



## **A dedicated method to estimate ecological flow for fish overwintering in plain rivers**

li wang

Nanjing Hydraulic Research Institute, Center for Eco-environmental Research, China (syauwangli@126.com)

Ecological flow is the foundation for conservation of riverine fish habitat and ecosystem. Habitat simulation methods have been widely used to estimate ecological flow because of their combination of hydrological regime and species hydraulic preference. Previous studies based on habitat methods focused more on the spawning season but paid less attention to the winter period which is also essential to fish life stage. This study developed a novel approach to estimate the ecological flow for fish overwintering particularly in plain rivers. The water depth for target fish safely overwintering was firstly determined based on the minimum tolerable water temperature of the species. A water balance model was then built to estimate the ecological flow for securing the determined water depth. The developed approach was applied in the middle reaches of Huaihe River, where the flow is highly regulated by dams and sluices. *Parabramis pekinensis* (*P. pekinensis*) was selected as the target fish, and the minimum water depth for *P. pekinensis* to overwintering in the river was about 15 meters. The calculated ecological flow was  $3 \text{ m}^3\cdot\text{s}^{-1}$  in December,  $2.2 \text{ m}^3\cdot\text{s}^{-1}$  in January and  $2.3 \text{ m}^3\cdot\text{s}^{-1}$  in February, respectively. The approach contributed a great supplement to fish spawning habitat model, and their combination could determine ecological flow regimes for the entire life cycle of the target fish.