



Sediment Removal Techniques for Reservoir Sustainability

Problem Statement: Reservoir sedimentation has become a significant problem with the aging of water storage facilities. Sediment deposition in reservoirs limits the active life of reservoirs by reducing reservoir storage capacity for water supply or flood risk reduction. Sedimentation also impacts dam outlets, reservoir water intakes, water quality, recreation, upstream flood stage, and downstream habitat. Most reservoirs are older than 50 years and many are older than 100 years. The sediment-design life (typically 100 years) will be reached when the sediment level at the dam is higher than the outlet and the outlet is prone to plugging.

Conventional temporary dredging has been used to remove sediment from some reservoirs, but it can be very expensive. Periodic flushing with a full reservoir does not remove much sediment, and drawdown flushing can be effective through low-level outlets, but sacrifices the much needed water stored in the reservoir. For many large reservoirs, water levels are operationally constrained to meet the needs of multiple uses (e.g. hydropower, irrigation, recreation, etc.) and cannot be drawn down to flush sediment downstream.

Potential Impacts of a Successful Solution:

New and improved solutions for reservoir sediment removal have significant benefits for water and related resources in the United States and throughout the world. Managing reservoir sedimentation extends or sustains the life of reservoirs and the numerous benefits they provide, avoiding eventual dam decommissioning and the potential billion-dollar investment required to build new reservoirs. Better sediment management can mitigate impacts to hydraulic structures and equipment which may reduce the likelihood of repairs and downtime. Implementation of more efficient and less expensive sustainable sediment management options on a large scale would enable Federal agencies to meet their water and power deliveries now and into the future.

The Solution We Seek: Reclamation and our collaborators seek new or improved techniques for reservoir sediment removal and transport of the removed sediment in a cost-effective manner that preserves and sustains the operational objectives of the reservoir. Long-term sediment management cannot use large quantities of the stored reservoir water and should accomplish environmentally-sustainable sediment discharge.

Prize Competition Scope: This prize competition is envisioned as a theoretical challenge requiring the submission of a white paper that describes how the proposed solution can successfully collect, transport, and discharge sediment from reservoirs in a cost-effective and environmentally sustainable manner. Subsequent stages of competition may be conducted based on results from the theoretical prize competition and future budgets.

Collaborators:

