To evaluate the effects of hydraulic engineering on river ecosystem services, a set of indicator system and quantitative methods, which included the appraisal principles, classification of river services and indicator selection were established. The river ecosystem services could be classified into four types: water supply and related services (e.g., transportation and hydroelectric generation), ecological supporting functions, regulation and control, and aesthetic and cultural services. Based on relative studies, the quantitative approaches were established to measure the indices reflecting the ecological effects of hydraulic engineering involving the change of biodiversity and purification services. The methods mainly contained exponent methods and BOD-DO model. These approaches will be helpful for further analysis and assessment on the effects of hydraulic engineering impact on river ecosystem services.