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PROBLEMS OF CONTROL OF STORMWATER RUNOFF POLLUTION IN ZHANGJIAKOU CITY, HEBI REGION

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Refer to the technical means of water quality management at home and abroad; use the concept of maximum daily load (TMDL) to govern the river water environment in Zhangjiakou City, Hebei Province; use total phosphorus as a representative indicator of river eutrophication as a water quality evaluation factor; sort out the drainage network, Current status of discharge and non-point source pollution; use Zhangjiakou river environment model coupling calculation method; scientifically formulate total phosphorus emission control plan; simulation calculation; control the discharge flow of the discharge outlet; the total phosphorus pollution load to be discharged into the river Cut 2.33t/a; it can effectively achieve the water environment governance goal of Zhangjiakou City, Hebei Province.

Keywords: water environment governance; total maximum daily load; water quality evaluation index; rivers in Zhangjiakou City, Hebei Province

Main urban water system: The rivers in Zhangjiakou City belong to three basins, namely: inland river basin, Luan he river basin and Hai he river basin. There are mainly five water systems, namely: inland river system, Luan River system, Yong ding River system, Chao bai River system and Daqing River system.

The purpose of the study is to use the concept of maximum daily load (TMDL) to control the river water environment in Zhangjiakou City, Hebei Province, Based on the construction and application of the TMDL model system, fully considering meeting the needs of residents' life and recreation, according to site conditions investigation, determine the plots and control rates in the drainage area where the source low-impact development measures can be implemented, and determine the source control plan. Construct a drainage network system and couple it with the two-dimensional surface to form a drainage model. Determine the specific location, waterlogging situation and waterlogging risk analysis of the waterlogging area in the region, and formulate a process gray pipe network restoration project plan. It mainly solves the problem of non-point source pollution of rainwater discharged into the river in the urban area of Zhangjiakou.

The study is based on the construction and application of the TMDL model system to determine the method and technical route of total volume control, Carry out the entire process of stormwater runoff pollution control, organically unify source emission reduction, process control and comprehensive treatment, and achieve comprehensive project compliance.

1. Main urban water system: The rivers in Zhangjiakou City belong to three basins, namely: inland river basin, Luan he river basin and Hai he river basin. There are mainly five water systems, namely: inland river system, Luan River system, Yong ding River system, Chao bai River system and Daqing River system.

2. Overall objective: With the goal of restoring the function of river water bodies, comprehensively assess the urban water volume (infiltration, retention, evaporation), water quality (non-point source pollution, point source pollution) and water ecology (river protection, ecological restoration) and various issues based on The construction and application of the TMDL model system scientifically guides the comprehensive improvement of the water environment in Zhangjiakou City.

3. Remediation measures and innovative measures: At present, among the water quality management technologies in various countries in the world, the US Environmental Protection Agency's Total Maximum Daily Load (TMDL) is the most mainstream system. TMDL is the daily environmental carrying capacity of pollutants in the receiving water body. USEPA uses TMDL to calculate the daily capacity of pollutants and is used to standardize water quality standards. After years of improvement and development, a complete system of total control strategies and technical methods has been gradually formed.

By establishing hydrology, hydrodynamic and water quality models, this project simulates the rainfall runoff process, groundwater flow, river channels and the migration and transformation of various pollutants in the catchment area. Since it cannot be achieved with only one model, the coupling of four models HSPF, SWMM, HECRAS and EFDC is used to simulate the hydrology, hydrodynamics and water quality from the upstream catchment area to the downstream water body. Each model needs to be calibrated and verified before it can be used for prediction, evaluation, design and other purposes.

4. Water model coupling: (1) The simulation range and interface of the four models of HSPF, HECRAS, SWMM, and EFDC in Zhangjiakou City.

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Source governance: 1) Roof runoff control

Rain down tube disconnection. Most of the rain downpipes in the old community are old and damaged, and many places are connected to the balcony sewage. During the renovation, the old rain down pipes will be connected to the sewage pipe network, and the newly built rain down pipes will be disconnected and drained to biological retention facilities such as transmission-type grass ditch and rain water garden for infiltration and purification treatment. According to different site characteristics and rainwater control requirements, the combination of disconnection measures and rainwater treatment facilities can adopt different forms.

Green roof. Set up green roofs in roof areas where conditions permit, and build roof rainwater collection and infiltration systems. In the water system organization form of green roof (square)-rainwater garden-rainwater storage pond-river course, rainwater is purified and then penetrated to ensure the water quality of supplementary groundwater sources and reduce the load of soil removal of pollutants.

Surface runoff control. Sponge facilities are set up on the green space and paving around the building to mainly treat the roadway, roof and own rainwater. Roof rainwater is introduced into the rainwater garden through rain downpipes. By adding small rainwater storage facilities, the rainwater is collected and stored at the same time for water replenishment and water exchange, as well as nearby greening and road sprinkling.

Remediation effect: (1) Social benefits

The renovation of Zhangjiakou's urban area has improved the living environment of residents, and improved the green landscape between buildings through greening and sketches; parking spaces have been increased and standardized to make parking more convenient for residents. At the same time, the waterlogging area and time of waterlogging at the intersection and the east area of Xing cun have been greatly reduced, reducing the risk of waterlogging in the urban area of Zhangjiakou and reducing the loss caused by urban waterlogging.

(2) Ecological benefits

On the basis of rain and sewage diversion, Zhangjiakou District has adopted various measures including LID and initial rainwater storage tanks to achieve urban non-point source pollution control. According to the volumetric method, the runoff pollution control rate of urban water is 82.68%, which meets the target requirements and plays a better role in protecting downstream water quality.

Therefore, through the TMDL method and roof runoff control, green roof, surface runoff control. The area and time of waterlogging at the intersection of Xing cun Village and the East District have been greatly reduced, the risk of waterlogging in the urban area of Zhangjiakou has been reduced, and the loss caused by urban waterlogging has been reduced. The urban water runoff pollution control rate was 82.68%, which met the target requirements and played a good role in protecting downstream water quality.

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