



— BUREAU OF —  
RECLAMATION

# Populating Reservoir Sedimentation Databases

**WaterSMART Internal Applied Science Tools Application**

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Cover photo is intake tower at Paonia Reservoir buried in sediment provided by Western Colorado Area Office, Bureau of Reclamation, 2014.



# Technical Proposal

## Executive Summary

**Project Title:** Reservoir Sedimentation Database

**Eligible Project Type:** a) Using Improved Reclamation GIS and Data Management

**Applicant Information:** Blair Greimann, Ph.D., Melissa Foster, Ph.D., Technical Service Center, Denver, Colorado.

### Project Summary:

Reservoir sedimentation is the accumulation of sediment and debris in slow moving water. Sedimentation occurs to some extent within all reservoirs on natural watercourses. Tracking reservoir sedimentation enables Reclamation to quantify one of our most important assets: reservoir storage capacity. Currently reservoir storage capacities are not available Reclamation-wide. Some capacity information is stored on TSC network drives and published to the web, but other data is only maintained and updated with revised surveys at the Region or Area Office level. This proposal will fund work to enter reservoir capacity data into an enterprise geodatabase (to be developed under the companion proposal “Mapping and Disseminating Reservoir Storage Capacity and Remaining Storage Life” by David Salas) and perform QA/QC on the data after entry into the enterprise geodatabase. These data will then be published in the Reclamation Information Sharing Environment (RISE) for Reclamation-wide and/or public access and uploaded to the US Army Corps of Engineers (USACE) Reservoir Sedimentation Information (RSI) database, which will create a much larger database on reservoir sedimentation. This larger RSI database will provide a larger dataset from which to develop relationships for sediment yield. These relationships can then be applied at projects that have not yet been resurveyed since construction, this work is being performed in the related proposal “Developing predictive equations to forecast reservoir sedimentation rates” (Foster, 2020).

Once implemented, this proposal will make it possible for Reclamation staff and/or the public to obtain current and historical reservoir storage capacities for all Reclamation reservoirs.

**Performance Period:** October 1, 2020 through September 30, 2022.

**General project location:** This project will be conducted at the Technical Service Center, in Denver, Colorado. Results will be available in databases Reclamation Information Sharing Environment (RISE) and Reservoir Sedimentation Information (RSI). We will be contacting Regional survey coordinators as well as project offices to determine if additional reservoir surveys are available. We will be partnering with the US Army Corps of Engineers (USACE) and leveraging their development of the Reservoir Sedimentation Information database.

## Supervisor Approval

Written approval from Jennifer Bountry, manager of the Sedimentation and River Hydraulics Group, is found in Appendix A.

## Statement of Work and Milestones

### Statement of Work

The work consists of entering reservoir capacity data into an enterprise geodatabase (to be developed under the companion proposal “Mapping and Disseminating Reservoir Storage Capacity and Remaining Storage Life” by David Salas), performing QA/QC on the data after entry into the enterprise geodatabase, and then publishing the data in the Reclamation Information Sharing Environment (RISE) for Reclamation-wide and/or public access, and uploading to the US Army Corps of Engineers (USACE) Reservoir Sedimentation Information (RSI) database. We will be entering information only for reservoirs that have been resurveyed since dam construction.

The two databases serve different needs as RISE is a Reclamation database that can contain a variety of information including water data, hydropower data, biological data, water quality data, and infrastructure/assets data. RSI will contain just the reservoir storage and sedimentation data for multiple agencies. A final report will be produced that documents all the data within the databases and details the procedure required to access the data. The proposed funding will be used to obtain an intern to aid data entry into the enterprise geodatabase, RISE, and RSI, as well as staff time from the project team for quality assurance and quality control (QA/QC) on the data in the enterprise geodatabase. The work is divided into the following tasks:

1. Finalize list of reservoirs to be entered into new enterprise geo-database. We suspect there are approximately 90 reservoir surveys that will be entered into the geo-database.
2. Get data in common formats for these three basic data types:
  - a. reservoir survey reports
  - b. geo-referenced reservoir bathymetric surfaces
  - c. area-capacity tables
3. Enter data into the enterprise geo-database developed under the companion proposal “Mapping and Disseminating Reservoir Storage Capacity and Remaining Storage Life.”
4. Perform quality assurance and checking of the enterprise geo-database. The data within the geodatabase will be checked against the data from the survey report.
5. Publish the data in RISE. Work will include setting up RISE catalog records, performing data review and screening, configuring data for upload, and uploading data to RISE. This portion of the work will continue the work begun under the Science and Technology Proposal titled “Open Data Pilot for Integrating BOR River and Reservoir topographic and sediment data into RISE”. The goal of that proposal was to refine best practices based on pilot program lessons learned and to create guidance on data format and metadata and

instructions for loading into RISE. This project will apply the recommendations of that research.

6. Upload data to the RSI. We will work with USACE to develop data linkages between our enterprise geodatabase and RSI. We will also assist USACE on improving the functionality of and access to the RSI database. Specifically, we want to be able to directly download sedimentation data for different reservoir storage zones, such as dead pool, conservation pool, and flood control pool.
7. Document data entered and reports describing the procedures to access the data. This includes an annual progress report following the first year and a final performance report summarizing all work and project benefits. All reporting will be peer reviewed by Reclamation's Sedimentation and River Hydraulics Group staff. At project close, a factsheet detailing sedimentation data within the RSI and RISE databases will also be provided. Webinars and presentations to the client will be made available as requested.

## **Milestones**

The major milestones of the project will be:

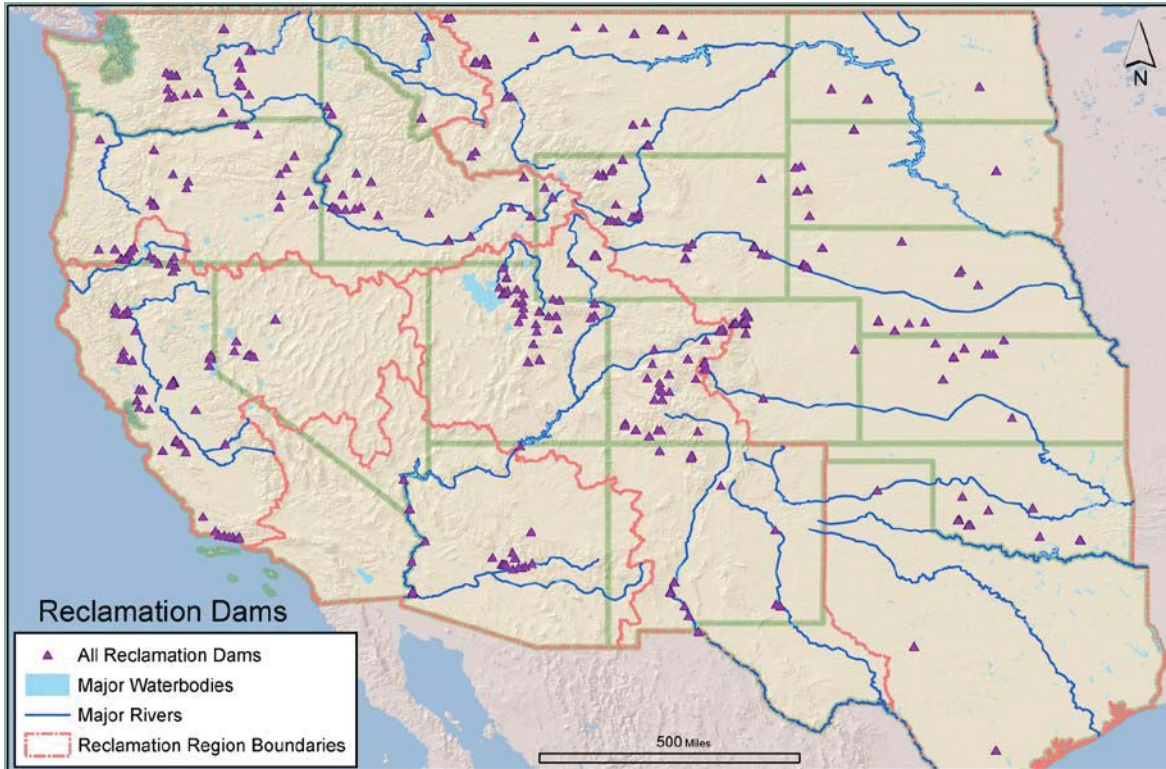
1. Entry of data into enterprise geodatabase.
2. Quality assurance and quality checking of data within enterprise geodatabase.
3. Sharing of information to the RISE and RSI databases
4. Publication of report describing data and how to access that data.

These milestones correspond to the project tasks and the schedule for these milestones is found in Table 1.

## **Specific Project Location**

All Reclamation reservoirs are potentially part of this effort (for locations, see Reclamation dams, Figure 1). Data entry will be conducted at the Technical Service Center in Denver, Colorado (TSC).





**Figure 1. Reclamation dams, western United States.**

## Data Management Practices

The data will be managed in the enterprise geodatabase and updates will be made to RISE as appropriate. The template for reservoir survey data entry into RISE has been developed in the proposal “Open Data Pilot for Integrating BOR River and Reservoir topographic and sediment data into RISE”. In collaboration with the USACE we have already developed established templates for data entry into RSI. We will be coordinating with David Salas to develop templates for data entry into the Reclamation enterprise geodatabase.

## Project Team

**Blair Greimann, Reclamation, [bgreimann@usbr.gov](mailto:bgreimann@usbr.gov)  
U.S. Bureau of Reclamation, Sedimentation and River Hydraulics**

Blair Greimann has been a Hydraulic Engineer in the Sedimentation and River Hydraulics Group at the TSC for the Bureau of Reclamation since 1998. He is currently the Technical Specialist of the group. His primary work is related to the analysis and design of large-scale dam removal, river restoration projects, and reservoir sedimentation issues. Some of the projects where he has performed a critical role include the San Joaquin River Restoration Program, the Klamath Dam Removal Studies, and Matilija Dam Removal. He is also a co-developer of the hydraulic and sediment transport model called SRH-1D (Sedimentation and River Hydraulics – One Dimension) and has applied it to the projects listed above as well as reservoir sluicing projects, such as Paonia Reservoir in Colorado. He has developed reservoir sedimentation training and guidelines for the government of Laos. He will work with the USACE to modify the RSI database to include better reporting of reservoir sedimentation and provide project management and team oversight.



**Melissa Foster, Reclamation, mfooster@usbr.gov**

**U.S. Bureau of Reclamation, Sedimentation and River Hydraulics**

Melissa Foster has been member of the Sedimentation and River Hydraulic Group at the TSC for the Bureau of Reclamation since 2015. She has an academic background in geomorphology and river research in addition to previous consulting experience in river restoration and sedimentation. Her primary work focuses on identifying and classifying geomorphic change in rivers, exploring the causes of sedimentation, and hydraulic modeling of rivers for flood analyses and restoration projects. Her previous work on documenting environmental parameters influencing reservoir sedimentation (Foster and Benoit, 2020) identified several QAQC issues in the RSI database that this proposed project will address. She is also the principal investigator for a complementary WaterSmart proposal that aims to adapt predictive equations of sedimentation to Reclamation reservoirs, allowing coordination between the two project teams. She will assist in data entry and QAQC of existing and new data.

**Steven Hollenback, Reclamation, shollenback@usbr.gov**

**U.S. Bureau of Reclamation, Sedimentation and River Hydraulics Group**

Steven Hollenback has been involved with the Reclamation Science and Tehcnology Proposal “Open Data Pilot for Integrating BOR River and Reservoir topographic and sediment data into RISE.” He has developed data templates for reservoir survey entry into the RISE database.

**David Salas, Reclamation, desalas@usbr.gov**

**U.S. Bureau of Reclamation, Geographic Applications and Analysis Group**

David Salas will be the lead developer of the enterprise geodatabase developed under the companion proposal “Mapping and Disseminating Reservoir Storage Capacity and Remaining Storage Life”.

**Deena Larsen, dlarsen@usbr.gov**

**Reclamation, Technical Editor**

Deena Larsen is a Technical Writer Editor and has assisted with numerous projects in Reclamation’s Water, Environmental, & Ecosystems division.

**Ariane Pinson, PhD, Ariane.Pinson@usace.army.mil**

**Climate Science Specialist, USACE Albuquerque District, 4101 Jefferson Plaza NE**

**Albuquerque, NM 87109**

Ariane is the Subject Matter Expert for the USACE Climate Preparedness and Resilience Community of Practice.

## **Evaluation Criteria**

### **Evaluation Criterion A—Project Benefits**

*Up to 35 points may be awarded based on the benefits that are expected to result from the proposed project. This criterion includes consideration of how the project will improve water management and operations, or how the project will result in benefits to other Reclamation mission-based objectives.*

#### ***What types of benefits will your project result in?***

Because this project will improve the calculation of reservoir storage in Reclamation reservoirs, the project will benefit almost every area of Reclamation, including the following areas:

- Reservoir operations
- Water deliveries
- Hydropower production
- Recreation uses at Reclamation facilities
- Management of fish and wildlife habitat
- Management of endangered, threatened or candidate species
- Water quality
- Flow and water dependent ecological resilience
- Flood control management
- Reservoir sediment management
- Development of sediment monitoring plans
- Reclamation-wide data management and use of GIS
- Other water management or objectives central to Reclamation’s mission, such as drought management, addressing conflicts over water or otherwise help address imbalances between water supply and demand.

***For the above benefits, please explain how your project will improve water management or other mission-based objectives.***

Because this project will improve the calculation of reservoir storage in Reclamation reservoirs, the project will benefit almost every aspect of water management, including the following aspects:

- support decision-making by water managers (i.e., Reclamation or partners and stakeholders) under uncertain hydrologic conditions (risk-based decision-making);
- increase the availability of consistent timely and reliable data, or provide a greater range of data;
- improve the ability to respond to stakeholder concerns; or otherwise provide information to support water management or operations

***To what extent will your project result in a demonstrated benefit to improve water management or other mission-based objectives.***

This project would ensure the standardization and quality of reservoir storage capacity data across Reclamation. Currently, there are two main problems in getting accurate reservoir storage capacities. The first is that although reservoir sedimentation is certainly occurring at Reclamation facilities, we have only resurveyed approximately 25% of our total reservoir inventory (Foster and Benoit, 2020). The second is that even where there has been a resurvey, the information has not always been utilized because it is not easily accessible. The data often exist only at the project office and are not easily accessible by others, as there is no centralized databased that contains this information. The currently available storage in Reclamation reservoirs as reported in the Project Data are often the as-built storage or a storage corresponding to an unknown date. The result is that Reclamation cannot verify the current water storage capacity in most of its reservoirs.

To remedy this situation, an enterprise database will be populated with available reservoir survey information. The information in this enterprise database will be published to two other databases that can be accessed by Reclamation staff: Reclamation Information Sharing Environment (RISE) and Reservoir Sediment Information (RSI). The reason for populating both databases is that RISE

will only contain Reclamation reservoirs information, whereas RSI is a US Army Corps of Engineers (USACE) led effort to store all the reservoir sedimentation data from multiple agencies (Pinson et al. 2016). The added benefit of RSI is that specific data reporting operations can be programmed to retrieve storage and sedimentation information for multiple reservoirs at once.

Another important benefit of developing centralized databases of reservoir sedimentation is that it will improve our ability to estimate reservoir sedimentation rates at facilities without repeat surveys or at new sites. Specifically, these data will be used in the related proposal “Developing predictive equations to forecast reservoir sedimentation rates” (Foster, 2020).

### **Evaluation Criterion B—Project Relevancy: Need for Project and Project Fit with Program Priorities**

*Up to 25 points may be awarded based on the extent the project will result in readily useful applied science tools or information that meet an existing need within Reclamation—this can include a need related to work we do in collaboration with, or to support, operating partners and other stakeholders or other Reclamation offices. Projects that clearly meet a Reclamation need and fit with program priorities will be scored the highest.*

***Please address the need and applicability of the project to address a specific management issue.***

This project will improve access to and use of reservoir storage capacity information within Reclamation. The data will be centrally located in a Reclamation enterprise geodatabase and published in the Reclamation Information Sharing Environment (RISE) system. The project will also fund data standardization and quality assurance/quality control. To illustrate the problems caused by both the lack of current reservoir capacity data and the lack of access to those data, the following examples are given:

#### Elephant Butte Reservoir

Reclamation’s Project Data website lists the storage of Elephant Butte Reservoir as precisely 2,210,298 acre-ft. The date or elevation of this storage is not referenced, and based upon the most recent survey in 2017, the storage of Elephant Butte Reservoir is about 2.01 million acre-ft. The original storage when the reservoir was built in 1915 was 2.63 million acre-ft, so there has been an overall capacity loss of over 23 percent. The reservoir storage data posted by the UC region ([https://www.usbr.gov/uc/water/hydrodata/reservoir\\_data/site\\_map.html](https://www.usbr.gov/uc/water/hydrodata/reservoir_data/site_map.html)) does not have a date associated with capacity relationship used to determine the current reservoir storage and the elevation versus capacity curves used to calculate storage are not available on this site. The most recent survey results are not easily accessible except through local inquiry or unless one knows to go to a website supported by the Sedimentation and River Hydraulics Group at the Technical Service Center (TSC).

#### Black Canyon Reservoir

The reservoir began storing water in 1924 with a capacity of 44,900 acre-ft and the 2016 estimate is 15,400 acre-ft, or 35% of the original capacity (Ubing and Hollenback, 2019). It could begin passing sand through the hydropower penstock in about 25 years, negatively impacting the viability of the hydropower plant (Ubing and Hollenback, 2019). This more recent reservoir sedimentation information was not used to assess the long-term viability of additional power units (Reclamation, 2016). The Record of Decision in 2016 for the hydropower enlargement project stated that the

Reservoir Capacity was 29,822 acre-feet (almost twice what its actual value is) and made no mention that the potential impact of reservoir sedimentation on the life of the hydropower facilities.

#### Shasta Reservoir

Shasta Reservoir began filling in 1945 and has a stated capacity of 4,552,000 acre-ft at elevation 1067 ft. It has not been resurveyed since construction and has lost an unknown amount of storage. Current plans to raise Shasta do not account for the storage lost since construction. All water supply and economic analysis included in the Shasta Dam Raise Feasibility Report do not account for storage losses since construction (see Figure 2-3 in Reclamation, 2015).

There are many other examples where there is a lack reservoir sedimentation data or lack of data accessibility.

#### *Please describe the project fit with program priorities and project eligibility criteria.*

This project will improve access to and use of reservoir storage capacity information within the Reclamation. The project will also fund data standardization and quality assurance/quality control.

#### **Will the project result in the application of a tool, method, or information?**

The data will be centrally located in a Reclamation enterprise geodatabase and published in the Reclamation Information Sharing Environment (RISE) system. This tool is currently available and used by Reclamation.

#### **Evaluation Criterion C – Project Implementation Plan and Likelihood of Success**

Up to **20 points** may be awarded based on the applicant's plan for implementing the project and demonstration of their likelihood of success by selecting appropriate team members, describing the project clearly, and including an adequate budget.

#### *Describe the objectives of the project and methodology and approach that will be undertaken.*

#### *Describe the project work plan, schedule milestones, and budget*

#### *Describe the availability and quality of existing data and models applicable to the project.*

#### *Identify project team members with appropriate credentials and experience.*

#### *Provide a summary description of the anticipated products of this research.*

The objective of the project is to make the reservoir capacity versus elevation relationship for every Reclamation reservoir easily available and accurate.

The existing surveys reports have already been compiled on the Reclamation web site: <https://www.usbr.gov/tsc/techreferences/reservoir.html>. We will also send out a request to project offices for surveys that were not conducted by the TSC to obtain additional surveys. This information will be compiled into a consistent format for entry into the Reclamation enterprise geodatabase.

We have already begun a partnership with the USACE on developing the Reservoir Sedimentation Information database (Pinson et al. 2016) that can be used to access current and historical reservoir storage information. Over 70 reservoir surveys have been already entered into this database. There are approximately 20 more surveys that will be added as part of this proposal.

We are currently entering survey reports and survey information into RISE through the proposal “Open Data Pilot for Integrating BOR River and Reservoir topographic and sediment data into RISE”, but the RISE database is not intended to be the only storage location for this information and a separate database is necessary to centrally store all the reservoir survey information. We will utilize the existing information entered into RISE to speed the entry into the enterprise database.

The tasks necessary to do this are listed in the work scope section and the schedule are given below. For each task there is a lead, who will be responsible for the majority of the effort, and a checker, who will be responsible to ensure that task is completed. The people involved have been introduced in the Project Team section. Both Greimann and Foster have worked with and entered data into the RSI system. Steven Hollenback has already been the primary person working with the Science and Technology Office to enter information into the RISE database. An intern will be hired beginning in June of 2021 to assist on data entry into RISE and RSI.

**Table 1 – Schedule and Budget**

<b>Task</b>	<b>Lead</b>	<b>Check</b>	<b>Completion Date</b>	<b>Cost (\$)</b>
Start			10/01/2020	
1. Finalize list of reservoirs	Greimann	Foster	11/01/2020	6,600
2. Get data in common formats	Intern	Hollenback	08/01/2021	26,915
3. Enter data into the enterprise geo-database developed under separate proposal	Intern	Hollenback	09/01/2021	9,205
4. Perform quality assurance and quality checking of the enterprise geo-database	Hollenback	Greimann	01/01/2022	17,168
5. Publish the data in RISE	Greimann	Foster	04/01/2022	6,384
6. Upload data to the RSI	Greimann	Foster	04/01/2022	4,832
7. Documentation of data entered and reports describing the procedures to access the data	Greimann	Foster	09/30/2022	13,416
Project management	Greimann		09/30/2022	2,416
Technical Writers	Larsen	Foster		4,960
End			09/30/2022	
<b>Total</b>				<b>91,896</b>

The deliverables for this project will be:

1. Entry of reservoir survey data into enterprise database stored and maintained by Reclamation for all Reclamation reservoirs with re-surveys since construction.
2. Entry of reservoir survey data into RISE and RSI for all Reclamation reservoirs with re-surveys since construction

3. Documentation of data entered and reports describing the procedures to access the data.
4. One-page bulletin describing the data products and use of the data.

There will also be a progress report detailing the work accomplished in FY2021.

### **Evaluation Criterion D – Project Partners and Dissemination of Results**

Up to **10 points** may be awarded for proposals that include partner involvement and that include a plan for the disseminating, transferring and communicating project results with others, including internal Reclamation offices and external partners. Please respond and provide support for your responses to each of the following sub-criteria.

*Does the project include partner involvement?*

*Describe your plan for how the tools, frameworks, or analyses being developed will be disseminated.*

We will be compiling the reservoir data into a consistent format and ensuring data are consistent with published results. This data will then be shared as described in the companion proposal “Mapping and Disseminating Reservoir Storage Capacity and Remaining Storage Life”. That proposal will publish results to two existing databases that will be publicly available: RISE and RSI. Making it available within RISE will increase the value of reservoir storage information because currently, it is not clear the date associated with the capacity versus elevation relationship used to calculate storage. We will be providing storage capacity information to RISE that can be directly linked to existing data products such as the real time reservoir storage information and “tea-cup” diagrams on Regional data websites. We will be working directly with the RISE team to accomplish these goals and we already working with them under the Reclamation Science and Technology Project “Open Data Pilot for Integrating BOR River and Reservoir topographic and sediment data into RISE”.

We will be working with USACE to extend the usefulness of an already existing database, RSI. We will develop a one-page bulletin that describes the data products, how to access the data, and the use of the data. These data are intended to be publicly available through the RISE and RSI databases.

### **Evaluation Criterion E – Department of the Interior and Bureau of Reclamation Priorities**

Up to **10 points** may be awarded based on the extent that the proposal demonstrates that the project supports Department’s and Reclamation priorities. Please address those priorities that are applicable to your project. It is not necessary to address priorities that are not applicable to your project. A project will not necessarily receive more points simply because multiple priorities are addressed. Points will be allocated based on the degree to which the project supports one or more of the priorities listed, and whether the connection to the priority(ies) is well supported in the proposal.

#### **Department priorities**

This proposal directly benefits the Department Priority: *Review DOI water storage, transportation, and distribution systems to identify opportunities to resolve conflicts and expand capacity.* To put it simply, to review the water storage we need to know the water storage.



## Interior priorities

This proposal directly benefits the Department Priority: *Increase Water Supplies, Storage, and Reliability under WIIN and other Authorities*. To improve upon the reliability of our water storage, we need to know the current state of our water storage capacity.

# Project Budget

## Total Project Costs

Table 2 – Total project costs

SOURCE	AMOUNT
Costs to be reimbursed with the requested funding	\$ 91,896
*Cost share contributions by applicant	\$ 0
*Cost share contributions by partners	\$ 20,000
<b>TOTAL PROJECT COST</b>	<b>\$ 111,896</b>

*\*Cost share contributions are encouraged but not required. If you have no cost share, leave these rows blank.*

## Budget Proposal Table

Table 3 – Budget breakdown

BUDGET ITEM DESCRIPTION	COMPUTATION		Quantity Type	Fiscal Year 1	Fiscal Year 2	TOTAL COST
	\$/day	Staff Days				
<b>Reclamation Labor Costs</b>						
Blair Greimann	1208	26	SL3	3,624	25,368	\$28,992
Melissa Foster	992	20	SL2	2,976	6,944	\$9,920
Steven Hollenback	992	40	SL2	24,800	11,904	\$36,704
Summer Intern	283	40	Intern	11,320	-	\$11,320
Technical writer	992	5	SL2	-	4,960	\$4,960
<b>Reclamation non-Labor</b>						
<b>Equipment</b>						
NA						
<b>Reclamation Travel</b>						
NA						
<b>Reclamation Environmental Compliance</b>						
NA						
FY TOTAL				42,720	49,176	
<b>TOTAL RECLAMATION COSTS</b>						<b>\$91,896</b>



## **Budget Narrative**

The budget has been itemized by task and milestone in Table 1. This table also contains the person responsible for completing each task. These costs are based upon the FY2021 staff day rate estimates. There are no non-labor, travel or contracting costs.

## **Cost Share Contributions**

**Partner:** US Army Corps of Engineers, Ariane Pinson, PhD, [Ariane.Pinson@usace.army.mil](mailto:Ariane.Pinson@usace.army.mil), Climate Science Specialist, USACE Albuquerque District, 4101 Jefferson Plaza NE

**Commitment Type:** In-Kind – Firm

**Partner's participation:** The USACE has invested in the development and maintenance of RSI. They will also improve the functionality of RSI as part of this effort.

**Contribution amount:** \$20,000

## **Environmental and Cultural Resources Compliance**

Environmental and cultural compliance is not an issue for the proposed project.

## **Required Permits of Approvals**

There are no permits required for the proposed project.

## **Supervisor and Acquisitions Approvals**

We have obtained supervisor approval for the submission of this proposal and for time needed to conduct the work if selected for funding. The form is valid for all team members and is available in Attachment A.

## **Letters of Support**

Letters of Support are in Attachment B.

# References

Bountry, J. (2019). Open Data Pilot for Integrating BOR River and Reservoir topographic and sediment data into RISE, Project ID: 20077, Bureau of Reclamation, Research and Development Office, Science and Technology Program.

National Reservoir Sedimentation and Sustainability Team (2019) *Reservoir Sediment Management: Building a Legacy of Sustainable Water Storage Reservoirs*, National Reservoir Sedimentation and Sustainability Team White Paper.

Foster, M. and Benoit, V. (2020). Technical Report No. ENV-2020-032, *Working toward understanding the environmental and physical parameters that influence reservoir sedimentation rates*, Prepared for the Water Resources and Planning, Bureau of Reclamation.

Ubing, C., Hollenback, S. (2019). *Pilot Study of Reservoir Sustainability– Black Canyon Reservoir*, Final Report ST-2019-8235-01, Research and Development Office, Science and Technology Program.

Reclamation (2016). *Finding of No Significant Impact, Final Environmental Assessment, Construction of a Third Hydroelectric Generating Unit*, Black Canyon Diversion Dam, Gem County, Idaho, prepared by Pacific Northwest Region, Middle Snake Field Office, Boise, Idaho.

Reclamation (2015). *Feasibility Report Shasta Lake Water Resources Investigation, California*, Prepared by United States Department of the Interior, Bureau of Reclamation, Mid-Pacific Region.

Pinson, A., B. Baker, P. Boyd, R. Grandpre, K.D. White, and M. Jonas. (2016) U.S. Army Corps of Engineers Reservoir Sedimentation in the Context of Climate Change. Civil Works Technical Report, CWTS 2016-05, U.S. Army Corps of Engineers: Washington DC.



# Attachment A. Supervisory Approval

**BLAIR GREIMANN** Digitally signed by BLAIR  
GREIMANN  
Date: 2020.04.17 14:37:26 -06'00'

4-17-2020

Project Manager, Blair Greimann

Date

Technical Specialist, Hydraulic Engineer, Sedimentation and River Hydraulics Group, 86-68240

**JENNIFER  
BOUNTRY** Digitally signed by JENNIFER  
BOUNTRY  
Date: 2020.04.17 14:41:28 -06'00'

4-17-2020

Project Manager Supervisor, Jennifer Bountry

Date

Manager, Sedimentation and River Hydraulics Group, 86-68240



# **Attachment B Letters of Support**



# United States Department of the Interior

BUREAU OF RECLAMATION  
Great Plains Regional Office  
P.O. Box 36900  
Billings, MT 59107-6900

1

IN REPLY REFER TO:

MB-4600  
1.3.10

APR 13 2020

VIA ELECTRONIC MAIL ONLY

Memorandum

To: Science Advisor  
Attn: MIB-96-00000 (DRaff)

From: Patrick J. Erger *Patrick J. Erger*  
Supervisory Hydrologist

Subject: Letter of Support for WaterSMART Proposal titled "Populating Reservoir Sedimentation Databases"

The Missouri Basin (MB) Region and MB other areas of responsibility would like to express our support for continuing the development and entry of data into the Reclamation's Information Sharing Environment (RISE), and Reservoir Sedimentation Information database (RSI) that is currently being established.

Tracking of the reservoir sedimentation enable Reclamation to track one of the most important assets which is reservoir storage. Current reservoir storage capacities are often only updated at the project or Regional level and sometimes this information is not available Reclamation wide. This may lead to inconsistent and misleading reservoir capacities. Centralizing the current and historical reservoir storage information will also improve estimates of reservoir sedimentation at projects that have not yet been resurveyed since construction. Making these valuable information and data widely accessible will be critical to ensuring the most recent information is accurately and consistently used.

Once again, I am excited about the possibilities of this proposal and look forward to the future capabilities developed by tracking reservoir storage across Reclamation. If you have any questions about this, please contact me at (406) 247-7755 or perger@usbr.gov.

cc: 86-68240 (BGreimann)





**DEPARTMENT OF THE ARMY**  
**CLIMATE PREPAREDNESS AND RESILIENCE (CPR) COMMUNITY OF PRACTICE**  
**U.S. ARMY CORPS OF ENGINEERS**  
**441 G ST NW, WASHINGTON, DC 20314**

14 April 2020

Re: Letter of Support for continuing the development of, and entry of data into, the Reservoir Sedimentation Information (RSI) database

Dear Sir or Ma'am:

I would like to express my strong support for staff from the Bureau of Reclamation to continue the development of, and entry of data into, the Reservoir Sedimentation Information (RSI) database. This database is an important step forward in interagency collaboration, especially as pressure increases on water resources managers. Though we anticipated reservoir sedimentation in the planning and design of dams, it could eventually interfere with some or all the project benefits, including navigation, flood risk reduction, hydropower, irrigation, water supply, recreation, and fish and wildlife benefits.

Further developing the shared database of reservoir sedimentation between the US Army Corps of Engineers (USACE), the Bureau of Reclamation, and the US Geological Survey will improve the agencies' ability to predict and respond to challenges posed by sedimentation impacts. Making these data widely assessable will be critical to ensuring the most recent information is accurately and consistently used.

Please do not hesitate to contact me if you have any comments or questions at [Kathleen.d.white@usace.army.mil](mailto:Kathleen.d.white@usace.army.mil) or 202-761-4163.

A handwritten signature in black ink, appearing to read "Kathleen D. White".

Kathleen D. White, PhD, PE  
Lead, Climate Preparedness and Resilience  
Community of Practice  
Engineering and Construction Directorate