

PlainsTalk

News from the Missouri Basin & Arkansas-Rio Grande-Texas Gulf Regions

Summer 2024

St. Mary Siphon Swift Response

- Photo contest open
- Fossils on Reclamation lands
- \$88.3M for St. Mary Diversion
- Spray drone testing with USDA
- Pole Hill repair success
- FEVS results



— BUREAU OF —
RECLAMATION



**Plains Talk
Summer 2024**

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Plains Talk encourages employee submissions, and assists with developing ideas. Questions about stories or photographic essays should be directed to the Plains Talk editor at (406) 247-7608.

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Back Cover
Back in Reclamation history

Cover: Drone photo of St. Mary siphon failure near Babb, Montana.
Photo by Stephen Kroeker

This page: Train at dawn in northern Montana.
Photo by Tinh Nguyen



The main focus of Reclamation’s water projects is to **provide water and hydropower energy** for agriculture and municipalities. But a multipurpose approach makes **recreation a significant benefit** for the American public.

Reclamation projects cover approximately **6.5 million acres of land and water**, most of which is available for public outdoor recreation.

Reclamation’s recreation areas are **among the nation’s most popular for water-based outdoor activities**. These areas often feature natural and cultural resources, educational opportunities, and interpretive programs.

Twelve Reclamation water projects have been designated as National Recreation Areas, managed by the National Park Service or the USDA Forest Service. These areas offer activities like **camping, hiking, fishing, and wildlife viewing**.

Reclamation projects have created **eleven national wildlife refuges**, providing habitat for diverse wildlife species. Visitors can enjoy activities such as **photography, hiking, and birdwatching**.

Reclamation **collaborates with local communities** to attract recreation-related investments and **involve citizens in decision-making**. This ensures that recreation developments meet public needs and expectations.

Most recreation areas and facilities open to the public **do not require use permits**. However, certain activities may need authorization from Reclamation.

RECREATION BY THE NUMBERS

Missouri Basin & Arkansas-Rio Grande-Texas Gulf Region

- 107 recreation and wildlife management areas
- 524 recreation sites (campgrounds, day use areas with facilities, etc.)
- 665,674 acres of land and water recreation
- 14 million visits annually

Reclamation wide:

- 289 Reclamation project areas that have developed recreation facilities and opportunities available for public use.
- 187 developed recreation areas with:
 - 115 concessionaires
 - 549 campgrounds
 - 454 boat launch ramps
 - 5500 miles of shoreline
 - 12,000 recreation vehicle/trailer sites, including over 5700 with hookups
- 6.5 million acres of land and water, most of which is available for public outdoor recreation
- 24 million visits annually
- 500 designated day use areas with picnic sites and shade shelters



Electric bike policies on Bureau of Reclamation lands have evolved to accommodate these eco-friendly modes of transportation.

Secretarial Order 3376: This order, signed in August 2019, aims to increase recreational opportunities through e-bike use on federal lands managed by the Department of the Interior. It simplifies and unifies e-bike regulations across Interior-managed lands, including Reclamation areas.

Definition of E-Bikes: E-bikes are two- or three-wheeled cycles with fully operable pedals and an electric motor of less than 750 watts (1 h.p.) that provides propulsion assistance.

Where E-Bikes Are Allowed: E-bikes are allowed where non-motorized bicycles are permitted. If traditional bicycles are allowed in a location, e-bikes may also be used there.

Types of E-Bikes: The policy does not distinguish between different classes of e-bikes (e.g., Class 1, 2, or 3). It includes all types of e-bikes, including electric mountain bikes.

Restrictions: E-bikes are not allowed where traditional bicycles are prohibited. They must adhere to the same rules as non-motorized bicycles.

Remember, always check local signage and guidelines when riding e-bikes on Reclamation lands!



2024



Submit your best qualifying images through Friday, October 4

PHOTO CONTEST

Open for entries!



The annual Missouri Basin photo contest is open for submission of entries! Each year, employees enter an outstanding collection of imagery showcasing our region’s natural beauty, team members, wildlife, infrastructure, and worksites.

All Missouri Basin employees are encouraged to submit their best qualifying photos through Friday, October 4 for a chance to be featured in the 2024 Missouri Basin Calendar, Reclamation social media sites, and other print and digital products.

To enter, upload your photo and caption at <https://intra.gp.usbr.gov/tmp/exif.htm>.

IMAGES: Please provide the highest resolution image you have. Basic editing is fine, as long as it does not affect the authenticity of the photo.

CAPTION: All photos must include an informative caption. Photographer name and caption must be filled out to be eligible.

SUBJECT: All photos must be taken within Missouri Basin Region. As many of us continue to telework, photos taken in your home and neighborhood are welcome.

NUMBER OF ENTRIES: There is no limit to the number of photos you can enter. However, Public Affairs staff may limit the number of images put up for voting based on quality.

DEADLINE: All photos are due by Friday, October 4.

QUESTIONS: Contact Darryl Asher at dasher@usbr.gov or (406) 247-7608.



SWIFT RESPONSE

by Nicholas Nohalty

The St. Mary Canal Siphon, located near Babb, Montana, suffered a catastrophic failure on Monday, June 17, 2024, requiring Reclamation to stop water diversion to the St. Mary Canal. The St. Mary Canal is a vital component of the Milk River Project, providing 60% to 80% of the water for irrigation and potable uses in northern Montana through a trans-basin diversion from the Hudson Bay watershed to the Missouri River basin.

The incident primarily impacted residents and Blackfeet tribal land. Hooks Hideaway, a facility in close proximity to the breach, has been affected, and livestock have been successfully relocated from the site. No injuries have been reported.

The St. Mary Canal Siphon consists of two 90-inch riveted steel barrels that traverse the valley from the inlet, transition to an 84-inch diameter pipe at the river crossing, and then back to a 90-inch diameter pipe as they ascend the valley slope to the outlet. It was constructed in two phases, with the downstream barrel completed between 1912 and 1915 and the upstream barrel after 1925.

The siphon has undergone extensive repairs over

time due to seepage, corrosion, and buckling. A cathodic protection system was installed in the 1950s to address these problems. However, unstable valley sidewalls have caused further movement of the steel barrels and concrete supports, leading to additional damage.

A technical team comprising Reclamation, Milk River Joint Board of Control, the Blackfeet Tribe, the Department of Agriculture's Natural Resources Conservation Service, and the Bureau of Indian Affairs was set up after the breach and met on site to assess the condition of the siphon and to explore repair solutions and alternatives shortly after the site was secured. The

team determined that pursuing a partial restoration of service to the St. Mary Canal Siphon would serve to slow progress toward the needed complete replacement of the siphon and is therefore not advisable.

"Reclamation is committed to this community and are grateful for the partnership from the Joint Board, the Blackfeet Nation, the state of Montana, and the Montana Congressional delegation as we move expeditiously," said Reclamation Commissioner Camille Calimlim Touton. (Continued)

“Reclamation has authorized an emergency extraordinary maintenance determination in order to quickly respond to urgent infrastructure needs at St. Mary Canal.”

-Commissioner Camille Calimlim Touton



Commissioner Touton and Missouri Basin Regional Director Brent Esplin observe the damaged St. Mary canal failure site. (Photo courtesy of MTAO)



June 17, 2024 – St. Mary Canal Siphon Failure. Approximately 8:45 a.m.

June 18, 2024 – Failure is still actively spilling, water is going back into Milk River, significant erosion of the earth around and below the siphons has occurred. Crews awaiting drying out of area around siphons before assessments/work can be performed.

June 19, 2024 – Water flow has ceased, and assessments of damage can begin.

June 24, 2024 – Reclamation, US Fish and Wildlife Service, technical engineering team conduct initial assessment of the damage.

June 25, 2024 – Technical team, Blackfeet Environmental Office, Blackfeet THPO, State of Montana Director of Tribal Affairs, Blackfeet Fish and Game, NRCS, BIA meet to discuss impact and solutions.

June 28, 2024 – Commissioner visit to the site.

July 9, 2024 – Reclamation and MRJBOC host a town hall meeting in Malta to discuss the temporary solutions, upcoming water deliveries, water demands and the next steps moving forward.



Montana Area Office Operations and Maintenance Manager Chris Gomer walks the site of the St. Mary siphon canal failure during the Technical Team assessment to determine total damage and steps moving forward. (Photo courtesy of MTAO)

(Continued from previous page)

“Reclamation has authorized an emergency extraordinary maintenance determination in order to quickly respond to urgent infrastructure needs at St. Mary Canal. This mechanism allows us not only to expedite essential repairs to the St. Mary Canal Siphon, but also the Halls Coulee Siphon, which is also at risk of failure, in addition to our work to rebuild the St. Mary headgates and Fresno Reservoir. We will continue to work in close collaboration with our partners to support this community and our water delivery needs to the area.”

“Due to the time and costs associated with a temporary solution that would deliver only a fraction of normal diversions, Reclamation has decided to focus all efforts on complete replacement of the St. Mary Canal Siphon and Halls Coulee siphon as expeditiously as possible,” said Ryan Newman, Reclamation’s Montana Area Office manager.



Commissioner Touton visits the St. Mary Canal siphon failure site to observe the damage. (Photo courtesy of MTAO)

Reclamation and the project beneficiaries will share the total cost for replacement of both sets of siphons, currently estimated at approximately \$70 million. Reclamation secured initial federal funding to begin site remediation activities, and the state of Montana made available approximately \$32 million for the Milk River Joint Board of Control to begin work on the siphon replacement.

As part of a planned replacement project, Reclamation and the Milk River Joint Board of Control initiated designs for replacement of the



Montana Area Office Project Manager Steve Darlinton speaks with key invested parties at the St. Mary Canal siphon failure site. (Photo courtesy of MTAO)

siphons in early 2023 with HDR Engineering, Inc. leading the design.

“Having designs started, even at 30% to 60% design stage, will allow the project to move forward in an expedited fashion,” said Jennifer Patrick, Milk River Joint Board of Control’s project manager. “We still expect replacement to take into late summer or early fall of next year. Continued collaboration with Reclamation, the state of Montana, the Blackfeet Nation and a host of other agencies is critical as we all work towards returning this key piece of infrastructure to service.”



Commissioner Touton and Missouri Basin Regional Director Brent Esplin speak with Blackfeet Tribal Business Council Chairman Scott Kipp and other affiliates at the damaged St. Mary canal failure site. (Photo courtesy of MTAO)



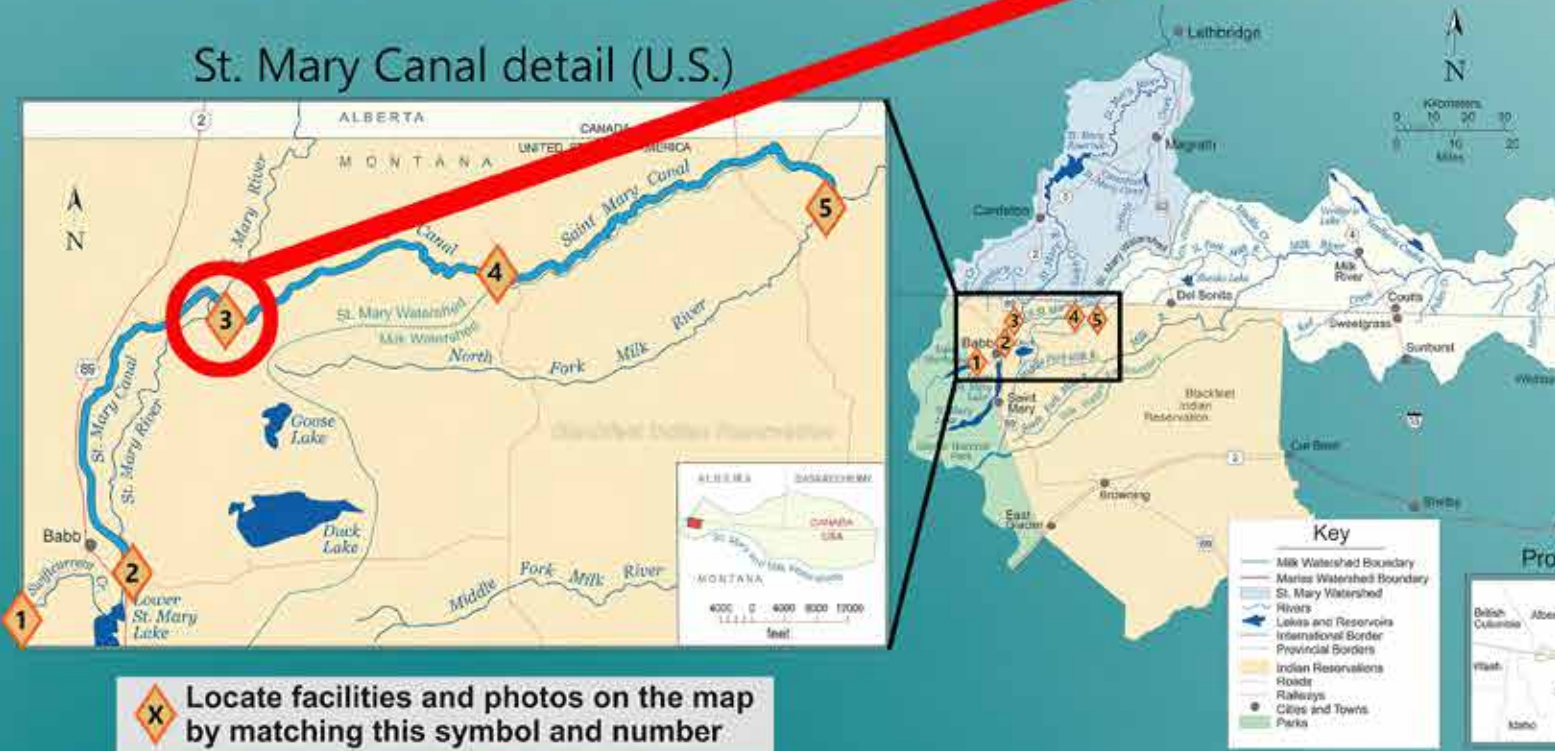
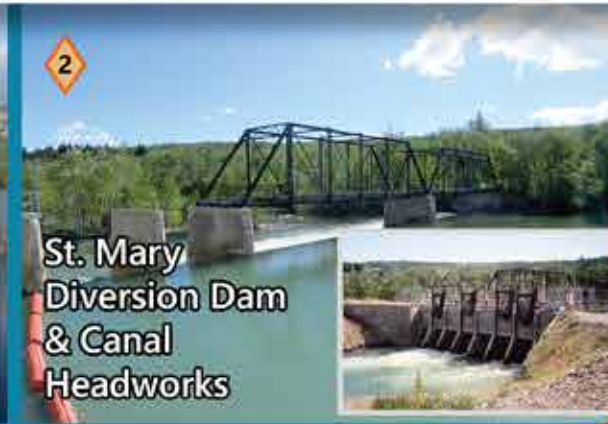
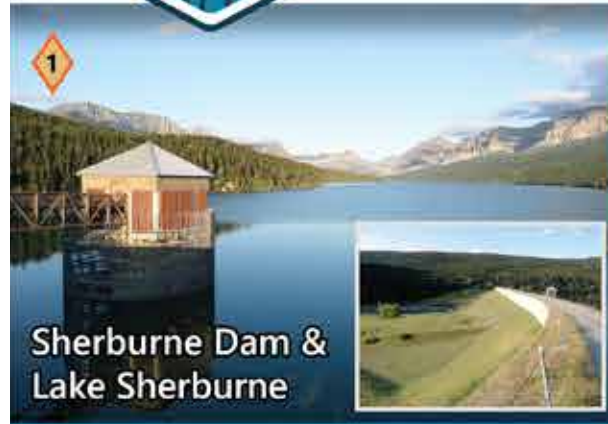
Left to right: Missouri Basin Region Deputy Regional Director Chris Wright, Montana Area Office Manager Ryan Newman, Commissioner Camille Calimlim Touton, and Dam Operator Tom Gervais inspect the site of a damaged pipeline. (Photo courtesy of MTAO)





BUREAU OF RECLAMATION

The St. Mary Supply System and the Greater Milk River Project

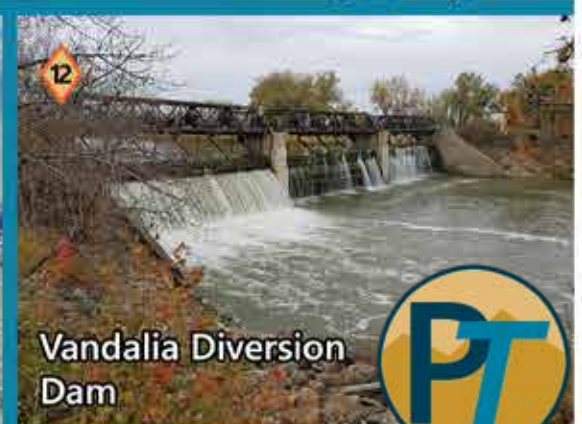
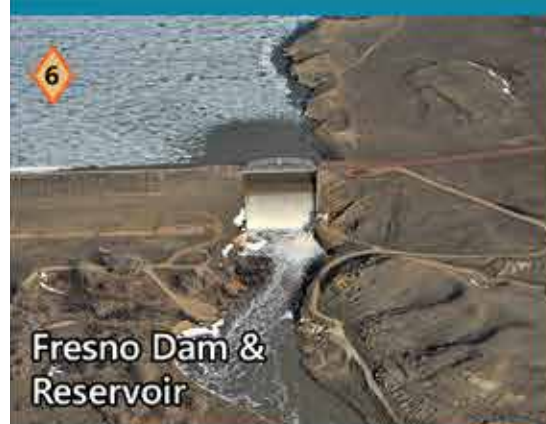


The siphon is a critical component of the St. Mary Project, conveying water by lifting it over a small hill, allowing the water to flow downhill to supply irrigation canals.

The St. Mary Project is a water storage and management project located in Montana, authorized in 1914 as part of the larger Milk River Project. The St. Mary Project provides water for irrigation in northeastern Montana, while also generating hydroelectric power and supporting wildlife and recreation activities. Construction of the St. Mary Diversion Dam began in 1916 and was completed in 1919. The dam diverts water from the St. Mary River into a system of canals that supply water to irrigate over 100,000 acres of farmland. The project includes two reservoirs, Upper St. Mary Lake and Lower St. Mary Lake, used for water storage.

The St. Mary Project has been modified and updated over the years to address issues such as water quality, fish habitat, and irrigation efficiency.

Locate facilities and photos on the map by matching this symbol and number



Fossil Discoveries

on Reclamation managed lands

By Dr. John B. Scannella, John R. Horner Curator of Paleontology
Museum of the Rockies, Montana State University

As water flows across the American west, it can wear away surrounding sediments and create beautiful exposures of the underlying rocks. In many regions, these rocks may be fossiliferous, containing the preserved remains of ancient life. The Bureau of Reclamation manages thousands of miles of these waterways and surrounding lands. Over the years, spectacular fossil discoveries have come to light.

The type of discovery depends on the age of the rock. If the rocks were formed during the Mesozoic Era (about 252 to 66 million years ago), they may contain the fossils of ancient dinosaurs. Sometimes dinosaur bones are found eroding from the banks of river channels. Many dinosaur discoveries have been made on Reclamation lands, including not only large bones but also eggs and even tiny dinosaur embryos. These fossils can help us to learn how these animals grew and behaved.

Near the Canyon Ferry Reservoir in Montana, the rocks are too young to find the bones of giant dinosaurs. Instead, they preserve an incredible fossil deposit that reveals a 30-million-year-old ecosystem. Hundreds of fossils of ancient insects, so beautifully preserved that you can see the detailed patterns on their tiny wings, have been recovered. The area also preserves leaves and seeds of ancient plants and even the delicate feathers of birds that once flew overhead. These Reclamation fossil localities provide windows onto the ancient world and allow us to see

what life was like on our planet long ago and how it has changed over time.

Collecting fossils on Reclamation lands requires permits and permissions. Many of these fossils are repositied in museum collections, like the Paleontology Collection at Museum of the Rockies in Bozeman, Montana. Museums protect and care for these fossils so that they remain available for research, ensuring that we can continue to learn new things from them. Research is ongoing and new discoveries are made all the time. Right now, water and wind are exposing fossils that have been buried for millions of years. Time will tell what surprising discoveries are being uncovered!



State archaeologist, Marielka Arksey, recovering a portion of the Marquette Mammoth, found on the bottom of the Buffalo Bill Reservoir in April, 2018. Photo by Mark Davis



Reclamation collections include holotypes, single type specimens upon which the description and name of a new species is based. These specimens are stored in designated "Type Rooms" due to their importance and value to the scientific community.



Extinct echinoderm sample stored in the Holotype room at the University of Texas at Austin, Jackson School of Geoscience, Non-vertebrate Paleontology Lab.

Echinoderms are recognizable by their five-pointed radial symmetry. The first definitive echinoderms appeared near the start of the Cambrian.



Reclamation specimens being processed at the University of Wyoming's Department of Geology and Geophysics.



The Missouri Basin Museum Program

Lisa Rannallo
Regional Staff Coordinator,
Environmental and Cultural Resources

The MB Museum Program manages archaeology, paleontology, and NAGPRA collections excavated from reclamation lands, permitted under the Paleontological Resources Preservation Act of 2009, Archaeological Resources Protection Act of 1979, and the Antiquities Act of 1906.

Missouri Basin has the largest collection within Reclamation, managing thirty-three repositories located across the nine-state region, accessible to researchers, students, and the public:

- 7- University Museums
- 2 -College Museums
- 5- State Historical Society and Research Centers
- 8- University Repositories
- 1-College Repository
- 6- Nature, Science, or Natural History Museums
- 4- DOI facilities

The Marquette Mammoth

The remains of a mammoth, consisting of the vertebral column, ribs and other parts of the skeleton, including mammoth teeth, surfaced at the bottom of the Buffalo Bill Reservoir in 2018 while being drained in preparation for high water. Tagged the Marquette Mammoth, because both the historic town and the ancient animal had been submerged in the same place, it is most likely much older than 14,000 years- the dividing line between archaeology and paleontology.

WYAO BRING YOUR KIDS TO WORK DAY

Story and photos by Hailey Glarrow, WYAO

On April 25th the Wyoming Area Office hosted Bring Your Kids to Work Day where the kids learned about hydropower, dams, and how awesome Reclamation is. First, Deputy Area Manager Christina Davis-Kernan introduced herself and welcomed the attendees and gave an overview of Reclamation's mission.



Next on the agenda was a tour of the Casper Control Center lead by supervisor Kathy Juarez-Woodruff. Flashlights were provided while they learned about the power Reclamation provides and what would happen without our facilities. Ashraf Alshemary, an electrical engineer, and Alex Ticknor, Engineering Supervisor, supplied electric motor models for each child to build and learn about the fundamentals of electricity, magnetism, and mechanical motion.

Billy Bright, North Platte Basin Facility Manager, demonstrated how a Pelton wheel extracts energy from moving water to generate power. Last but not least, Regis Michelena, civil engineer, taught the kids the importance of dam safety using water and sand, then allowed the kids to shape their own dam.

The event gave parents the opportunity to showcase their workplace while the kids got a glimpse of a professional work environment and learned about the career opportunities that may lie ahead if they choose to follow their parents' path in a career with Reclamation.



Fireworks light up the sky

while red, white and blue lights illuminate Colorado's Estes Powerplant on Independence Day 2024.

Photos by Ronnie Rogers, Powerplant Supervisor



CROSSWORD SOLUTION

BATHTUB			V	
MAMMOTH	U	PESTICIDES		
	F	E	W	P
MAINTENANCE				
O	L	FOSSILS	J	E
SI	ECHINODERM	I	H	E
PILOT	A	B	IRRIGATION	H
HON	G	L		E
PELTON	R		REPLACEMENTS	A
RE			H	D
N			EXTRAORDINARY	R
REC			WORK	W
UN			D	R
W			K	K
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E	BL	ADDITI	ONS	M
	AC	EM		P
	E	PL		O
ELECTRICBIKE	F	LO		W
ION	N	E		E
	GL	EL		INTRIN
	E	LD		ERIC
	T	E		AN
				SURVEY



\$88.3 Million

CONSTRUCTION AWARD

The St. Mary Diversion Dam Replacement project has been awarded to NW Construction Inc., which is based in Bozeman, Montana. This \$88.3 million project aims to provide a reliable water source for the Milk River water users while also protecting the bull trout population.

Reclamation is partnering with several invested parties including: the Blackfeet Nation, U.S. Fish and Wildlife Service, Milk River Irrigation Joint Board, six municipalities, and more than 150 pumpers along the Milk River. This collaboration ensures that all voices are heard and considered in the project's development and implementation.

“Water transferred by the St. Mary Canal is the lifeblood of the communities along the Milk River Project. Its benefits ripple out, touching every aspect of life in our region, from agriculture to health, from economy to environment.”
-Ryan Newman, MTAO Area Manager

The existing dam, completed in 1915, diverts water from the St. Mary River into the St. Mary Canal through a gated headworks structure.

The main features of the dam replacement will include a low-head diversion dam and rock ramp for upstream passage, a new headworks structure, a canal fish screen, a check structure downstream of the fish screen, a fish bypass to return fish to the river, O&M and control buildings, and auxiliary features. The project is funded by the Bipartisan Infrastructure Law and is expected to start construction in July 2024 and conclude in 2027.

Compliance with the Endangered Species Act is a key priority for this project. The bull trout, a species native to the St. Mary River, has been significantly affected by the existing diversion dam. The man-made barrier has severely limited fish passage and disrupted migration patterns, posing a threat to the bull trout population. The St. Mary Diversion Dam Replacement project is designed to address this issue and ensure the long-term survival of the bull trout.



Did you know?



The Bull Trout was listed as a threatened species under the Endangered Species Act in 1999, reflecting concerns about its declining populations.



Because of their specific habitat requirements, Bull Trout are considered an indicator species. Their presence or absence can reflect the overall health of the aquatic ecosystem.



Bull Trout exhibit migratory behavior, moving between lakes, rivers, and streams for spawning, feeding, and overwintering. Some populations are entirely riverine, while others migrate to larger bodies of water.



Bull Trout can live for up to 12 years, which is relatively long for a freshwater fish. This long lifespan allows them to grow to substantial sizes, sometimes exceeding 20 pounds.



Bull Trout typically spawn in the fall, and their spawning habitats are characterized by clean gravel beds in cold headwater streams. They often return to the same spawning sites year after year.



2023 MB&ART Federal Employee Viewpoint Survey Results

**Participation
Rate 72%**

**Cumulative Positive
Responses 72%**



**Intrinsic Work
Experience
78% Positive**

**Performance
Confidence
87% Positive**

The FEVS provides valuable feedback on how leadership can improve on addressing the needs of a results-driven and high-achieving organization. We have and will continue to use the results of the FEVS to benchmark our successes and to implement workplace improvements.

-Commissioner Camille Calimlim Touton

Full results at <https://intra.gp.usbr.gov/takeaction/index.html>



SERENITY NOW!

After upgrades, Green Mountain Powerplant returns to a place of relative solitude

By Anna Perea, ECAO

For the last 20 months, the usually quiet parking lot at Green Mountain Dam and Powerplant has been filled with trucks, contractors, port-a-potties, and equipment. But with penstock upgrades completed and protective relays replaced, May ended with the (comparative) calm of Units 1 and 2 generating hydropower.

"I'd like to give credit to all the parties involved—Regional Construction and Safety Services, TSC, and ECAO support staff. It's just been a monumental achievement and I'm really grateful," said Travis Kummer, Plant Manager at Green Mountain.

The penstock rehabilitation project involved relining and recoating both penstocks and replacing the old bypass tube valves with new jet flow gates. The penstocks were blasted and then relined with Vinyl-Type Impacted Immersion Coating. This new coating system will provide better protection for the penstocks and extend the useful service life.

The plant's original 82-year-old bypass tube valves were replaced with new jet flow gates. This upgrade will offer a much higher outflow resolution with greater supervisory control due to added flow meters on each penstock and added PLC control scheme.

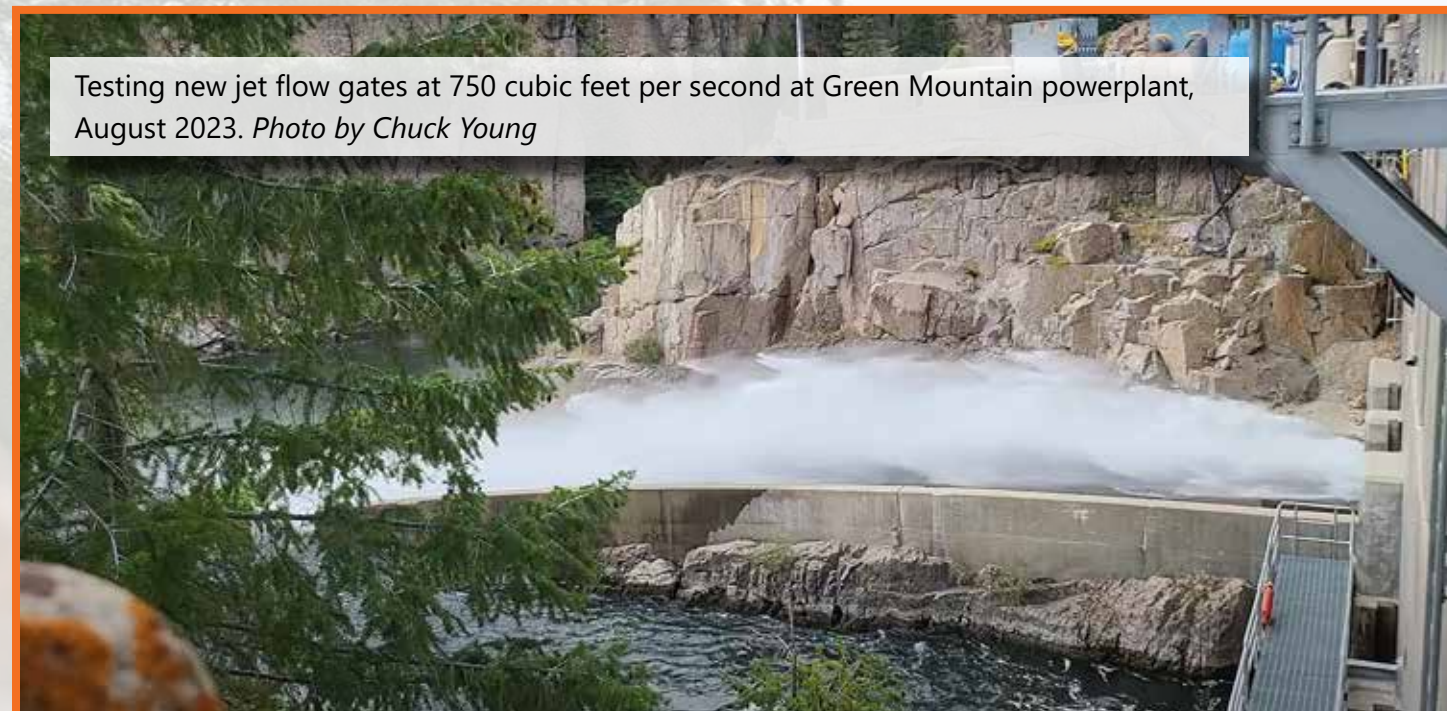


Plant manager Travis Kummer and MB Regional Director Brent Esplin admire one of the two new jet flow gates at Green Mountain Powerplant. Photo by Anna Perea

In addition to the penstock upgrades, Green Mountain received an upgrade to the plant's protective relays and synchronizer. These upgrades "Provide enhanced generator protection, improved synchronization with the grid and simplified troubleshooting," said Tim Furman, electrical engineer on the Colorado-Big Thompson project.



Bottom view of new jet flow gate. Photo by Chuck Young



Testing new jet flow gates at 750 cubic feet per second at Green Mountain powerplant, August 2023. Photo by Chuck Young



C-BT Project in **POLE POSITION** after unplanned winter outage



By Anna Perea, ECAO

On December 11, 2023, Eastern Colorado Area Office and Regional staff discovered that a basin, or “bathtub,” in the Pole Hill Powerplant afterbay had shifted and separated from the siphon—effectively stopping water movement and power generation on the eastern arm of the Colorado-Big Thompson project.



The basin in the afterbay showing signs of uplift prior to repair. *Photo by Travis Bauer.*

Engineers from ECAO and the Technical Service Center, led by ECAO Project Manager Tom Hastings, immediately began investigating the extent of the movement and possible fixes. Simultaneously, Jessica Busman and Monte Baird, headed by David Bryan, jumped in to begin the contracting process.

TSC completed repair plans and recommendations in mid-January with guidance from Kylie Pelzer and Brandon Jackson. Work began immediately after the repair contract was complete.

“The basis for our success was teamwork,” said Busman, of the project.

To repair the basin, the concrete in the afterbay required stabilization. This included grouting the voids under the basin with 90 yards of material, then overlaying the basin with cast-in-place concrete to increase its weight and prevent future uplift. Finally, the siphon and joint would require cleaning and grouting. Repairs were expected to take roughly two months, leaving the eastern arm of the C-BT power and conveyance system under clearance until April 1.

While the repair process marched forward, water schedulers needed a plan for moving water to East Slope storage at Horsetooth Reservoir. On March 5, ECAO’s water schedulers, led by James VanShaar, slowly began releasing water from Olympus Dam in Estes Park directly to the Big Thompson River, below.

The team began slowly—aware that ice jams could potentially form in the wintry canyon—but eventually increased flows to as high as 440 cubic feet per second in the following days. During the initial releases, crews from Flatiron and Estes Powerplant and Northern Water kept watch over the canyon’s many bridges and culverts to make sure that no ice jams formed. A mile upstream of the canyon mouth, the Flatiron crew diverted water at Dille Diversion Dam and sent it north to Horsetooth Reservoir.

ECAO Area Manager, Jeff Rieker expressed his admiration for everyone involved in this project by stating, “This repair process—from design to contracting to project and construction management—went more quickly than anything I’ve seen in my history with Reclamation. Our water scheduling and O&M teams worked masterfully to avoid water supply impacts. We are extremely grateful for everyone involved who made this a success.”

The Colorado-Big Thompson Project, like many Reclamation projects, is an 80-year-old project that periodically requires repairs and upgrades. While most of these efforts can be scheduled to avoid disruption, preparing and managing unexpected outages may become an increasingly important task, agency wide.

The success of the project, said Tom Hastings, “Can be attributed to effective leadership and collaboration, out-of-the-box thinking and a lot of individual perseverance. And maybe some luck too.”



Post-repair, water enters Rattlesnake Siphon through the Pole Hill afterbay. *Photos by Anna Perea*



Operators sent releases from Olympus Dam in Estes Park down the Big Thompson Canyon for diversion downstream and storage in Horsetooth Reservoir. *Photo by Jeff Cross.*



Grout plant setup on the afterbay dam. The plant operator stays in radio and visual contact with the nozzleman working in the outlet structure to contact grout below the existing slab. *Photo by Tom Hastings.*



Uplift from the basin cracked the siphon connection. *Photos by Travis Bauer.*



Commissioner Touton, Dick LaFond and MB Regional Director Esplin award the team for their success. Left to right: Brent Esplin, Jessica Busman, Tom Hastings, David Bryan, Kylie Pelzer, Andy Marner, Brandon Jackson, Camille Calimlim Touton, Dick LaFond. *Photo by Dominic Jackson*

From DEVASTATION to RESILIENCE

A history of Glen Elder Dam

By Frank Sanchez

In the aftermath of devastating 1951 floods that wreaked havoc across Kansas and Missouri, a monumental project emerged: the Glen Elder Dam. More than just a structure to tame the raging waters, it was designed to nurture life through flood control and irrigation for the entire region.

The Great Flood of 1951 began above Manhattan, Kansas on the Big Blue River, where relentless rains triggered a cascade of destruction. Over 7,000 buildings were damaged or destroyed in Topeka alone. Roads vanished, railroad tracks shifted, and communication lines snapped. The impact rippled through 116 cities and towns, displacing 85,000 people from their homes. Nearly 2,500 residences were obliterated, and 336 businesses lay in ruins. Tragically, 28 lives were lost, and over a million acres were submerged.

Amidst this devastation, hope emerged. The Pick-Sloan Missouri Basin Program approved the Glen Elder Dam. Located in north-central Kansas, it was more than a concrete structure; it symbolized rebirth. Constructed in the mid-twentieth century, the dam aimed to prevent extreme flooding in the Missouri River Basin.

Fast forward to 2022: The Glen Elder Dam Spillway Chute Replacement project is now in progress. Ames Construction Inc. was awarded a \$41.2 million contract for the project, with \$14 million in funding from President Biden's Bipartisan Infrastructure Law.

The work to enhance the dam's concrete spillway began in early 2022 with completion estimated in 2025. The goal is to ensure the dam's continued protection and regional benefits. Aging concrete, drainage materials, and pipes were removed, while rock excavation reshaped the landscape.

“Glen Elder Dam is critical to protecting the way of life in the surrounding communities”
-Nebraska-Kansas Area Manager Aaron Thompson

As part of the repair efforts, engineers evaluated a novel concrete shrinkage-reducing additive. This innovation aimed to prevent shrinkage cracking in the repair materials used for the approach apron.

“Glen Elder Dam is critical to protecting the way of life in the surrounding communities,” said Nebraska-Kansas Area Manager Aaron Thompson. “The main purpose of the dam is flood control; and we want to continue to safeguard these communities from potential disaster from Solomon River flooding for years to come.”

As part of the project, Reclamation geologists meticulously mapped and inspected the dam's foundation rocks consisting of Greenhorn Limestone and Graneros Shale. Fractures and slip planes were documented, ensuring the dam's integrity for generations. The end result is slated to be a state-of-the-art concrete spillway slab poised to withstand nature's ferocity.



Reclamation geologists map exposed foundation rock. The foundation must be mapped and approved by geologists in order to identify any geologic features that could affect the performance of the new structure and may require mitigation. Examples would be faults or fractures, loose blocks of material, sharp overhangs and bentonite seams.



Contract employees from Harrison Western immediately apply shotcrete to approved foundation rock to protect the foundation before placing a sand and gravel filter. Certain rock types such as pictured here can deteriorate or slake upon exposure to the elements.



Contractor aligns casing and prepares to drill borehole for anchor bar for new spillway slab. Rock anchors are steel bars that are set into boreholes and grouted, providing a solid connection to the foundation for the new spillway slab.



Contractors place a mud mat over properly graded sand and gravel filter material prior to installing the anchor bar. The sand and gravel filter underlies the spillway slab and is a critical feature of any spillway. A properly designed and installed filter prevents failures from occurring and can be used as a warning system if fine grain material is seen exiting the filter.



The **WATER JAMBOREE** *Bringing Water Education to Life*
 A Splash of Learning and Fun

By Frank Sanchez

Bureau of Reclamation staff and their fellow federal partners converged for this year's Water Jamboree, held in the heart of the Tri-Basin Natural Resources District and Lower Republican Resources District. The jamboree is more than just a day of fun—it's a unique educational experience that leaves a lasting impact on local fifth and sixth grade students.

This year's Water Jamboree, held on April 23rd and 24th, saw nearly 400 enthusiastic students and 140 dedicated adult volunteers come together. With schools from Phelps, Gosper, Harlan, Franklin, Kearney, and Furnas Counties in Nebraska, as well as north central Kansas (including the cities of Phillipsburg, Norton, and Kensington), the Water Jamboree brings together young minds to explore the wonders of water.

Students dive headfirst into a variety of activities related to water. From understanding aquatic ecosystems to exploring recreational uses, they gain insights into the vital role water plays in our lives. They got an up close and personal with aquatic creatures, learning about their habitats, behaviors, and importance in maintaining a healthy ecosystem. Through hands-on experiments students discovered how water quality affects both humans and wildlife. They learn about pollution sources, filtration methods, and the impact of clean water on our environment.

The Water Jamboree isn't just about the present—it's also about the past. Students explore the historical significance of water, from ancient civilizations to modern infrastructure. Participants explore the relationship between plants and water, understanding how vegetation contributes to water quality and conservation. Students learn about the benefits on how dams impact water flow, irrigation, and flood control.

Nebraska Extension and Post Rock Extension provided valuable resources and expertise to enhance the learning experience. Natural Resources Conservation Service shared insights on soil health, conservation practices, and watershed management. The U.S. Army Corps of Engineers shared their expertise in dam construction and management which added depth to the event.

The Water Jamboree wouldn't be possible without the joint efforts of several organizations. As stewards of water resources, Reclamation contributed to the Water Jamboree's success along with their partners Tri-Basin NRD. Leading the charge in water conservation and education, the Tri-Basin NRD plays a pivotal role in organizing the event.

As the Water Jamboree concluded, students left with a newfound appreciation for water, armed with knowledge to protect this precious resource. This yearly event gives students a reminder that water connects us all, and it's our responsibility to safeguard it for generations to come.



NKAO's Catherine Griffin demonstrates dam and hydropower operations with a working scale model.

Making Waves at the 31st Annual Water Jamboree

This year's Water Jamboree saw nearly 400 enthusiastic students and 140 dedicated adult volunteers come together. Their curiosity, energy, and passion for water conservation created ripples of change that will extend far beyond the event.



Spray drone testing *with the* **USDA's Agricultural Research Service**

The Bureau of Reclamation's Missouri Basin Regional Office has been collaborating with the U.S. Department of Agriculture's Agricultural Research Service (ARS) in College Station, TX to test the effectiveness of using an uncrewed aerial system (UAS), commonly called a drone, for applying liquid herbicides to treat weeds and undesirable vegetation on dams. Earthen dams present multiple challenges to effective vegetation management, including steep slopes, unstable footing on rip rap-covered slopes, and large areas requiring treatment. The goal of this interagency collaboration is to identify, test, and validate new techniques for killing weeds that is faster, safer, and cheaper.

Traditional methods of spraying an earthen dam consist of either a team of people spraying pesticides using a vehicle-mounted tank and pump attached to a long spray hose, or the use of a backpack sprayer. Spraying with a hose provides increased application range but may still require the operator to navigate steep slopes to reach areas that need to be sprayed. Additionally, the hose can catch on the rip rap, requiring extra time to get it loose, and even possibly damaging the hose, which could result in a chemical spill.

Recent advances in aerial spray drone technologies provide a new alternative to traditional pesticide application methods. Large drones equipped with either liquid or granular payload tanks can now apply their payloads over difficult terrain in a precise manner while allowing the applicator pilot to maintain a safe distance from the chemical being applied by the drone. The pilot can also remain in a place with stable footing where they can observe the spray drone in flight.

By Stephen Kroeker
GIS Coordinator,
Environmental & Cultrual Resources



L. to R. - Steve Kroeker, Evan Blackledge (USACE), Dr. Dan Martin (USDA), Bryce Berter & Chris Kubeczka (Hylio).



Bryce Berter installing water sensitive test strips.

The drone can spray about 20 acres per hour over rough terrain.



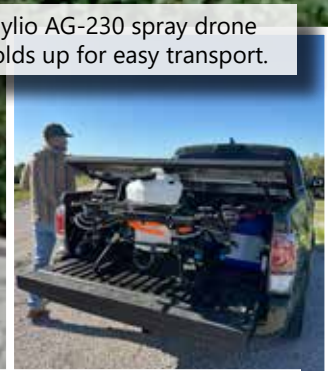
Steve Kroeker & Dr. Dan Martin at the Somerville Lake USACE office.



Water sensitive paper test strips mounted on blocks for spot spray testing.



Evan Blackledge collecting water sensitive test strips.



Hylio AG-230 spray drone folds up for easy transport.



Drone controller and laptop used for testing.



Water sensitive paper strip after a test flight showing droplet pattern.



Steve Kroeker & Dr. Dan Martin with the spray drone ready for flight.



Spray drone coming in for landing.



The AG-230 has an 8 gallon payload capacity.



Examining the results of a test flight.

During the first week of April 2024, Steve Kroeker, the Missouri Basin Region's GIS Coordinator, and a Reclamation UAS pilot, traveled to College Station, TX to conduct spray drone testing with Dr. Dan Martin, a Research Engineer in the USDA ARS Aerial Application Technology Research Unit. The U.S. Army Corps of Engineer's Somerville Dam, located nearby at Somerville, TX, was used as the spray drone testing site. Bryce Berter and Chris Kubeczka from Hylio, Inc., of Richmond, TX, supported the tests by providing and operating a Hylio AG-230 spray drone. Somerville Lake Park Ranger Evan Blackledge assisted with placing and collecting testing material, and Lake Manager Russell Meier approved and provided a suitable area to conduct the testing.

The spray drone testing consisted of spraying water through the nozzles to simulate spraying liquid pesticides. The spraying tests involved spraying both parallel and perpendicular to the dam face to replicate spraying a large area, as well as performing spot spraying on point targets to test the ability to spray individual plants. All three spraying methods were tested, and the test results indicated the spray drone could very effectively and efficiently apply pesticides on steep, difficult to access terrain. Further testing with USDA is planned to determine the best combination of flight speed, height above terrain, spray nozzle size, etc. that optimizes the spray pattern for the most efficient operation.

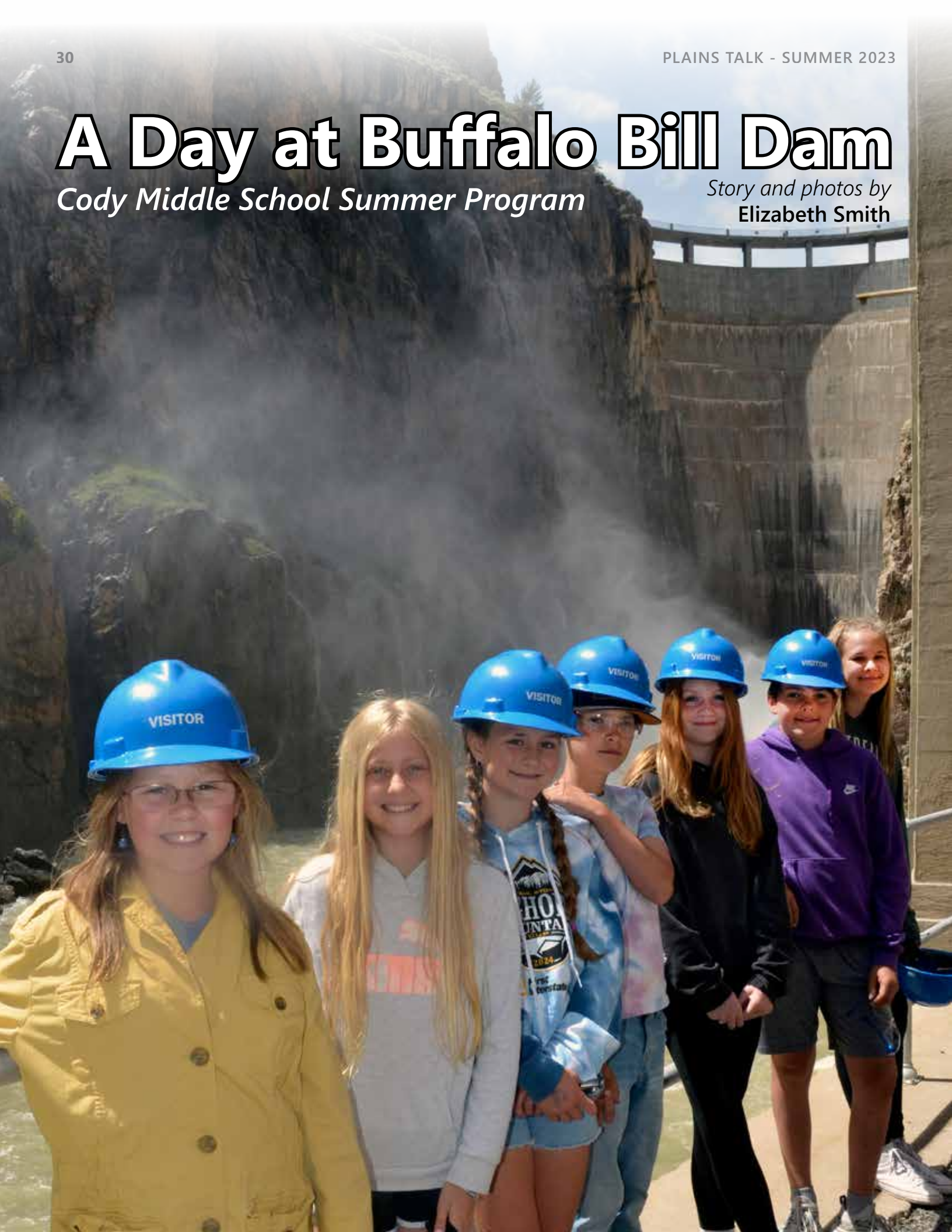
The ability to spray difficult terrain with a drone will improve Reclamation operations by reducing the time and effort it takes to perform pesticide spraying on steep slopes, it will free up time to address other tasks, and it will increase the personal safety of Reclamation employees by both reducing their exposure to possible chemical contamination as well as lowering the risk of injuries caused by trips and falls, stings and bites, and anything else that nature throws at us.



A Day at Buffalo Bill Dam

Cody Middle School Summer Program

*Story and photos by
Elizabeth Smith*



Mark Skoric, the Facility Manager at Reclamation's Bighorn Basin, had a special task at hand this summer: he hosted a tour for the eager students of the Cody Middle School Summer program. The destination was none other than the historic Buffalo Bill Dam, a concrete arch-gravity dam on the Shoshone River, and the Shoshone Powerplant.

The students arrived at the dam, located about six miles upstream from Cody, Wyoming, and chatted excitedly as they donned hardhats and safety glasses, before taking in a safety briefing with Skoric.

Skoric grew up in Cody and toured Buffalo Bill Dam and Shoshone Power Plant when he was in fifth grade. "I still remember doing the tour to this day," said Skoric. "It was a positive early educational experience and may have led me to eventually pursue an Engineering Degree. I think it's important to show students our facilities and the work that we perform. It may lead to them to pursue math or science courses and chart a future career path."

Skoric began the tour with a brief history of the dam, explaining how it was one of the first high concrete dams built in the United States. He spoke about its construction, which began in 1905 and was completed in 1910, and how it was named after the famous Wild West figure William "Buffalo Bill" Cody.

The students were then led to the old penstock tunnel. Here, they witnessed the power of water being released, a sight that left them drenched in the cold-water sprays and in awe. Skoric explained the workings of the dam, how it impounds the Shoshone River to create the Buffalo Bill Reservoir, and how this process generates hydropower.

The tour concluded with a visit to the top of the dam. From this vantage point, the students looked down 280 feet to the Shoshone River. They then walked down into the spillway gate chamber, a part of the dam that controls the release of water.

The day ended with the students leaving with a newfound appreciation for the marvel of engineering that is the Buffalo Bill Dam. They had not only learned about hydropower but also about the rich history of the dam and its significance to the region. Like Skoric, it was a day they will likely remember for a long time to come.



RAX

Replacements, Additions, & Extraordinary Maintenance



By: MB Power O&M Group:
Tim Koczur, Brenda Huffman,
Anthony Braun, Thanh Nguyen

POWER UPFRONT FUNDING

For most of the personnel who work with Reclamation's power programs, language such as O&M, RAX, UEs and the like are known and understood. However, power only comprises a small part of Reclamation's mission of moving water and being environmentally responsible. As you may note, power generation is not necessarily included in our mission statement. Rather we fall under "moving water" and by moving water through our generators, we produce power. When we do discuss power generation and the power program, there is a term used, RAX, that many may not quite understand.

The Power Replacements, Additions, and Extraordinary Maintenance program revolves around Operations and Maintenance activities that are comprised of out of the ordinary, costly activities and don't fit into the existing routine O&M budget. For instance, O&M forces may check various meters to see that a generator is operating correctly (routine O&M) or they may disassemble a unit for routine maintenance (again, routine O&M). These activities are typically planned out, driven by Reclamation's Facilities Instructions, Standards, & Techniques manuals commonly referred to as FIST manuals. In general, Reclamation operates from a time-based maintenance program.

However, at times, larger issues occur; a turbine (the thing the water pushes against to turn the generator) may have extensive damage, an electrical coil may fail, damaging the generator, or a bearing may fail in service causing severe damage. In other cases, structural issues may occur such as rock scaling activities or rock net clearing. These activities are not routine and thus, they fall outside of the realm of routine O&M. Nor do they typically fit into an Area Office's routine budget.

Since these activities have an impact on Missouri Basin's primary power reseller, Western States Power Corporation (WSPC), they have entered an agreement with Reclamation to help fund these extraordinary maintenance activities upfront rather than waiting for appropriations. Enter the Power RAX program. When out of the ordinary activities occur, the Area Offices begin a process of developing a RAX project. Typically, the Area Office will put together a justification or narrative describing the situation, the work required and provide a simplified project schedule showing anticipated expenses and in what years those expenses are expected to occur. Area Offices may involve outside entities such as Denver's Technical Services Center, other facilities who have experienced a similar issue or even reach out to the private sector to gain information.

Later in the calendar year, these justifications are submitted to the Regional Office through a SharePoint site. Existing and/or ongoing projects already have justifications and those are updated to show changes in scope, schedule and/or budget. In general, these submissions are completed by the end of December.

Beginning in January, the Power Office and the Finance Office begin reviewing the justifications. This process looks generally at issues such as:

- Was a change in scope fully explained?
- Do the budget numbers add up in the expected expenditures vs year?
- Were schedule slips satisfactorily explained?
- Is additional funding required and is that explained in the narrative?
- Does the justification fit the expected format?
- Is a project correctly identified as capitalized versus expensed?

This effort is a back-and-forth, iterative process between the Area Offices, the Regional Power Office and the Regional Power Finance staff.

Around the beginning of February, the Regional Office Power Accountant will begin reviewing numbers and entering outyear estimates into the Master Workplan. A workplan is prepared annually for the Technical Committee Meeting that Reclamation, Western Area Power Administration, U.S. Army Corps of Engineers, Loveland Area Customer Association, Mid-West Electric Consumers Association, Western States Power Corporation and other entities participate in.

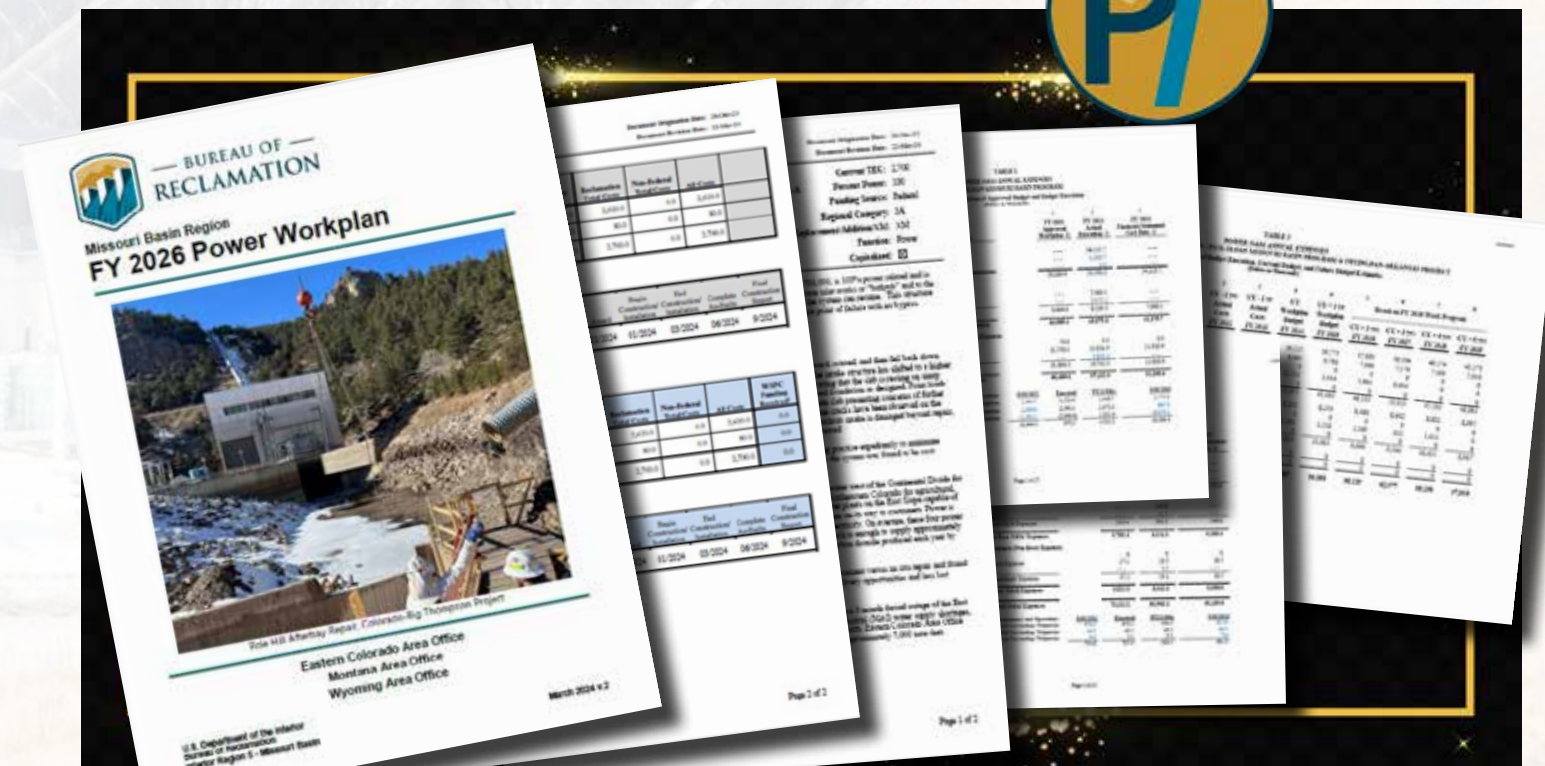
There may be feedback by the Region's Facility, Operation, Maintenance, and Replacement (FOMR) team on the prioritization list in early February as well. During this time the Power Office and Area Offices are still cleaning up narratives and numbers. By March, the Power Office begins coordinating the printing of the Work Plan hard copies. There may be conference calls with various Area Office staff to clean up last minute items – some of which happen just before finalization and printing at the end of March.

The Power Office and the RO Power Accountant work to get the pieces and parts of all these financial tables and justifications into the correct format, then put into a draft Work Plan PDF document. This document

is then reviewed before finally agreeing that it's an acceptable product and sent to the printer. After it's sent to the printer, e-copies of the Work Plan are sent to Reclamation, US Corps of Engineers, WAPA and Power Customer team members. An Excel version of the Work Plan is sent to only a few of the team members.

All this work, effort, and collaboration result in a FYXX Work Plan document that spells out the work we're going to perform, when we're going to perform it and what we believe it's going to cost. This document shows the Power Customers what our plans are and how we intend to use the expected funding.

Following up on this document is the next fiscal year's Up-Front Funding (UFF) request. This is the document used to request the funding we're expecting to use in the upcoming fiscal year based on our Work Plan. Then, each month that we are expecting funding based upon the UFF request, the prior month the Regional Office will transmit a request for that next month's funding. This process is also followed with Missouri Basin Region quarterly updates on the RAX projects and continues throughout the year until we get to the end of the next calendar year, and we begin the process all over.



Bull Lake Dam

SAFETY OF DAMS CONSTRUCTION PROJECT NEARS COMPLETION



Story by
Elizabeth Smith
Photos by
Hailey Glarrow

In the heart of central Wyoming, nestled within the Wind River Indian Reservation, lies the Bull Lake Dam. This dam, a testament to human ingenuity, was originally completed in 1938, its spillway standing strong for decades. However, in 2013 the Reclamation Safety of Dams program evaluated the risk of spillway failure and determined that modification was necessary in order to bring the dam up to state-of-the-practice standards and reduce the risk of failure.

In 2018, a new chapter began for the Bull Lake Dam. Reclamation awarded a contract to Malcolm International LLC, a company based in Rancho California.

The Safety of Dams construction project on-site work began in November 2018, and it is set to reach its culmination this year.

"We're excited to reach the completion of this project and look forward to the increased safety of the facility," said Wyoming Area Office Deputy Manager Christina Davis-Kernan.

Technical Service Center in Denver determined the most cost-effective approach: A new spillway was to be constructed approximately 700 feet south of the existing one. Once this new spillway was completed, the old one was to be retired, its gates demolished, and the dam section sealed off.

The construction process has been a series of activities: the creation of a temporary access road for construction traffic, the erection of cofferdams, dewatering, and the formation of a new concrete spillway structure. The old spillway was removed, replaced by a section of earthen dam embankment. All these tasks were performed under Reclamation's

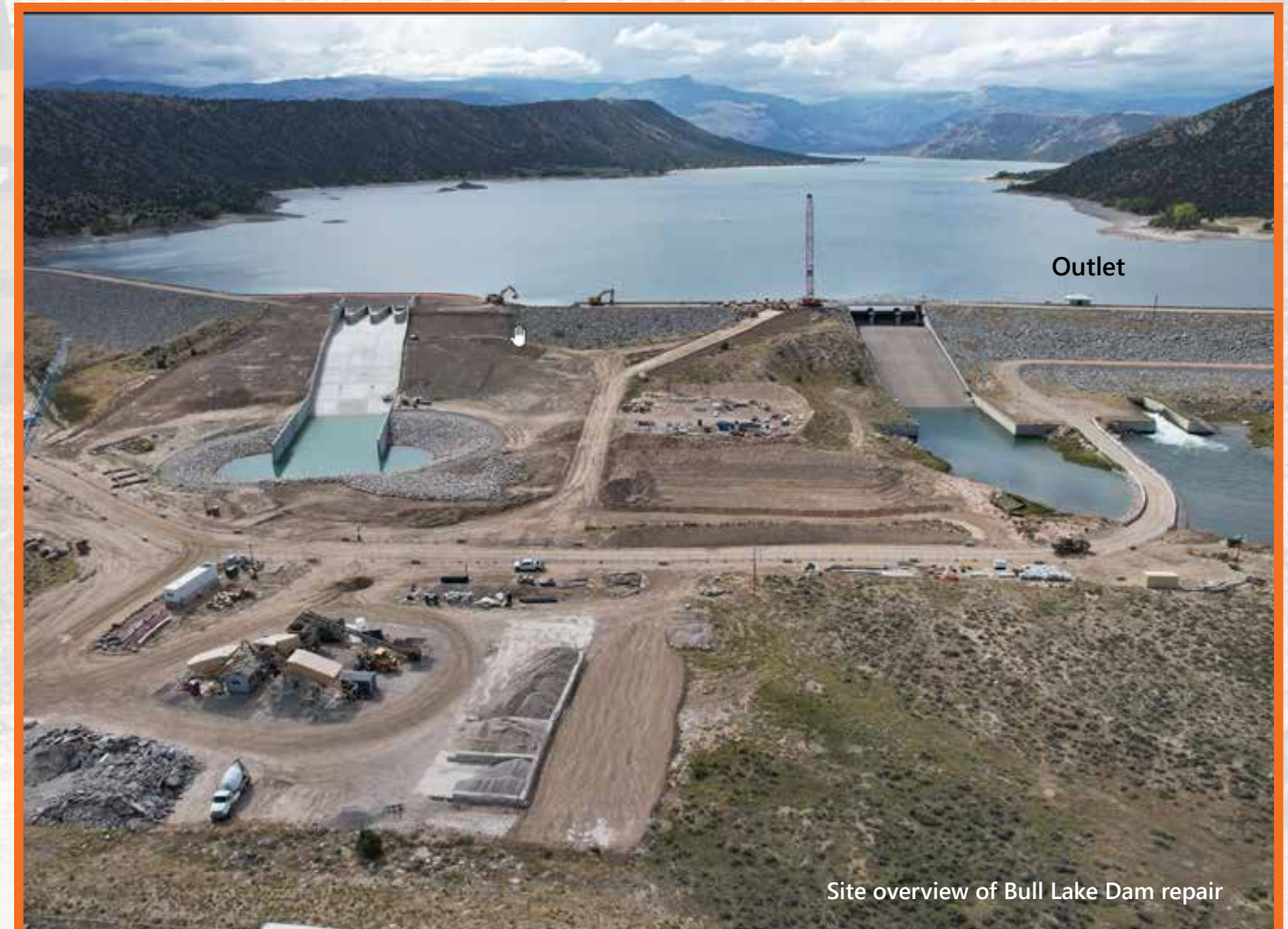
Safety of Dams Program. The Midvale Irrigation District was entrusted with the responsibility of repaying Reclamation up to 15 percent of the project cost.

The construction has not been without its challenges. The primary hurdle was lowering the groundwater level to facilitate the construction of the new stilling basin, which reaches a depth of approximately 40 feet. Due to complex geology that varies greatly throughout the site, additional geologic investigations were conducted, and additional dewatering wells were installed to facilitate spillway construction.

"All facets of Reclamation worked as a team to respond to project challenges," said Regional Dam Safety Coordinator Amy Darlinton. "Everyone from

construction managers, designers, and geologists collaborated to respond to project changes and ensure that Bull Lake Dam continues to function safely and deliver project benefits."

Today, the Bull Lake Dam stands on Bull Lake Creek, a tributary of the Wind River. The water stored in Bull Lake provides a supplemental irrigation water supply to approximately 70,000 acres served by the Midvale Irrigation District. This dam, a symbol of resilience and adaptation, will continue to serve its purpose, just as it has for decades.



Site overview of Bull Lake Dam repair

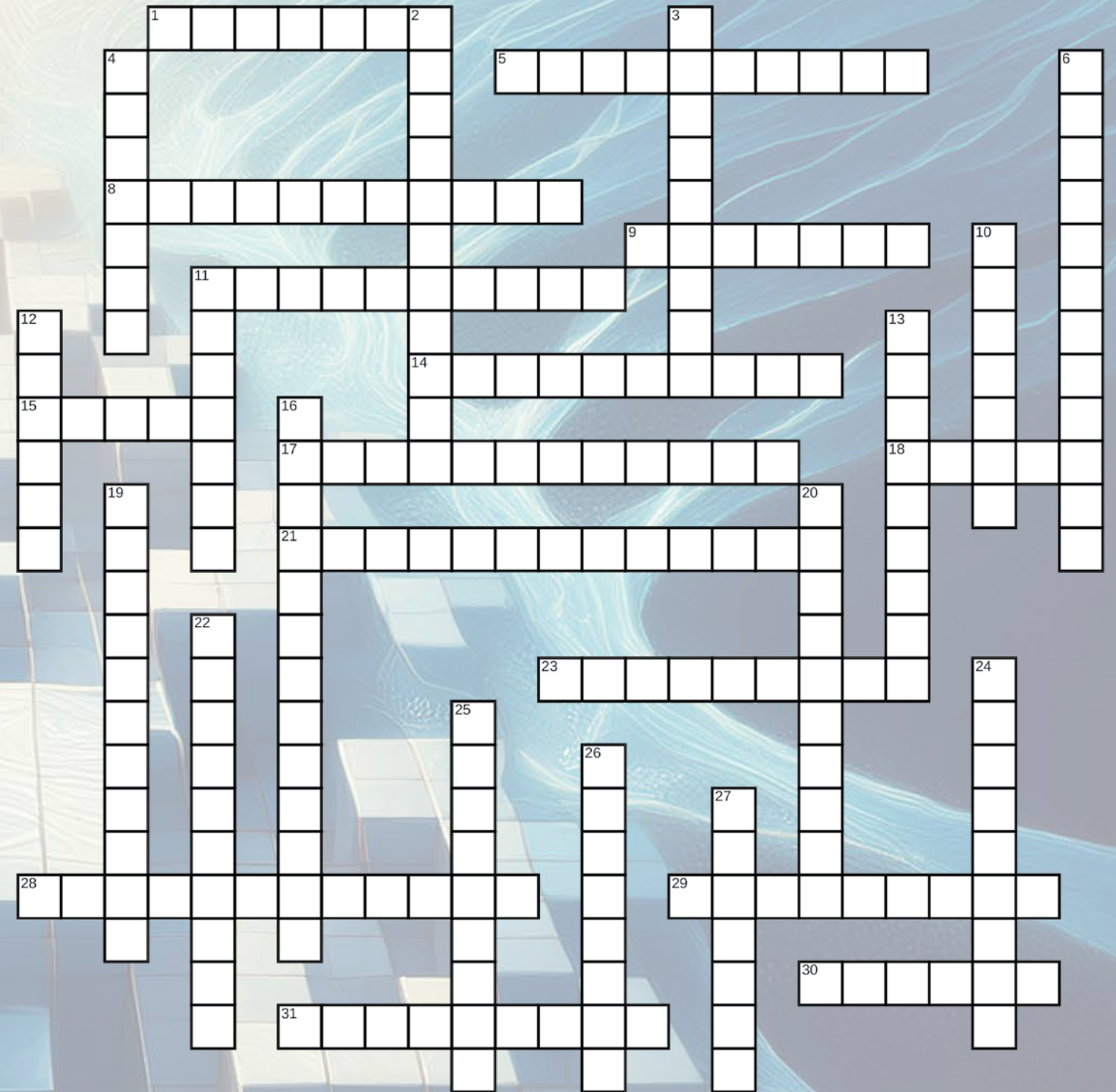
Across

- 1** The basin at Pole Hill is compared to this
- 5** Weed killers
- 8** In the RAX program, this is extraordinary
- 9** Collecting these on Reclamation lands requires permits and permissions
- 11** This type of fossil has five-pointed radial symmetry
- 14** These kinds of canals are fed by the St. Mary siphon
- 15** This is what an uncrewed aerial system operator is called
- 17** The R in RAX
- 18** Uncrewed aerial system
- 21** The X in RAX
- 23** The A in Rax
- 28** Reclamation policies have evolved to accommodate this type of powered vehicle
- 29** This type of work experience is measured by the FEVS survey
- 30** The S in FEVS
- 31** This dam is undergoing spillway replacement



Down

- 2** Cody middle schoolers recently toured this dam
- 3** The V in FEVS
- 4** The fossilized remains of this kind of animal were found at Buffalo Bill Reservoir
- 6** This annual competition accepts entries through October 4 this year
- 10** New gates of this type were recently installed at Green Mountain Powerplant
- 11** Drone spraying was recently tested on this type of dam
- 12** This vital part of the St. Mary project recently failed, prompting emergency response
- 13** This vital part of the St. Mary project recently received \$88.3M in funding
- 16** This powerplant recently received upgrades to its protective relays and synchronizer
- 19** This turbine-like device extracts energy from moving water to generate power
- 20** Reclamation generates this
- 22** While not our main focus, Reclamation provides this significant benefit
- 24** The St. Mary Supply System is one part of this greater project
- 25** The St. Mary siphon is located on this Native Tribe's land
- 26** The E in FEVS
- 27** This state is home to the Milk River Project



*All answers can be found in this issue
Puzzle solution on page 15*



LOWER Yellowstone PROJECT



Stenographer's Office, La Mesa, Montana, Mar. 23, 1907.

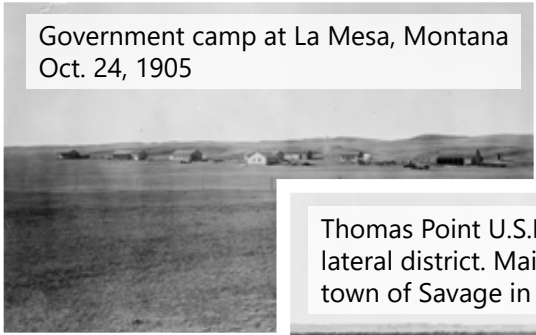
Some of Reclamation's earliest projects were built in Montana. Work began on the Lower Yellowstone Project in 1905 just three years after the agency was created.



F.H. Newell, H.N. Savage, R.S. Stockton and Chas. W. Tharp, in auto, at LaMesa camp. Starting on tour of inspection of lower valley. May 26, 1909.



Quarry camp mess, bunk and stables. Feb. 4, 1912.



Government camp at La Mesa, Montana Oct. 24, 1905

Newly completed office building at the headworks of the Ft. Burford project. Sept. 12, 1905.



Thomas Point U.S.R.S. headquarters, 1st lateral district. Main canal in foreground and town of Savage in distance. July 6, 1910.



Group of office force and foreman. Feb. 5, 1912.

