

Colorado River Basin Aridification and Resource Management in Grand Canyon, Arizona (USA)

Paul E. Grams, David J. Topping, Gerard Salter, Robert Tusso, Matt Kaplinski, and Katherine A. Chapman

US Geological Survey, Southwest Biological Science Center, Grand Canyon Monitoring and Research Center, Flagstaff, AZ, USA

The Colorado River is both an essential source of water for agriculture, cities, and industry in the western US and the focal point of the landscape of the Colorado Plateau, including several of the nation's most unique and valued National Parks and Recreation Areas. Although water needs of these landscapes was not considered at the time water allocations were first negotiated, these needs were recognized in subsequent legislation and policy. Management goals span a range of aquatic and riparian resources, including fine sediment (sand, silt, and clay) which, in Grand Canyon, is important for ecological, cultural, and recreational resources. Over ~30 years, stakeholders, resource managers, and scientists collectively developed operational strategies for sediment management to meet goals outlined by an adaptive management program. However, prolonged drought, or "aridification," resulting in declining runoff and the lowest reservoir storage levels in decades has challenged those strategies. The paradigm for sustainable sediment management relies on (1) sand accumulation on the bed of the Colorado River during periods of sediment-rich floods from tributaries in the summer/fall monsoon season, and (2) dam-released high-flow experiments (HFEs) to redistribute the accumulated sand to rejuvenate bar and floodplain deposits. Lower dam releases associated with drought have changed the pattern of sand accumulation and low reservoir levels have prevented the implementation of high flows following the existing management protocols. We present preliminary findings from a test of an alternative strategy for HFE planning and implementation which indicate that management goals for sediment under conditions of prolonged drought may be achievable but will likely require substantial changes in dam management strategies.

Contact Information: Paul Grams, U.S. Geological Survey, Southwest Biological Science Center, Grand Canyon Monitoring and Research Center, 2255 N Gemini Dr, Flagstaff, AZ, USA 86001, Phone: 928-266-6096, Email: pgrsams@usgs.gov