

# PlainsTalk

*News from the Missouri Basin Region*

Winter 2020

**Reclamation Responds to  
Fort Laramie Tunnel Collapse**

**Missouri Basin  
Photo Contest Results**

**Reclamation Represents  
at Scout Jamboree**



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**RECLAMATION**





PlainsTalk  
Winter 2020

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Photo: An early snow storm covers the landscape at Lake Sherburne Dam.  
Steve Darlinton



# Reclamation Responds to Fort Laramie Canal Tunnel No. 2 Failure

By Jay Dallman, WYAO



**F**ort Laramie Canal Tunnel No. 2 experienced a partial collapse July 17, 2019, causing flow to back up and breach the canal upstream. The canal diversions were discontinued, which caused about 107,000 acres of cropland in eastern Wyoming and western Nebraska to go without water during the hottest time of irrigation season.

The tunnel is located near the Wyoming-Nebraska border about 1 ½ miles south of Fort Laramie, Wyoming. The 2150-foot-long tunnel has a horseshoe-shaped cross section and is about 14 feet high and 14 feet wide and was designed to carry a flow of about 1,400 cubic feet per second. Along most of its alignment, the tunnel ran approximately 75-100 feet below ground surface. It was constructed in 1917 by the Bureau of Reclamation as part of the North Platte Project's Fort Laramie Canal. The canal draws water from the North Platte River at Whalen Diversion Dam in Wyoming

*“107,000 acres of cropland in eastern Wyoming and western Nebraska were without water in the hottest part of the irrigation season.”*

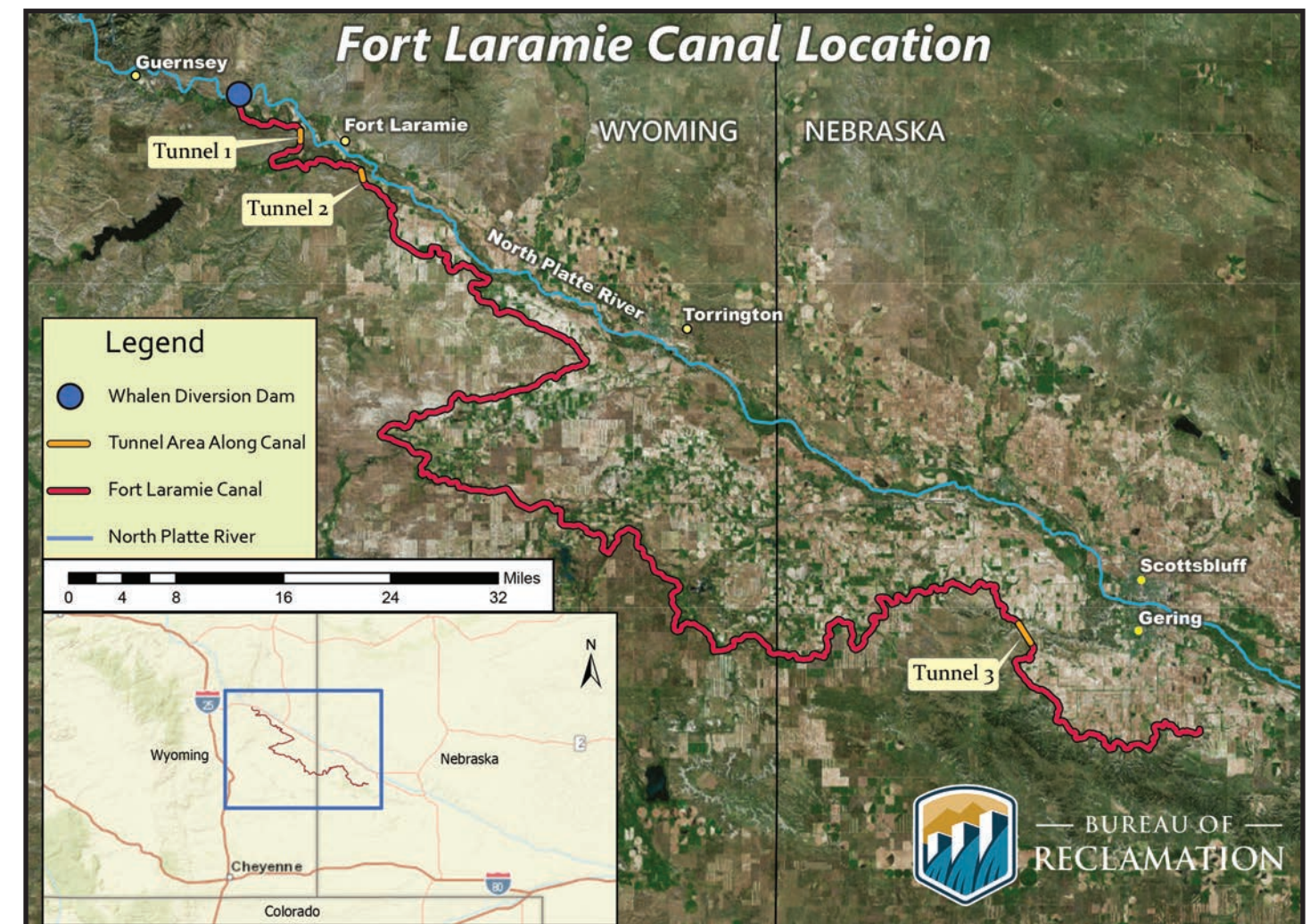
and winds its way approximately 129 miles to an area south of Gering, Nebraska. It provides irrigation water to about 52,000 acres in the Goshen Irrigation District (GID) of Wyoming and 55,000 acres in the Gering-Fort Laramie Irrigation District (GFLID) of Nebraska. The canal and tunnels are transferred works, and as such, the districts took the lead to address the collapse and breach.

**D**uring the early morning hours of July 17, GID personnel received a low-water-level alarm for the stretch of canal below Tunnel No. 2 and soon thereafter, a high-water alarm for the portion of canal upstream of the tunnel. After an on-site investigation and discovery of the canal breach, the district shut off the supply to the canal at Whalen Diversion Dam

and called Reclamation to request the flows from Guernsey Dam be reduced by the amount normally released for the Fort Laramie Canal.

*“Tunnel No. 2 experienced two cave-ins approximately 600-700 feet from the upstream entrance.”*

Tunnel No. 2 experienced two cave-ins approximately 600-700 feet from the upstream tunnel entrance, completely blocking the tunnel and ponding water upstream of the tunnel. The water backed up in the canal and breached the canal bank about a half mile upstream from the tunnel. Even with the water shut off at Whalen





Dam, the 12½ miles of canal between the dam and the breach was full of water trying to move downstream. As the water eroded the bank and exited the canal, it deposited silt and eroded a new channel ruining about 40 acres of private farmland as it navigated its new shortcut back to the North Platte River several hundred yards away.

The districts requested emergency assistance and began pumping water out of the tunnel to be inspected. Following dewatering of the canal and tunnel, Reclamation dispatched a six-person team of engineers from the Wyoming Area Office, the Great Plains Regional Office, and the Technical Service Center in Denver. The Reclamation inspection team was on-site

*Aerial view shows Tunnel No. 2 from the upstream end.*



Friday, July 19 to evaluate the condition of the tunnel, estimate the volume of material to be cleared, and gather other information needed to develop recommendations for the irrigation district regarding the repair of the tunnel. Although the tunnel was originally constructed by Reclamation, operation and maintenance responsibilities for the Fort Laramie Canal and its appurtenances were turned over to the GID in 1926.

During the inspection, two adjacent sink holes were observed on the surface above the topside of the tunnel structure. One sink hole was as large as 27 feet wide and up to 15 feet deep. The other hole was up to 75 feet wide and up to 40 feet deep. They were formed when portions of the concrete tunnel ceiling collapsed, and unconsolidated soil spilled into the tunnel at the two cave-in locations.

Reclamation presented several potential repair alternatives to the district for consideration following the July 19 inspection. The district elected to hire an experienced tunnel contractor, SAK Construction LLC out of Missouri, to further develop a repair solution so water service could be restored for the remaining 2019 irrigation season.

The contractor subsequently mobilized and completed emergency repairs to the tunnel, which included adding internal reinforcement to the tunnel, pumping grout to fill voids behind the tunnel lining, and removing the sinkhole material that had collapsed into the tunnel. The districts and their contractors also excavated and stabilized the sinkhole material on the ground surface above the tunnel in order to prevent additional material from entering the collapsed area. This involved removing massive quantities of soil overburden which covered the collapsed sections of the tunnel.

While the contractor repaired the tunnel, the districts mended the breached canal section. Both districts served by the canal worked round the clock to rebuild the canal. They were aided by manpower and equipment from other irrigation districts who were otherwise unaffected by the collapse.

Reclamation did not perform detailed forensic investigations of the tunnel collapse due to the immediate focus of the district and their contractor to repair the tunnel quickly to restore water deliveries. Since there are two other tunnels (Tunnels No. 1 and 3) on the Fort Laramie Canal that were constructed in similar fashion during the same time frame as Tunnel No. 2, Reclamation personnel performed on-site inspections of Tunnels 1 and 3 on August 7, in conjunction with the potential failure mode analysis of Tunnel No. 2. The districts wanted to consider potential long-term permanent modifications of all three tunnels.

Reclamation's technical team also conducted a Potential Failure Mode Analysis (PFMA) to determine possible mechanisms that contributed to the collapse, to document readily known information about the tunnel

collapse and develop a cursory summary of potential failure modes (PFMs). The technical team identified three PFMs that could have contributed to the tunnel lining failure and subsequent tunnel collapse. Each of those PFMs included consideration of void formation behind the unreinforced concrete liner and cracking of the concrete over the tunnel's 100 years of service as probable contributing factors. It was the technical team's opinion that the failure of Fort Laramie Canal Tunnel No. 2 was likely due to internal erosion



*Heavy equipment was staged at the Tunnel No. 2 entrance.*

*An excavating trench box was used above the Tunnel No. 2 Ceiling, August 20, 2019. (G.T. Hastings)*







Trench box assembly in use at Fort Laramie Canal Tunnel No. 2, August 23, 2019. (G.T. Hastings)

of the materials adjacent to the tunnel lining and decay of timber supports that occurred.

Data from the National Weather Service indicated that precipitation in the area was 200-300 percent above normal levels for the past year and 100-200 percent above normal precipitation in the 30 days prior to the collapse. After reviewing preliminary assessments by the Department of the Interior and the National Weather Service, the U.S. Department of Agriculture's Risk Management Agency concluded that weather was at least partly to blame for the tunnel failure. As a result of that determination, farmers experiencing crop losses related to the tunnel failure were considered eligible for payments under the federal crop insurance program. That ruling assisted farmers

that previously purchased insurance through the program, and the policy holder was responsible for covering any deductibles, which are about 15-30 percent of the claimed loss.

The temporary repairs were completed, and water releases were re-initiated at Whalen Dam on August 28. Diversions were gradually increased, with the repaired canal being closely monitored by irrigation district and Reclamation personnel. By then, the district's crops were without irrigation water for more than six weeks. Diversions continued from August 28 to October 4.

The temporary fix cost millions of dollars and the districts scrambled to find sources of financial assistance. The Governors of Wyoming and Nebraska issued state of emergency declarations to initiate funding options.

The districts secured financial assistance from Reclamation and the State of Wyoming. Reclamation advanced \$4 million in financial assistance to GID for emergency repairs early in the response enabling the districts to keep

**“The Governors of Wyoming and Nebraska issued state of emergency declarations to open up funding options.”**

their contractor working. As part of this emergency repayment contract, 35 percent of the total money advanced is considered non-reimbursable, meaning GID will repay 65 percent of the total advance. The repayment term is 50 years with a 3.125 percent interest rate. More recently, the GID announced it was the recipient of a \$4 million loan from the Wyoming State Land and Investment Board; a 30-year loan with a potential for up to 75 percent principal forgiveness.

Once the temporary repairs were completed, the districts turned their attention to a more permanent solution. The districts hired Reclamation to identify and evaluate alternatives for permanent repairs to all three tunnels. At the request of the districts, Reclamation evaluated various options for repairs inside the tunnels as well as options to incorporate new canal alignments and provided associated cost estimates.

After considering more than ten options and gathering additional cost estimate information, the districts selected the permanent fix they will pursue. Void and structural grouting will be used to permanently repair tunnels No. 1 and 2. Steel ribbing and void and structural grouting will be used to permanently repair tunnel No. 3. Reclamation will review and approve the designs and work plans for these permanent repairs.

Water is of critical importance to these water users and farming communities. In addition to government assistance, the local communities pulled together to assist the families affected by the cut-off of irrigation water due to the tunnel failure. Many local organizations raised funds to assist affected families as well. Agencies throughout Wyoming and Nebraska collaborated to assist the districts through the situation. Reclamation employees at all levels of the organization supported the districts and will continue to be involved and available for assistance to the district as permanent repairs are made.



## Pathways Student Spotlight



Pathways student Corbyn Coffelt performs Quality Assurance (QA) on the toe drain system at Altus Dam. Corbyn is using a survey grade Global positioning System (GPS) in conjunction with a 3D model to measure the grade of the pipe. The section of pipe is located at the newly excavated Lugert trench. QA is in support of Safety of Dam construction, Altus Dikes modification project, located near Altus, Oklahoma.

## Crossword Solution







# Drones Increase Efficiency and Safety

By Patience Mosbrucker

DKAO's 3DR Solo Quadcopter Drone in action above the McClusky Canal, a major feature of the Garrison Diversion Unit Principal Supply Works. The drone weighs 3.3 pounds, has a range of up to a half a mile, and can cruise up to 5.7 miles per hour.

The Dakotas Area Office has three newly trained unmanned aircraft pilots, or drone pilots, among their ranks. Adam Madigan, Brian Billman and Jacob Frein completed the A-450 UAS Basic Remote Pilot Course offered through the Department of the Interior and the Federal Aviation Administration. A significant increase in training unmanned aircraft pilots within the Bureau of Reclamation comes after the Research and Development Office released a feasibility and versatility study about the use of unmanned aircraft to meet Reclamation's mission. As of 2018, the Department of Interior has 359 certified drone pilots and more drone pilots are being trained to meet increasing mission demands.

Measuring the value of the unmanned aircraft program has been on-going since the program's beginning. Unmanned aircraft can assist in performing inspections, conducting searches, following project progress, surveying, modeling, wildfire detection, and public visual information needs. However, a significant consideration in quantifying the program's real value comes in the form of replacing human risk, by saving employees from injury and removing them from dangerous situations.

(Continued)

Drone pilots Brian Billman and Adam Madigan calibrate the DKAO drone alongside the Garrison Diversion Unit's McClusky Canal.





*(Continued from previous page)*

Drone pilots in the Dakotas, Adam Madigan and Brian Billman demonstrated this “safer, faster, cheaper” awareness by capturing footage of ongoing work on the McClusky Canal. The canal is a feature of the Garrison Diversion Unit and the canal banks are sliding into the canal system. Prior to the use of drones, this level of monitoring the canal slides repair work would have taken several days and presented numerous safety challenges. The drone completed the task in less than one hour.

In addition to the safety improvements, the use of unmanned aircraft systems allows the Dakotas to expand its data collection capability with less environmental impacts.



*Drone pilots Adam Madigan and Brian Billman pilot the DKAO drone along the McClusky Canal.*



*Drone images show slide repair work and completion at McClusky Canal.*



# ***Photo Contest Showcases Region's Beauty, Facilities, and Talent***

*By Darryl Asher*

The 2019 Missouri Basin Regional photo contest presented an opportunity for participation from every employee in the region. Entering photographs, viewing the entries, and voting on their favorites provided a region-wide experience that encouraged regional employees to share part of their world and see how others experience the Missouri Basin Region and their work environments.

This year's contest saw over 100 entries, with 127 votes cast. Top votes went to Budd Breining for his color-soaked photograph of Canyon Ferry Lake at Sunrise. Jeff Ticknor's vertiginous shot of Trent Lewis inspecting the rock slope above the Gibson Dam Spillway took second place, while a moody morning at Reudi Reservoir by Gary Barsness took third.

These images, as well as all entries, may show up in various Reclamation publications, websites, and other products. A gallery of all submitted images will be available online on the Missouri Basin Region's multimedia site.

## **First Place**

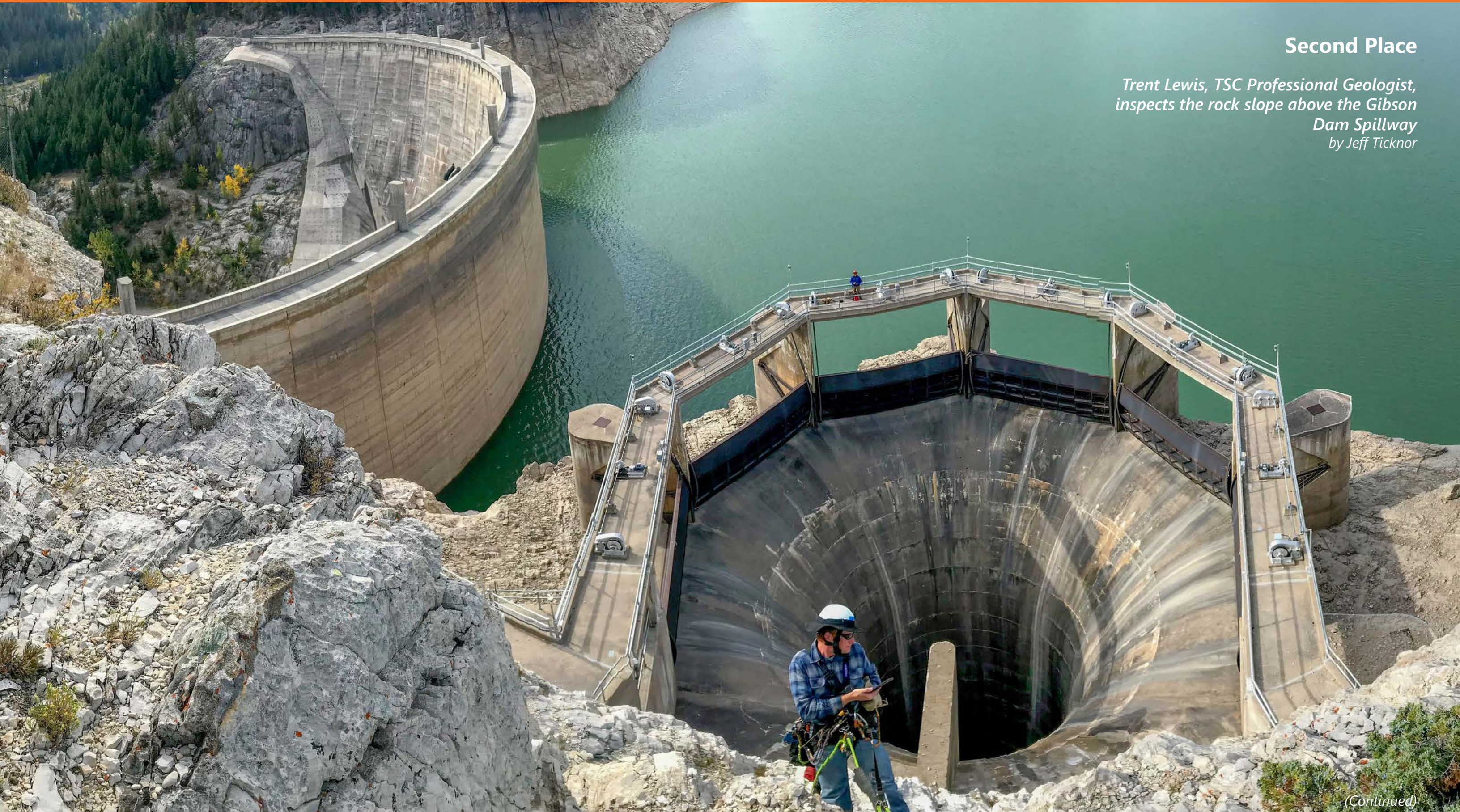
*Sunrise on Canyon Ferry Lake with Cemetery Island  
by Budd Breining*

*(Continued)*



## Second Place

*Trent Lewis, TSC Professional Geologist,  
inspects the rock slope above the Gibson  
Dam Spillway  
by Jeff Ticknor*



(Continued)





## Third Place

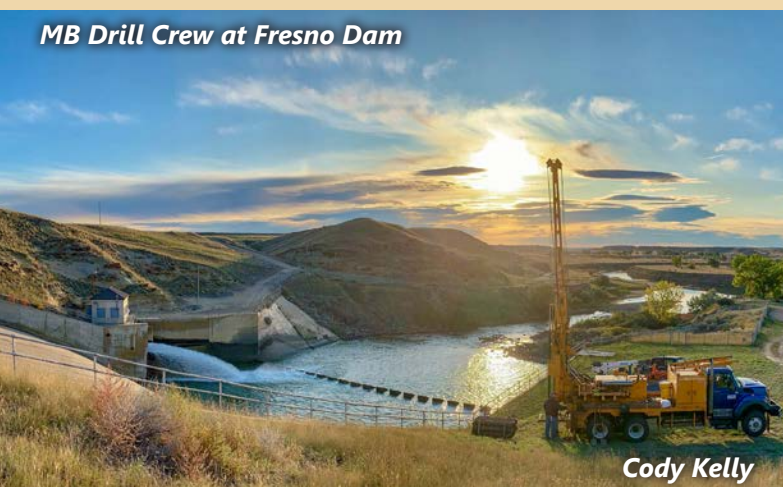
*Morning Beauty at Ruedi Reservoir, Colorado*  
by Gary Barsness

(Continued)





## Photo Contest Honorable Mentions



## Photo Quotes

"When people ask me what equipment I use, I tell them my eyes." - Anonymous

"Which of my photographs is my favorite? The one I'm going to take tomorrow." - Imogen Cunningham

"There are no rules for good photographs, there are only good photographs." - Ansel Adams

"Photography is the story I fail to put into words." - Destin Sparks

"The whole point of taking pictures is so that you don't have to explain things with words." - Elliott Erwitt

"There are no bad pictures; that's just how your face looks sometimes." - Abraham Lincoln

"Taking an image, freezing a moment, reveals how rich reality truly is." - Anonymous

"I never have taken a picture I've intended. They're always better or worse." - Diane Arbus

# New Logo Embraces Reclamation's Heritage While Looking to the Future



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In October of 2019, Reclamation Commissioner Brenda Burman addressed employees through a recorded video to introduce a new logo and a new chapter in Reclamation's branding history.

Hello, Reclamation! I'm Commissioner Burman at beautiful Pueblo Dam. I'm here to talk to you about our brand and unveil a new chapter in Reclamation's identity. Our brand is who we are as an organization, and what we represent. It goes beyond our mission of bringing reliable water and affordable power to the west.

Our brand speaks to core values of respect, safety and professional excellence. It's our reputation as an international leader in engineering and water supply reliability, and it's our commitment to delivering water for agriculture, renewable hydropower, and municipal needs in an environmentally sound manner.

Over the last century, our brand has evolved to reflect changes in how we carry out our mission and how we communicate. Today we are taking proactive steps to improve the way we tell our story.

As federal servants, we're obligated to use plain language to provide transparency, and we have new ways to reach our audience through social media. As part of a larger effort to modernize our communication infrastructure, we are launching a new logo.

As the department is rolling out a reorganization to unify the regions, we're rolling out a logo to build a consistent identity across Reclamation. We've designed a logo that is easy to recognize and builds on our history. It embodies the strength of water and the strength of our employees.

No single image can encompass all we do or the impact we have on the national economy. We rely on our employees and our partners to showcase our complex mission. The logo is a tool to help us do that. Embrace the opportunity by using our new logo. Over the coming months, Public Affairs will provide guidance as we transition to our new visual identity.



Commissioner Burman

Please reach out with your questions, and your feedback. I'm proud to be part of Reclamation and I'm excited to introduce a new logo to identify our organization."

## Reclamation's Past Logos



**RECLAMATION**  
Managing Water in the West



## DKAO Prairie Benefits from Pollinator Seed Mix Award

By Patience Mosbrucker

The Dakotas Area Office and the North Dakota Game and Fish Department collaborated, applied for, and were awarded a bee and butterfly seed mix in the spring of 2019 from the Seed a Legacy Bee and Butterfly Fund. This award came at no cost to the Bureau of Reclamation or the state.

Using the bee and butterfly seed mix, approximately 15-acres of prairie lands on the Lonetree Wildlife Management Area were seeded. This mix included more than fifty species of pollinator plants.

The program objective is to establish pollinator habitat using two separate plantings. The two plantings, one for monarch butterflies and one for honey bees, increase pollinator benefits over other pollinator conservation programs.

Currently, North Dakota is one of twelve states in the Seed a Legacy Program. This twelve-state region is the most critical to pollinator health and habitat needs.





## Reclamation Employees Participate in the 24th World Scout Jamboree

By Public Affairs Staff

The 24th World Scout Jamboree was held at Summit Bechtel Reserve near Beckley, West Virginia, July 22 to August 2.

The Jamboree is an educational event that brings together the world's young scouts to promote peace and mutual understanding and to develop leadership and life skills.

"The World Scout Jamboree happens every four years and is an opportunity for scouts and scouters from around the world to meet and enjoy the fellowship of others in this youth character development program," said James VanShaar, supervisory civil engineer at Eastern Colorado Area Office. "I heard estimates of 45,000 attendees."

*Reclamation employees Judith Lavoie, Jeff Lucero, Tyler Larsen, and Mike Howe participate in the Jamboree.*



Reclamation employees joined a team from the Department of the Interior to host a large vendor tent called The North American Dream.

Five agencies were represented in the same tent location: Bureau of Reclamation, Bureau of Land Management, the Fish & Wildlife Service, the National Park Service and the Office of Surface Mining Reclamation and Enforcement.

"The Department of the Interior wanted to introduce to world-wide scouts the principles of stewardship, resource management, sustainable development, etc.," said VanShaar. "I think DOI hoped to inspire the generation and perhaps instill the seeds of professions important to the agency. Maybe a few years from now some of the attendees will become employees or world-wide collaborators."



If a scout, scoutmaster or visitor spoke with or participated in the activities of each of these five agencies, he or she received a commemorative Department of the Interior patch.

The activities offered by Reclamation included model building an earth-fill dam, an agency overview of water resources in the west, a discussion of hydropower, and drone simulation and virtual reality look at Elephant Butte Dam in context of dam safety inspections.

**“DOI hoped to inspire the generation and perhaps instill the seeds of professions important to the agency.”**

"Although our Bureau is not widely known outside of the western United States, the issues we work on impact most of the world in one way or another," said VanShaar. "As the event occurred in the moist, wooded region of West Virginia, the outlook of the western United

*James VanShaar talks to Jamboree attendees about Reclamation's mission.*

States also broadened perspectives and engaged people coming from diverse geographic regions and cultures."

"I was surprised how hard we worked at the booth, expecting a little more time to enjoy the jamboree myself," said VanShaar. "Nevertheless, to meet people from 50-plus countries and to share my enthusiasm about the aspects of Reclamation's mission with young impressionable scouts has been an unforgettable and incredibly rewarding experience."

The event was hosted jointly by national scout organizations from Canada, Mexico and the United States and featured 12 days of scouting, comradery, adventure, and learning.





talk to your  
**BOSS**

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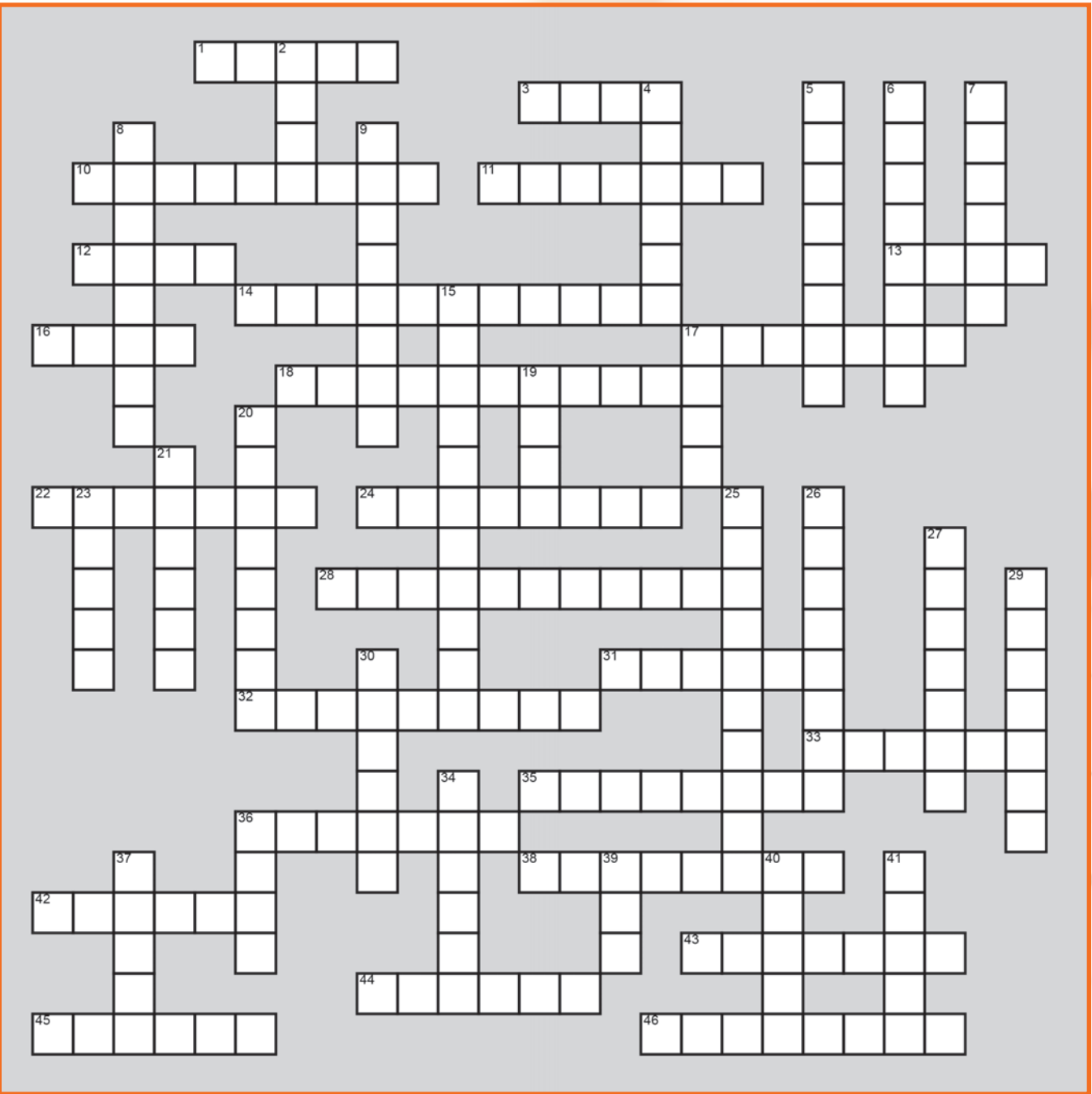
**Across**

- 1 Over \_\_\_\_ species of plant seeds were provided to DKAO
- 3 A plant embryo
- 10 Natural assets, such as water
- 11 The back page features a photograph from Reclamation's \_\_\_\_
- 12 The FCIC insures this asset
- 13 To converse, as with one's boss
- 14 Insects vital to pollinization
- 16 \_\_\_\_ Management Agency (a part of USDA)
- 17 The 24th Scout Jamboree was held near here
- 18 The USDA's main concern
- 22 A natural home or environment
- 24 A gathering of Scouts
- 28 You can submit these to the Missouri Basin's annual contest
- 31 The worker on the back page is called this
- 32 Two of them issued emergency declarations after the Fort Laramie Tunnel collapse
- 33 A type of box used in excavating the Fort Laramie Tunnel
- 35 Explosive
- 36 The president who is quoted as saying, "There are no bad pictures; that's just how your face looks sometimes."
- 38 A drone is this type of aircraft
- 42 Reclamation's Commissioner
- 43 The time of day the third place photo contest winner was taken
- 44 Drone operators
- 45 An irritant to some, but necessary for plant reproduction
- 46 Reclamation's internship program

**Down**

- 2 The World Scout Jamboree is held every \_\_\_\_ years
- 4 Used for safe and efficient aerial photography
- 5 This canal is a feature of the Garrison Diversion Unit
- 6 This Wildlife Management Area was recently seeded with pollinator plants
- 7 Photographs need a lot of these to be considered high resolution
- 8 A state affected by the Fort Laramie Canal Tunnel collapse
- 9 The island in the first place winning photograph
- 15 The Bureau that manages water in the west
- 17 Insects vital to pollinization
- 19 Reclamation just introduced a new one
- 20 This is required to be certified as a drone pilot
- 21 This dam is featured in the second place winning photograph
- 23 Quality Assurance was recently performed on this dam's toe drain
- 25 Pixels in a photo, or a promise to yourself on New Year's Day
- 26 It's not cement, but it contains cement and aggregate
- 27 A state affected by the Fort Laramie Canal Tunnel collapse
- 29 The main concern of the NWS
- 30 Pollinator seeds were provided by the Seed a \_\_\_\_ Program
- 34 The G in GPS
- 36 Another bureau manages this, not us
- 37 To bore
- 39 A variety blended together, such as seeds
- 40 Filling for a certain kind of dam
- 41 This type of bee sounds sweet

# Crossword



All answers can be found in this issue.  
Complete puzzle solution is on page 7.



# ***Back in Reclamation History***

On the right wall of the Yellowtail spillway intake, a scaler carefully lowers a wired stick of dynamite into a drill hole. Drill hole marks can be seen where previous blasting has occurred.  
12/28/1961 (*Thomas R. Broderick*)



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