Current situation and Countermeasures of water ecological environment protection in Sichuan Province

Su-lan ZHANG

Sichuan Institute of Land Science and Technology  
Sichuan Chengdu 610045, China

Bi ZHANG

Chengdu University of Information Technology  
Chengdu 610225, China

Xiang LIU

Sichuan Institute of Land Science and Technology  
Sichuan Chengdu 610045, China

Li-juan YU

Sichuan Agricultural University  
Dujiangyan 611830, China

Li YANG

Sichuan Institute of Land Science and Technology  
Sichuan Chengdu 610045, China

**Abstract:** Water resources are the main material basis of all living things, basic natural resources and strategic economic resources, and the controlling element of ecological environment. As one of the three strategic resources as important as food and energy, water resource plays an extremely important role in economic and social development and national security. Sichuan is the "province of thousands of rivers", an important source of water conservation and water supply for the Yangtze and Yellow Rivers, and an important ecological barrier for the upper reaches of the Yangtze River. There are more than 1,400 rivers in the province, with water reserves accounting for one-fifth of China's total, forest grassland area accounting for 70% of the province's land area, and 80% of the water in the Three Gorges Reservoir area coming from Sichuan. He ethnoniedicinal zoige wetland grassland border in the Yellow River and the Yangtze river region, is an important water source of the Yellow River upstream, is also China's largest plateau peat swamps, referred to as "solid reservoir" plateau, with China's biggest peat swamp area, nearly 10 billion cubic meters of water amount, 30% in upper Yellow River water from the zoige wetland. Sichuan province is also an important water and soil conservation area and flood control and storage area in the Yangtze River basin, with an annual runoff of 308.34 billion cubic meters, accounting for about one third of the Yangtze River. At the same time, Sichuan is also an extremely precious biological gene pool in China and even the world, and is one of the 34 biodiversity hotspots in the world. To ensure the water ecological environment safety in Sichuan is of great strategic importance in the whole Yangtze River basin and even in the whole country. By means of literature method, comprehensive analysis method, combination of theoretical analysis and empirical research, combination of qualitative research and quantitative research, inheritance and innovation, the present situation of water ecological environment protection in Sichuan province has been deeply analyzed and evaluated, and the countermeasures of water ecological environment protection and restoration in Sichuan province have been put forward. The results show that Sichuan province attaches great importance to the prevention and control of water pollution, and continuously promotes the comprehensive management of water ecological environment in the Yangtze river and Yellow River basins. Through strengthening the comprehensive management of minjiang river, Tuojiang River, Jialing River and other key basins, the quality of water ecological environment in sichuan province has been significantly improved. In 2021, the surface water quality of the province was generally excellent, with 195 of 203 national examination sections reaching above Class ⅲ, with an excellent and good rate of 96.1%. No ⅴ class, poor ⅴ class water quality section; Emissions from key chemical oxygen demand projects were reduced by 82,000 tons and ammonia nitrogen projects by 10,100 tons, respectively, fulfilling the annual targets set by the state. Among the 33 sections, 32 (97.0%) were classified asⅰ~ⅲ. Among the 32 drainage sections, 28 sections (87.5%) were classified as ⅰ~ⅲ. The water quality of the Yangtze river (Jinsha River), Yalong River, Anning River, Chishui River, Minjiang River, Dadu River, Qingyi River, Jialing River, Fujiang River, Qujiang River and Yellow River is generally good, while the water quality of the Tuojiang river and Qiongjiang river is generally good. In the main stream evaluation, 9.0%, 56.3%, 29.4% and 5.2% of the chiefs of class ⅰ,ⅱ,ⅲ and ⅳ rivers were in the whole year. The quality rate of prefecture-level and above centralized drinking water sources in the province was 100%. But part of the river water quality standard is not stable, some still exceeds bid, he river to exceed bid section, total phosphorus, ammonia nitrogen and chemical oxygen demand (cod) exceeds bid situation is serious, the total phosphorus pollution has become the primary environmental problems of surface water in Sichuan province, and Sichuan as the biggest environmental risk in the upper Yangtze river ecological barrier, water pollution prevention and control work is still difficult. Therefore, it is necessary to strictly implement the emission permit system and continue to reduce emission of major projects. Strict access to the ecological environment, strengthen the "three lines, one order" constraint, effectively prevent ecological environmental risks; We will step up monitoring of water pollution, strengthen prevention and control of water pollution in key river basins and regions, and further improve the quality of water ecological environment. We will continue to strengthen the development of urban sewage collection and treatment facilities, make coordinated efforts to control pollution from rural domestic sewage, garbage and agricultural non-point sources, and ensure water ecological environment safety. We will continue to increase investment in the integrated treatment of mountains, rivers, forests, farmland, lakes, grass and ice and the development of zoige National Park. We will focus on implementing projects to restore wetlands, improve desertified land and restore degraded grasslands, and strengthen the ecological barrier in the upper Reaches of the Yellow River.

**Key words:** Water ecological environment protection; Sustainable use of water resources; Countermeasures; Sichuan province