Supplementary Table S1. Ecological Conservation Projects Implemented in Yongzhou City.

No.	Ecological Restoration Project	Restoration Measures	Implementation Scope	Implementation Year
1	Ecological Restoration Project of the Mountain, Water, Forest, Farmland, Lake, and Grass in the Lingling Manganese Mining Area	The project adopts a combined restoration strategy of artificial assistance and integrated treatment. For open-pit mining slopes, netting and spray-mixing planting are used to restore greenery, while the foot of the slope uses manual planting for reforestation. Gentle slopes use soil broadcasting, and rocky barren slopes use soil spraying to restore greenery, comprehensively improving land quality and soil and water conservation.	Southwest of Lingling District, Yongzhou City, including Shuzipu, Zhushan Town, Shuikoushan Town, etc.	2018–2020
2	Ecological Restoration Project of Abandoned Open-pit Mines in Lingling District, Hunan Province, Yangtze River Economic Belt	This project involves backfilling mining pits, reinforcing slopes, and applying scientific planting techniques and maintenance to improve vegetation survival rates and growth speed. It focuses on re-organizing and utilizing abandoned land resources to increase land usage. Measures such as land reclamation and soil improvement will convert abandoned land into usable farmland or construction land, transforming abandoned mines into landscapes with aesthetic and ecological value, with special attention to landscape design. In some mountainous areas, frequent geological disasters like landslides and collapses require ecological engineering for restoration.	Fuchaqiao Town, Lingling District, Yongzhou City	2020
3	Ecological Environment	The project includes ecological restoration of major	Lengshuikeng and Lingling Districts,	2022

	Governance of the Water Ecosystem in the Urban Section of the Xiangjiang River	tributaries of the Xiangjiang River in the urban area, mainly focusing on overflow dam ecological renovation, constructing river mouth wetlands, slope protection, and improving the river's ecological environment to reduce the pollution load entering the Xiangjiang River. The main river restoration includes building stepped wetlands and restoring sandbars, which will improve water quality while shaping the urban landscape.	Yongzhou City	
4	Ecological Restoration Project of the Fouer River Basin	Ecological reconstruction of tributaries entering the Fouer River and the main river ecological embankment protection construction	Yongzhou Economic Development Zone, Lengshuikeng District, Lanjiaoshan Street, Quhe Street	2022
5	Ecological Restoration Demonstration Project of Historical Abandoned Mines in Important Tributaries of the Xiangjiang River in Hunan Province	The project includes four core steps: soil reconstruction, vegetation restoration, drainage ditch construction, and later maintenance. Soil reconstruction aims to improve soil structure and restore fertility and ecological functions through physical, chemical, and biological methods. Vegetation restoration involves selecting local tree and grass species suitable for the climate, constructing a multi-layered, multi-species ecosystem, and enhancing regional biodiversity. Drainage ditches are constructed to prevent rainwater erosion and reduce soil erosion. A comprehensive maintenance system ensures long-term preservation of the restoration results.	Approximately 30 hectares, restoration of 28 historical abandoned mine plots in Jianghua County, including Daluopu Town, Baimangying Town, Taowu Town, Heluokou Town, Shuikou Town, and Daxi Town	2024