

Dams and reservoirs as nodes of social-ecological systems

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The global proliferation of dams and reservoirs is a prime anthropogenic disrupter that has contributed to the decoupling of hydrological and biogeochemical cycling across the land-ocean continuum. Yet, dams and reservoirs are key socio-ecological systems (SES) that incorporate multiple subsystems, such as a range of ecosystem services/resource units, stakeholders, and the local/regional governing organizations responsible for SES management and resource allocation. The complex interaction between these sub-systems in turn may have a feedback effect on the functioning and ecological and biogeochemical responses of an SES. An understanding and consideration of the socio-ecological framework within which the dams and reservoirs exist, therefore, is essential for informed decision-making and developing sustainable management plans for these built aquatic systems. Here, we explore how the interplay between reservoir usage and hydro-climate variability influences stakeholder decisions, reservoir management, and ultimately biogeochemical processes and water quality across broad spatiotemporal scales.