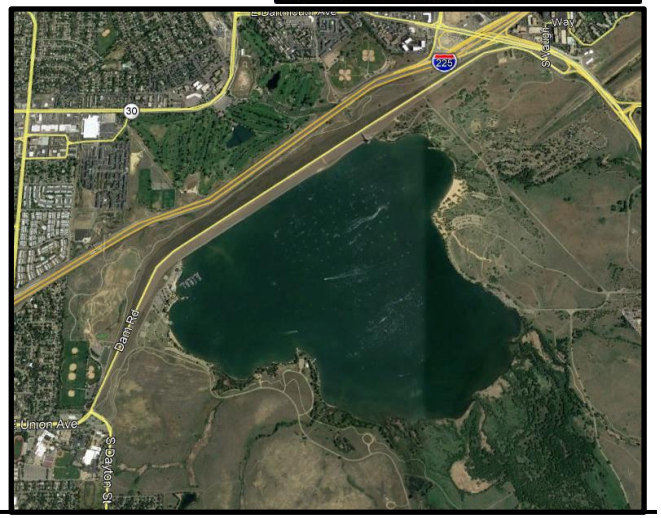
FY20 RSM IPR

NWO, Application of Shallow Acoustic Reflection Seismic (Chirp) Data to Reservoir Storage: Can we revisit the past and plan for the future? Phase 1 – Field Data Collection

BLUF: Many U.S. reservoirs lack pre-dam topographic surveys, making it impossible to accurately quantify modern reservoir sediment volumes. This project seeks to determine if chirp sub-bottom profiling can be used to recreating these critical data sets in two different environments: Cherry Creek Reservoir (Denver, CO; dominantly mud/sand) and Shadow Mountain Lake (Grand Lake, CO; dominantly sand/gravel).

Challenge/Objectives

- Recreate reservoir lost/incomplete as-built surveys using chirp sub-bottom imaging.
- Look for correlation between subsurface layering and event-driven sediment deposition



Approach (including Tools/Models/Data Used)

- Chirp sub-bottom surveys in two different reservoirs:
  - Mud/sand dominated (Cherry Creek)
  - Sand/gravel dominated (Shadow Mountain Lake)

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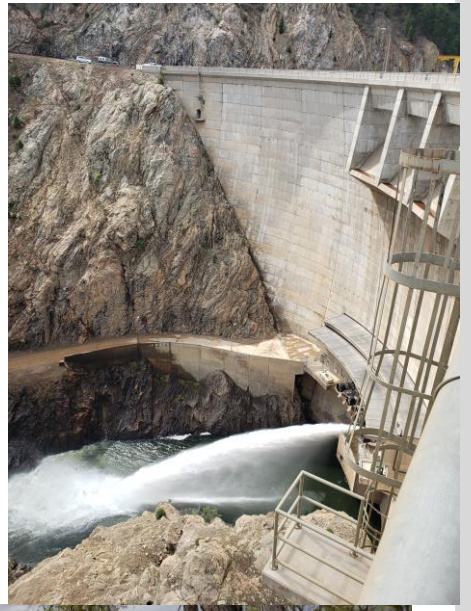
District/Other USACE PDT Members

- NWO: Paul Boyd
- ERDC-CHL: Heidi Wadman
- ERDC-CHL: Jesse McNinch
- Reclamation: Kent Collins
- Reclamation: Dan Dombroski

Stakeholders/Partners

U.S. Bureau of Reclamation
USACE DOTS
Denver Water
USGS
State of Colorado



Leveraging/Collaborative Opportunities

- U.S. Bureau of Reclamation providing vessel support ($27K)
- State of Colorado (water access)
- DOTS-funded demo
  - Was in-field; will now be fully virtual (Reclamation to film; NWO-PAO to produce)

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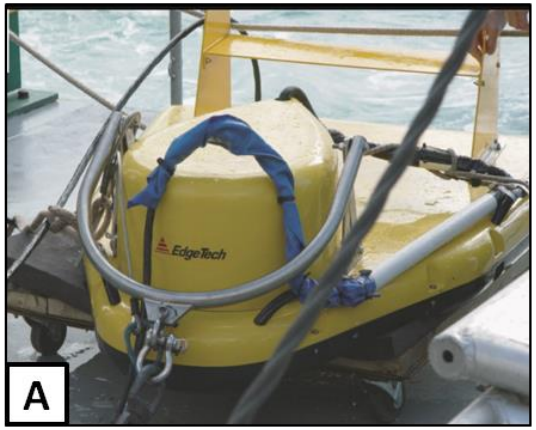
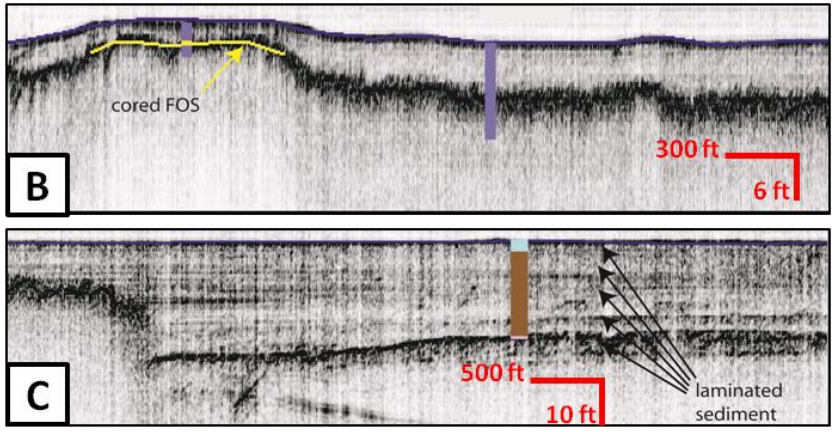
Accomplishments/Deliverables
Lessons Learned

- Successful partnership with Reclamation for vessel/crew support to conduct fieldwork
- Fieldwork pending (delayed due to COVID)…
  - Scheduled for 17-28 August 2020





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What challenges did you face to get your project to implementation and how did you move past them? If not yet implemented, what is your path forward to construction? (Give us your lessons learned that you think might benefit other Districts)

1. Fieldwork delayed due to COVID-19 related travel restrictions

2. In-person field demo replaced with a virtual demo
   - Might be beneficial (ability to reach a wider audience)

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How is this project benefiting the USACE and Nation?

1. Incomplete or missing as-builts mean we have little quantitative understanding of:
   - Estimate of storage loss in reservoirs
   - Role of large storms in depositing sediment
   - The physical properties of the sediment contained behind dams
2. Chirp sub-bottom surveys are significantly less expensive and more accurate than extensive coring efforts; can be conducted on larger regions than GPR.
3. USACE has 15% and Reclamation has 65% of reservoirs with 0 or 1 survey. Hundreds of reservoirs could benefit from this application.