

◆ Research paper

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Water Ecological Demands and Supplementary Water Supply in the Yongding River Basin, China

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Abstract: With the intensification of global environmental change, variations in runoff patterns have profoundly impacted the natural environment. This study focuses on the Yongding River Basin, analyzing the runoff change trends from 1962 to 2020 and calculating the ecological water demand and ecological replenishment curves for the basin. The research finds that changes in water resources have significantly affected the ecosystem, exacerbating the water resource shortage in the basin. By calculating the minimum, suitable, and maximum ecological flow, the study ensures that the hydrological needs of the basin's ecosystem are met. The minimum ecological water demand in the Yongding River Basin is 63 million m³, the maximum ecological water demand is 378 million m³, and the optimal ecological water demand is 297 million m³. Additionally, the ecological replenishment demand exhibits significant seasonal and interannual fluctuations, especially in years of water scarcity, where replenishment demand fluctuates greatly. The study provides important scientific evidence for water resource management and ecological restoration in the basin and proposes recommendations for dynamically adjusting replenishment measures to ensure the stability and sustainable development of the ecosystem. Future efforts should focus on strengthening water resource monitoring and management to ensure the achievement of ecological restoration goals.

Keywords: Yongding River Basin, runoff change, ecological water demand, ecological replenishment, water resource management



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