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# Water Operations and Maintenance Bulletin

Routine Maintenance and Reporting

U.S. Department of the Interior

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## Bulletin Mission Statement

This *Water Operations and Maintenance Bulletin* is published quarterly through the Asset Management Division of the Dam Safety and Infrastructure Directorate. It serves as a medium to connect personnel who operate and maintain Bureau of Reclamation water supply systems.

## Bulletin History

The *Water Operations and Maintenance Bulletin* has been published quarterly since 1952. Past issues may be read and downloaded at [Water Operations and Maintenance Bulletins](#), where you can also search the entire bulletin database by subject.

## Contact

We welcome suggestions for future issue topics, contributing authors, and comments on the *Bulletin*. Please direct all inquiries to [drowateroandm@usbr.gov](mailto:drowateroandm@usbr.gov).

# Editor's Note

Welcome back! The *Water Operations and Maintenance Bulletin* is resuming quarterly publication. It has been quite a year. We hope you have stayed safe and healthy during the pandemic. Maximum telework has given us the opportunity to refresh perspectives about how we operate and maintain our facilities. We look forward to providing a forum for you to share how you're adapting to and succeeding in our evolving workplace.

Bringing back the *Bulletin* was made possible through the efforts of our invaluable authors, designers, contributors, and Reclamation leadership. And thank you for your feedback as we honor the *Bulletin's* previous 70 years and set a path for its future.

Learn more in this issue about required major rehabilitation and replacement reporting, how the Enterprise Asset Registry will provide a centralized foundation of asset data to connect with Reclamation systems, and the importance of measuring sedimentation and monitoring canals for invasive species. We're also excited to introduce a Q&A section to celebrate Reclamation's outstanding people.

Thanks for reading!

Darion Mayhorn, P.E.

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Writer-Editor  
Dam Safety and Infrastructure

# Around O&M

The recent Water Management Workshop and Review of Operation and Maintenance (RO&M) Workshop provided opportunities to discuss best practices for maintaining Reclamation infrastructure, collaborative partnerships, and local and regional concerns.

## Water Management Workshop: March 9-11, 2021

- Featuring five sessions over two-and-a-half days, the workshop's objective is the self-improvement of personnel directly responsible for the technical details of operating and maintaining water systems.
- 155 people registered for the workshop, representing 60 water districts and 19 area offices. 80% of those who completed the exit survey identified as engineers or management/supervisor.
- Participants found the Concrete & Structural Lab; Inspection, Maintenance, & Testing of Mechanical Equipment; and Major Rehabilitation & Replacement (MR&R) sessions most interesting.
- Suggested future topics: more MR&R discussion, animal studies, and project-based case studies.

## RO&M Workshop: April 27-29, 2021

- Over 115 participants from all five regions, including area and field offices, attended the workshop for only Reclamation employees hosted by the Lower Colorado Basin (LCB) Region, in conjunction with the Technical Service Center and Asset Management Division.
- The first four sessions were over two days, with 3-5 topics presented in each session. Session 5 was a roundtable discussion led by LCB's Richard Eastland, as well as other regional field subject matter experts.
- Exit surveys showed that the Field Examinations; Mechanical Inspection Overview; Making Specific, Measurable, Achievable, Relevant, Time-bound (S.M.A.R.T.) Recommendations; and Gate Testing Program sessions were particularly useful.
- Suggested future topics: success stories, power generation and delivery, electrical inspection overview, SOP updates and guidelines, and O&M Inspection examples.



# Vegetation Management on Canals

**Jolene Trujillo**

Environmental Protection Specialist, Policy and Programs

Vegetation management is essential for sustainable canal systems. Mismanaging vegetation can impact operational deliveries, create blockages, provide habitats for burrowing animals, lead to root damage, cause limited access—including during inspections, and contribute to the likelihood of failures of Reclamation's assets, including canals. Several canal failures occur each year and are often attributed to improper maintenance of vegetation. These failures can cause significant economic damages, loss of project benefits, injuries, and even loss of life.

Brush and overgrown vegetation provide both food and cover for burrowing animals that can damage the canal system. Managing vegetation on canal embankments will make the area less inviting, thus reducing the likelihood of rodent activity in the embankments. Regularly manage dense vegetation to reduce cover for animals.



Weeds in a wasteway blocking emergency flows.

Be aware of common plant species in the area and look out for the appearance of any new species in the canal system. Some weeds are invasive, meaning they cause ecological or economic harm in a new environment where they are not native. Invasive weeds can grow quickly and may become problematic over a short period of time.

For example, hydrilla can grow an inch a day. Water hyacinth can form dense mats and double in size in less than two weeks under favorable conditions. Invasive weeds in canals primarily come from upstream or nearby populations. Reducing or eliminating their spread can help prevent invasive species problems, and timely action can stop much larger issues from developing.



Extensive damage from trees on a concrete-lined canal.

Keep operations and maintenance (O&M) roads; canal embankments, toes, and prisms; wasteways; and drains free from overgrown vegetation and deep-rooted bushes and plants. Use these main methods of control together as part of an overall Integrated Vegetation Management Plan (IVMP).

- Mechanical: Physically remove or reduce vegetation by cutting above- or below-ground biomass (e.g., mowing and dredging)
- Cultural: Modify environment to be less conducive to unwanted vegetation (e.g., drawdowns or light exclusion through tarps or covers)
- Physical: Line canals in very troublesome areas
- Chemical: Use herbicides to stop or slow vegetation from growing or spreading
- Biological: Introduce natural biological enemies for invasive weeds



Grasses form thick, short mats that keep out invasive species and require little maintenance.

As part of an Integrated Pest Management Plan, an IVMP establishes a systematic approach for identifying, managing, and repairing vegetation issues.

An IVMP helps determine:

- If vegetation management is needed
- Timing and frequency of management actions
- What control treatments or combinations will be most cost effective
- The effectiveness of the treatment and adaptive management strategies

Additionally, an IVMP can:

- Identify the most effective methods to control weeds and pests
- Reduce O&M costs
- Reduce herbicide usage
- Reduce the likelihood of a canal failure
- Prevent the spread of invasive species

An IVMP should be incorporated with a regular O&M program to avoid one-time fixes and ensure a sustainable long-term approach. The ultimate goals should be to manage vegetation to avoid the need for costly removals and repairs and minimize habitats for animals that threaten the integrity of the canal system.

The costs for an IVMP are comparatively less than the potential costs of flood damage, loss of project benefits, and litigation should a canal break occur. Prevention is the first line of defense and can be the most cost-effective approach. Once a species becomes widespread, ongoing efforts to control it may increase O&M costs into the future.

However, before removing weeds and trees, consider the aftermath. Vegetation can be an ally in a canal system, so don't just remove harmful vegetation but plan to replace it with something that benefits your canal system. Plan for long-term revegetation and rehabilitation to stabilize embankments and help suppress weeds and nuisance animal habitats. Because of dormancy within the soil-seedbank and vegetative reproduction capabilities, weeds will often continue to re-infest sites after management is conducted, for decades in some cases. Successful revegetation normally requires integration with other control methods to shift the vegetative community to a more desirable and stable state. Maintaining intact plant communities with desired structure and ecological function can make takeovers from invasive species and other weeds less likely.

Well-managed vegetation can make canals look great and encourage neighbors and others to care for the surrounding area.

For detailed information on vegetation management plans and vegetation management tools, check out [Reclamation's Canal Operation and Maintenance: Vegetation Manual](#) and [Reclamation's Integrated Pest Management Manual](#).



# Enterprise Asset Registry

**Daniel Staton, P.E.**

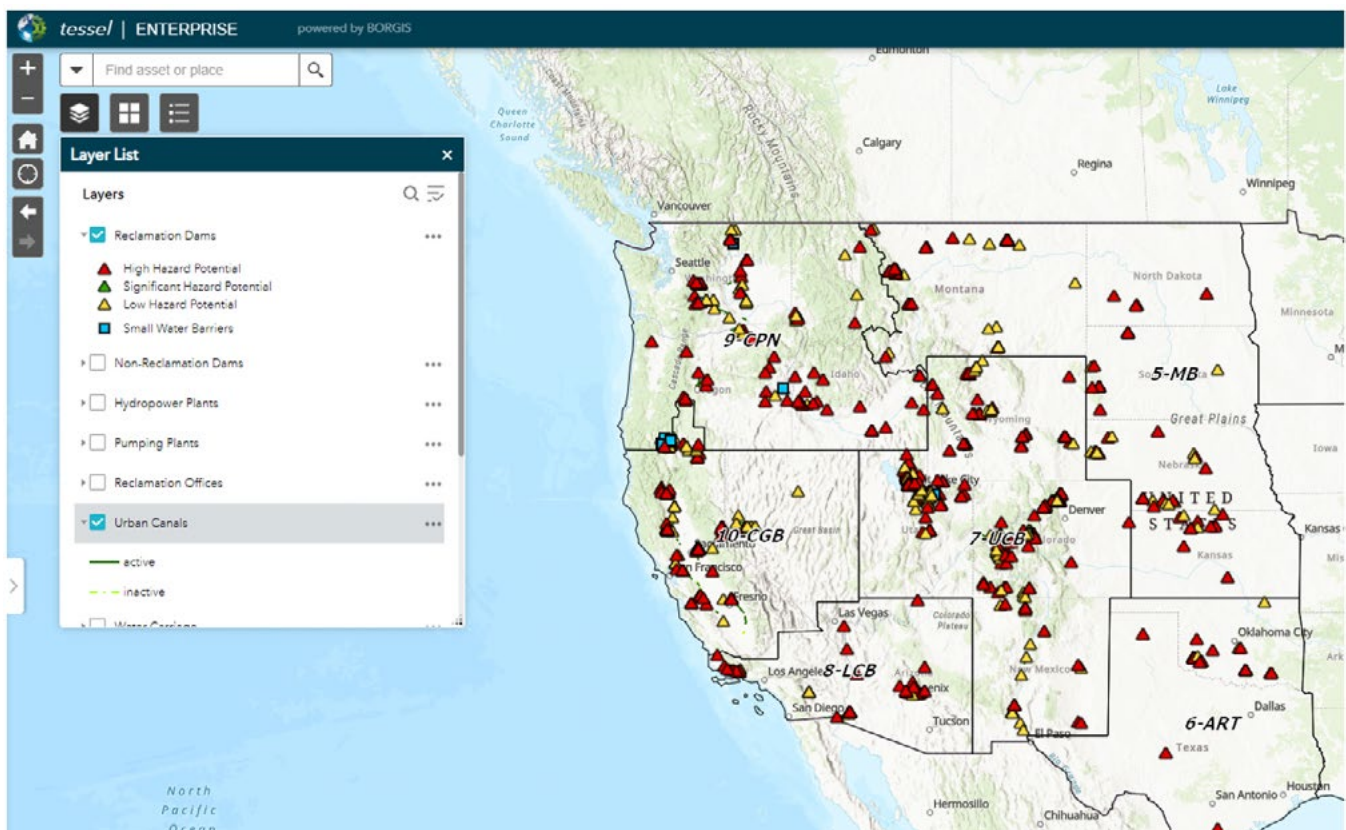
Structures O&M Program Manager, Asset Management Division

Reclamation's individual asset programs, notably dams and hydropower, are industry leaders. Real property assets at Reclamation are often viewed individually, meaning one asset class is focused on by area of expertise. Viewing and interacting with Reclamation's assets holistically is difficult, as the asset information is not collected and stored in a central location accessible across the organization. Reclamation has numerous individual asset registries listing and describing assets that range from high-hazard dams to recreation sites, but it lacks a distinct repository where all asset information can be viewed and analyzed. To address these challenges, the Asset Management Division has embarked on the Enterprise Asset Registry project.

The scope of the Enterprise Asset Registry project is to coordinate with asset class subject matter experts (SMEs) across Reclamation, develop requirements and processes for data stewardship, establish an initial inventory, validate the inventory, and publish

asset class data and editor applications for 18 asset classes. This will centralize the location of basic asset metadata within Reclamation's Geographic Information System (BORGIS) and provide a common data source for existing asset management IT systems (e.g., Dam Safety Information System, Power Resources Information System, Major Rehabilitation and Replacement, Capital Asset and Resource Management Application, Federal Real Property Profile).

The Enterprise Asset Registry editor applications will allow authorized regional SMEs (i.e., staff from regional, area, and field offices) to maintain a comprehensive asset registry of all Reclamation facilities and relevant non-Reclamation facilities. The authorized data editors will update the enterprise asset classes in BORGIS for use across Reclamation. This effort requires Reclamation-wide participation to verify existing facility information and maintain up-to-date information in the future.



Reclamation's Tessel application where all Reclamation assets can be viewed and analyzed.

The Enterprise Asset Registry project is a long-term effort aimed at helping Reclamation organize its asset information in a consistent, accessible way to allow asset management refinement and advancement in the future. The project is scheduled to take approximately three years to complete. Reclamation is developing and deploying asset classes sequentially with three to five asset classes in various phases of development at any time. The first two asset classes that were launched are the dams and the urban canals asset classes. The regional SME review period ended in March 2021 and the asset classes were

finalized in June 2021. The regional SMEs are now able to update their dam and urban canal asset data at any time through the SME editor application. For the rest of Reclamation, dam and urban canal asset information can be viewed through Tessel by turning on the Reclamation Dams and Urban Canals layers.

The reservoir and hydropower asset classes are also in development. These two asset classes will be finalized by the end of fiscal year 2021. All 18 asset classes included in the asset registry are shown below with an approximate development schedule.

| Asset Class         | Schedule               | Asset Class           | Schedule              |
|---------------------|------------------------|-----------------------|-----------------------|
| 1. Dams             | Aug. 2020 – May 2021   | 10. Transmission      | Jan. 2022 – Aug. 2022 |
| 2. Urban Canals     | Aug. 2020 – May 2021   | 11. PCCP              | Jan. 2022 – Aug. 2022 |
| 3. Reservoirs       | Oct. 2020 – Aug. 2021  | 12. Buildings         | Apr. 2022 – Dec. 2022 |
| 4. Hydropower       | Apr. 2021 – Sept. 2021 | 13. Lands             | Aug. 2020 – Oct. 2022 |
| 5. Conveyance Lines | Feb. 2021 – Jan. 2022  | 14. Conveyance Points | Aug. 2022 – Mar. 2023 |
| 6. Levees           | Aug. 2021 – Mar. 2022  | 15. Water Treatment   | Oct. 2022 – May 2023  |
| 7. Transportation   | Aug. 2021 – Mar. 2022  | 16. Wells             | Oct. 2022 – May 2023  |
| 8. Pumping Plants   | Nov. 2021 – June 2022  | 17. Fish Structures   | Mar. 2023 – Oct. 2023 |
| 9. Recreation       | Oct. 2021 – May 2022   | 18. Misc. Assets      | Jun. 2023 – Jan. 2024 |

Asset Classes and Schedule.

## Transparency Act and MR&R Update

### Sita Egan

Supervisory Program Analyst, Asset Management Division

### Deborah Nicholson

Program Analyst, Asset Management Division

Reclamation produced its first [Asset Management Report to Congress](#) to comply with the John D. Dingell, Jr. Conservation, Management, and Recreation Act (Transparency Act) by preparing a list of all future repair needs, including information on the level of cost estimate, categorization of relative importance, and planned funding for each activity. The Fiscal Year (FY) 2020 Major Rehabilitation and Replacement (MR&R) update resulted in anticipated estimated MR&R needs of \$4.6 billion over the next 5 years and \$11.9 billion for 2,814 activities over the next 30 years (FY 2021-2050). The Deputy Director

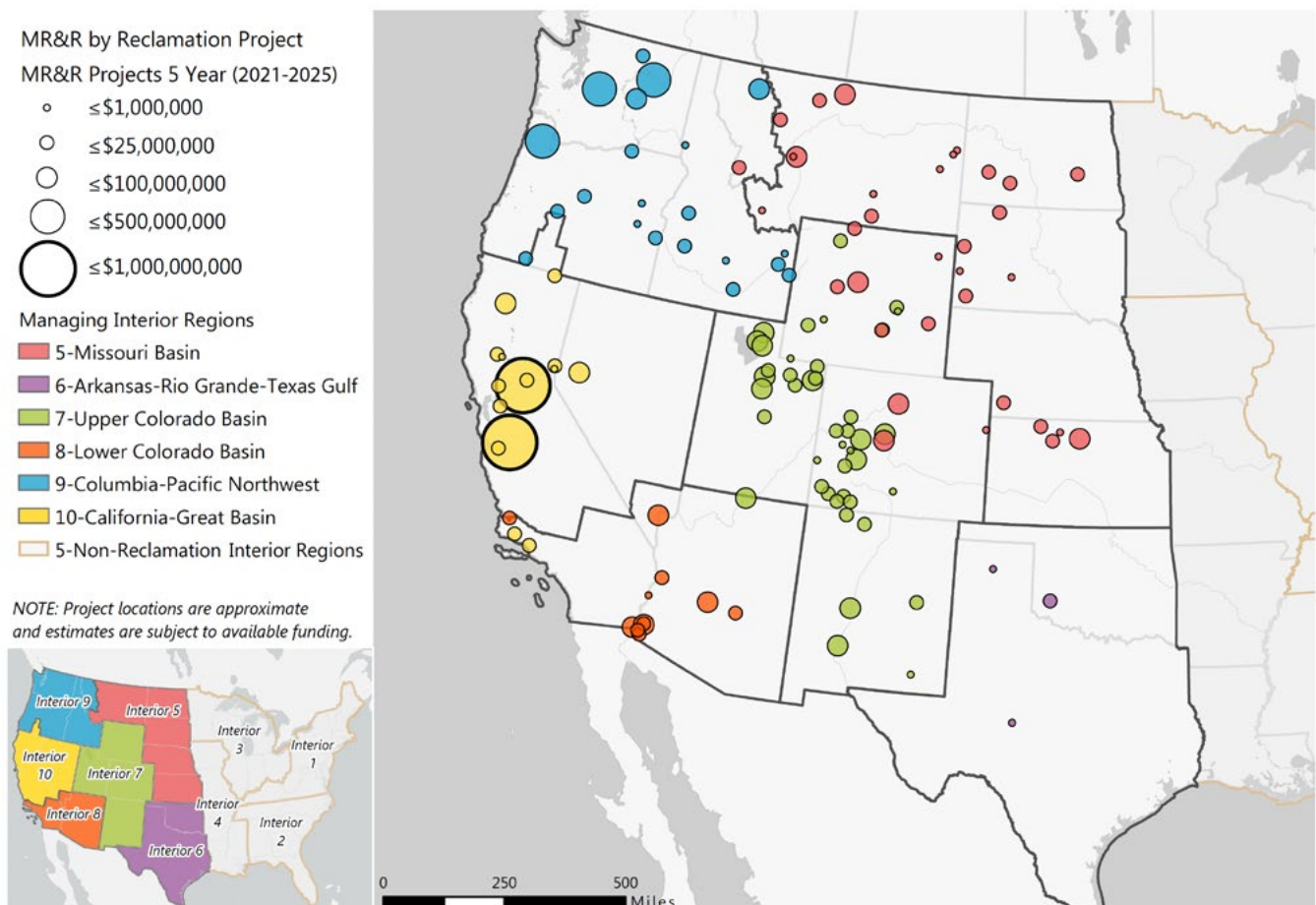
and Facilities Operation and Maintenance Team MR&R Task Force was formed to improve the annual collection and quality of MR&R data to enable full compliance with the Transparency Act. This collection effort resulted in an increase of \$1 billion and improved comprehensiveness of the data through evaluation of assets previously without identified MR&R. Additionally, the use of a centralized MR&R SharePoint solution, data visualization, and business analytics tools have streamlined data collection and increased the value and access of MR&R data across Reclamation.

## Transparency Act and MR&R Update (Continued)

To comply with the Transparency Act, Reclamation will be presenting a unified message to engage and encourage operating partners to begin providing all future repair needs for transferred works. Numerous tools are being created for Reclamation employees in the area and field offices to help explain why it is essential to identify, categorize, and report MR&R activities for Reclamation's facilities. This will require operating partners to enhance their planning, design, risk rating, and estimating practices to align with Reclamation practices. Improving these practices will further enhance Reclamation's reporting of MR&R activities and align with asset management strategies to maintain aging infrastructure and reduce risk.

Updating the MR&R catalogue to account for transferred works needs will enable Reclamation to continue safe, dependable, and reliable delivery of authorized project benefits throughout the western United States.

Reclamation will continue to improve the overall quality of asset management data over time to better inform decision making throughout Reclamation and meet the March 2023 Transparency Act reporting deadline.



Map showing number of currently reported MR&R activities in FY 2021-2025 on Reclamation assets.



# Federal Interagency Sedimentation Project

## Rob Hilldale

Hydraulic Engineer, Technical Service Center

Accurate knowledge of sediment characteristics and transport is critical to the mission of several Federal agencies to properly respond to the effects of sediment transport and deposition. Instrumentation, data acquisition, and analytical protocols capable of providing consistent, comparable, and accurate measures of selected sedimentary characteristics and sediment-related contaminants in the Nation's waters are the foundation of understanding and responding to these issues. Without consistently accurate tools, methods, and protocols used by all practitioners, sediment data are not meaningful.

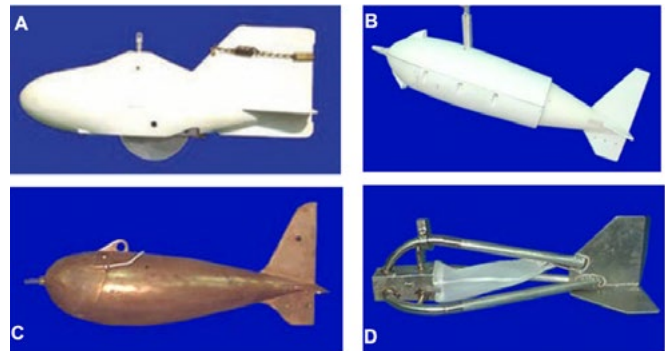
To achieve these goals, the Federal Interagency Sedimentation Project (FISP) developed and recommended a suite of physical sediment and water quality samplers beginning in 1940, along with proper procedures for their use. While these samplers are available to Federal agencies and the public, there is a need to collect more frequent and less costly sediment data.

Existing and emerging technologies and methods for indirect (surrogate) monitoring of fluvial (and, potentially, lacustrine, estuarine, and marine) sediment can provide much greater temporal and spatial data resolution with increased data quality at potentially lower costs. Use of new technologies for measuring or inferring selected fluvial-sediment characteristics and their potential use without sufficient testing and evaluation may lead to inconsistent, non-comparable, and unreliable data, as was the case before 1940. The cooperation of Federal agencies is needed to ensure the integrity of the nation's sediment data and effective responses to sediment-related issues.

The FISP committee meets at least twice annually to provide the latest policy, procedures, software, recommendations, and equipment to Federal agencies and the public that handle, collect, or use fluvial sediment data. In most years the FISP releases a call for ideas to fund contributions in areas of expertise needed by the FISP.

Current areas of work for this committee include: beam normalization for the SonTek M9, which will eliminate the need to re-calibrate a replacement device should the original device be replaced; testing the LISST-SL2 against a FISP standard instrument (P-6) to ensure agreement in particle size distribution and sediment concentration; and development of a new physical sampler to replace the P-6 that has improved actuators and can be manufactured using a 3D printer.

The FISP maintains a [website](#) hosted by the USGS. Reclamation's representative to the FISP committee is Rob Hilldale ([rhilldale@usbr.gov](mailto:rhilldale@usbr.gov)).



FISP sampling equipment for bed material (A: BM-54), integrated suspended sediment and water quality (B: D-96), suspended sediment in the water column (C: P-61), and bed load (D: BL-84).



Surrogate sediment sampling devices. A: LISST-SL2 and B: LISST-200X: laser devices for particle size and volumetric sediment concentration. C: LISST-AOBS: acoustic and optical device for suspended sediment concentrations. D: SonTek M9: acoustic Doppler current profiler for suspended sediment concentrations. (credit Sequoia Scientific (A-C), SonTex/Xylem (D))

# Q&A

## Russell Anderson

**Power O&M Program Analyst**  
Power Resources Office

After serving 20 years in the Navy and then another 20 in Reclamation's Power Resources, Russ Anderson is retiring (again). Here he discusses his travels over 40 years, the importance of consistent maintenance across facilities, and extra motivation for always working safely.

### **Can you provide a summary of your career before joining Reclamation?**

I grew up in a small town in Florida. When I graduated high school, I joined the Navy. Off to San Diego I went for Boot camp. My job was to repair propulsion plants systems on nuclear submarines. I received my classification as Journeyman Pipefitter and Nuclear Repairman. I ended up serving on four different repair ships, stationed at two Nuclear Power Training Units, and Service School Command. I traveled the world for the next 20 years, living in Scotland, Italy, Guam, Japan, South Carolina, and Virginia. Some positions I had were Nuclear Repair Coordinator, Weld Shop Supervisor, Service School Command Duty Officer, and Planning and Estimating Division Chief. I retired in 2001 as a Navy Chief and started my career with Reclamation.

### **Can you walk us through your time at Reclamation?**

I started as an apprentice mechanic at Palisades Powerplant in Idaho. Shortly after, I was hired on as a Hydropower mechanic before later becoming the Powerplant Supervisor II. In 2013, I applied for a position in the Power Resources Office.



For the next few years, I supported the Power Review Program and became involved in Hazardous Energy Control and Electrical Safety. I visited numerous Reclamation facilities performing PRO&M reviews and conducting training. That was probably my favorite part of my career. In 2016, I took a position as the Facility Manager at the Middle Snake Field Office, which included three powerplants and three dams. The crew there was amazing. The Operations Analyst position opened up in the Power Resources Office in 2018, so back to Denver.

### **How has the scope of work of power resources changed over 20 years?**

It's constantly changing to meet new demands and newer technologies. Our O&M programs run from the craft level up. While we can change policies – how we want to perform maintenance and improve infrastructure – we will always need men and women to do the work. Reporting to the administration on the work we do and how we plan to be sustainable for the future is probably the most difficult task the O&M program faces. We need to work within funding restraints as well as keep our O&M program progressive as infrastructure keeps aging.

## **What is the biggest lesson you've learned in the O&M community?**

To have good O&M at our facilities, people need to be aware of how to set up the maintenance program. Reclamation currently has hundreds of different facilities and there are hundreds of different ways of doing business. This has made it hard to gather and evaluate information that could help improve our overall O&M program. Maintenance is maintenance. Working on mechanical or electrical equipment at a power facility or a non-power facility should be the same maintenance.

## **What is a project that you're proud of?**

The Palisades Turbine Overhauls. We were updating and figuring out how to make the facility's electrical system safer. A lot of stuff there was early design, so I was involved with front-end planning – how we could get newer equipment in there. I was working with the crew from the Middle Snake Field Office – Black Canyon and watching the installation of the Microwave system. I'm proud to have been part of revamping our Hazardous Energy Control program and updating our Electrical Safety program.

## **Can you recall a memorable site visit?**

The first time I went to Grand Coulee and worked with the staff there. The place is almost overwhelming coming from a medium-sized facility. But after numerous visits, you realize that they are dealing with a lot of similar issues as everyone else, just on a bigger scale. And they have a very talented workforce there.

## **How would you describe the importance of Power Resources going forward?**

The most challenging part of PRO is trying to meet the demands on the office. There are deficiencies in programs that need to be addressed, but trying to change and implement them is challenging, even when you can provide Federal standards or show industry trends. The overall goals to support Reclamation programs and justify what Reclamation does to leadership are important. These help provide the backing for funding and sustainability.

## **Before you retire are there words of wisdom you'd like to share, particularly for employees just starting off their careers?**

Reclamation is a great place to work. There are a lot of opportunities. Our jobs have inherent dangers that we face every day working in power and water facilities. I used to show a video in Electrical Safety training that interviewed a guy involved in an arc flash explosion. His words stuck with me. Before you do anything unsafe, "think of your family." We all want to do our jobs the best we can and go home at the end of the day — alive and in one piece.

## **What are you most looking forward to with retirement?**

Well, retirement. I'm not going to be able to go fishing every day, I think. I have a couple of years of work on my new home to get it where I want it to be. And being able to visit my daughter more often. Just the stuff I haven't gotten to do much.





# Updates & Due Dates

## FY 2021 MR&R Update

Reclamation is starting the FY 2021 MR&R update, which will include improving repair needs identified at our transferred works facilities, in addition to our reserved works facilities. Over the next few months, transferred works outreach, recommendation review, and asset inventory analysis will take place to meet this year's reporting deadline of August 31, 2021. Please reach out to your regional MR&R coordinators if you have any questions!

MB/ART – Denis Kelsch

UCB – Chad Savage

LCB – Jay Nemeth

CPN – Russell Chatterton

CGB – Hubbert Booze

Dam Safety and Infrastructure – Sita Egan and Deborah Nicholson

## 2021 SECURE Water Act Report

Every five years, Reclamation submits a Report to Congress under the SECURE Water Act that analyzes projected risks to water supplies in the West using the best available science and highlights collaborative efforts to mitigate those risks. The recently completed Water Reliability in the West – 2021 SECURE Water Act Report provides a west-wide assessment of expected changes to water supplies, uses, and demands; highlights progress; and describes actions taken to increase water supply reliability since the 2016 SECURE Water Act Report. The Report to Congress and supporting technical documents can be found on Reclamation's website at: <https://www.usbr.gov/climate/secure>.

## Facility Reliability Ratings (FRR)

The regional scoring sheets for the FY 2021 FRR Measures will be due to AMD no later than September 30, 2021.



## FY 2024 Federal Lands Transportation Program (FLTP) Projects

On April 29, 2021, the Director of Dam Safety and Infrastructure requested via memo that proposals to be considered for FY 2024 FLTP funding be submitted by June 30, 2021. All proposals should be submitted by the regional transportation coordinators.

## TRMR-66, Operating Practices and Procedures for High and Significant Hazard Dams

[TRMR-66](#) was recently extended for one year, through May 2022. With the extension, AMD included a minor revision to update the requirements for submitting SOPs to AMD. The TRMR now requires that Reclamation offices transmit new SOPs and SOP revisions to AMD as complete documents in an electronic format.

## FAC 01-12, Canal Hazard Program

A minor revision to [FAC 01-12](#) was issued in February 2021. Most notably, use of the Asset Registry now replaces the Annual Regional Summary Report. Emergency action plan requirements and AMD contact information were also updated along with other minor changes.

## FAC 08-01, Landslide Surveillance Program

A minor revision to [FAC 08-01](#) was issued in May 2021 that changes the format of the Landslide Register from a compilation of spreadsheets to a comprehensive listing of landslide areas with descriptive data in a GIS database. The change will improve the collection and dissemination of data on landslide areas near Reclamation facilities.