

River Restoration in Asia and the Asia Restoration Network

Wenxue Chen
Secretary general of ARR
28th October 2014



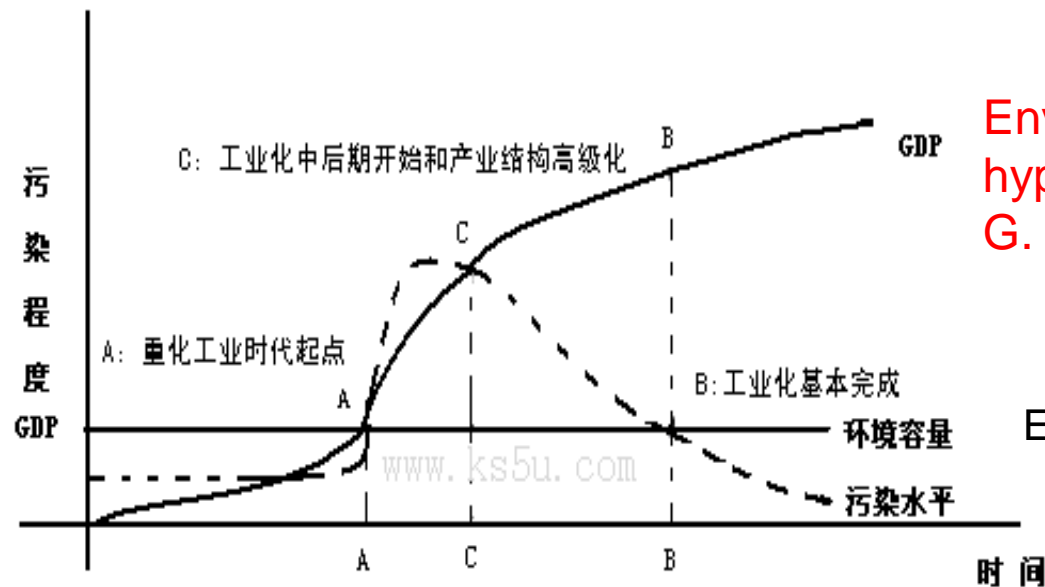
Contents

- 1 **The road to river restoration**
- 2 **River restoration methods/theories**
- 3 **River restoration cases in Asia**
- 4 **Asia River Restoration Network**



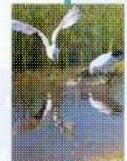
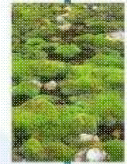
1 The road to river restoration

In the eastern Asia, each country went nearly the same road: pollution and then clean up



Environmental Kuznets Curve hypothesis
G. Grossman & A. Kureger (1992)

Environmental capacity
Pollution level

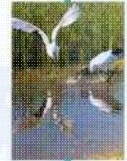
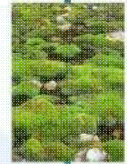


1 The road to river restoration

The road to river restoration in Japan

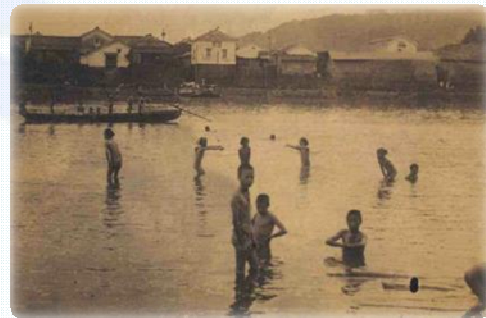


1940's~1960's: Minamata disease (methylmercury pollution) & Itaiitai disease (Cadmium pollution)



1 The road to river restoration

Rivers of different times in Japan

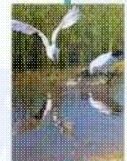
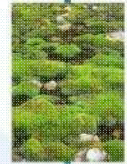


State of rivers as
people's living,
around in 1940s.

River has
deteriorated in the
era of high economic
growth (1970s).



Restored Rivers
(2000s)



1 The road to river restoration

The road to river restoration in China

(Main Target)

1970's

Water quality / quantity

1980's

Water comprehensive management in cities

1990's

Water quality & water landscape

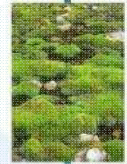
2000's

River restoration, watershed comprehensive management

2010's

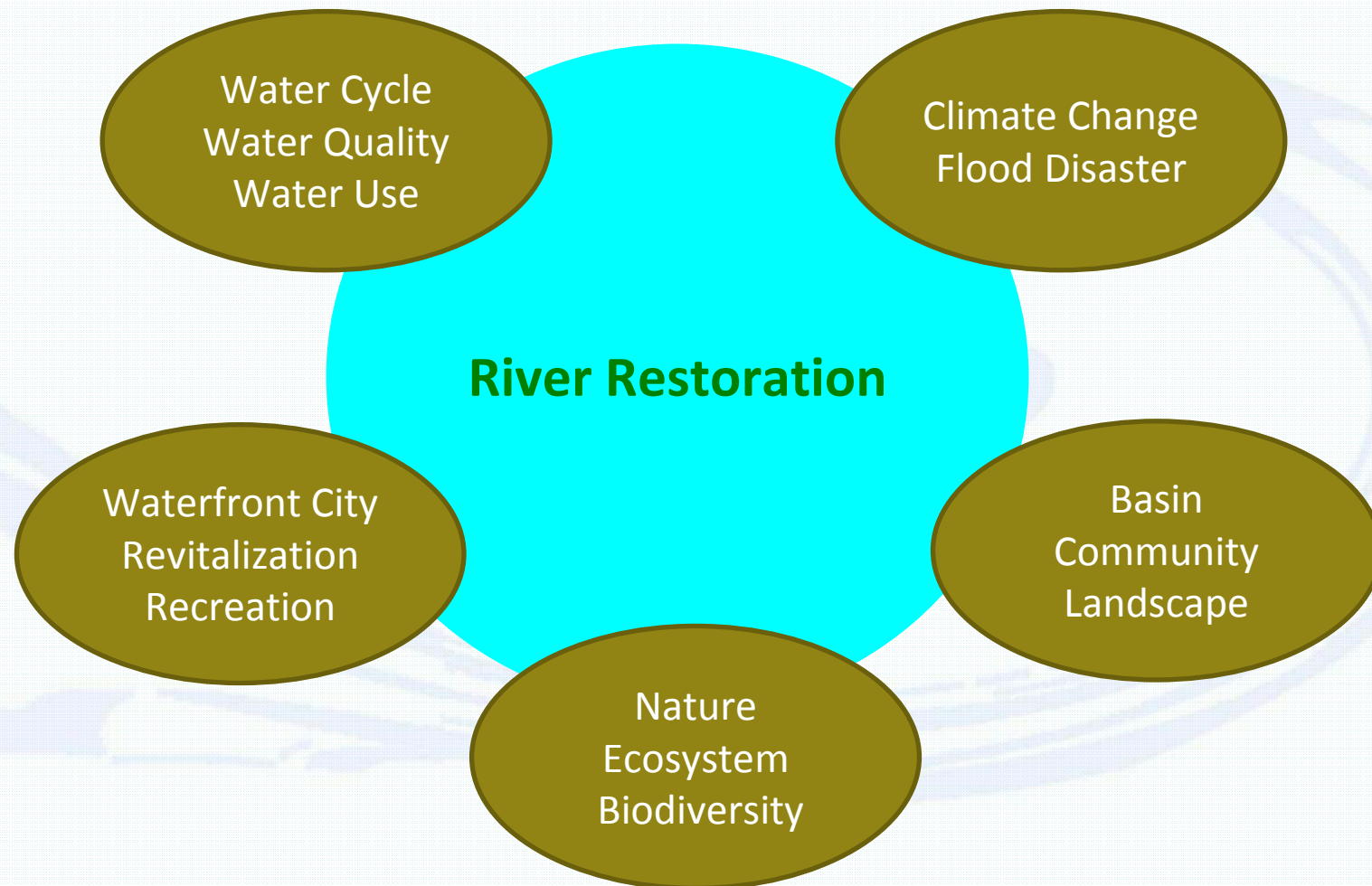
(Major Administration)

- ✓ 1970: Establishment of environmental protection agency
- ✓ 1974: Industrial three wastes discharge standards (GB J4-73)
- ✓ 1985: First national environmental protection conference
- ✓ 1991: Second national environmental protection conference
- ✓ 1994: River basin water pollution treatment (3 large rivers and 3 large lakes)
- ✓ 2004: Some suggestions on protection and restoration of water ecosystems (MWR)
- ✓ 2009~2015: River restoration of small and middle size rivers
- ✓ 2013: Pilot of water eco-civilization construction



Water pollution of Taihu Lake and Dianchi Lake

2 River restoration methods/theories

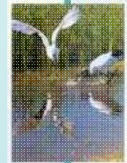
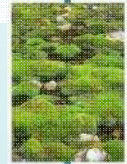
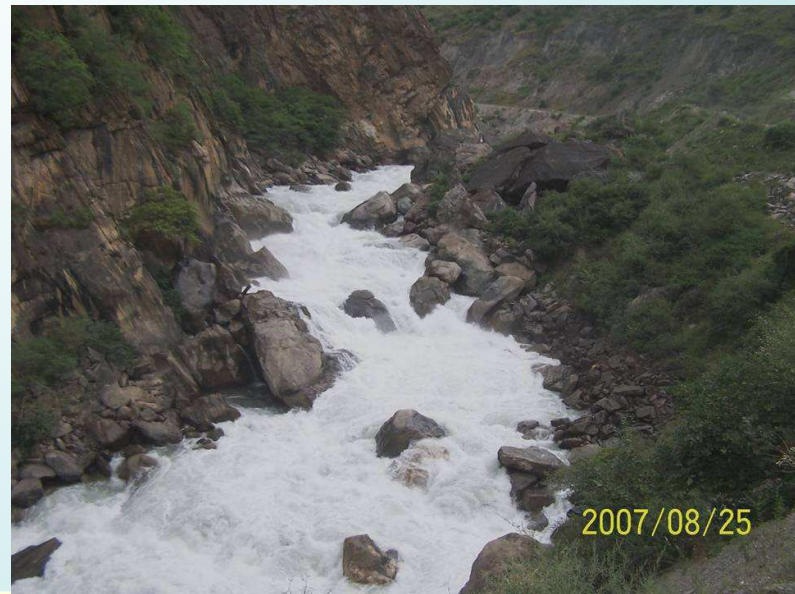


2 River restoration methods/theories

2.1 Nature-oriented river restoration

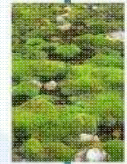
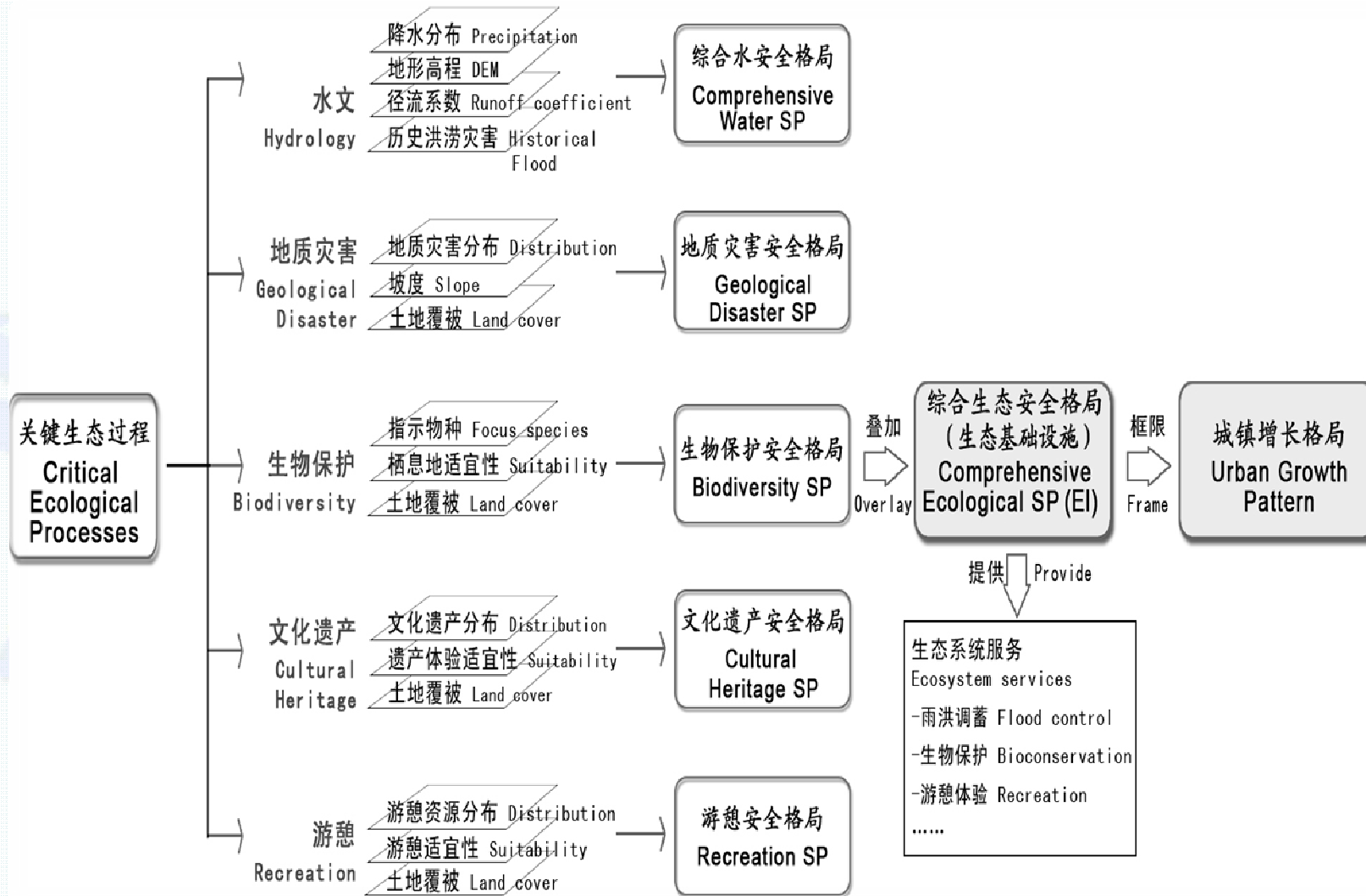


Mimic the nature river system, create the proper structure (such as step-pool in the mountain rivers, pool-riffle structures) and hydrograph, use the local materials

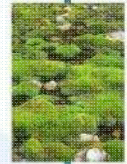


2 River restoration methods/theories

2.2 Antiplan theory

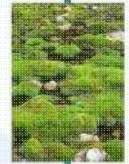


2 River restoration methods/theories



Liupanshui City, Guizhou, China

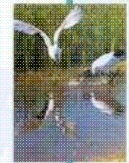
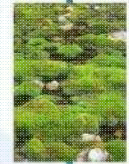
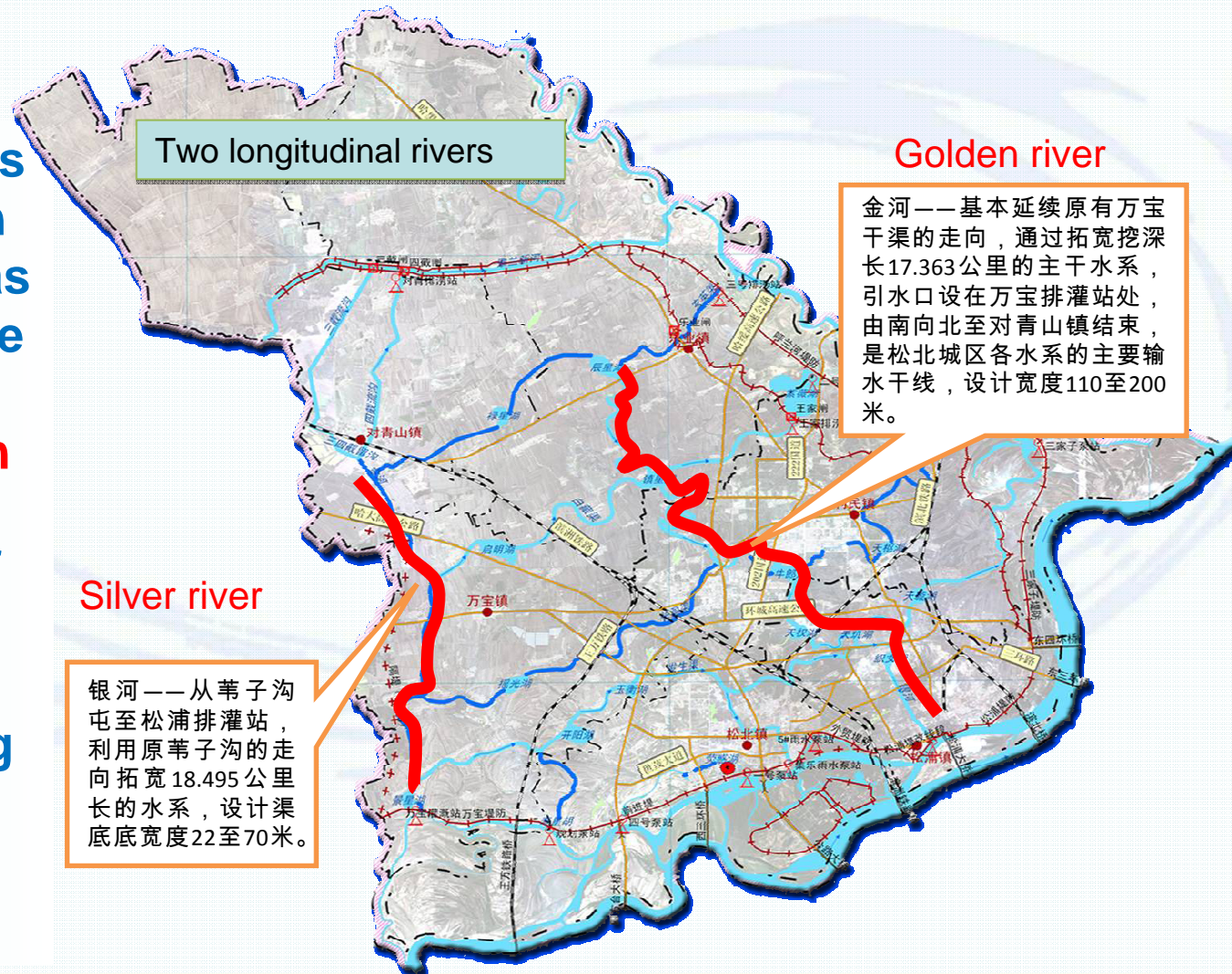
2 River restoration methods/theories



2 River restoration methods/theories

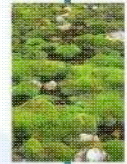
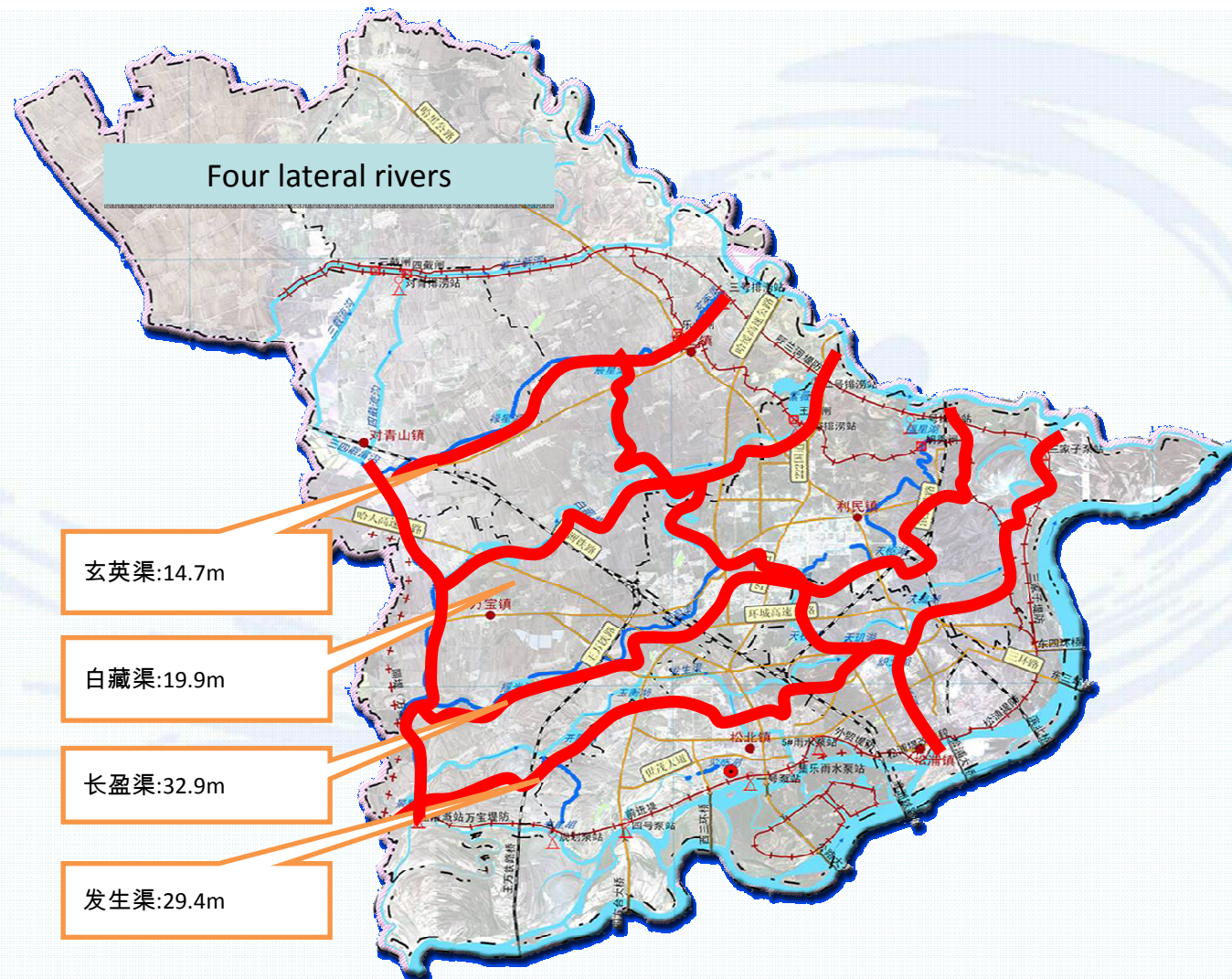
2.3 Settling water system before urban planning

This idea was proposed in 2008, and was applied in the planning of the northern water town with area of **578km²** in Harbin Heilongjiang Province



2 River restoration methods/theories

2.3 Settling water system before urban planning

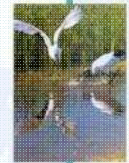
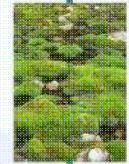
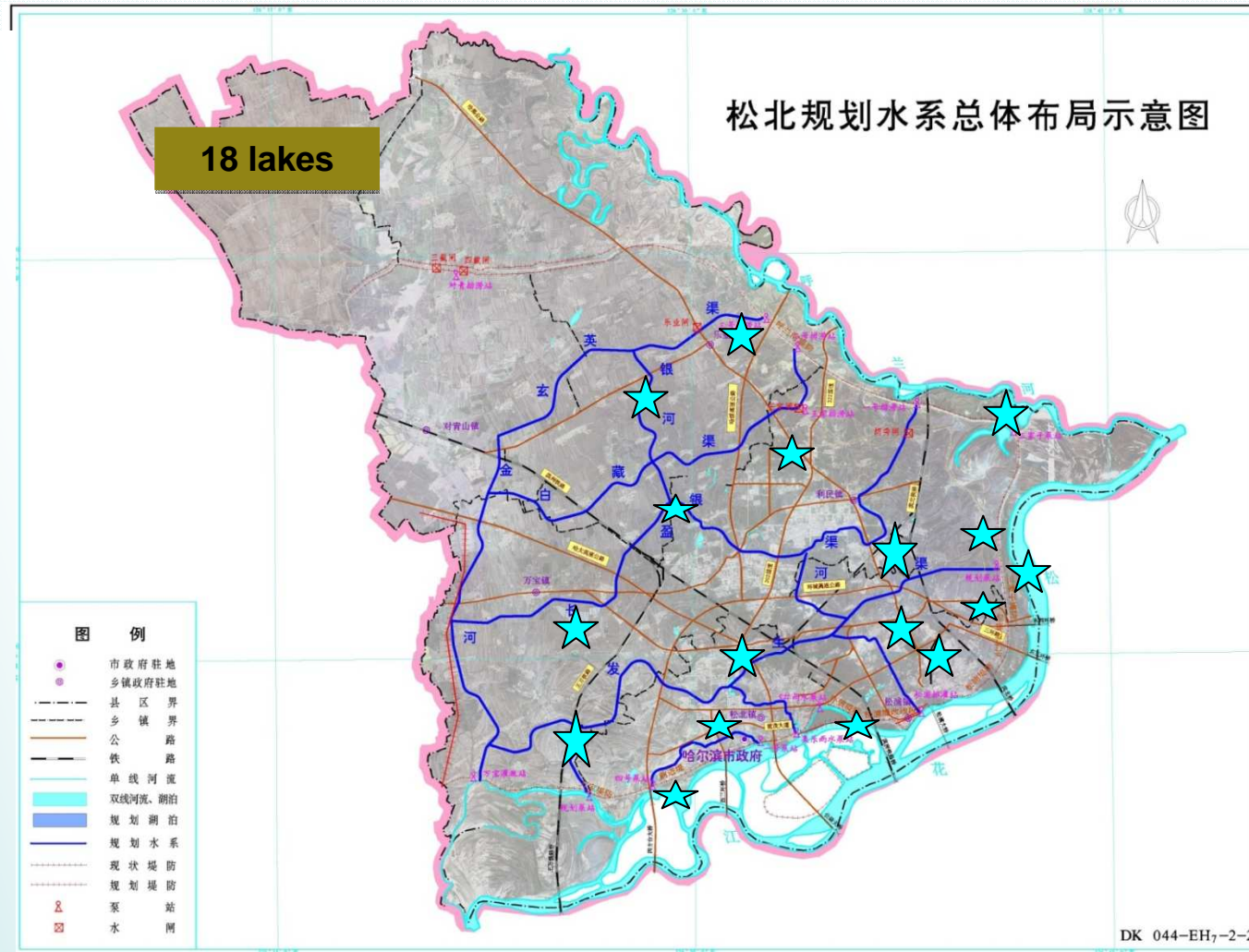


2 River restoration methods/theories

2.3 Settling water system before urban planning

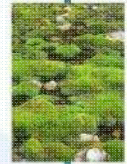
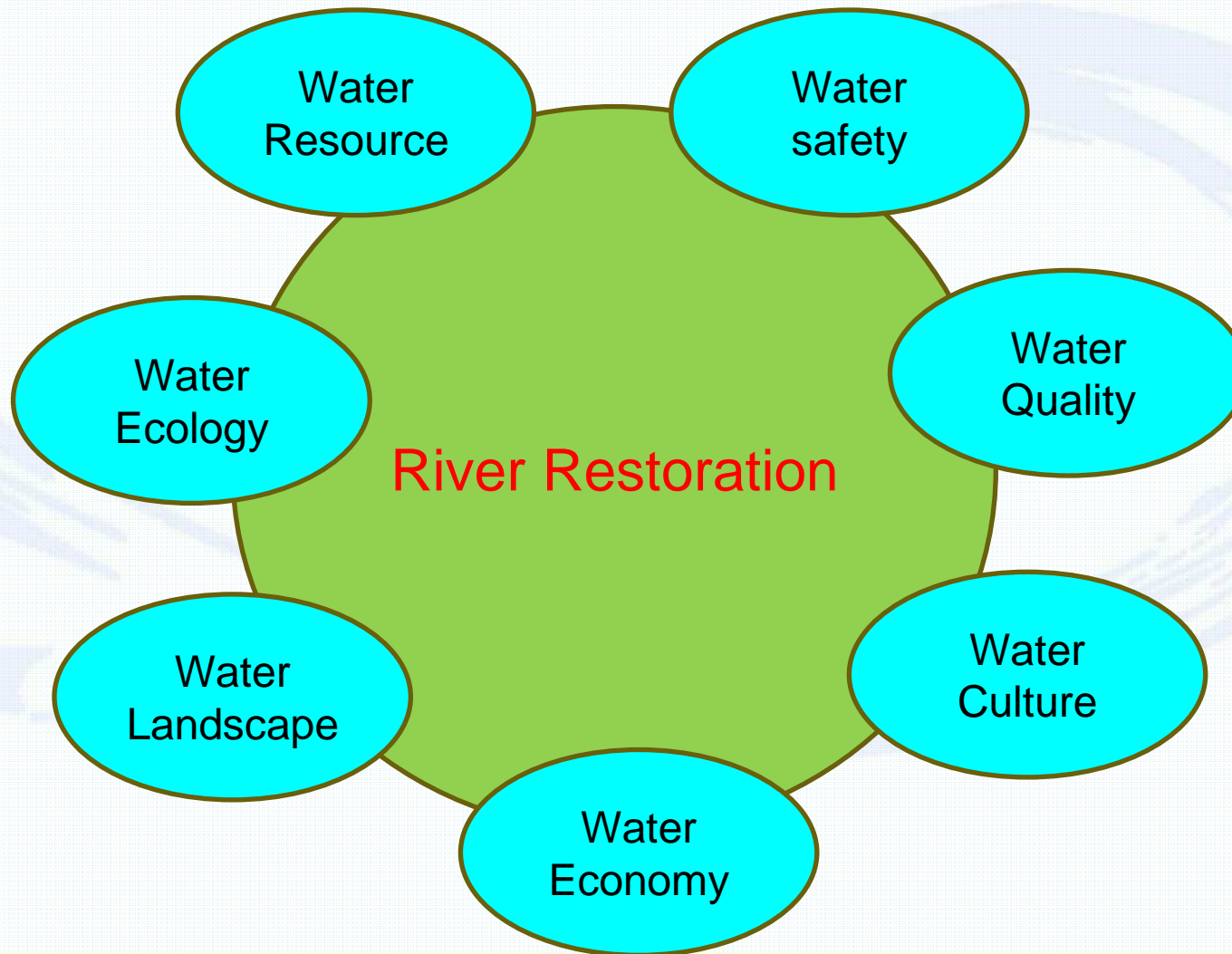
The total surface area is **11.3km²**, covers about **12%** of the total area. Several **wetlands** are also placed in the town. The town planning was carried out after the water system being

designed



2 River restoration methods/theories

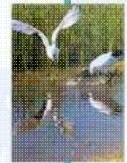
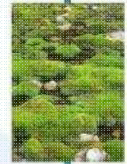
2.4 Comprehensive planning method



2 River restoration methods/theories

2.4 Comprehensive planning method

- Water safety: Flood control
- Water resources: Water utilization. Ecological water demand should be considered.
- Water quality: Some measures should be considered for improving water quality.
- Water ecology: Construction and protection of aquatic habitat
- Water landscape: The landscape along the riverside should be improved.
- Water culture: During river restoration, some symbols may be constructed along the river depicting the relationship between man and water in the history.
- Water economy: When the environment along the river is improved, the price of the real estate will be increased also. Therefore we could raise funds in the market for river restoration.

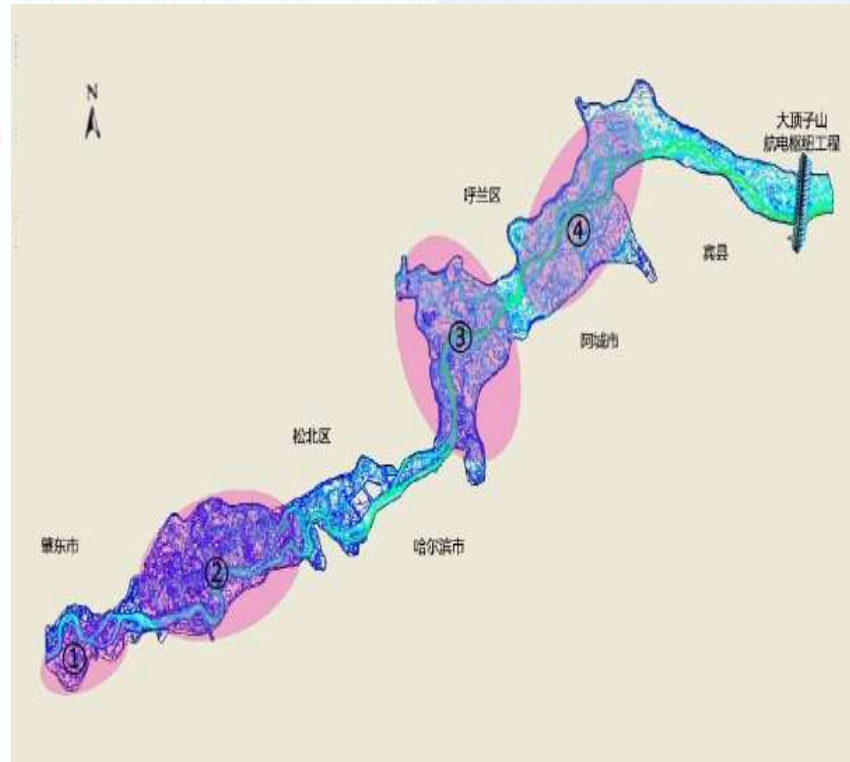


2 River restoration methods/theories

2.4 Comprehensive planning method

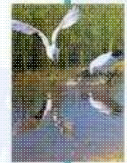
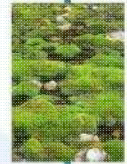


Birds migrate routes



Feeding area, spawning site and shelter area of fishes

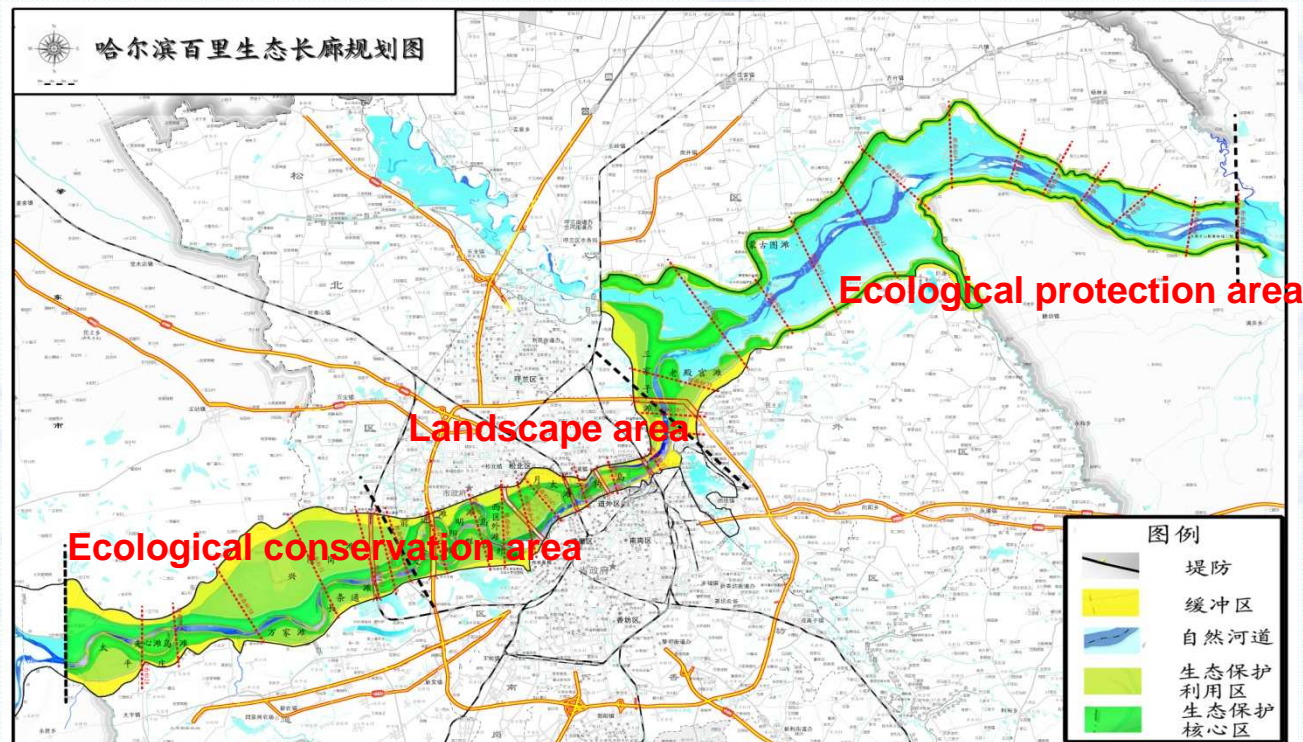
Date collection: geographic & geomorphic condition; hydrograph; climate; water quality; soil; birds; fishes; vegetation



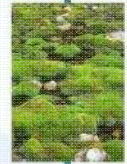
2 River restoration methods/theories

2.4 Comprehensive planning method

Overall planning of the urban ecological corridor along Harbin Songhua river



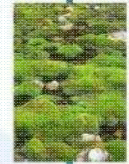
Ecological sensitivity analysis; Divide the ecological functions areas



3 River Restoration Cases in Asia

3.1 Cases in Japan

Case 1: Nature Restoration in Maruyama River Basin



Efforts

- ✓ Restoration of characteristic nature environment
- ✓ Restoration of swamp environment
- ✓ Enduring the continuity of river
- ✓ restoration of connection between people and nature

Outcome

- ✓ Increasing the number of running fish
- ✓ Enhancement of the growing environment for storks
- ✓ Region revitalization and economic effects by storks

3 River Restoration Cases in Asia

3.1 Cases in Japan

Case 2: Nature Restoration in Kushiro Wetland

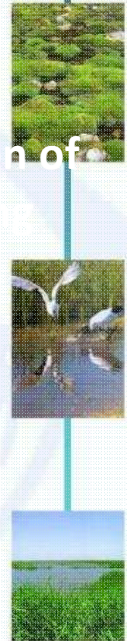


Goals

- ✓ Recovering of wetland ecosystems
- ✓ Recovering of water cycle
- ✓ Building up the society for continuous relationship with wetland

Outcome

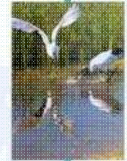
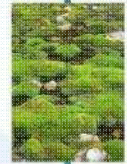
- ✓ Rising the groundwater level
- ✓ Decreasing the amount of sediment inflow
- ✓ Enhancement of the growing environment for fishes and aquatic insects



3 River Restoration Cases in Asia

3.1 Cases in Japan

Case 3: Waterfront City Revitalization in Hiroshima city



- ✓ River administrator applies special treatment for establishing permanent shops on the river bank.
- ✓ Shop owners have a duty to improve ambient surrounding.
- ✓ Holding various events in cooperation between local government and citizens.

Outcome

- ✓ Revitalizing the river bank
- ✓ Becoming a popular tourist attraction
- ✓ Environmental improvement

3 River Restoration Cases in Asia

3.1 Cases in Japan

Case 4: Study on the swamp restoration in the Yubari river from a standpoint of water cycle

Current state

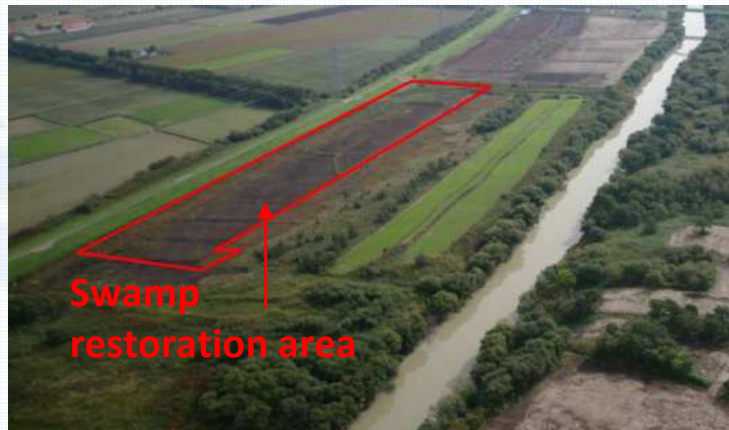
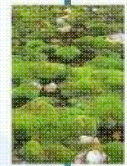
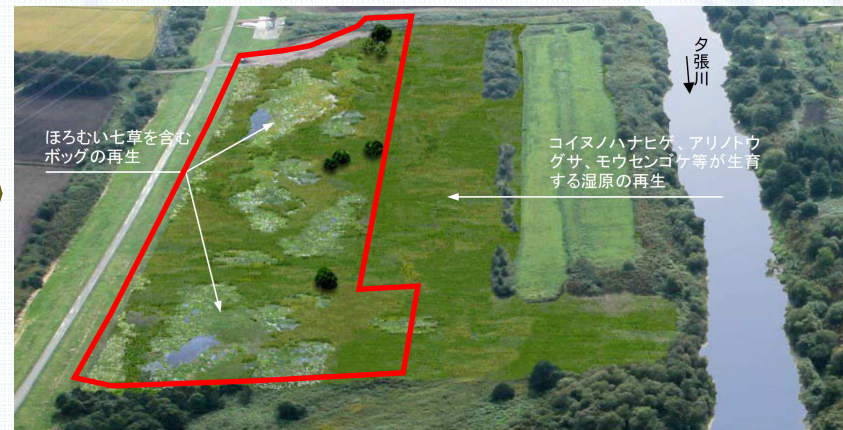


Image of future goal



- ✓ Validating the restoration plan through water cycle analysis
- ✓ Recognizing problems and challenges for restoring the swamp

Outcome

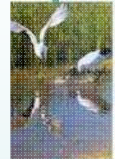
- ✓ Possibility to keep the groundwater level high by proposed measure
- ✓ However, in the year of low-rainfall, groundwater level may be lowered

3 River Restoration Cases in Asia

3.2 River Restoration Cases in China

Several importance things affecting river restoration in China

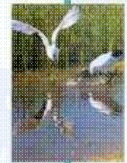
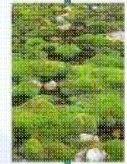
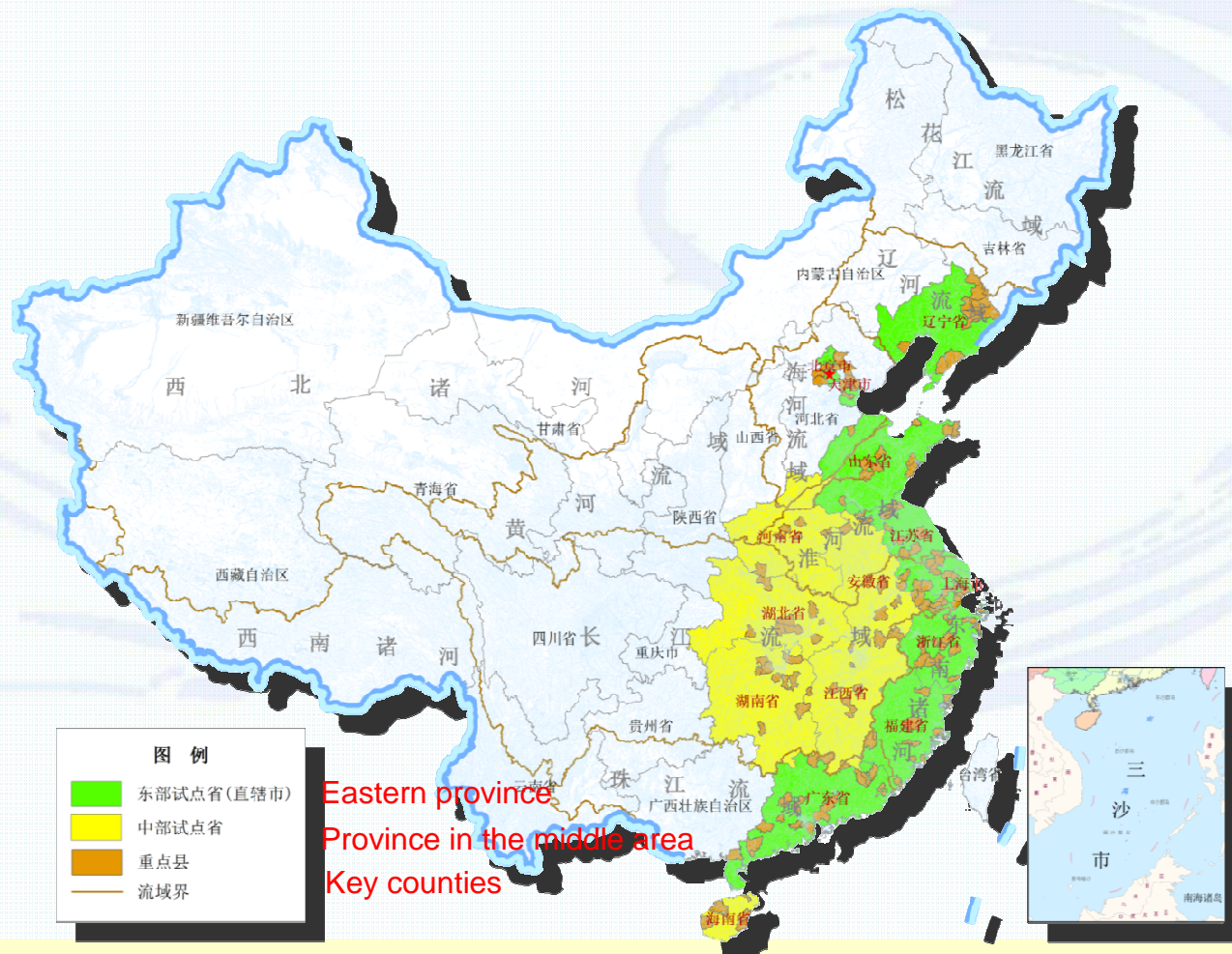
- Major Science and Technology Program for Water Pollution Control and Treatment (2006~2020). Main purpose is to improve the quality of rivers and lakes in China.
- River restoration of small and middle size rivers. (2009~2015. 5174 rivers, the total length is 67500km, and the investment is 186 billion Yuan)
- Fast urbanization in China
- Water eco-civilization construction (2013~)



3 River Restoration Cases in Asia

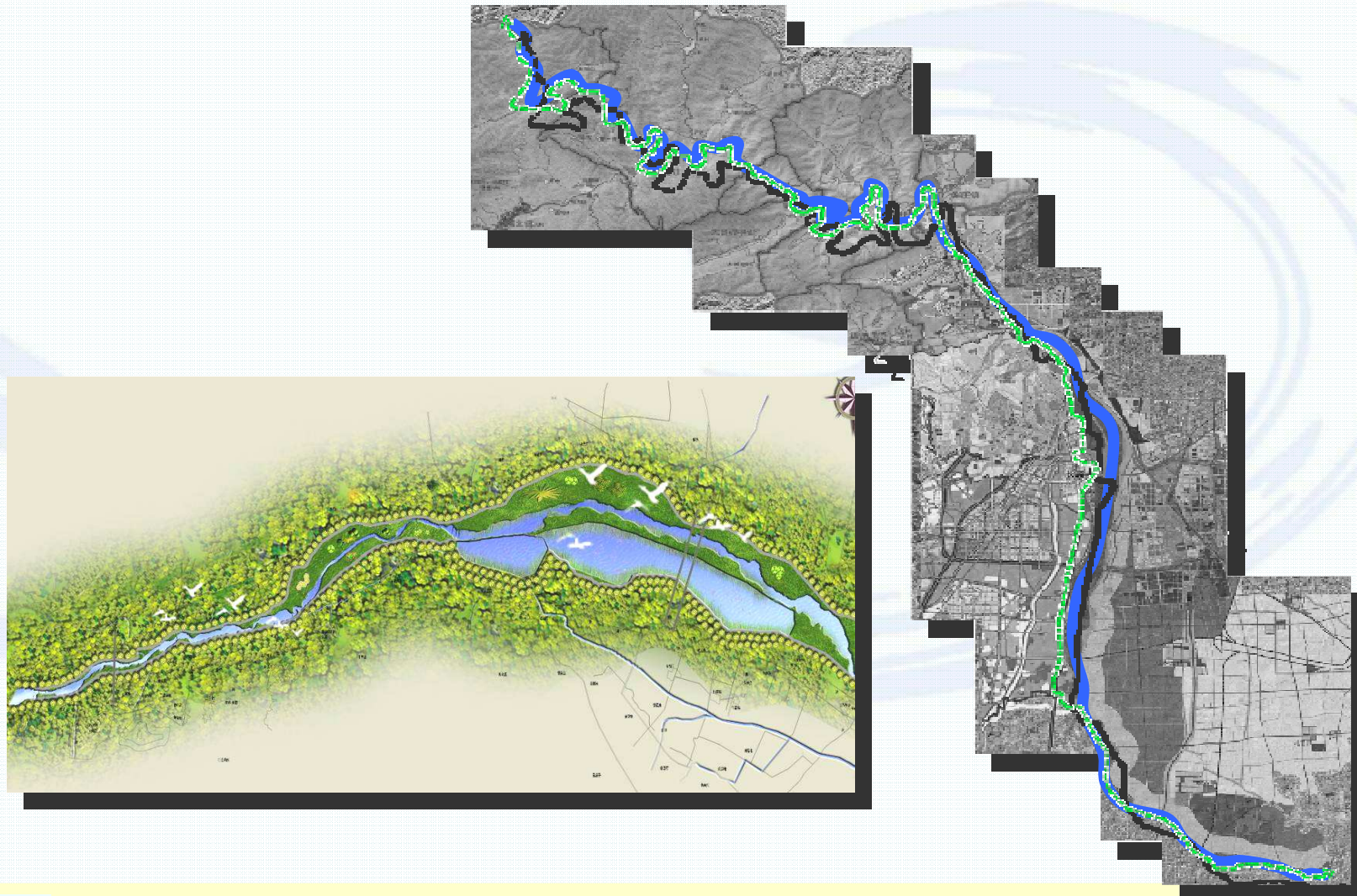
3.2 River Restoration Cases in China

Pilot projects of the river restoration with middle and small size



3 River Restoration Cases in Asia

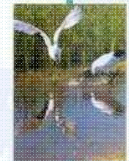
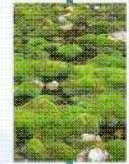
3.2 River Restoration Cases in China



3 River Restoration Cases in Asia

3.2 River Restoration Cases in China

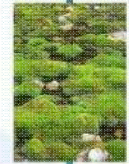
Case 1: River restoration of Yongding river in Beijing



3 River Restoration Cases in Asia

3.2 River Restoration Cases in China

Case 2: River restoration in Shengzhen



3 River Restoration Cases in Asia

3.2 River Restoration Cases in China

Case 3: River restoration in rural areas

Kuanghe river in Hefei, Anhui province



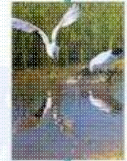
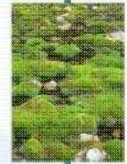
Changgang river in Ezhou, Hubei Province



Jinlongsigou river in Dalian, Liaoning Province



**Xuxi river in Anji
Zhejiang Province**

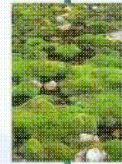
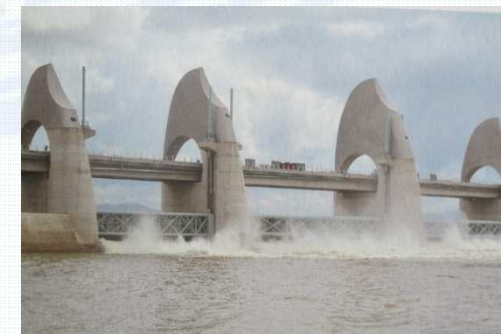
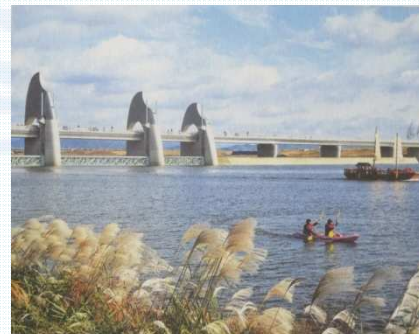


3 River Restoration Cases in Asia

3.3 River Restoration Cases in Korea

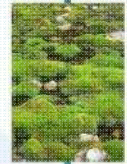


The very important projects are the nation's four main rivers mainly aiming to halt the seasonal floods and droughts. (2009~2012)



3 River Restoration Cases in Asia

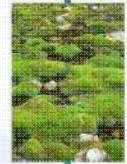
3.3 River Restoration Cases in Korea



3 River Restoration Cases in Asia

3.3 River Restoration Cases in Korea

The most famous project is Cheonggyecheon



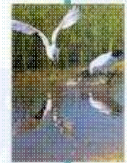
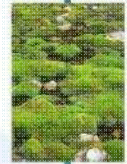
3 River Restoration Cases in Asia

3.3 River Restoration Cases in Korea

Abandoned Channel Restoration

Use of the Method for Abandoned Channel Restoration Design

- The prediction by the equilibrium method and channel evaluation helps to design abandoned channel restoration with keeping the stable conditions of the main channel.
(The stable channel analysis used SAM model from the U.S. Army Corps of Engineers)
- The application of the method is expected to give a good answer for future shape of channels in case channel changes should be carried out.



KIC
T-
RE
C

4 Asia River Restoration Network

ARRN is a non-political organization for exchanging knowledge and technical information on the restoration of rivers and watersheds in Asia, which was established in November 2011. Now it has three national RRN, i.e. CRRN, KRRN and JRRN, one regional RRN, i.e. TRRN, and several non RRN organization members (include governments, NGOs, and privates).

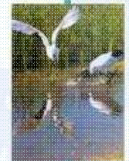
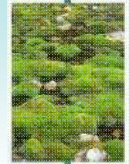
ARRN
Chapter



www.a-rr.net



The Secretariat is set in turn in the national RRN. Now it is located in IWHR (China Institute of Water Resources and Hydropower Research), China. The chairperson is Prof. Ziping Liu, and the former chairperson is Prof. Nobuyuki Tamai.

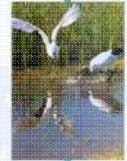
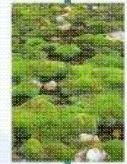
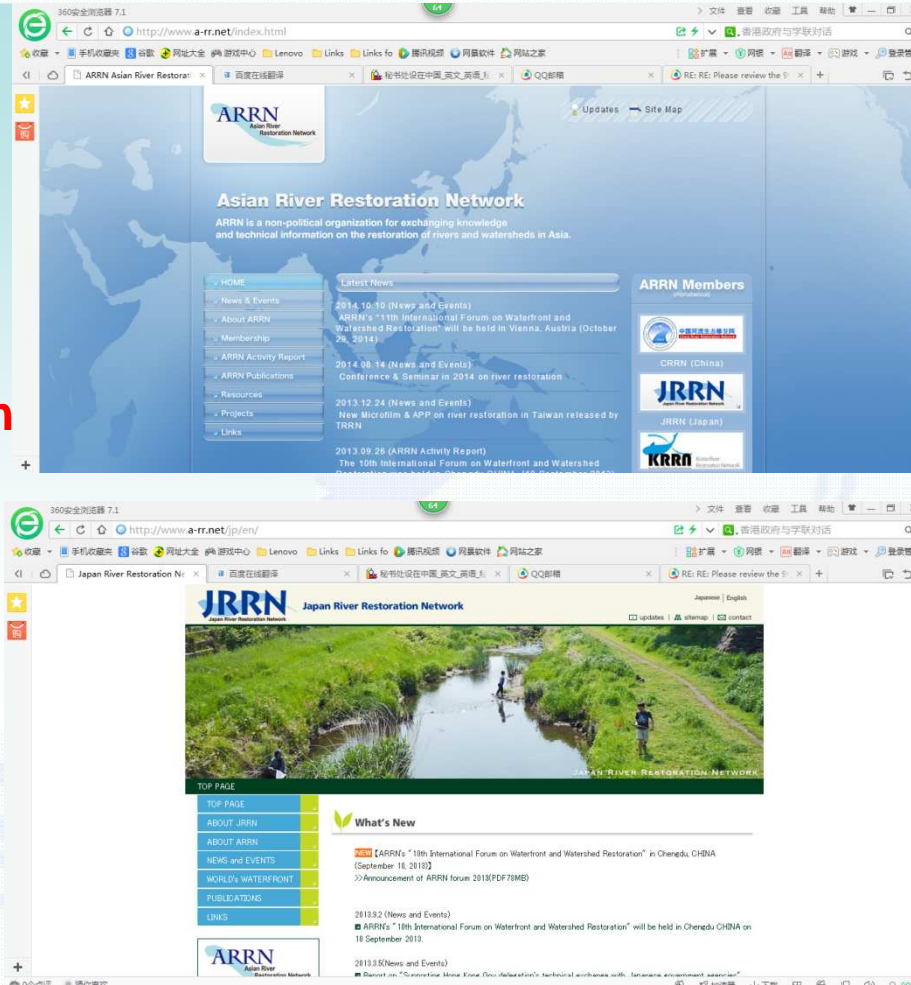


4 Asia River Restoration Network

The main works of RRN:

- Website development
- Information delivery/sharing
- Forum and seminar
- Technical exchange and train
- Research work
- Publication
- Expansion members

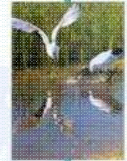
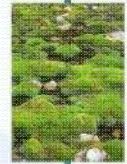
In JRRN, there were about 680 personal/50 organization members till October 2014.



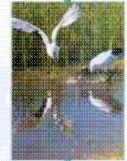
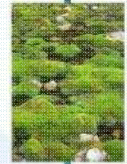
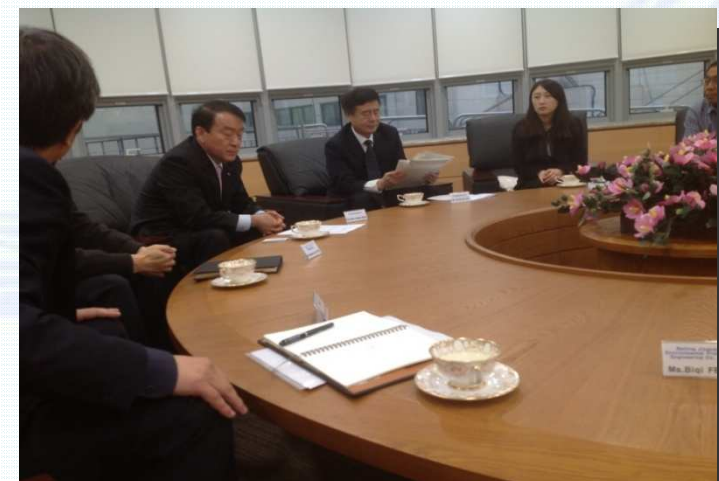
4 Asia River Restoration Network

Main activities

- 1 Governing Council Meeting each year (8)
- Regularly hosting International Forum on Waterfront and Watershed Restoration (10)
- Publishing river restoration guide book--“Reference guideline for restoration by eco-compatible approach in river basin of Asia (Ver.2)”
- Technical consultation on river restoration, e.g., consulting on the integrated planning of Pixian river system in 2013, Chengdu, China.
- Academic exchange and technical investigation.



4 Asia River Restoration Network

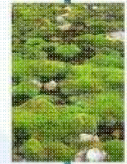


4 Asia River Restoration Network

European countries are the pioneers on river restoration, and had proposed several new theories, such 'as give room for rivers' and 'cycle floodplain rejuvenation' etc., and made a lot of guidelines and regulations on this field, such as the Water Framework Directive, the European Habitats Directive, the Birds Directive etc.

The ECRR aims to enhance and promote river restoration and sustainable river management throughout Europe and has done a lot of works on this field. It also acts at the international level, as a "network of networks".

ARRN hopes to strength the cooperation between ARRN and ECRR for promoting river restoration and sustainable river management in Asia.



***Thank you for your
attention!***

