

NATURAL AND SCENIC RIVER PROTECTION IN WESTERN CHINA

2018 River Management Symposium: *Wild, Scenic & Beyond!*

Wild & Scenic Rivers 50th Anniversary

2018.10.22-25

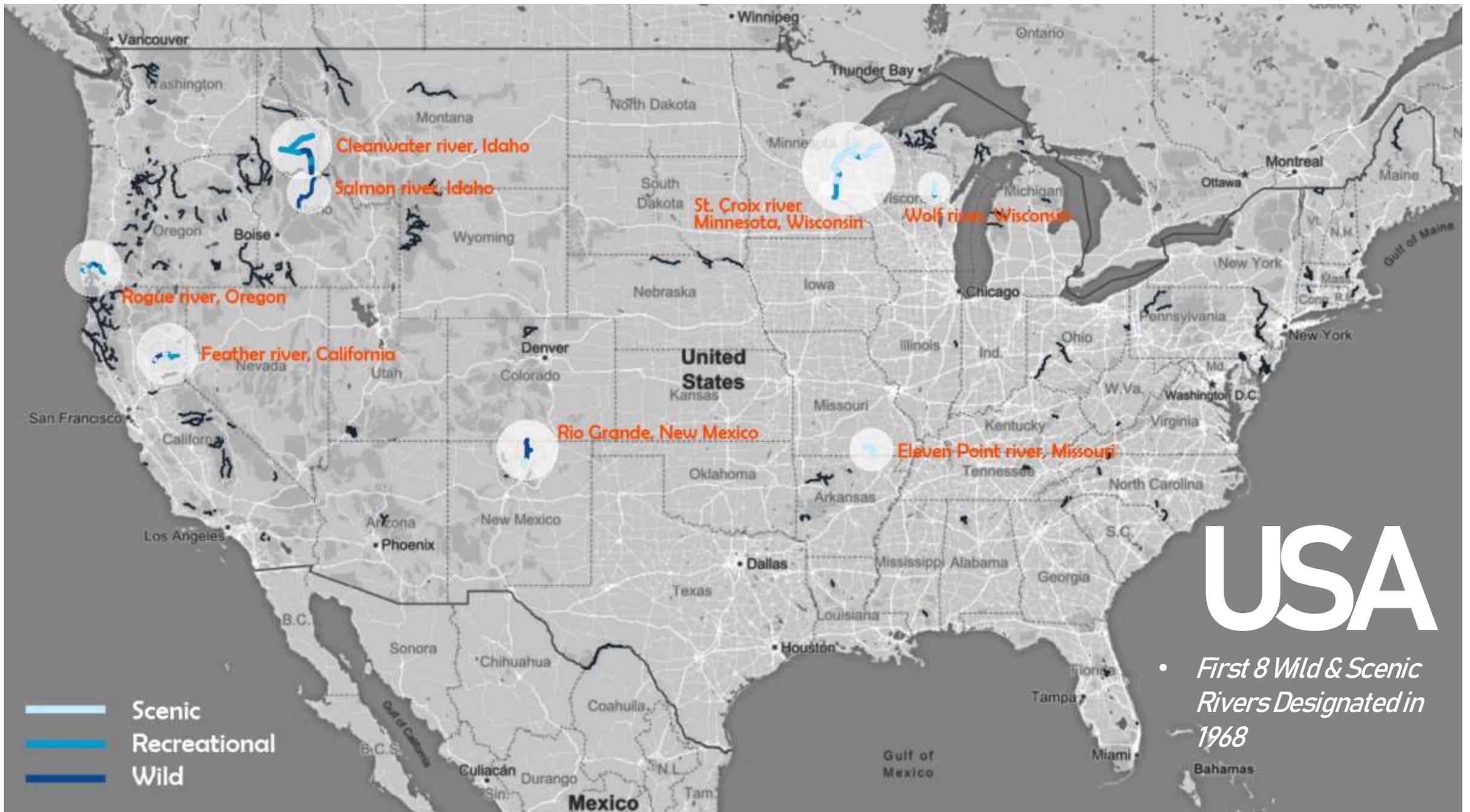
Presentation by

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Instructor: Professor Liu Hailong





Wild & Scenic River

*Rio Grande River
(New Mexico)*

*Designated in
Oct. 2, 1968*

? China

Q: Do China has such “wild & scenic river” resources?

A: YES!



*Natural &
Scenic River
in China?*

*Potential Wild &
Scenic River
Resources in China*

*Lancang River
Source Area "Daqu"*

? China

*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.

? China

*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

01

INTRODUCTION:

Natural & Scenic Rivers in China (Western Area)

CASE STUDY:

Lancang River In Sanjiangyuan National Park

02

03

THREE FURTHER RESEARCH QUESTIONS:

Comparison Study Between The USA And China

01

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 》 :

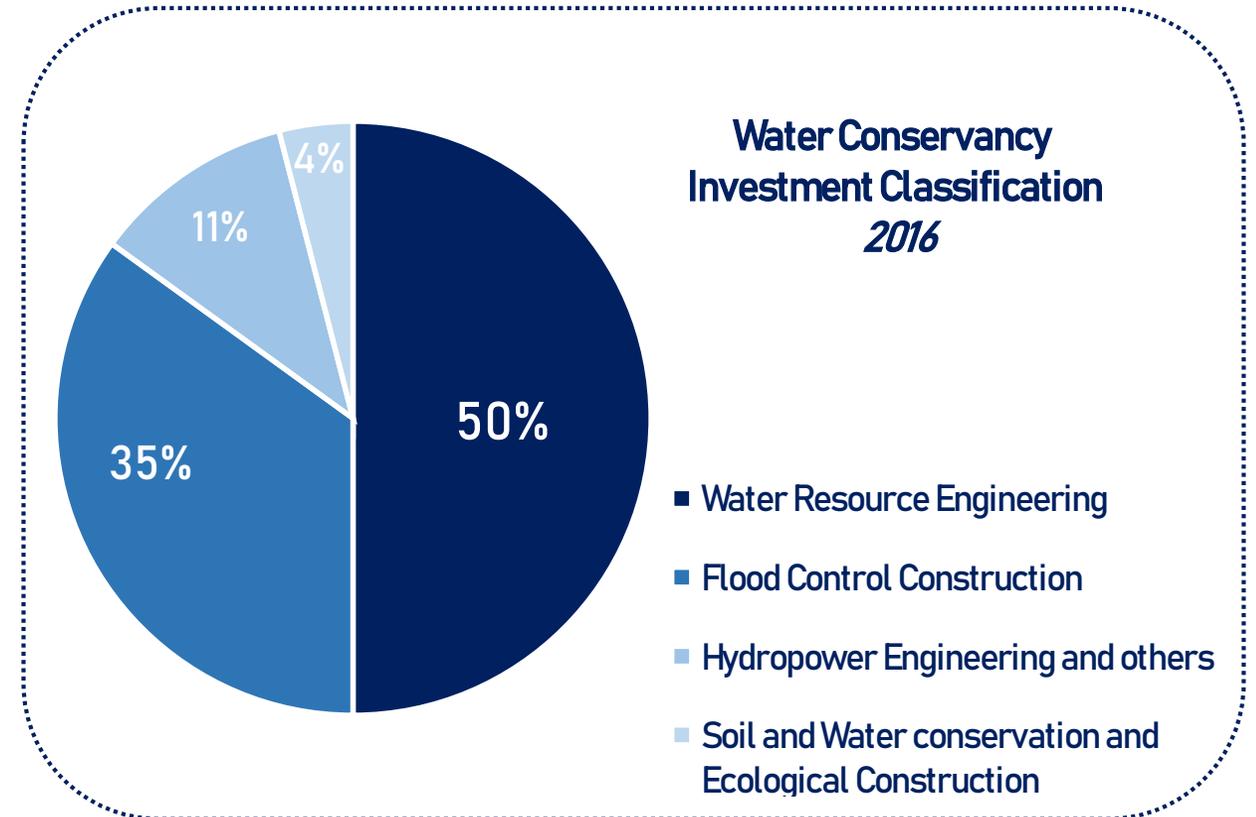
China is the **world's largest energy consumer**, accounting for **23%** of global energy consumption and **34%** of net energy consumption growth. At the same time, China is also **the world's largest hydropower country** and China's current water conservancy construction is still in a large-scale development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

According to the data of

《 China Water Conservancy Statistical Yearbook 2016 》 :

the annual growth rate of comprehensive investment in water conservancy infrastructure is

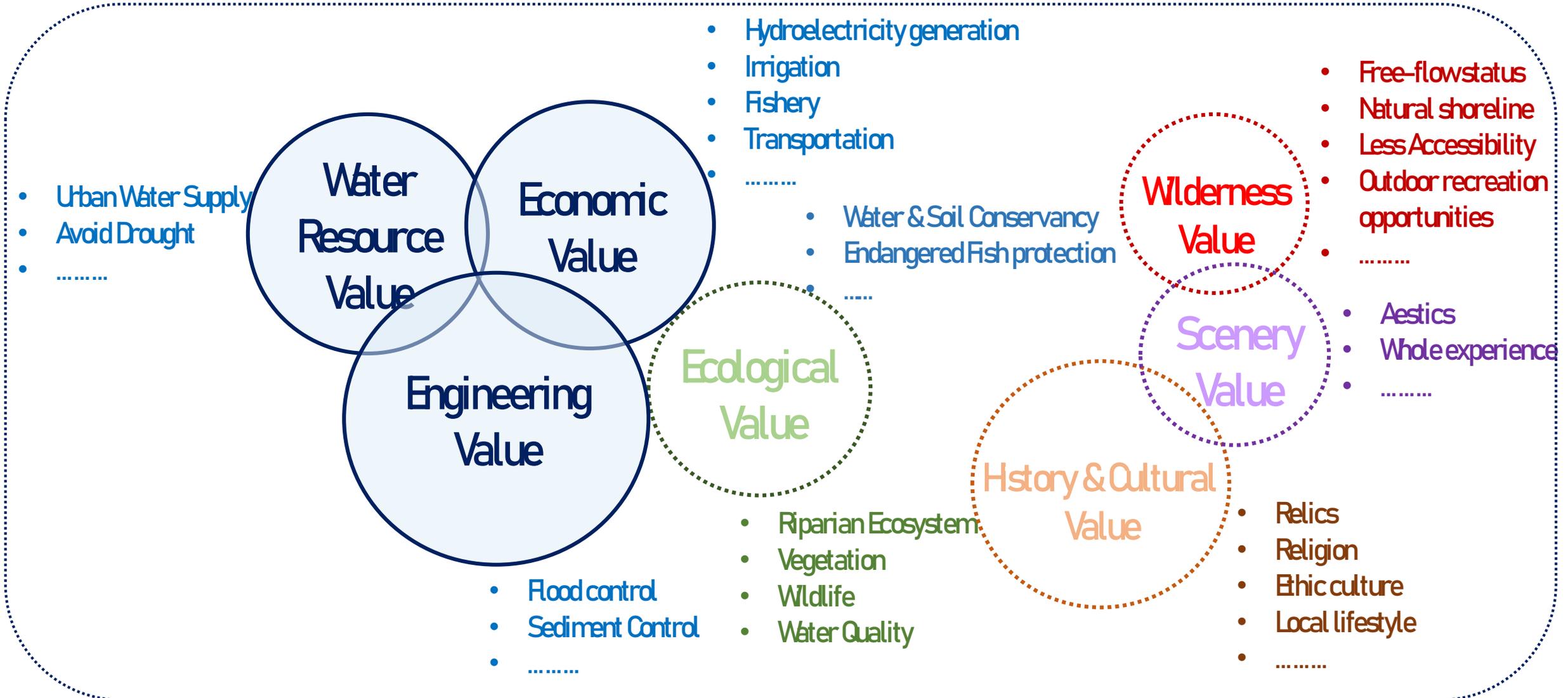
over 10% and 50% of its investment is used for water resources projects, 35% for flood control projects, 11% for hydropower projects, 4% for soil and water conservation and ecological construction.



- 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!



II. Main water structures summary statistics

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

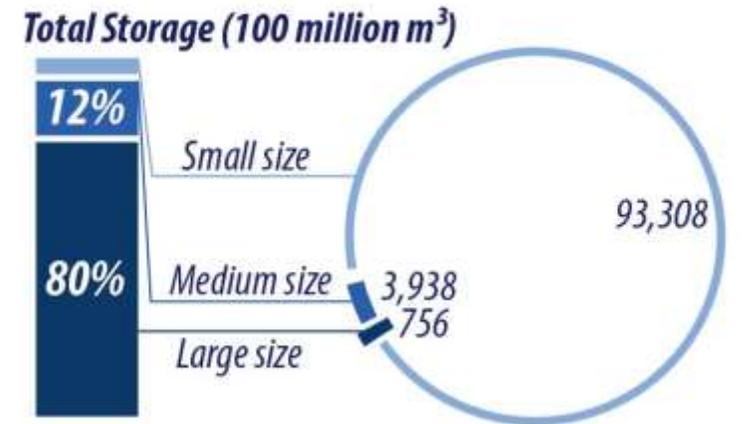
Water Structures in China:

- Reservoirs
 - Hydropower Stations
 - Sluices
- Impoundment Constructions that stop or restrict the free-flow status of river
- Embankments
 - Pumping Stations
 - Rural Area Water Supply Projects
 - Small Reservoirs and Ponds
 - Irrigated Areas
 - Construction of Irrigation Districts
 - Groundwater Abstraction Wells
 - Groundwater Sources

- Reservoirs



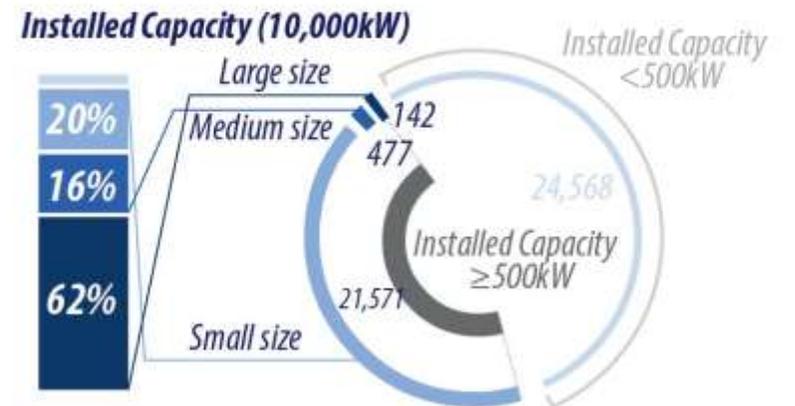
Largest reservoir in China: The Yangtze River Three Gorges Reservoir
Total storage capacity (100 million m³): 393



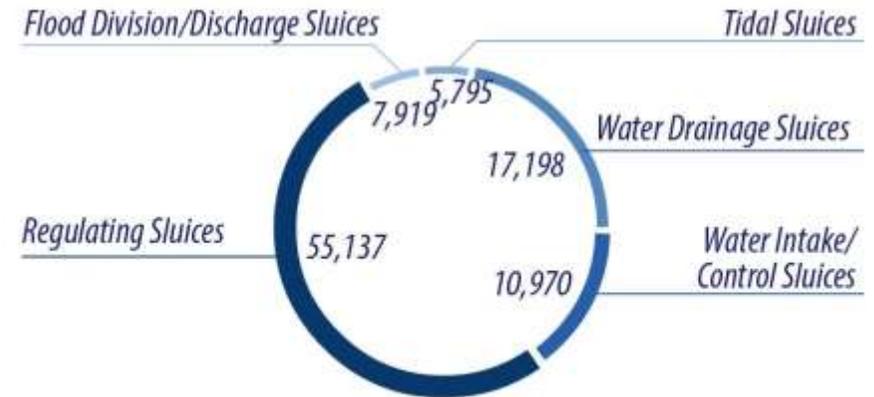
- Hydropower Stations



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



- Sluices



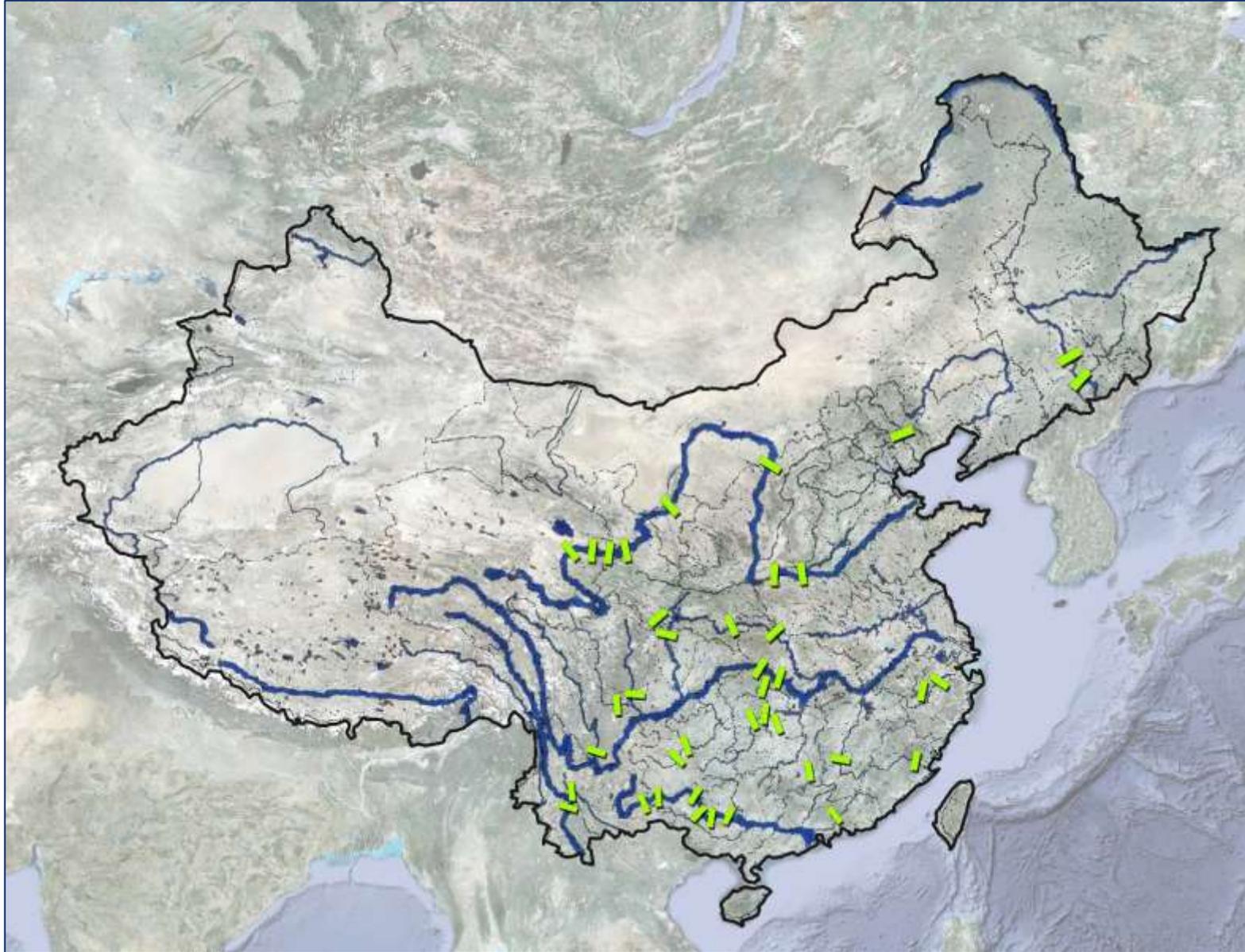
Largest sluice in China: Gezhouba Dam water conservancy project

III. Potential Natural & Scenic River



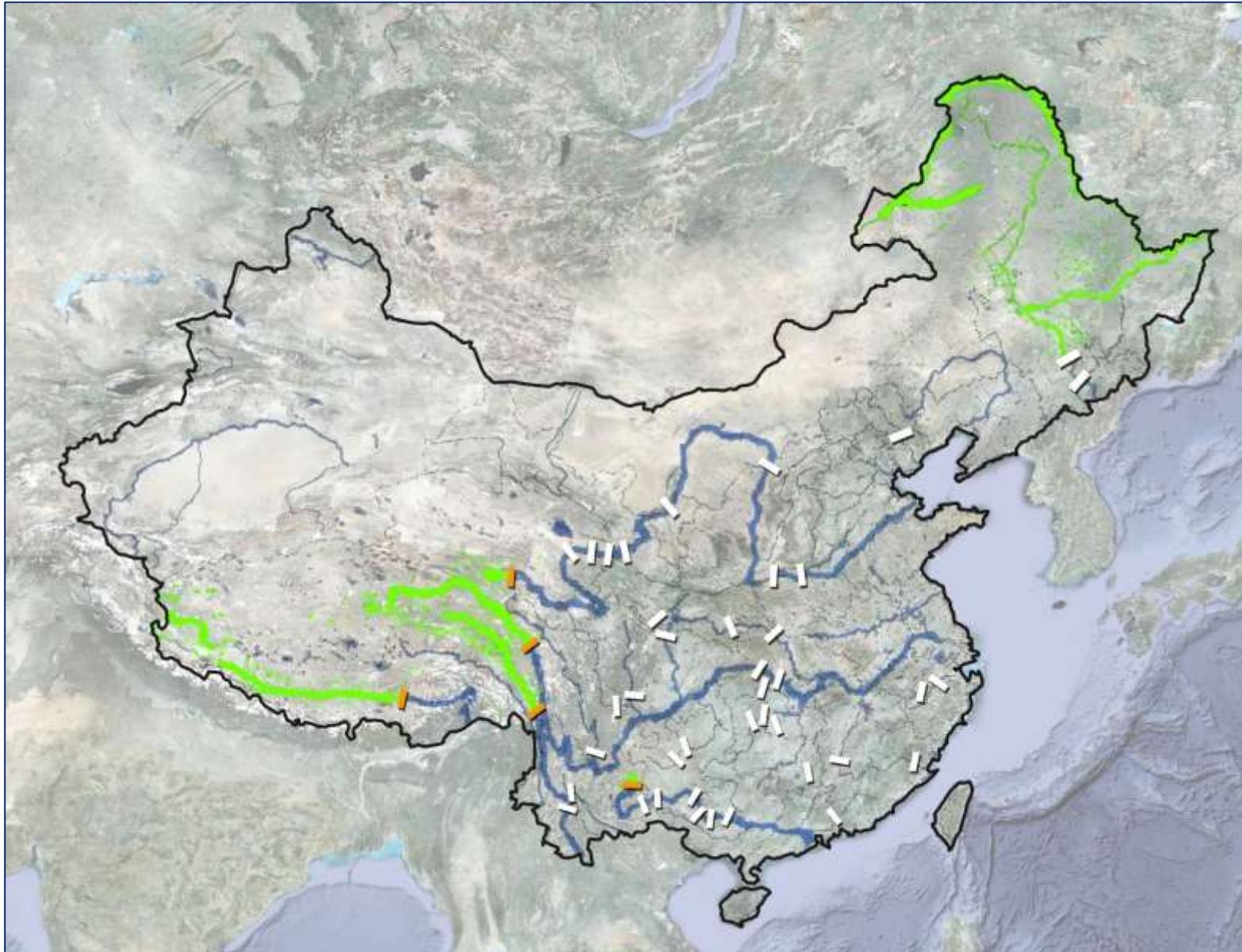
- Main River Basins
Spatial Distribution in China





- Main Hydropower Stations Spatial Distribution in China

Main River Basin	Installed Capacity (10,000kW)	
	≥100	25-100
Yellow River	44	11
Yangtze River	22	71
Pearl River	6	10
Sonehua River	2	6
Lancang River	12	5
Yaluzangbu River	6	7
Yanpan River	10	8
Nu River	9	3
Mng River	1	1



- Potential Natural & Scenic River Resources Spatial Distribution in China

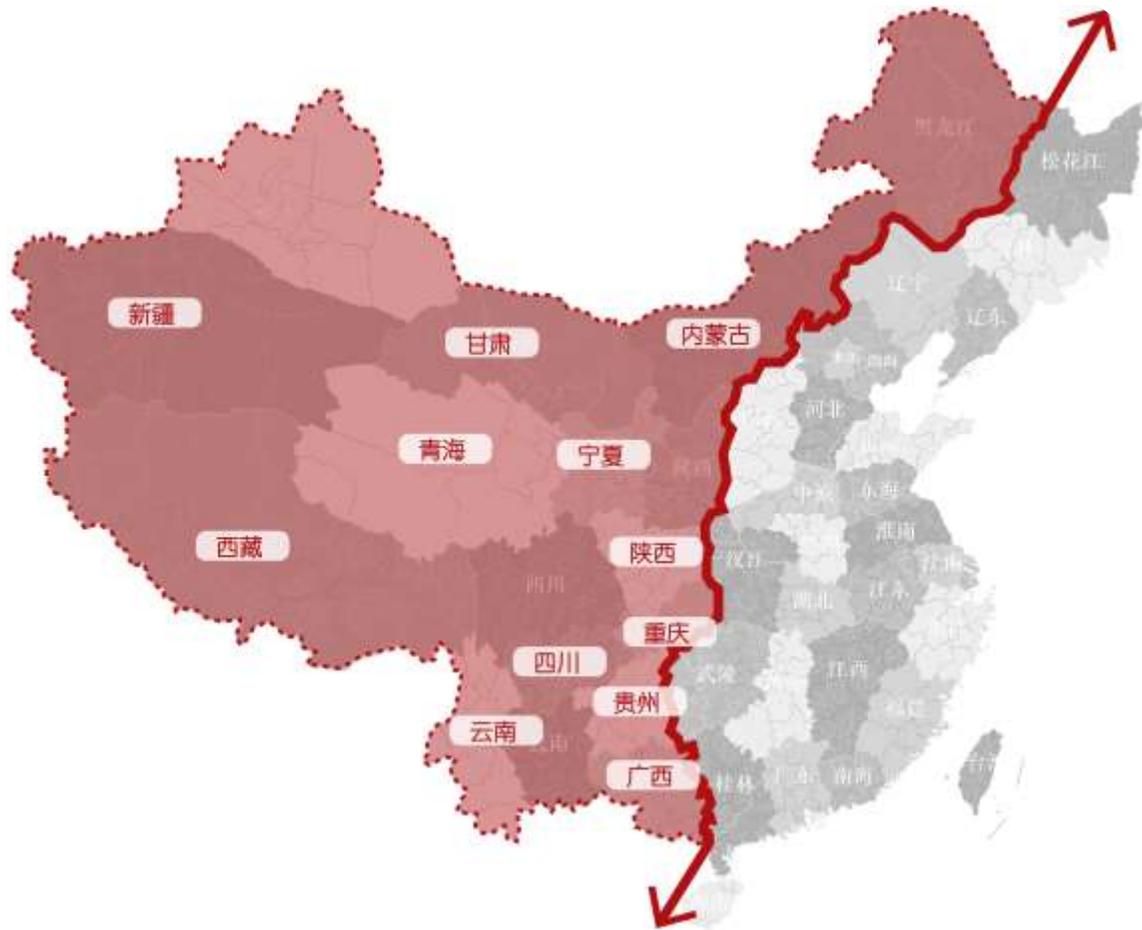
Urgency of Protection

- *Western China*
- *Eastern China*
- *Other Rivers*

IV. Western China River Features

- Western River Region Definition

Western Territory
Administrative Boundary



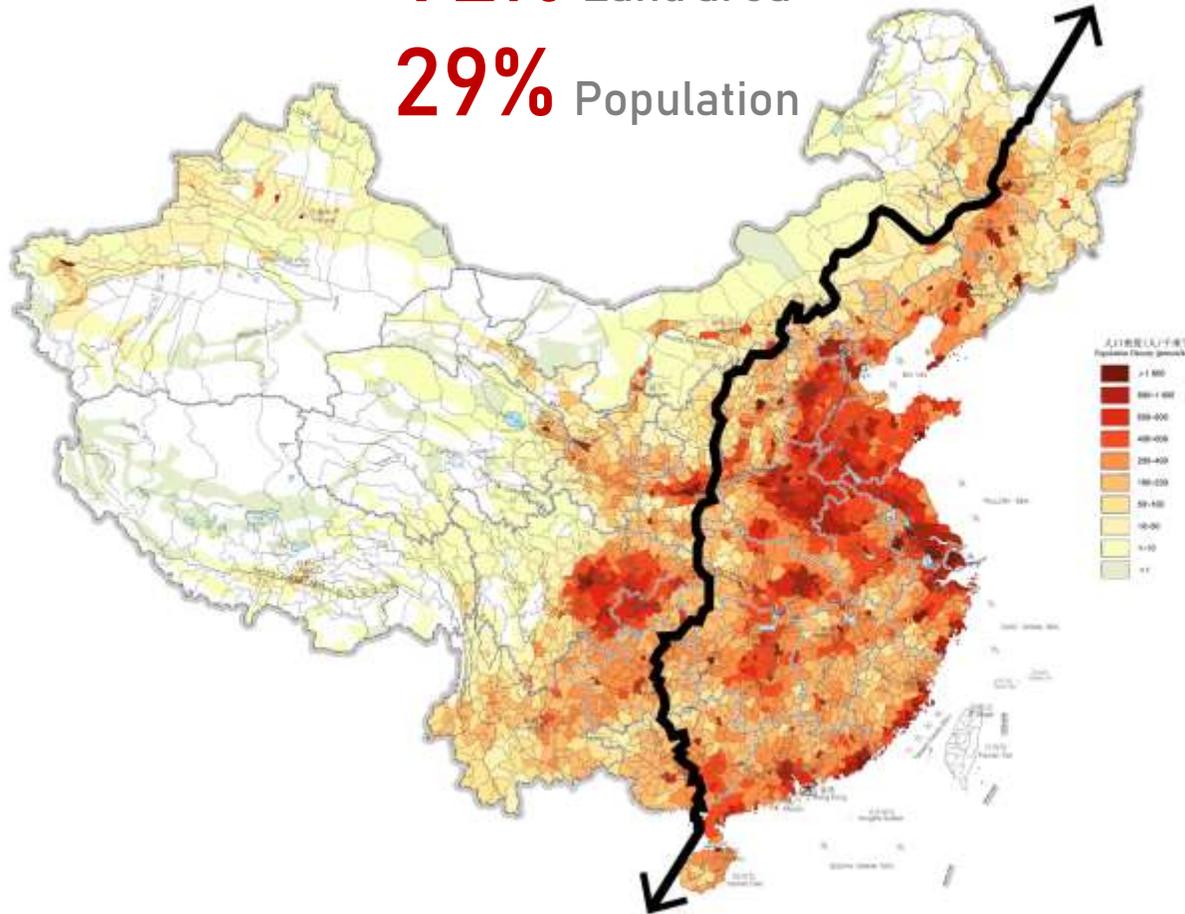
Western River Basin
Boundary



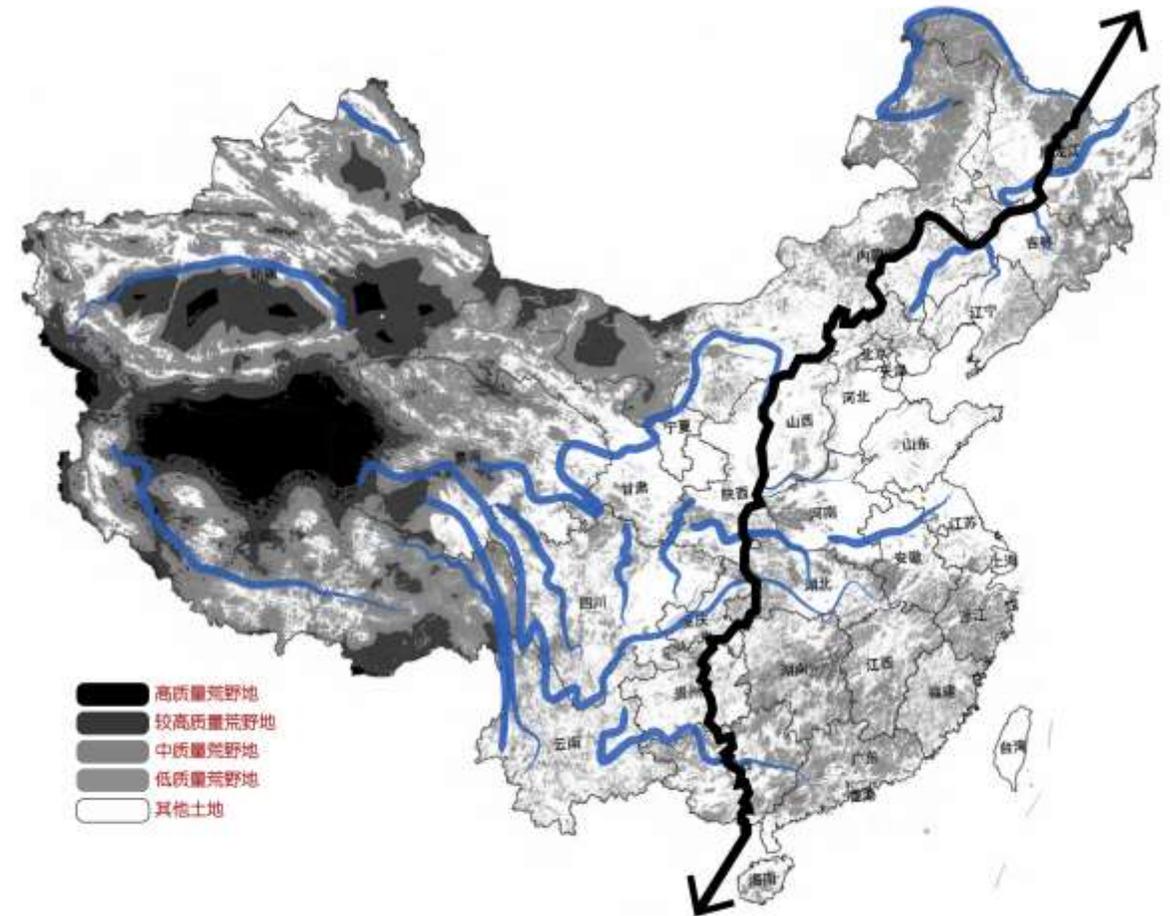
- Western River Feature 2: Outstanding wilderness attributes

Western Territory
Land vs Population

72% Land area
29% Population

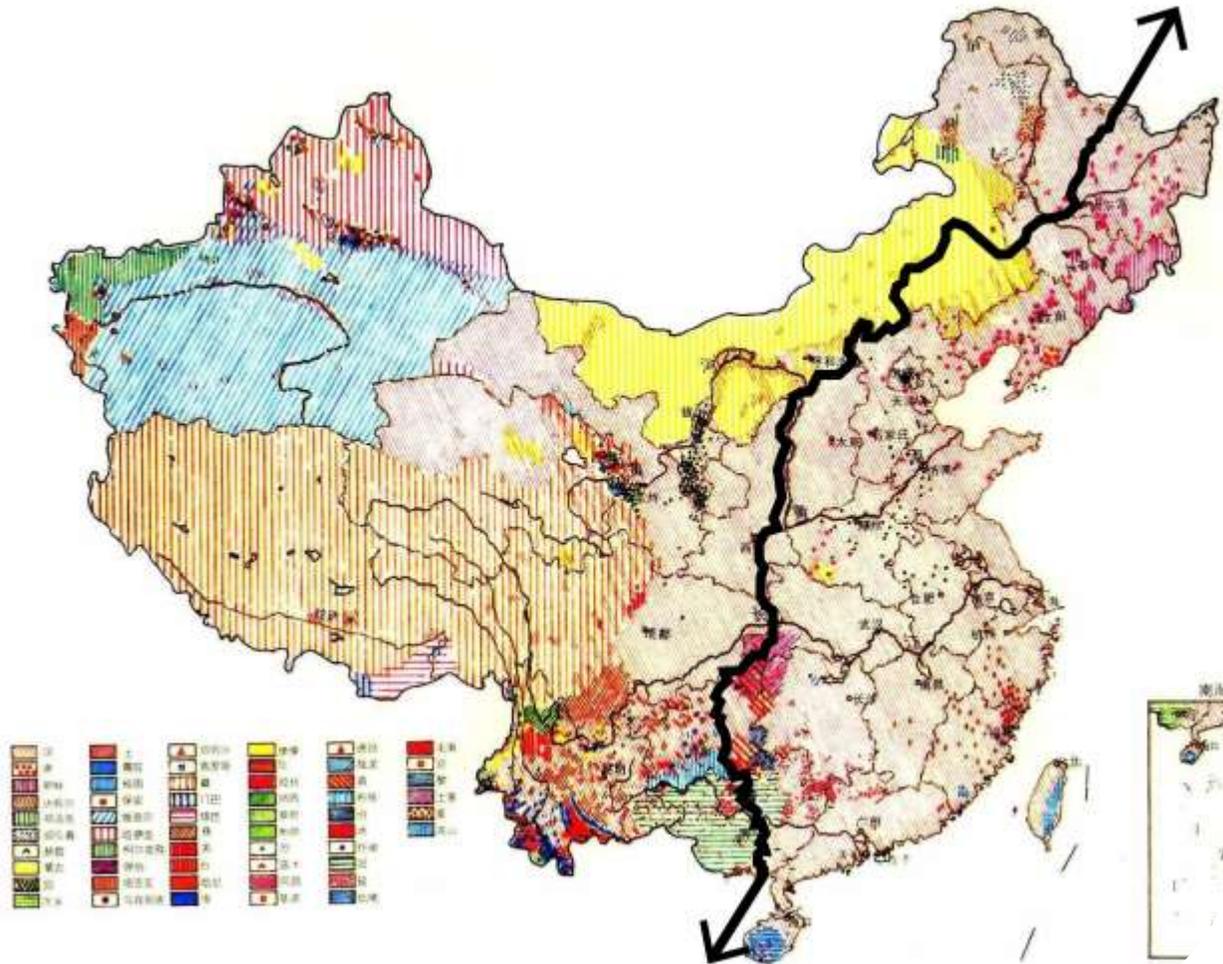


Western River Basin
Wilderness Index
(Refer to Dr. Cao)



- Western River Feature 3: Remarkable culture diversity

Western Territory
Ethnic Minority



Western River Basin
Diverse Cultures



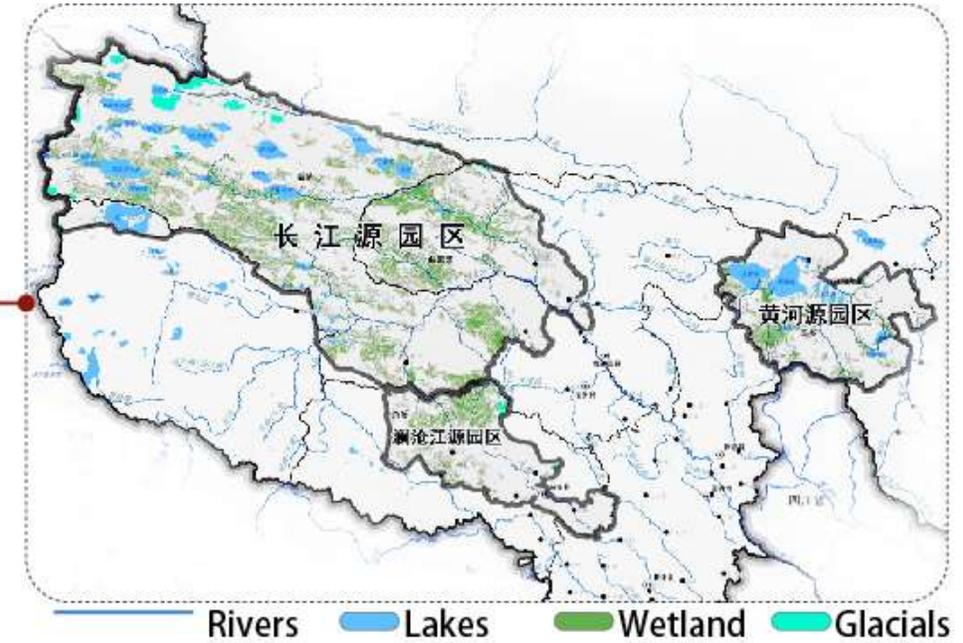
02

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



Lancang River Source Park



Zado County



Holy Mountain



Sacred Lake



Glacier
5300 elevation
(degradation status)



**Ice Erosion Landform
Glacial Stream**

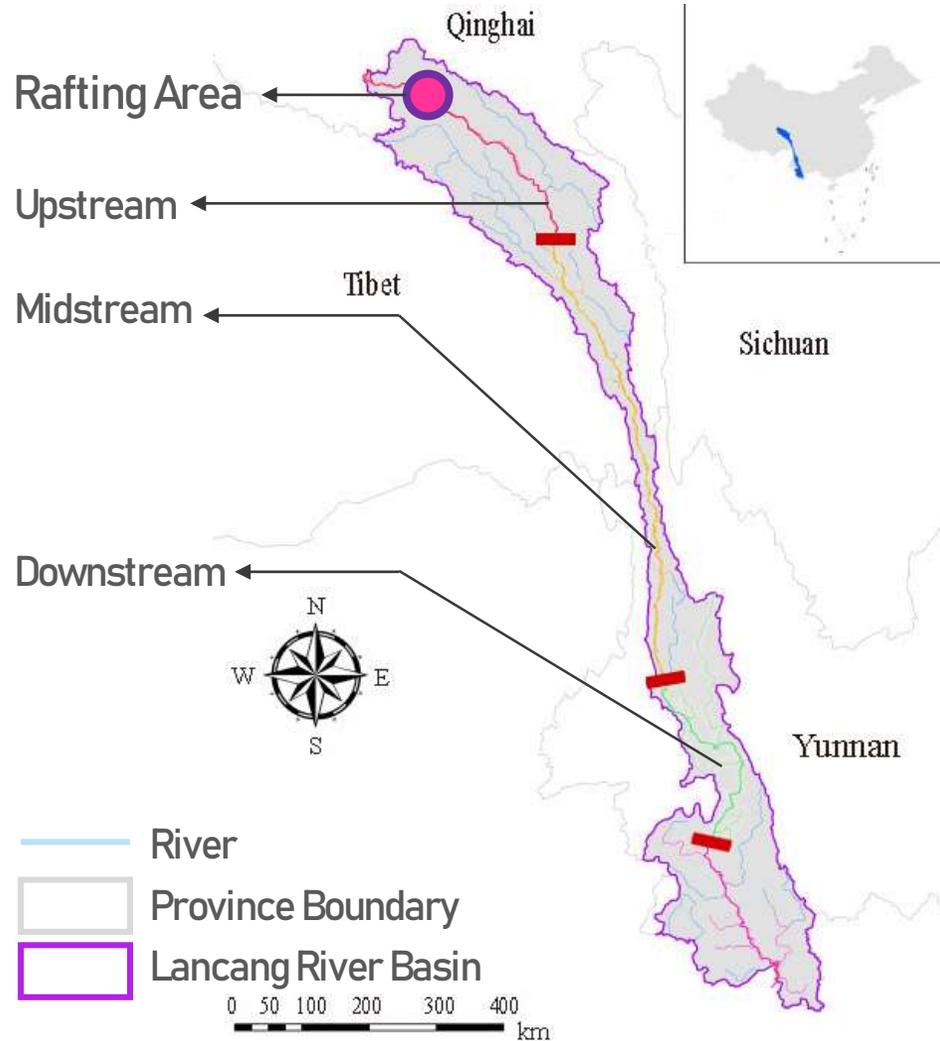
- **Second Journey: Rafting (2018.7.19-26) / Last Descents River Expedition**



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)



ii. 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 Zaduogang 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.

ii. ORVs-④ History & Culture Value

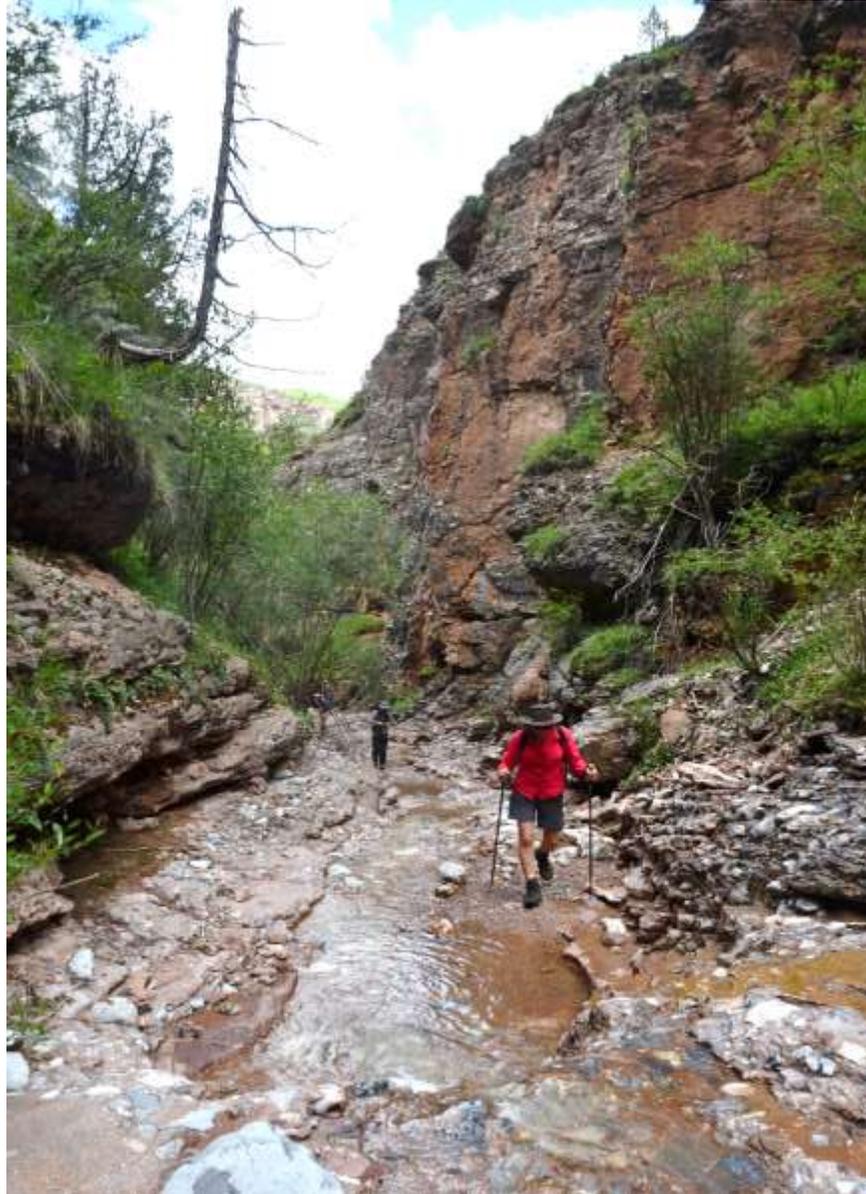


- 1.** Lancang River Basin is the **third birthplace of civilization in China**, following the Yellow River and Yangtze River, and has the reputation of "cultural corridor".
- 2.** In the **Paleolithic Age**, there were **human civilization footprints**. In the Qin and Han Dynasties, counties were set 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-⑤ 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 – ① 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 hid 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

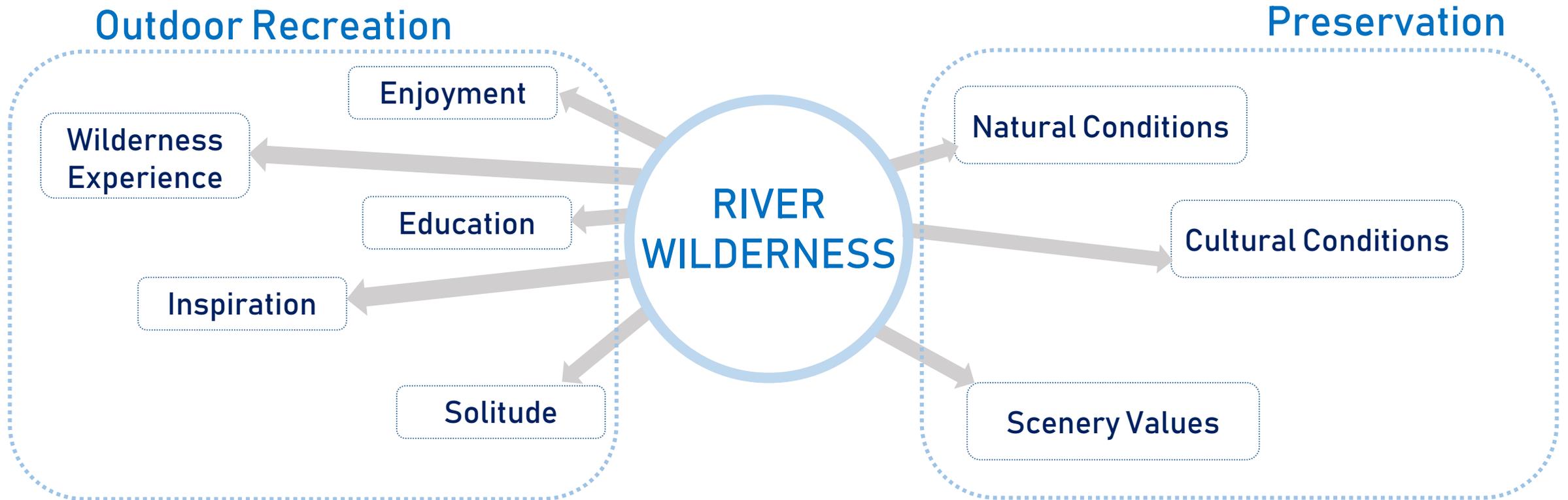


• Potential Threats List

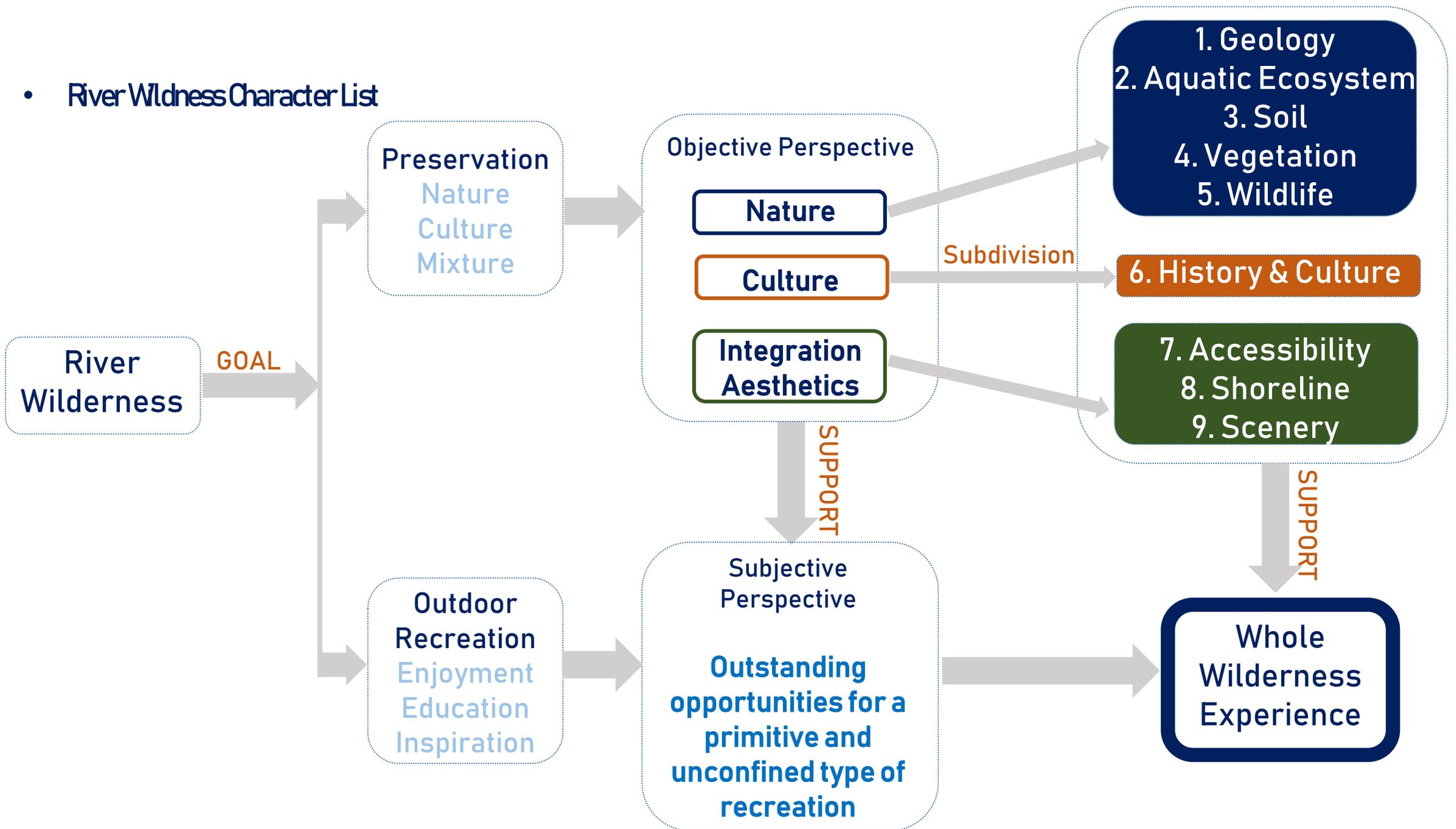
1. Road
2. Bridge
3. Wire Tower
4. Building & Other structure
5. Livestock
6. Trash
7. Boundary Constrain
8. Recreation

ii. Matrix – ② River Wilderness Character Subdivision

- Main Aspects: Preservation + Outdoor Recreation



• River Wilderness Character List



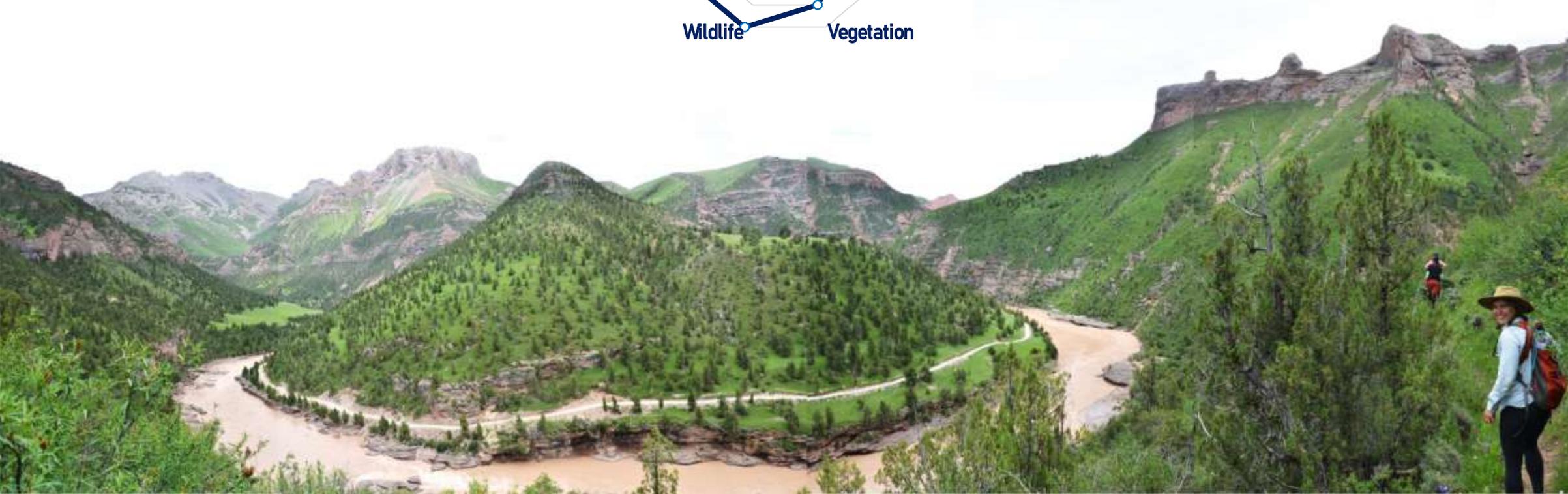
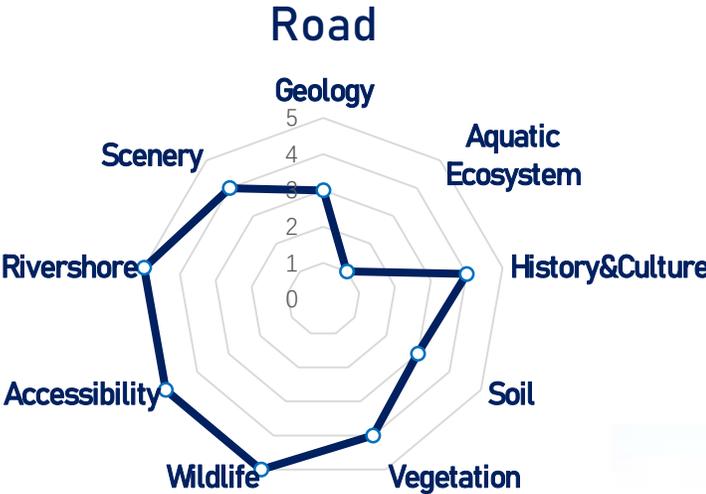
ii. Matrix – ③ River Wilderness Threats Matrix Structure

		ATTRIBUTES OF RIVER WILDERNESS CHARACTER								
		GEOLOGY	AQUATIC ECOSYSTEM	SOIL	VEGETATION	WILDLIFE	HISTORY & CULTURE	ACCESSIBILITY	SHORELINE	SCENERY
POTENTIAL THREATS	Impact Degree Level									
	5: Very High									
	4: High									
	3: Moderate									
	2: Low									
	1: Very Low									
	ROAD									
	BRIDGE									
	WIRE TOWER									
BUILDING & OTHER STRUCTURE										
LIVESTOCK										
TRASH										
BOUNDARY CONSTRAIN										
RECREATION										

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.**

ii. Matrix – ④ Preliminary Evaluation (Each threat impacts on each attribute)

- Potential Threat: ROAD









Potential Threat: BRIDGE





- Potential Threat: WIRETOWER





- Potential Threat: BUILDING & OTHER STRUCTURES
(Commercial Campingsite, Toilet)

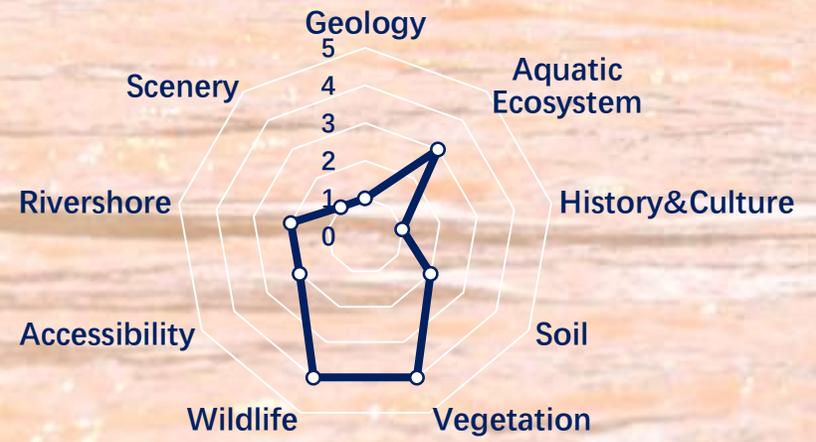




Potential Threat: LIVESTOCK



Livestock





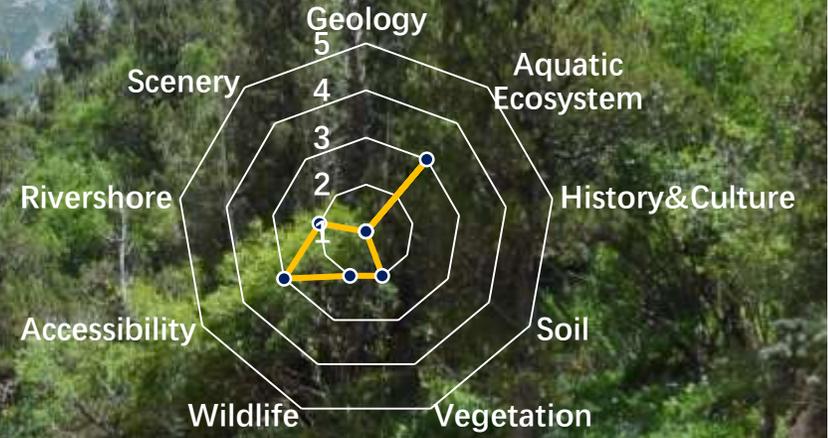
- Potential Threat: TRASH



Potential Threat: RECREATION



Recreation



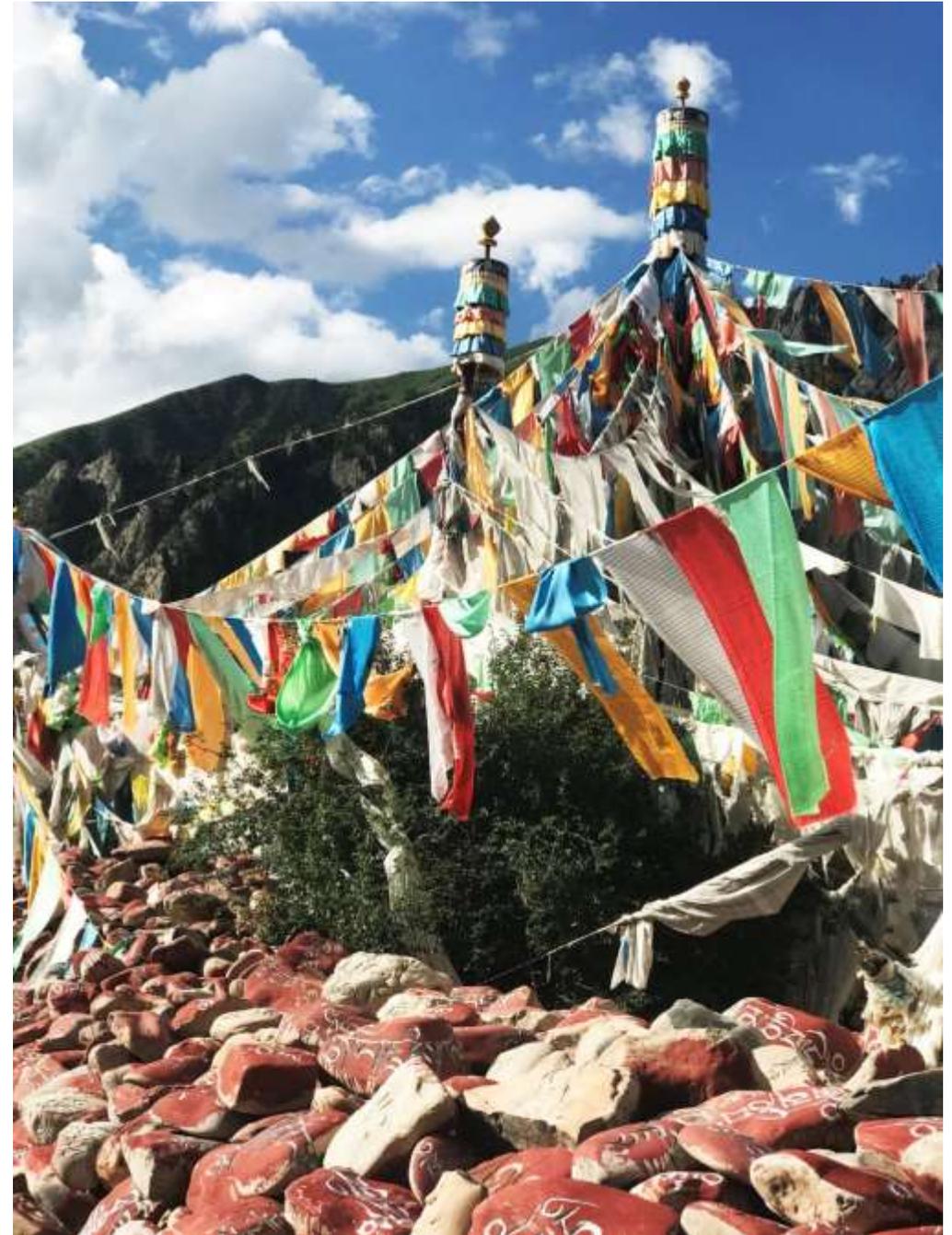
- Potential Threat: BOUNDARY CONSTRAIN



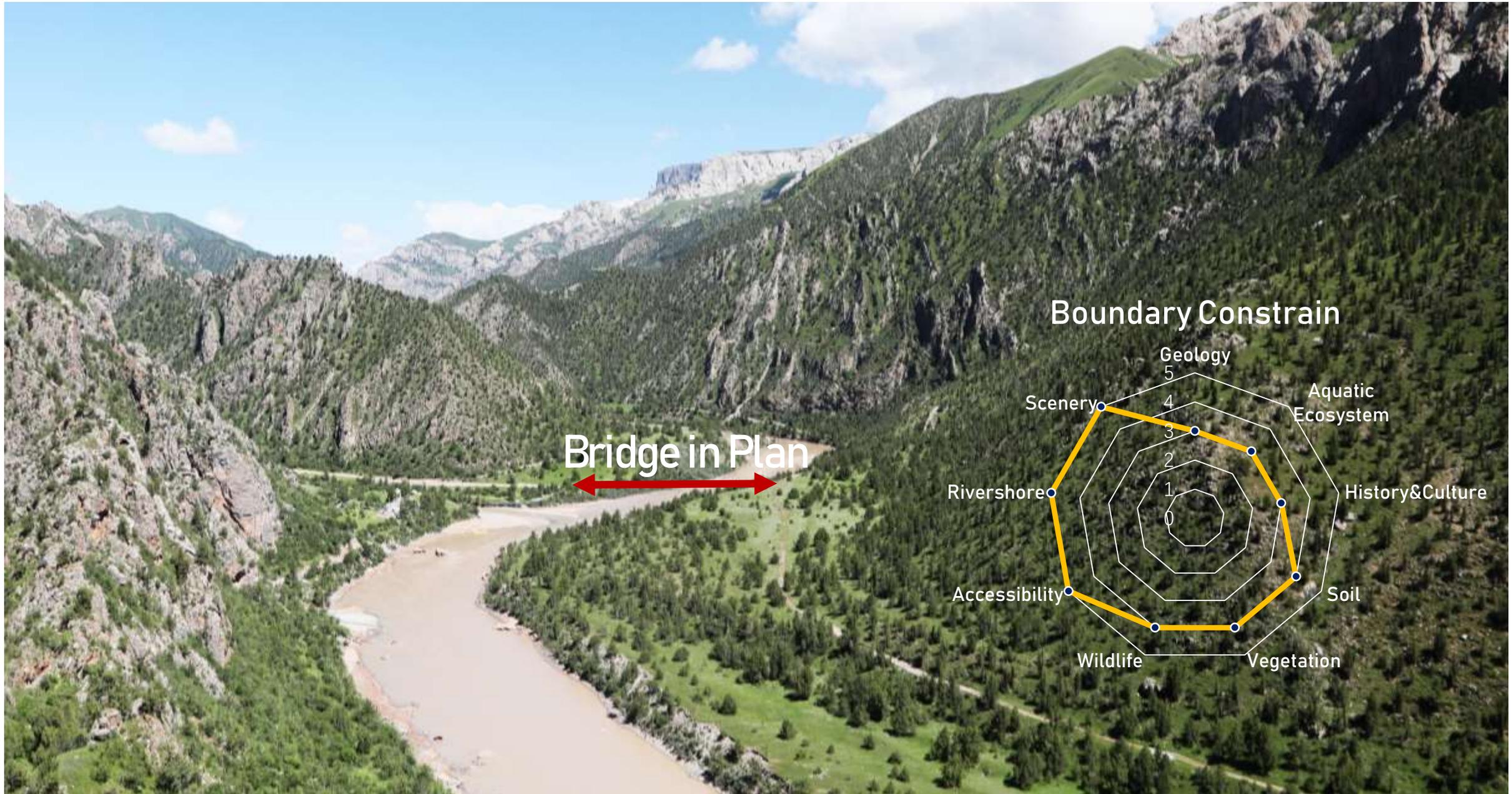
Undisturbed Area



Undisturbed Area



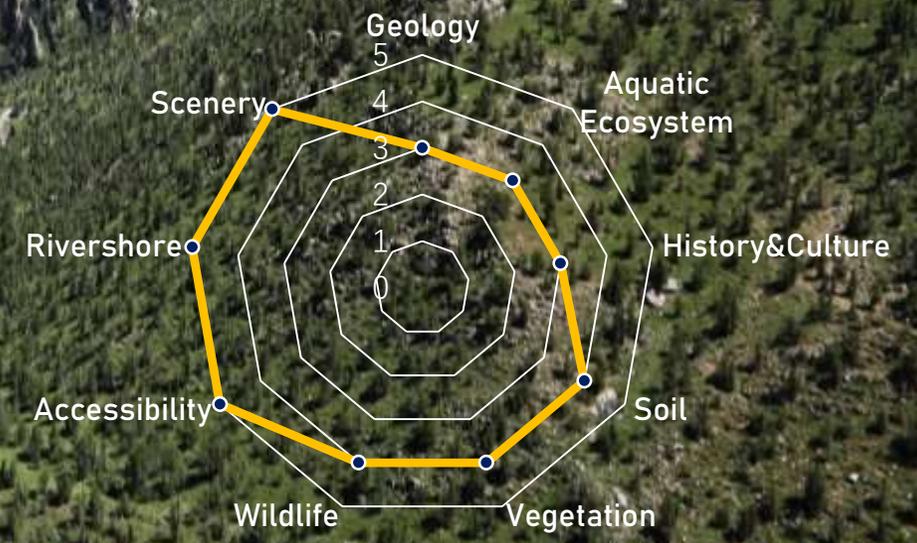
Marnyi Stone Pile
Pagoda Relics



Bridge in Plan



Boundary Constrain







- Preliminary Evaluation Result

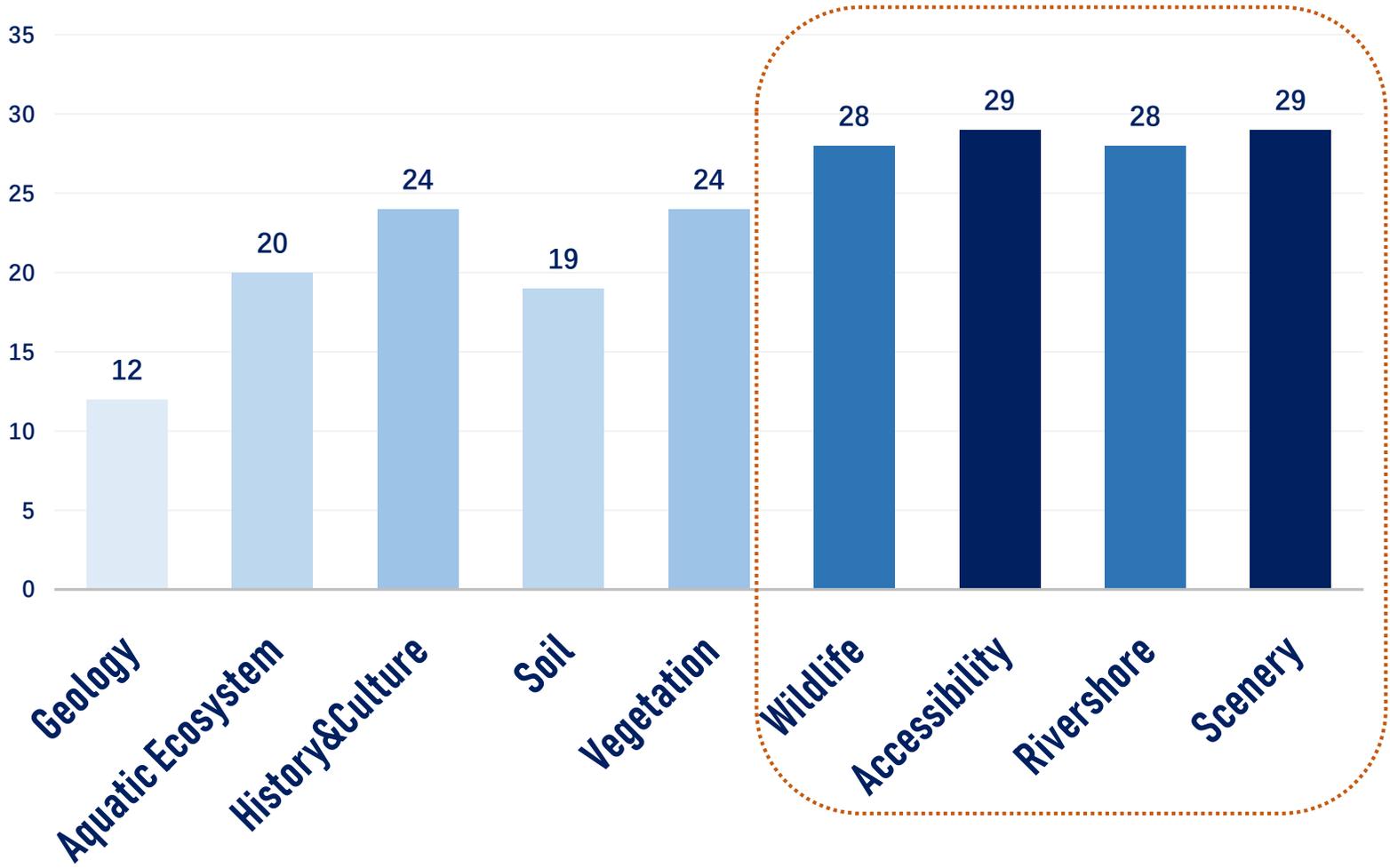
ATTRIBUTES OF RIVER WILDERNESS CHARACTER

POTENTIAL THREATS	ATTRIBUTES OF RIVER WILDERNESS CHARACTER									
	GEOLOGY	AQUATIC ECOSYSTEM	SOIL	VEGETATION	WILDLIFE	HISTORY & CULTURE	ACCESSIBILITY	SHORELINE	SCENERY	
ROAD	3	1	4	3	4	5	5	5	4	
BRIDGE	1	1	4	2	2	2	4	4	5	
WIRE TOWER	1	1	2	1	3	3	4	3	5	
BUILDING & OTHER STRUCTURE	1	4	5	3	3	3	4	2	4	
LIVESTOCK	1	3	1	2	4	4	2	2	1	
TRASH	1	4	4	3	2	5	2	5	4	
BOUNDARY CONSTRAIN	3	3	3	4	4	4	5	5	5	
RECREATION	1	3	1	1	2	2	3	2	1	
TOTAL	12	20	24	19	24	28	29	28	29	

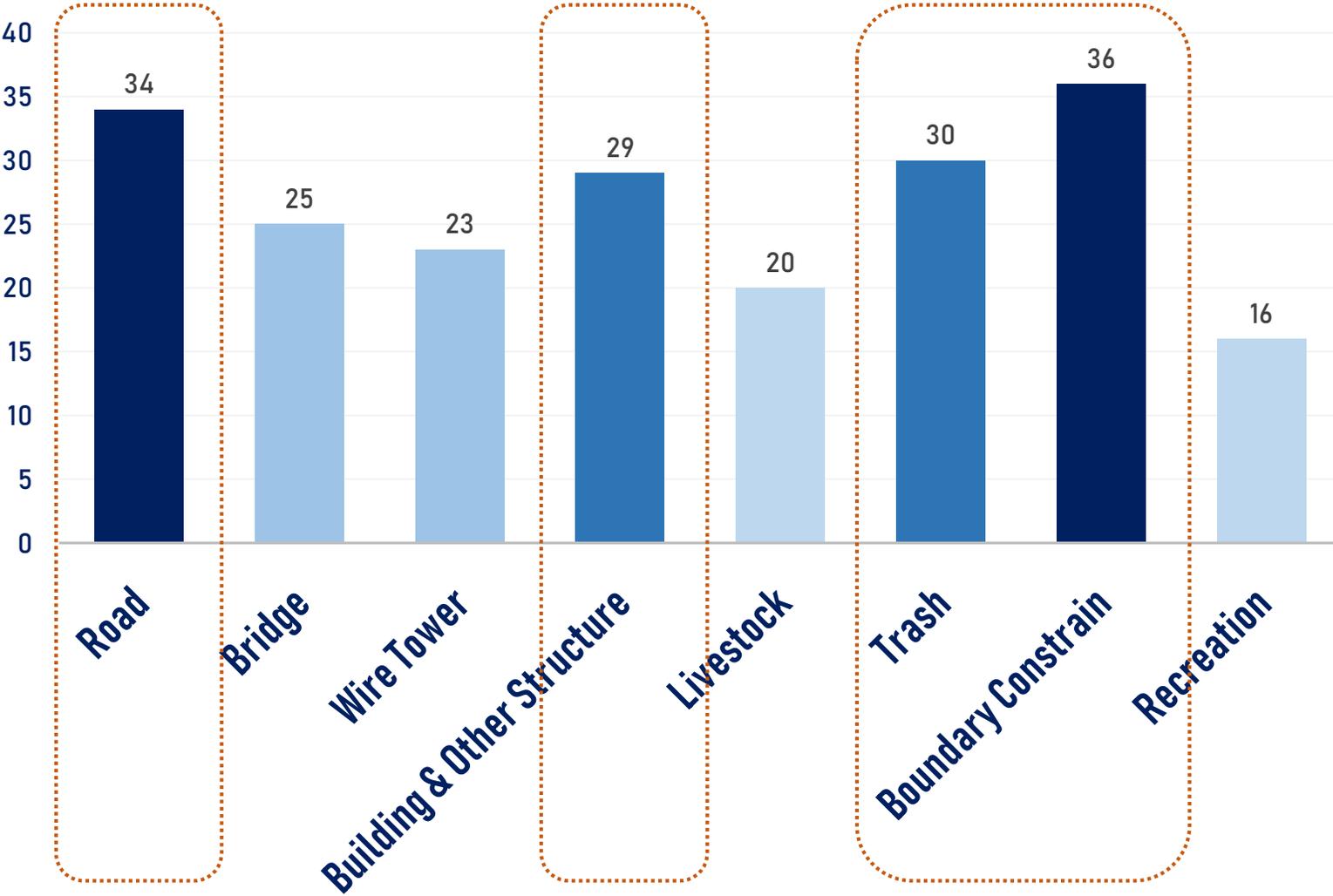


ii. Matrix – ⑤ Preliminary Analysis

- Threats Impact Level of Each Attribute



- Threats Impact Level for Priority Management



03

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:

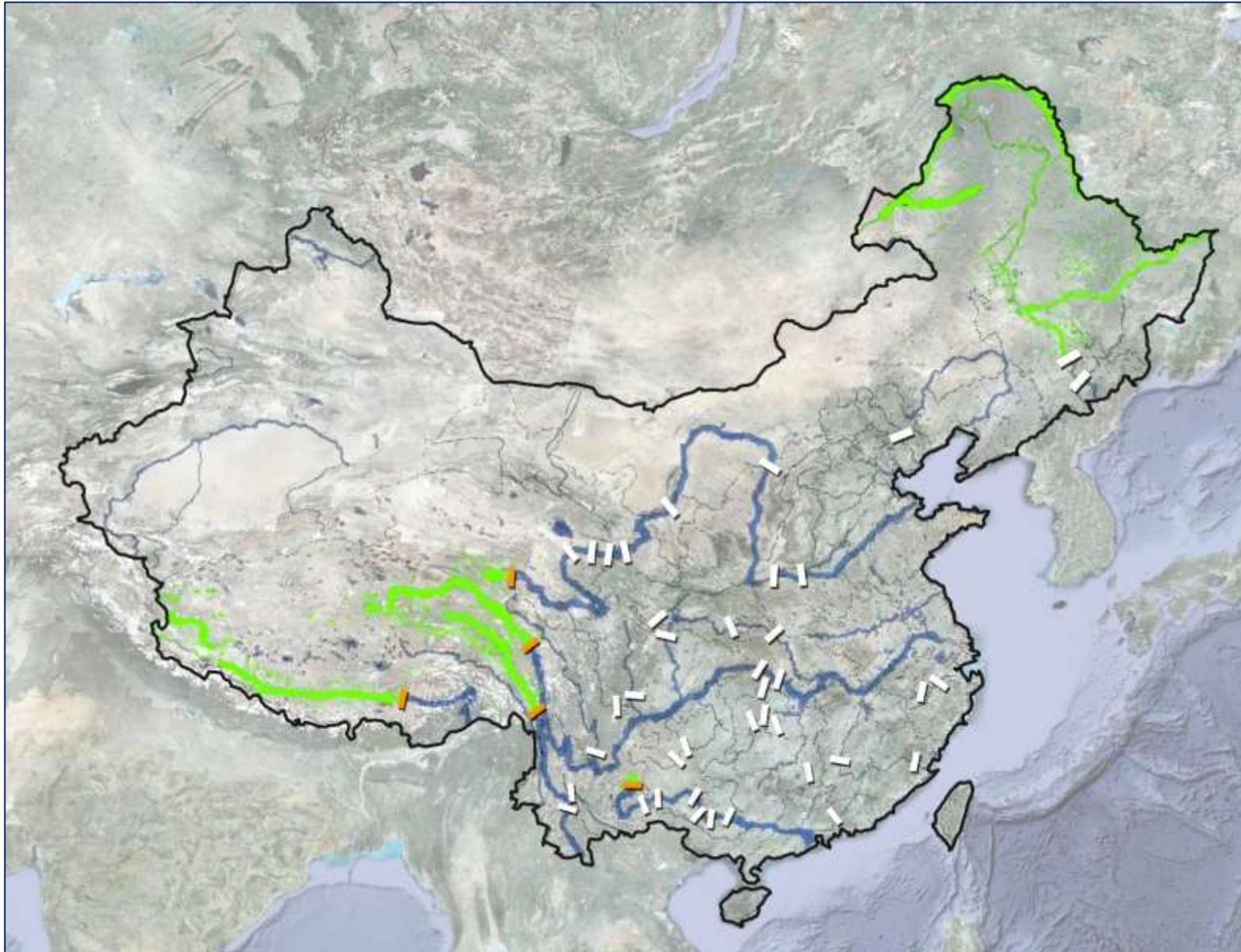
Natural or Wild ?

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?

US

Everything is about
the relationship
between People and
Nature!

→ Wilderness

← Recreation
in the Wld



CHINA

Scenic Spot
Tourism



Public Recognition
Foundation?

- 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?

Shut Down!
Not permit
for visiting



Visitors Lack of
Decent Behaviors
in the Wild

Zhaling & Bing
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

Category of American Protected Areas		
Sub-System	Administration	Category Count
Federal Government—Independent System		
National Park System	National Park Service(NPS)	20
National Forest System	United States Forest Service(USFS)	13
National Wildlife Refuge System	Fish and Wildlife Service(FWS)	4
National Landscape Conservation System	Bureau of Land Management(BLM)	11
Marine Protected Areas	National Oceanic and Atmospheric Administration(NOAA)	9
Indian Reservation	Bureau of Indian Affairs(BIA)	1
Ministry of National Defense Reserve	Department of Defense,Corps of Engineers	1
National Natural Landmark System	National Park Service(NPS)	1
Federal Government—Joint System		
National Wildness Preservation System	NPS/USFS/BLM/FWS	6
National Wild and Scenic Rivers System	NPS/USFS/BLM/FWS/State Government	3
National Trails System	NPS/BLM	3
National Monuments	NPS/USFS/BLM/MPA	2
Research Natural Area	NPS with 8 Departments	1

Category of China Protected Areas

Sub-System	Administration
Ministry—Independent System	
National Park	Ministry of Natural Resources of the People's Republic of China
Forest Park	
National Geological Park	
Wetland Park	
Ocean Park	
Special Marine Reserve	
Desert Park	
National Mine Park	
Desertification Protected Area	
Small Nature Reserves	
Livestock and Poultry Genetic Resources Protection Area	Ministry of Agriculture and Rural Affairs of the People's Republic of China
Aquatic Germplasm Reserve	Ministry of Agriculture and Rural Affairs of the People's Republic of China
Scenic Area	Ministry of Housing and Urban-Rural Development of the People's Republic of China
Water Park	Ministry of Water Resources of the People's Republic of China
Protected Region of Drinking Water Source	Ministry of Ecology and Environment of the People's Republic of China
Typical Earthquake Sites	China Earthquake Administration
Ministry—Joint System	
Natural Reserve	Forestry/ Environmental Protection/ Agriculture, Ocean/ Land and Resources/ Education/ Water Resource/ Chinese Academy of Sciences
Original habitat protection point	Ministry of Natural Resources of the People's Republic of China/ Ministry of Agriculture and Rural Affairs of the People's Republic of China

Natural & Scenic rivers

Wetland

Natural rivers & lakes

Urban river & lakes

Irrigated Area

Water & Soil

Conservancy



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?
-

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

Thank You!

