

Create a "Yongding River" watershed governance model to enhance the stability of the basin ecosystem in multiple dimensions

创建流域治理“永定河”模式， 多维度提升流域生态系统稳定性

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- ◆ **an important strategic position**—the mother river of Beijing Municipality, is an important water conservation area, ecological barrier and corridor in the Beijing-Tianjin-Hebei-Shanxi region;
- ◆ The Yongding River has been facing significant challenges since the 1980s, including **resource over-exploitation, water scarcity and fragmentation**, as well as severe degradation of its ecosystem.

cross-provincial
administrative division

the first domestic based
on the whole basin



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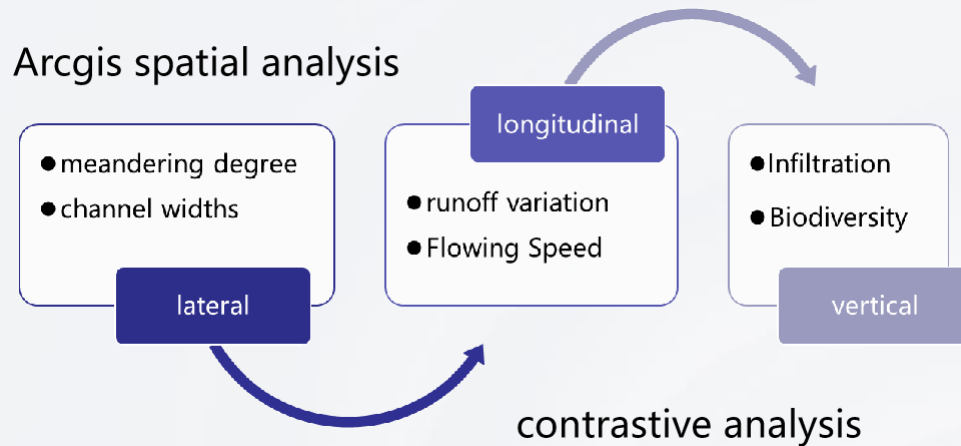


the Yongding River model of watershed governance has been established initially, with remarkable management results, which has made important contributions to the ecological restoration of the watershed , the economic and social development of the region.



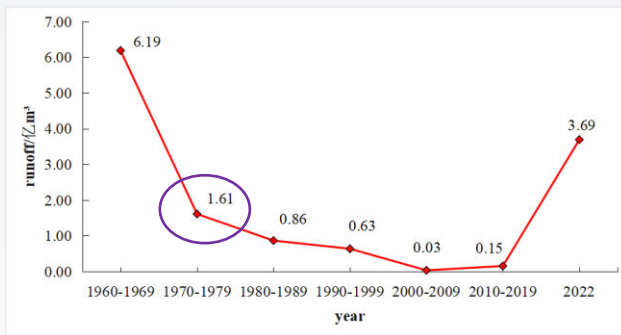
◆ After years of comprehensive governance and ecological restoration, the regular ecological water replenishment has broken the runoff situation of Yongding River, and the **three-dimensional structural characteristics have been improved**, and Ecological restoration has achieved gradually.

Arcgis spatial analysis

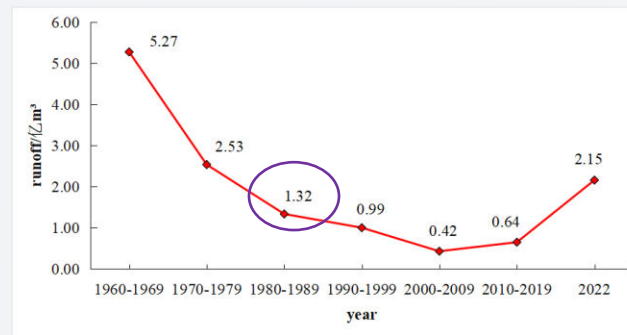


□ runoff variation

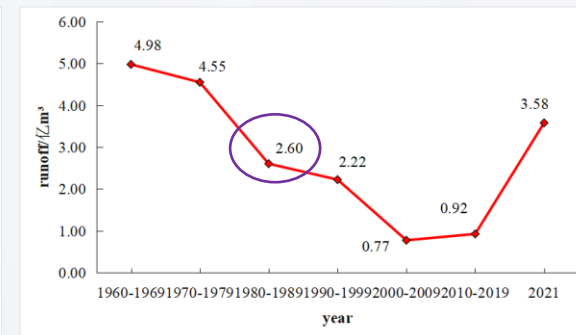
- ◆ Based on different typical sections of Yongding River, Sanggan River and Yanghe River, the runoff of Yongding River basin was compared with the average annual runoff in recent 60 years.
- ◆ **Longitudinally**, the annual runoff of Sanjiadian section in 2022 is 369 million cubic meters, and **the annual runoff of the river has recovered to the average level of the 1980s.**



Sanjiadian in Yongding River



Cetian reservoir in Sanggan River



Xiangshuipu in Yanghe River

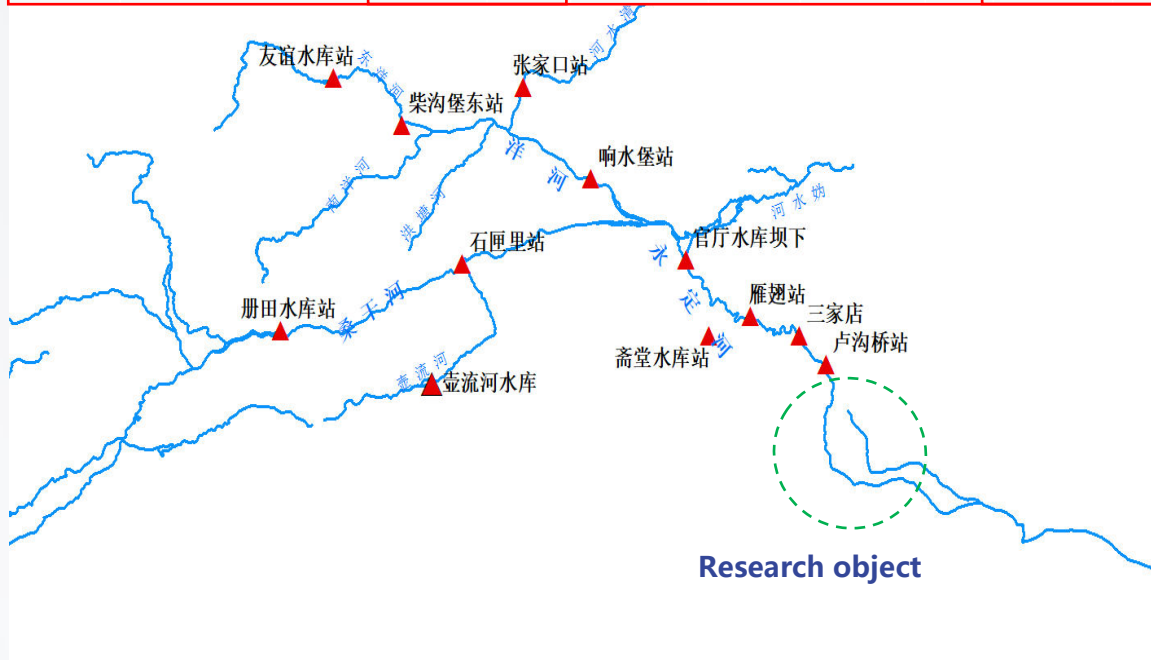
□Flowing Speed

Changes in flowing speeds in the watershed 2020-2022

NO.	Head Position	2020,spring		2020,fall		2021,fall		2022.spring	
		Flow speed	Time	Flow speed	Time	Flow speed	Time	Flow speed	Time
YD166.2	Jingliang bridge	Guanting Reservoir releases water, South- to North diversion, as the period starting point							
YD174.6	Liuhuan Road	5.0	1.7	4.7	1.9	1.2	6.9	13.6	0.59
YD184.1	Xingyao Road	3.8	3.0	4.6	1.7	1.7	3.0	10.7	0.95
YD187.5	Jinmenzha	4.3	0.3	4.7	1.0	1.8	1.3	6.8	1.33
YD201.4	Daguang highway	5.2	1.8	4.0	4.0	2.4	3.7	9.5	0.70
YD204	Gu'an hydrological station	5.2	0.5	4.1	0.4	2.3	1.0	9.3	0.31

◆Take Gu'an Hydrological Station as an example, before the whole region water supply in 2022, the spring flowing speed is 5.2m/s, and the spring flowing speed after is 9.3m/s.



◆Longitudinally,With the change of the underlying surface, the Flowing Speed increases overall after the water flow through the whole line.



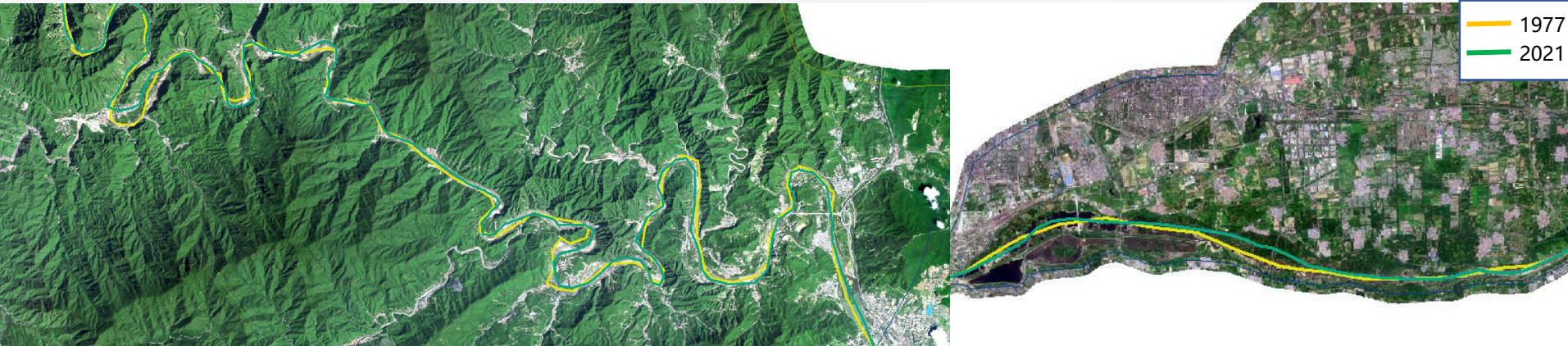
□ Meandering degree

◆ Before and after the full water supply, the Meandering degree of all sections of the river from Yanhua Tube Bridge-Cuizhihuiying increased, indicating that ecological water replenishment has a certain promotion effect on Meandering degree restoration .

Changes in river sinuosity before and after full water access

Segmentation	1967	2020	2022
Yanhua Tube bridge-Jingliang Road	1.05	1.13	1.17 
Jingliang Road-Liuhuan Road	1.03	1.06	1.07
Liuhuan Road- Jinmen zha	1.08	1.03	1.04 
Jinmenzha- Cuizhihuiying	1.22	1.21	1.26

◆ Laterally, meandering degree has been restored to the average level of the 1970s.

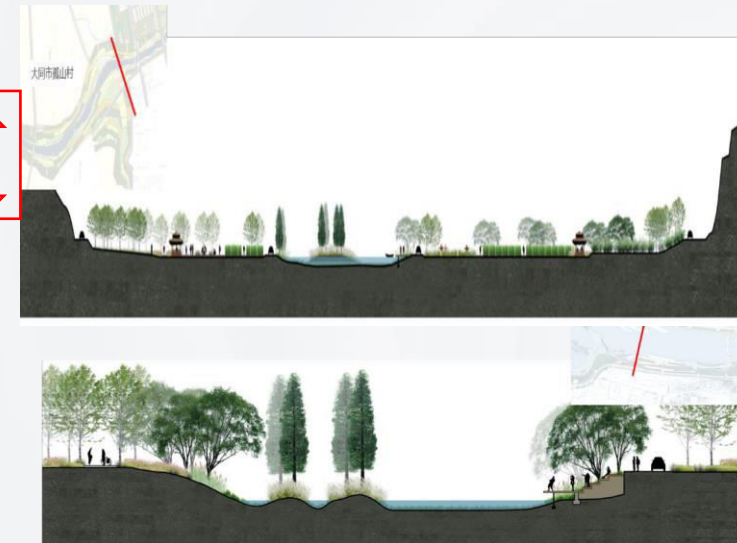


□ Channel widths

- ◆ Before and after the full region water supply, the maximum width of Yanhua Tube Bridge-Jingliang Road increases and the minimum width decreases.
- ◆ Laterally, the channel cross-section morphology has been reshaped.

Changes in the width of the Yongding River channel

Segmentation	Max/min	1967	2020	2022
Yanhua Tube bridge-Jingliang Road	Max	621.95	1031.23	1013.62
	Min	51.32	15.62	28.12
Jingliang Road-Liuhuan Road	Max	911.06	761.11	748.39
	Min	109.93	20.66	29.48
Liuhuan Road- Jinmen zha	Max	726.96	746.19	546.6
	Min	161.55	32.7	27.28
Jinmen zha-Cuizhihuiyin	Max	783.49	574.71	546.6
	Min	122.27	28.33	30.77

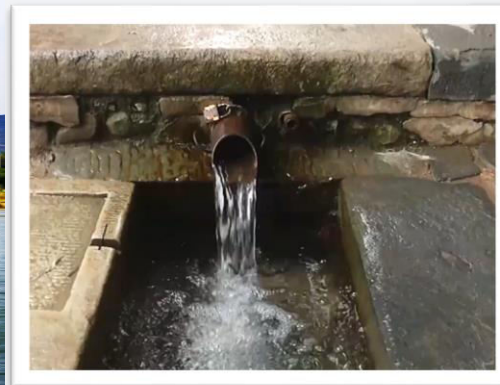


□ Infiltration

- ◆ the groundwater level has been effectively recovered. Then, the infiltration of surface water in Yongding River Watershed during the water supply period in 2020, 2021 and 2022 were $49\text{m}^3/\text{s}$, $41\text{m}^3/\text{s}$ and $35\text{m}^3/\text{s}$, which can be clearly seen that the amount of surface water infiltration decreases.
- ◆ Vertically, the river channel underlay is restored, groundwater is recharged, and surface water infiltration is reduced.

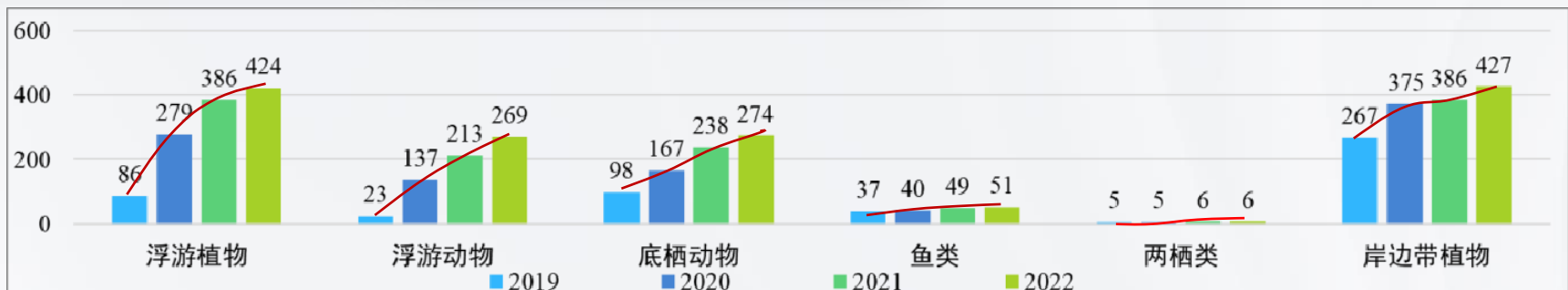
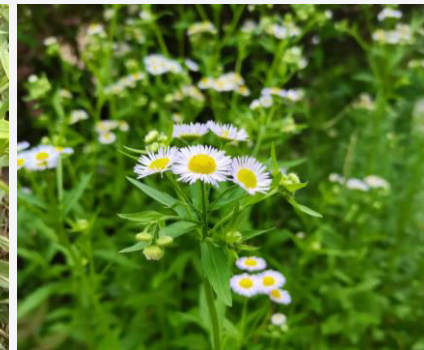


Shuozhou Shentou Spring



□ Biodiversity

- ◆ Through the comprehensive management and ecological restoration of Yongding River,,the construction of river ecological corridors promotes the restoration of river habitats,the biodiversity has increased significantly.



Statistical graph of cumulative biodiversity surveys, 2019-2022

- ◆ By consolidating the river form, ensuring the integrity of the biological chain, low-impact development and other methods, multi-dimensional improvement of ecological governance effectiveness.
- ◆ **Through comparative analysis of the multi-dimensional effects before and after the governance, it is clear that the "Yongding River" watershed governance model is feasible, in order to provide reference for other watershed ecological governance.**



Qujiadian opens the sluice and releases water



Thank you for listening!