

PANEL DISCUSSION SUBMITTAL

Title: Reservoir Sediment Dredging for Long-Term Management

Panelist: Brief CV's on each panel participant are provided at the end of this submittal

Category: Reservoir Sedimentation

Objective: This panel will discuss the current state of reservoir sedimentation in the United States, estimated reservoir capacity losses, flooding impacts due to the loss capacity, dredging practices to reduce reservoir sedimentation, current research efforts by the USACE, environmental benefits and steps to secure permits for reservoir dredging, and Reclamation and USACE research prize competition for reservoir sediment removal.

Abstract - *This abstract was developed from the executive summary from the White Paper entitled "Reservoir Sediment Management: Building a Legacy of Sustainable Water Storage Reservoirs. The White Paper was previously published in the proceedings of the SEDHYD-2019 conference by the National Reservoir Sedimentation and Sustainability Team (NRSST), (Randle, et al., 2019, <https://www.sedhyd.org/reservoir-sedimentation/>):*

- NRSST is comprised of 25 members from 15 organizations who authored the White Paper
- The paper has received four (4) external peer reviews
- The list of names and organizations will be provided in the presentation

"Whereas the twentieth century focused on the construction of new dams, the twenty-first century will necessarily focus on combating sedimentation to extend the life of existing infrastructure. This task will be greatly facilitated if we start today." (Morris & Fan, 1998).

The estimated 90,000 dams and reservoirs in the U.S. (National Inventory on Dams, 2017) constitute a critical component of the nation's water infrastructure. Our economy and welfare depends on a continuous and reliable system of water supply and infrastructure for municipal, industrial, agricultural, flood control and hydropower uses. These water systems are also important for environmental management, recreation and groundwater aquifer recharge.

Water storage reservoirs are essential for regulating highly Variable River flows, making water available whenever needed, creating a singularly important, but often unseen foundation for modern society.

The vast majority of the nation's water storage reservoirs were constructed decades ago, and since construction, they have been trapping clays, silts, sands and gravels eroded from the land surface of the upstream watershed. The present practice of allowing the nation's reservoirs to gradually fill with sediment over time is not sustainable. Once the benefits of a reservoir have been lost to

sedimentation, dam removal is often the eventual outcome and can be expensive for large sedimentation volumes. Even after dam removal, significant quantities of sediment may remain in the reservoir which will likely render the area unsuitable for future generations to use for water storage.

Without active management, the continual accumulation of sediments gradually displaces the storage volume in a reservoir, which risks ultimately rendering the reservoir useless for capturing and storing water. In addition, long before the reservoir has lost its water storage capacity numerous problematic sedimentation impacts can occur:

- Reduction in the reliability of water supply, burial of dam outlets and intakes for water supply
- Power production will be reduced due to damage to hydropower and pumping equipment,
- Recreational benefits will diminish due burial of boat ramps or marinas, impairment to navigation and reduction in the surface area for lake recreation,
- Increased flood levels upstream, downstream channel degradation, and other environmental impacts.

The loss or degradation of legacy water infrastructure will impose significant financial and environmental burdens on future generations, compounded by the fact that replacement sites for most dams and reservoirs are not readily available.

Panel Presentations/Discussions:

Panel Moderator/Introductions: Stan Ekren (5 minutes)

NRSST Perspective: Greg Morris (20 minutes)

- Statement of reservoir sedimentation problem and why it is important.
- Annual reservoir dredging is needed to achieve sustainable storage capacity for reservoirs that cannot use reservoir water for sediment management.

USACE Reservoir Research: John Shelly (20 minutes)

- Focus on delivering sediment to downstream channel and the environmental benefits and other considerations.

Dredging practice: Michael Whelan (20 minutes)

- Discuss how reservoir dredging is different than navigational dredging (e.g., annual operation, only dredge certain areas of the reservoir, fluctuating reservoir levels, deliver sediment past the dam to downstream channel).

Regulatory: David Olson (20 minutes)

- Address how a permit can be obtained to continually dredge reservoir sediment.

Research Prize Competition for Reservoir Sediment Removal: Tim Randle (10 minutes)

- Reclamation and USACE seek new or improved techniques for reservoir sediment removal in a cost-effective manner that still preserves and sustains the operational objectives of reservoirs.
- New or improved techniques may include reducing energy cost, improved efficiency of sediment collection, reducing the number of people required to operate and maintain the equipment, improved durability of equipment to operate over many months in variable environmental conditions, increased capabilities to remove sediment from water depths greater than 50 ft.

Questions - 20 to 25 minutes

Brief CV on the panel participants:

1. Dr. Gregory L. Morris, graduate from the U.S. Naval Academy, Ph.D. from the University of Florida. Since 1974 Greg has worked and lectured internationally as a consultant in the fields of hydrology and Environmental engineering. He is the co-author with Jiahua Fan, Reservoir Sedimentation Handbook –Design and Management of Dams, Reservoirs, and Watersheds for Sustainable Use”.
2. Dr. John Shelley received a B.S. in Civil Engineering from Brigham Young University and a Ph.D. in Civil Engineering from the University of Kansas. John works for the U.S. Army Corps of Engineers, Kansas City District as a regional technical specialist in river and reservoir sedimentation. He is currently leading an effort to project future reservoir sedimentation and recommend management solutions at 18 federal reservoirs in the Kansas River basin. John has provided training on reservoir sediment management and sedimentation modeling on three continents.
3. Dr. Tim Randle is a Civil Engineer and former Manager for the Bureau of Reclamation’s Sedimentation and River Hydraulics Group and Chair of the National Reservoir Sedimentation and Sustainability Team. He has 40 years of professional experience and has worked on many sediment management issues such as the Colorado River in the Grand Canyon, AZ; Platte River, NE; Teton River, ID; and Elwha River, WA.
4. Michael Whelan is a principal dredging design engineer with Anchor QEA, a national consulting firm specializing in sediment management and remediation. A long-time participant in WEDA, Mr. Whelan has 23 years of experience acting as official engineer of record for numerous projects involving dredging of lakes, marinas, and waterfront sites; shoreline restoration; offshore grading; public and commercial development; and environmental remediation. Mr. Whelan has been a co-presenter for several dredging-based short courses for marinas, shipyards, and other industry groups.

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5. David Olson is a Regulatory Program Manager at the Headquarters office of the U.S. Army Corps of Engineers. He has worked for the Corps since 1991, beginning as a Regulatory Project Manager at the Baltimore District, evaluating applications for Department of the Army authorization to do work in waters and wetlands. In 2002, he began working at his current position at Corps Headquarters. His focus areas currently include the Corps' nationwide permit program, Endangered Species Act compliance for Department of the Army permits and cumulative effects analysis.
6. Stanley W. Ekren is the Director of Business Development for Great Lakes Dredge & Dock Company. He has +37 years of experience in the dredging industry and has been involved in pricing dredging opportunities on five (5) continents. Has been involved with Harbor/Channel Deepening, Beach & Marsh Restoration, Land Creation, Car/Rail Tunnel Crossings, Navigation Dredging and Inland Reservoir Dredging Contracts. Fortunate to work with 23 USACE District Offices, located on West, Gulf and East Coast, as well as the Great Lakes, Mississippi River System and mid-America.