



Impacts of anthropogenically altered river flow regimes on freshwater ecosystem in China

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Hydrological regimes play a major role in determining a series of the biotic characteristics within river ecosystems. Maintaining natural river flow regimes is essential in protecting native riparian habitats. Since last 50 years, human-driven hydrological changes such as reduction in river flow discharge and alteration in seasonal regimes due to human water withdrawals and dam operation have significantly influenced the fresh water ecosystems in China. The aim of this research is to assess the impacts of human activities on river flow regimes and hydrological relevant ecosystems throughout China. To reveal the reduction of river flow discharges in China, natural and anthropogenically altered flow conditions were computed using the global scale hydrological and water use model WaterGAP by taking into account the influences of human water consumption and 580 large reservoirs. A modified “Indicators of Hydrologic Alteration” approach was used to evaluate human impacts on aquatic ecosystems due to anthropogenic alterations in river flow regimes. The changes in long-term monthly and annual river discharge, absolute monthly mean discharge and coefficient variation of monthly mean discharges under natural and anthropogenically altered conditions were compared and analyzed. The results show large alterations of river flow regimes in northern China, and the seasonality and the inter-annual variability of the flows in the northern China are very likely to have caused significant ecological impacts.