800000

**Green energies** : Carbon capture

**Digital services** : Mobility, Water

**Sustainable mobility** : Roads, Greenways, Pedestrian Mobility, Bus, Bicycle path, Urban furniture, Accessibility

**Water cycle** : Containment, Purification, River bed and river bank restoration , Foreshore restoration, Phytoremediation, Protection

**Circular economy and waste management** : Eco-Design, Industrial Ecology, Optimization of resources, Save of resources, Other

**Biodiversity & Ecosystems** : / Green and blue corridor, Buffer zone, Ecosystem restauration, Carbon capture, Environment education, Eco-tourism, Ecosystems preservation /



**18 000 000**

**Builder**

Taitong construction group co.,ltd.

**Manager / Dealer**

Phytorestore

## GENERAL INFORMATION

Wolong Lake Nature Reserve is located in northern Liaoning Province, near the western side of Kangping County. This lake was one of the most important resting places for several endangered species of birds in the world (Siberian Crane, Hooded Crane, Sandhill Crane, Pochard de Baer, Eastern Stork, Dwarf Goose, Swan Goose, etc.).

The construction and development of the Wolong Lake Nature Reserve play an important role in regulating the climate of northern Liaoning, recharging groundwater and maintaining the ecological balance of the region. As a major barrier the lake also plays a role in limiting the southward expansion of the Khorchin

Desert.

Wolong Lake is a typical plain lake in northern China, which preserves the intact wetland ecosystem. However, due to human activities (agriculture and fish farming) and lack of protection measures, the area of Wolong Lake decreased gradually from 2002 to 2004. Drought is another important threat to Wolong Lake, which has led to a significant reduction in biodiversity in Wolong Lake, especially migratory birds and fish. The drought also caused changes in the soil characteristics of the lake: part of the swamp soil was transformed into meadow swamps or meadows, and some areas were affected by secondary salinization.

The total area of the lake is about 6,800 hectares and the circumference is 51 kilometers.

Therefore, the landscape design of Wolong Lake mainly restores the original wetland ecology, creating a suitable habitat for protected bird species globally and nationally.

This goal calls for the restoration of large swamps ranging from 1,500 to 2,000 hectares from the south of Wolong Lake to attract certain sensitive species, such as the Siberian cranes, which account for 80% of the world's cranes.

There is no doubt that this is the main ecological attraction of Wolong Lake, and this priority must be strengthened: to facilitate the return of the many species of birds in the state of ecological benchmarks for 2010.

In order to restore the original biodiversity, the following different measures have been implemented.

- Improve the quality of the lake by constructing a wetland buffer zone that combines with existing reed wetlands to process 20,000 cubic meters of wastewater per day. The water discharged from the wastewater treatment station to the lake is intercepted, treated and led to the canal to prevent the water in Wolong Lake from being polluted.
- Reducing pollution from canals and wetlands and restoring local biodiversity through the construction of green corridors. It also increases the water storage capacity during floods and protects six villages near the lake;
- Effectively control and manage water inflows and outflows by restoring water supply facilities, rebuilding gates and building dikes to control water levels in the southern part of the lake
- By creating 36 bird islands with different habitats: reed land, wet grass, dry grass, freshwater bodies, riverbank forests, sand dunes, rocky islands; rich ecological habitats.
- Develop ecotourism and build a local ecological museum of animal and plant diversity.
- Construction of 2 bird watching towers and 4 monitoring stations. Their concrete structures are covered with wood to withstand the harsh climate of Kangping;
- Improve living environment by connecting the natural trails of the lakes at four monitoring stations

## Progress Status

Delivered

## Data Reliability

Self-declared

## Funding Type

Public/Private Partnership

## Website Enterprise / Infrastructure

<http://wolonglakerestoration.com>

## Sustainable Development

### Attractiveness :

The attraction of Wolong Lake lies in its powerful natural image. Today, the main visitors of Wolong Lake are from major cities such as Shenyang or Beijing. These new tourists are seeking for natural areas characterized by the preserved authenticity and integrity. That is why it is essential to combine the protection of the whole lake ecosystem and tourism for all activities, namely the protection of natural habitats links the bird populations.

The "Natural Dynamic Ecotourism" area near Kangping includes the following ecotourism infrastructure and key facilities.

- Tourist reception
- Cultural Promotion (Museum, Traditional Cultural Center);
- sports activities (water sports);
- Main services and facilities (restaurants, accommodation, shopping and night activities).

The rest of the lake is a "static ecotourism" area, the main content of which is the observation of the life of plants and birds of the lake. It is the achievement of two bird watching stations (in ecological corridors and wetland trails) and nature trails of the AFD project (French Development Agency). Southern part of the dam is a natural area reserved for bird observation. In the northern part of the dam, the original biodiversity of the lake has been restored thanks to the construction of green corridors.

### Well Being :

At the same time, the following actions were taken to meet the recreational needs of residents in Kangping:

- Improve the safety and comfort of visitors with transportation facilities and signs;
- Launch new scientific and natural activities in the environment to attract more visitors (develop soft links such as: science propaganda trails, walking and rest areas, sports facilities/leisure facilities, etc.);
- Create a wide variety of accommodation types for visitors with more natural experiences.

Private cars stop at bus stops and cruise terminals. Bicycle rentals will be available at the bus station and boat dock. Visitor reception center,eco-museum and accommodation stations also offer bicycle rentals. Bicycle transportation is available around the lake in the park. Only buses and cruise ships enter the park and stop at each tourist attraction around the lake.

### Social Cohesion :

After the ecological restoration of Wolong Lake landscape, the eco-tourism activities that can be provided are as follows

- Green Corridor: A two-hour walk for families and bird lovers, as well as a nesting and foraging place for birds.
- Wetland Ecology Museum: Immersed in the ecological process of wetland ecosystem development.
- 4 scientific monitoring stations, experts are responsible for scientific tracking research, and can also organize follow-up training
- 2 observatories: they are used for observation of Wolong Lake and provide a wealth of activities (see next section)

300,000 residents live on the edge of Wolong Lake. In the context of the decline in the price of fish farming and agricultural products, unemployment has intensified and new sources of income have been sought. Therefore, by creating museums and enhancing the attraction of Wolong Lake tourism, more new jobs are created as an important part of the project. There are 24 ecological guides in the park which are trained by Wolong Lake Committee. They are responsible for the park's educational tourism, ticketing and policing tasks:

- There are 4 ecological guides in the monitoring station responsible for public security issues
- Ensure health problems in the park by collecting waste every day
- Science and Education Tour - Visit 2 observatories, wetlands science tourism and photography seminars at 4 monitoring stations. ,

Organizing tourism events is conducive to strengthening the tourism potential of Wolong Lake and increasing tourism visibility, while attracting tourists all year round. The Wolong Lake Winter Festival is a very successful example.

In order to promote both tourism development and environmental protection at the same time, it is necessary to develop ecotourism accommodation around Wolong Lake.

The organization of events strengthens the tourism potential of Wolong Lake and increasing tourism popularity, while attracting tourists all year round. The Wolong Lake Winter Festival is a very successful example.

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### Preservation / Environmental Improvement :

The Wolong Lake project restores the natural capabilities of the lake through four major actions:

- Ecological greening on the northwestern shore of Wolong Lake - creating a green corridor
- Create Bird Island Park as a new habitat for bird protection
- Interception of sewage through wetland buffer to improve water quality in Wolong Lake
- The southern part of the L-dam is a natural area reserved for bird watching. On the north side of the dam, greening the revetment along the green corridor ,restores the original biodiversity of the lake.
- Ecological corridors - bird landscapes and their habitats
- Trail of the swamp - Wetland Promenade
- Bird Island in different habitats

Implement scientific management to ensure the main parameters of control and management of natural life of the lake. Four monitoring stations are located around the lake to control and manage the natural resources of Wolong Lake, such as

- Water quality
- Sedimentation
- Bird species
- Evolution of plants

### Resilience :

Due to the sluices in the upper and lower reaches of Wolong Lake, the water level can be adjusted in the case of heavy rain or flood, avoiding flooding surrounding villages as much as possible or avoiding lake drought, which will cause serious damage to local biodiversity.

The selected plant species are based on local species in Liaoning, especially in Shenyang, so they will adapt to the extreme climate of Kangping.

Phytorestore has designed a natural landscape that can be self-generated, and the site itself can be adjusted over time to achieve biodiversity development.

### Responsible use of resources :

The Eco-Museum has enough natural light to enhance the lighting effect through the skylights.

The building structure of the monitoring station is in «foam concrete» environmentally friendly material, a very light [density: 65 kg / m<sup>3</sup>], breathable, widely used material. It not only has good insulation and anti-noise functions, but also has certain fire protection functions. Foamed concrete is an inorganic material that does not burn and has good fire resistance. This material greatly reduces the use of energy and carbon dioxide during the manufacturing process.

## Testimony / Feedback

*Owner: Management Committee of Wolong Lake Development Zone, Kangping County.*

*No user reviews.*



## Governance

Management Committee of Wolong Lake Development Zone, Kangping County

**Holder Type :** Local Authority

Taitong construction group co.,ltd.

**Builder Type :** Natural Ressources Manager

Phytorestore

**Manager / Dealer Type :** Private

The management committee of Wolong Lake Development Zone in Kangping County is the owner of this project.

The French Development Agency finance the sustainable development projects in this nature reserve. The project has the priority of the French Development Agency's loan to reinforce the biodiversity of the Wolong Lake wetland, thereby restoring the biodiversity of the wetland.

Phytorestore is the designer of the entire project, responsible for the overall design and construction of the project.

### Business Model :

The Chinese government has received a loan from the French Development Agency to finance the biodiversity and wetland conservation project of Wolong lake. The loan period is 15 years.

The French Development Agency offers different types of loans. The terms of the loan depend on the nature and environment of the project (scope, political background, economy, society, environment) and the qualifications of the borrower (field, level, guarantee).

## Sustainable Solutions

Wolong Lake Ecological Corridor

### Description :

The Eco Green Corridor is a trail connecting the north and south ends, located on the entire west side of the lake. A canal divides the green corridor and the resident farmland. The trail is located on the original dam.

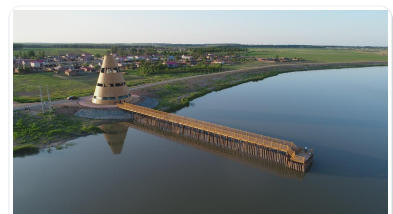
The ecological green corridor is 9 kilometers long. A two-floor observation tower at the entrance to the northern green corridor is a landmark. The beginning point is an observation platform along the lake, which allows visitors to get closer to the lake and observe birds and local plants.

This design creates a natural green protective band around the lake. Not only have the dam been repaired to prevent the risk of flooding the village, but also blocked the diffuse pollution from the village. This pollution has been treated by the reticular wetlands, and the lake has been in a protected state.

There are diverse plant landscapes in the pergola: reeds, grasslands, irises, orchards, poplars etc.

The green corridor has 31 regional sections. We can see plant species with biodiversity. It includes three types of plants, namely herbs, shrubs and arbor plants. There are 658 trees in the green corridor, and the species are selected according to the local soil. The cultivation of regular hedges can hide the viewers so as not to scare the birds. Birds can freely nest and multiply and migrate.

There are several trestles in the green corridor to connect the surrounding rivers, and there are several fences on the lakeside. 3 meters tall plants were planted between the land and the canal, and meters tall plants were planted near the lake.



The sluice is designed to separate water and lake water from the canal. The sluice will remain open until it is closed during the flood season to avoid flooding farmland and villages.

The dams of the lake will be fully stabilized from the top to the bottom of the slope, a bit lower than the water level :

- Stone cage cushion, Reno cushion type
- Planting of live willow stumps
- Place a degradable coconut fiber mat, fixed at the upper and lower ends of the dam
- Planting of live willow branches
  - Resources :
  - Biodiversity :
  - Water management
  - Citizen-awareness
  - Management of natural areas
  - Climate adaptation

[Company \(es\) Website :](#)

[Company \(es\) Website :](#)

### L-shaped dam

#### Description :

The project is expected to rehabilitate existing central dam, to divide the northern and southern parts of the lake, and to promote the growth of alfalfa to provide food for birds such as the white crane.

The dam can regulate two water levels: the relatively highest water level in the northern region and the lower water level in the southern region. At the same time, the water level in the southern region is between 50 cm and 20 cm.

As one of the key protected areas in the eastern region, dams are a must for birds to migrate. The dam will also be open to the public.

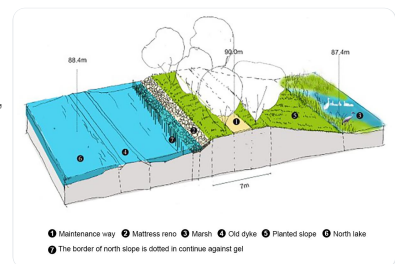
In order to block the water pressure in the northern region (average water level difference is 1 meter, the highest is 1.5 meters), the L-shaped dam is constructed by using high quality and high density materials. The subject structure will cover 30 cm thick plants. Reno stone cage cushions and coconut fiber cushions are installed on most northern area dams to provide good protection. Floating aquatic plants between stones provide a habitat for small birds and insects. Different types of plants are planted on the southern tip of the dam: trees, shrubs and herbs. There will be a 7-meter-wide gravel road in the middle of the dam.

The dams in the project separate the northern and southern regions to distinguish between different water levels, thus providing a protected area for birds.

- Resources :
- Biodiversity :
- Water management
- Citizen-awareness
- Management of natural areas
- Climate adaptation

[Company \(es\) Website :](#)

[Company \(es\) Website :](#)



### Bird island

#### Description :

Bird Island is located in the southern part of the river, a place that attracts many birds.

Bird Island provides habitat for birds and migratory birds in the park.

The entire island group is located 500 meters from the dam, and the island group is divided into two parts and is L-shaped. The first part is 40 hectares and the second part is 20 hectares. They are rectangular and surrounded by swamps. They contain 20 islands and 14 islands respectively.

These islands are designed to provide a diverse ecological environment and are rich in different plant species. In the 60-hectare range, 200 species of birds are concentrated each year in different seasons, allowing visitors to see a variety of birds through monitoring stations and observation towers.

To create 35 different bird habitats, the islands come in many forms. We use different soils (mud flats, beaches, moist soil, dry soil, gravel) and diverse plants; plant different types of grassland (high meadows, ground lawns, flowering plants that attract insects). The woodland of native high-stem trees will become the breeding ground of grey herons, giant salamanders, little egrets, night herons, and white egrets from April to August. In particular, different water levels distinguish variable ecological environments.

In order to welcome 90% of the white cranes passing through Wolong Lake, the cultivation of the weeds and wetlands in the southern part of the lake is an ecological environment that needs to be established first.

The establishment of reed beds is also essential for the reproduction of birds, such as cannabix, jaundice, and so on.

The reed bed provides a rich ecological environment for aquatic birds and ducks. In fact, it constitutes a unique habitat that allows birds to winter and provide



food.

Dry meadows grow on top of the island to avoid being flooded. This habitat provides a living environment for insects.

There are many amphibians, insects, mollusks and small fish here. Some will stay on the island all year round, some will only stay for a few months (adults and their larvae), or some just come to lay eggs (salamander).

Lakeshore forests formed by wooded islands are the main habitat for many species: fish, shellfish, insects, amphibians, birds, and mammals. These islands are near the edge of the dam.

The island has an important role in the development of a diverse ecosystem within the lake. Creating a cool place in the lake, the temperature is adjusted to limit the effect of water flow. In addition, the trees are from top to bottom, each part is filled with different micro-habitats: the intertwined tree roots form the caves of insects and amphibians, and the ardeidae birds nest on the branches.

Floating organic materials (wood, humus) are also habitats for a variety of birds.

The sandy island creates special habitat conditions and is the habitat of the white egret, the white crane and the black-winged stilts.

- Resources :
- Biodiversity :
- Water management
- Citizen-awareness
- Management of natural areas
- Climate adaptation

[Company \(es\) Website :](#)

[Company \(es\) Website :](#)

Urban wetland of Kangping

[Description :](#)

The project is designed with a high-efficiency filtering garden constructed wetland project with a processing capacity of 20000m<sup>3</sup>/d, which will deeply treat the water from the county sewage treatment plant and achieve the purpose of protecting the water quality of Wolong Lake and beautifying the lakeside scenery belt. The water treated by the wetland garden buffer zone reaches water quality of Grade 3 ,and is not discharged into Wolong Lake but directly connected to the canal.

It is necessary to have areas with different water depths in the wetland garden buffer zone. For example, the good growth of the lotus flower requires a certain depth of water.

Two outlets are provided depending on the required water level. This wetland garden buffer has several purification effects: sedimentation, physical filtration of plants, and reoxidation of water.

The wetland garden buffer zone has two pools. The first one is a sedimentation tank. The tail water of the sewage treatment plant after microbiological treatment shuttles between the artificial dam and the plants. The second is an aeration tank with lotus flowers. The two pools are separated by a manual sluice. The tail water enters from the pumping station into the sedimentation tank, and the reed filter tank ,then the aeration tank. After the tail water treatment, the best effect is achieved.

- Resources :
- Biodiversity :
- Water management
- Citizen-awareness
- Management of natural areas
- Climate adaptation

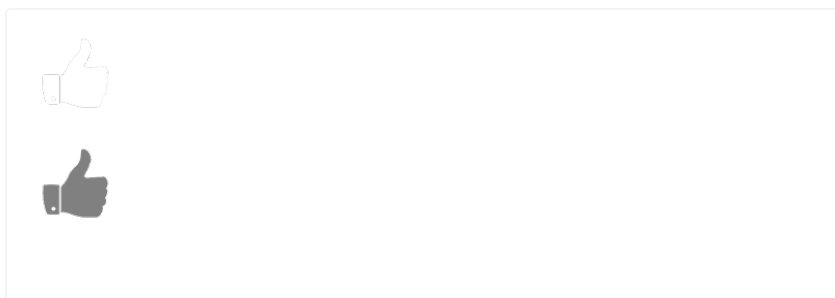
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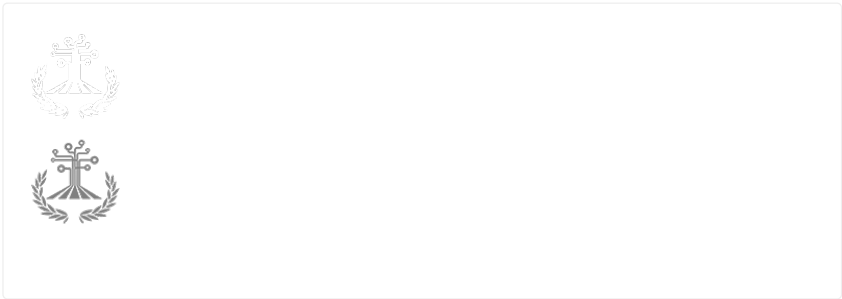
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## Contest

### Building candidate in the category





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