NATURAL AND SCENIC RIVER PROTECTION IN WESTERN CHINA

2018 River Management Symposium: *Wild, Scenic & Beyond!*
Wild & Scenic Rivers 50th Anniversary
2018.10.22-25

*Presentation by*

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*Ph.D Candidate of Landscape Architecture Department*
Instructor: Professor Liu Hailong
First 8 Wild & Scenic Rivers Designated in 1968

- Rogue River, Oregon
- Feather River, California
- St. Croix River, Minnesota, Wisconsin
- Wolf River, Wisconsin
- Cleanwater River, Idaho
- Salmon River, Idaho
- Rio Grande, New Mexico
- Eleven Point River, Missouri
Q: Do China has such “wild & scenic river” resources?
A: YES!
Potential Wild & Scenic River Resources in China

Lancang River Source Area “Daqu”
Q: Are the integrated values and wilderness attributes of such river under comprehensive, even legislative protection?

A: Not Yet.

Our protected land system doesn’t has such subdivision providing protection of rivers’ ORVs and wilderness attributes.
Q: Do we need such **River Protected Area**?

A: Yes!

*Because of the great pressure of population and economic development, China’s rivers are under huge threats*
CASE STUDY:
Lancang River In Sanjiangyuan National Park

INTRODUCTION:
Natural & Scenic Rivers in China (Western Area)

THREE FURTHER RESEARCH QUESTIONS:
Comparison Study Between The USA And China
INTRODUCTION:
Natural & Scenic Rivers in China (Western Area)

I. Water conservancy development trends
II. Main water structure summary statics
III. Potential Natural & Scenic River Resources
IV. Western China River Features
I. Water conservancy development trends

According to the 《BP World Energy Statistics Yearbook 2016》:

China is the world's largest energy consumer, accounting for 23% of global energy consumption and 34% of net energy consumption growth. At the same time, China is also the world's largest hydropower country and China's current water conservancy construction is still in a large-scale development period.

According to the data of 《China Water Conservancy Statistical Yearbook 2016》:

the annual growth rate of comprehensive investment in water conservancy infrastructure is over 10% and 50% of its investment is used for water resources projects, 35% for flood control projects, 11% for hydropower projects, 4% for soil and water conservation and ecological construction.
Scope of current River related laws, regulations and administration system in China...
The recognition of River VALUES?

River values need to be recognize in a more integrated way!

- Water Resource Value
  - Urban Water Supply
  - Avoid Drought
- Economic Value
  - Hydroelectricity generation
  - Irrigation
  - Fishery
  - Transportation
- Engineering Value
  - Flood control
  - Sediment Control
- Ecological Value
  - Riparian Ecosystem
  - Vegetation
  - Wildlife
  - Water Quality
- Wilderness Value
  - Free-flow status
  - Natural shoreline
  - Less Accessibility
  - Outdoor recreation opportunities
- Scenery Value
  - Aestics
  - Whole experience
- History & Cultural Value
  - Relics
  - Religion
  - Ethic culture
  - Local lifestyle
II. Main water structures summary statistics

According to 《Bulletin of First National Census for Water (2013)》

Water Structures in China:

- Reservoirs
- Hydropower Stations
- Sluices
- Embankments
- Pumping Stations
- Rural Area Water Supply Projects
- Small Reservoirs and Ponds
- Irrigated Areas
- Construction of Irrigation Districts
- Groundwater Abstraction Wells
- Groundwater Sources

Impoundment Constructions that stop or restrict the free-flow status of river
• **Reservoirs**

  **Largest reservoir in China:** The Yangtze River Three Gorges Reservoir
  **Total storage capacity (100 million m³):** 393
• Hydropower Stations

Largest Hydropower Station in World: Three Gorges Hydroelectric Power Station
Total installed capacity (10,000 kW): 2240
- Sluices

Largest sluice in China: Gezhouba Dam water conservancy project
III. Potential Natural & Scenic River

- Main River Basins Spatial Distribution in China

- Songliao Basin
- Haihe River Basin
- Yellow River Basin
- Huai River Basin
- Yangtze River Basin
- Pearl River Basin
- Taihu Basin
Main Hydropower Stations Spatial Distribution in China

<table>
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<tr>
<th>Main River Basin</th>
<th>Installed Capacity (10,000 kW)</th>
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<th>25-100</th>
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Potential Natural & Scenic River Resources Spatial Distribution in China

Urgency of Protection

- Western China
- Eastern China
- Other Rivers
IV. Western China River Features

- Western River Region Definition
- **Western River Feature 1**: The birthplace of major rivers in China
- **Western River Feature 2**: Outstanding wilderness attributes

  **Western Territory**
  Land vs Population

  **72%** Land area
  **29%** Population

  **Western River Basin**
  Wilderness Index
  *(Refer to Dr. Cao)*
- **Western River Feature 3**: Remarkable culture diversity
CASE STUDY: Lancang River In Sanjiangyuan National Park

I. Sanjiangyuan National Park Background
II. Field Investigation Background
III. River Segment Study
I. Sanjiangyuan National Park Background

- National Park System established in 2017 + 10 Pilot parks
- Source of Yangtze River, Yellow River and Lancang River
- Sanjiangyuan National Park pilot period: 2020
- Boundary: Three separated source parks/ Maybe changed at the end of pilot period
- Area: 123,100 km²
- Population: 650,000 (Below poverty line: 240,000)
II. Field Investigation Background

- First Journey: Hiking (2018.7.5-14)/ Tsinghua Mountaineering Club Expedition team

- Hiking Range: total 67km
Holy Mountain
Glacier
5300 elevation
(degradation status)
Ice Erosion Landform
Glacial Stream
• Second Journey: Rafting (2018.7.19-26) / Last Descents River Expedition

Diverse Visitor Group
• Chinese Teenagers
• Media Person
• Steve & Cyd from US NPS
• Colin & Lori from Australia NPS
• Rafting Experts, like Travis
• Me & Dr. Liu Landscape Researchers
• Rafting Range: 122km
  **Lancang – Mekong River**

**Highlights for my first Rafting Experience:**

• First time to really touch & interact with river
• Super enjoyable and have fun with rafting
• Rafting + Short Hiking + Good river chef = Whole river life experience
• Educate the youth
• Silently lost in wilderness and inspired by nature
• An impressive journey to have long and deep impacts for my life
III. River Segment Study

i. Location: Daqu (Lancang River Source Area)
Outstandingly Remarkable Values (ORVs)

1. Geology Value  
2. Hydrology Value  
3. Fish & Wildlife Value  
4. History and Culture Value  
5. Recreation Value  
6. Scenery Value
ii. ORVs-① Geology Value

1. Lancang River is one of the highest elevation rivers in China. It is located in the Tibetan Plateau area with an average elevation of 3800-5800 meters.

2. The source area is a typical continental glacier that forms glacial rivers.

3. The source of the Lancang River flowing through the Zaduo Angsai county has the most complete Cretaceous Danxia landform on the Tibetan Plateau.
ii. ORVs-② Hydrology Value

1. The Lancang river is rich in water resources and runoff resources and also has an average runoff of 74 billion cubic meters over the years.

2. Atmospheric precipitation is the main recharge source of water resources in the Lancang-Mekong River basin, and the snowmelt runoff in the upper reaches of the Lancang River also supplements some of the inflow.
ii. ORVs-③ Fish & Wildlife Value

1. The Lancang-Mekong River system is one of the world's richest freshwater fish ecosystem, second only to the Amazon.

2. The rich fish resources of the Lancang-Mekong include highly endangered catfish (Pangasianodon gigas) and Irrawaddy porpoise (Orcaella brevirostris).

3. The region is one of the most densely distributed and intact habitats for large carnivores on the earth, of which Snow Leopard is an endangered species.
1. Lancang River Basin is the third birthplace of civilization in China following the Yellow River and Yangtze River, and has the reputation of "cultural corridor".

2. In the Paleolithic Age, there were human civilization footprints. In the Qin and Han Dynasties, counties were set up in the valley, and there were abundant tourism resources of ruins and architectural facilities.

3. Most of the Lancang River basin is Buddhist belief area, and there are some local religions and ancient religions of ethnic minorities. The upper Tibetan areas are representative Tibetan Buddhism and Ben religion, with many temples of higher ranks.
ii. ORVs

Recreation Value

1. Rafting: Class II to V rapids/ Moderate and little bit challenging, suitable for public to experience
2. Hiking

Glacial streams flow down the gorge branches along the river/
Each gorge has unique hiking experience
1. **Camping**: diverse camping experience along the river: wildflower meadow/ red beach/ silent valley ....
ii. ORVs-⑥ Scenery Value

1. **Geological:** magnificent and vast, rich color.

2. **Diverse species:** habitats of endemic species of the Qinghai-Tibet Plateau and habitats of migratory birds, wilderness full of vitality.

3. **Meteorological:** changes in landscape colors throughout one day like four seasons.

4. **Cultural:** the great Tibetan area is unique in religious belief, lifestyle and legendary stories.
ii. River Wilderness Threats Matrix
   (reference: “The wilderness threats matrix for assessing impacts” _ David N. Cole)

- ① Potential Threats Identification
- ② River Wilderness Character Subdivision
- ③ River Wilderness Threats Matrix

- ④ Preliminary Evaluation
- ⑤ Preliminary Analysis

- ⑥ Future: Administration & Management
ii. Matrix – Potential Threats Identification

• Rafting Visitors on-site Interview

  The orange building besides bridge/vehicle access is really disturbing/the commercial camping site is noisy/do not use container as toilet, so strange in the field/give money to let local people renovate their houses in traditional construction techniques......

  Wire tower/Trash/No vehicle entry/no concrete road and current road can be hided by vegetation/

  Trash/Bridge/Wire tower/Road
  Keep the current status of road construction, only improvement, no new road
  Building should not build along river shore, use local material, like wood, mud and stone

• Potential Threats List

1. Road
2. Bridge
3. Wire Tower
4. Building & Other structure
5. Livestock
6. Trash
7. Boundary Constrain
8. Recreation
ii. Matrix – River Wilderness Character Subdivision

- Main Aspects: Preservation + Outdoor Recreation
The diagram illustrates the River Wilderness Character List and its components.

**River Wilderness**
- GOAL
- Preservation: Nature, Culture, Mixture

**Objective Perspective**
- Nature
- Culture
- Integration Aesthetics

**Subjective Perspective**
- Outdoor Recreation: Enjoyment, Education, Inspiration

**Outstanding opportunities for a primitive and unconfined type of recreation**

**Subdivision**
- 6. History & Culture

**Whole Wilderness Experience**
- 1. Geology
- 2. Aquatic Ecosystem
- 3. Soil
- 4. Vegetation
- 5. Wildlife
- 7. Accessibility
- 8. Shoreline
- 9. Scenery
The “River Wilderness Threats Matrix” represents that the impact degree each “Potential Threats” has on each “River Wilderness Character” attributes. I use 1-5 to show specific the impact degree level.

<table>
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<tr>
<th>POTENTIAL THREATS</th>
<th>GEOMETRY</th>
<th>AQUATIC ECOSYSTEM</th>
<th>SOIL</th>
<th>VEGETATION</th>
<th>WILDLIFE</th>
<th>HISTORY &amp; CULTURE</th>
<th>ACCESSIBILITY</th>
<th>SHORELINE</th>
<th>SCENERY</th>
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</table>

Impact Degree Level
5: Very High
4: High
3: Moderate
2: Low
1: Very Low
ii. Matrix – Preliminary Evaluation (Each threat impacts on each attribute)

- Potential Threat: ROAD
Potential Threat: BRIDGE
- Potential Threat: WIRE TOWER
• Potential Threat: BUILDING & OTHER STRUCTURES
  (Commercial Camping site, Toilet ........)
Potential Threat: LIVESTOCK
Potential Threat: TRASH
Potential Threat: RECREATION
• Potential Threat: BOUNDARY CONSTRAIN

Undisturbed Area
Marnyi Stone Pile
Pagoda Relics
## Preliminary Evaluation Result

<table>
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<th>Potential Threats</th>
<th>GEOLGY</th>
<th>AQUATIC ECOSYSTEM</th>
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### Impact Degree Level
- 5: Very High
- 4: High
- 3: Moderate
- 2: Low
- 1: Very Low
ii. Matrix – Preliminary Analysis
   • Threats Impact Level of Each Attribute
Threats Impact Level for Priority Management

- Road: 34
- Bridge: 25
- Wire Tower: 23
- Building & Other Structure: 29
- Livestock: 20
- Trash: 30
- Boundary Constrain: 36
- Recreation: 16
THREE FURTHER RESEARCH QUESTIONS:
Comparison Study Between The USA And China

I. Natural or Wild?
II. Future Natural & Scenic River Protection System in China?
Q1: Natural or Wild

USA: Wild & Scenic River
China: Natural & Scenic River?

- How many “wild river” resources remain in China?
- How about the public attitude towards “River Wilderness” protection?
How many “wild river” resources remain in China?

**DAM**
- Change the river’s free-flow status
  - Hydropower Station (main)
  - Small Hydropower Station
  - Other impoundment construction: reservoir, sluice......

**SHORELINE**
- River shore constructions, like embankment

**ACCESSIBILITY**
- Road along the river
How about the public attitude towards “River Wilderness” protection?

Everything is about the relationship between People and Nature!
• What is Wilderness?

• Why we need solitude in the nature?

• Why I need to see the “scenery” in a more time, money consuming and physically challenging way?

Public Recognition Foundation?
Shut Down!
Not permit for visiting

Visitors: Lack of Decent Behaviors in the Wild

Zhaling & Eling Lake
Sanjingyuan National Park
Q2: Future Natural & Scenic River Protection System in China

- Comparison of Protected Area System Between USA and China
## Comparison of Protected Area System Between USA and China

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<th>Sub-System</th>
<th>Administration</th>
<th>Category Count</th>
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<td>Research Natural Area</td>
<td>NPS with 8 Departments</td>
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## Category of China Protected Areas

<table>
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<td>Special Marine Reserve</td>
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<td>Original habitat protection point</td>
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These issues are still under discussion by the administrators during National Park pilot period:

- Provide recreation opportunities or not?
- What is the difference between tourism and outdoor recreation?
- Build roads to remove local poverty is very important, but what is the relationship with natural, cultural and scenery resources protection?
- ................
Thank You!

Supplementary Photo credit to:
Dr. Liu &
Meredith Meeks (Last descents river expedition)