Guardians of the Reservoir Challenge

Presented by
Tim Randle
PhD, PE, D.WRE
Guardians of the Reservoir Challenge

Sponsors
• Bureau of Reclamation
• U.S. Army Corps of Engineers (USACE)

Contractors
• NASA’s Tournament Lab
• HeroX
• Research prize challenges address tough problems, where solutions have been evasive or expensive, by opening the problem area to previously untapped domains.
Challenge Goal

• Develop and demonstrate new processes and technologies.
• Looking for technologies that will annually move sediment downstream.
• Technologies that would regain lost reservoir storage capacity would be of interest if environmentally acceptable.
Challenge Objective

- Ask a global community of solvers to find an innovative solution.
- Identify the most promising ideas and help to develop them.
- Connect promising technologies with industrial partners.
Background

• Part of a larger sustainability effort to maintain our nation’s reservoirs, which are part of the nation’s aging infrastructure.

• Raising awareness about the problem of reservoir sedimentation.

Paonia Reservoir, CO

July 1961

November 2014

70 ft
Challenge Prize

• Up to $550,000 in cash prizes shared among winners.
• The authors of the most compelling submissions will have the opportunity to develop and demonstrate their technologies at increasing scales for the Challenge sponsors.
• The Challenge will be conducted in three phases.
Challenge Prize

• Challenge offers development support and field-testing opportunities to the most compelling ideas.
Challenge Phase 1

• Everyone is invited to participate in Phase 1.
• Submissions must be received by October 20, 2020.
• As many as 5 of the most compelling submissions will each receive $75,000 and advance to Phase 2.
  ▪ $50,000 at the beginning of phase 2
  ▪ $25,000 after successful completion of their mid-point check-in
Challenge Phase 2

- Development period: December 8, 2020 - February 15, 2022
- Phase 1 winners have about 15 months to work according to their proposed project plans, develop their proposed approaches, perform a laboratory-scale demonstration, and submit a report.
- Up to 3 of the top-performing teams will advance to Phase 3 and each will receive an additional $25,000.
Challenge Phase 3

• Demonstration period: April 5 - June 10, 2022
• Phase 2 winners have 9 weeks to prepare for a large-scale demonstration, where they will set up and run their demonstration for Reclamation, USACE, and their partners.
• At a final demonstration event, teams will present an overview of their work to Reclamation, USACE, and possibly affiliated commercial partners.
• The final winner will receive $100,000 cash award.
Limitations of Current Methods

• Expense
  • Dredging can cost more than $20/\text{yd}^3$

• Durability and reliability
  • Sand and gravel can be very abrasive, causing equipment failure and downtime

• Versatility
  • Reservoirs have different shapes and sizes and many have depths greater than 50 ft

• Water loss
  • Reservoir flushing or sluicing uses valuable water storage
Ideal Challenge Solutions

• Applicable to a wide range of sediment types and reservoir geometries.

• Solutions that specifically address a targeted issue, such as sediment collection or transport, deeper reservoirs, more cohesive sediments, or very abrasive sediments are also of great interest.

• Reclamation and USACE are interested in innovative approaches that may have additional capabilities over existing sediment removal solutions.
Solution Constraints

• Must not cause significant reservoir drawdown.
• Must be able to coexist with recreational activities, without limiting access to large areas of the reservoir or endangering visitors.
• Should not release harmful materials into the water or the air and should not endanger wildlife.
Ideas should consider the following

• Technical maturity
  ▪ Develop and demonstrate within Phase 2 (15 months)

• Practicality and scalability
  ▪ Able to implement within a real reservoir

• Expense
  ▪ Cost to implement idea would be less than the cost of current methods or at least comparable

• Novelty
  ▪ Looking for new and innovative ways of thinking about the problem
Here is How to Become a Solver

• To accept the challenge, visit https://www.herox.com/GuardiansoftheReservoir

• The prize is open to anyone aged 18 or older participating as an individual or as a team.