

# PlainsTalk

News from the Missouri Basin Region

Summer 2020

## COVID-19 Reclamation Rises to the Challenge

Arkansas Valley Conduit:  
History and Progress

Bull Trout Protection  
and Recovery

Yellowtail Powerplant  
Rewind Project

WYAO Accelerates Tunnel  
Inspections

Flood Control:  
Reclamation's Unsung Hero

St. Mary Canal  
Repairs Scheduled



— BUREAU OF —  
RECLAMATION



PlainsTalk  
Summer 2020

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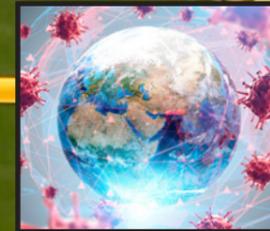
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Photo: Yellowtail Unit Three prior to start of the rewind process. (Darryl Asher)

# HOW WE CONTINUED TO SERVE THE AMERICAN PUBLIC DURING THE GLOBAL COVID-19 OUTBREAK

By Brittany Jones

*Editor's note: Numbers and statistics in this article are current as of press time, unless otherwise noted.*

## Bureau of Reclamation employees faced unparalleled challenges during the Coronavirus pandemic.

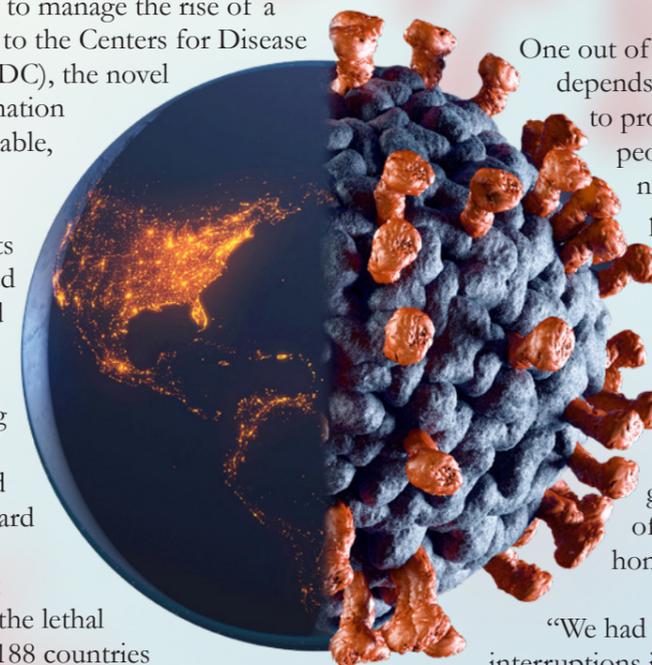
The viral outbreak drew comparisons to doomsday movies as it spurred mass quarantines, halted global economies, and revealed some inadequacies of the healthcare industry's ability to manage the rise of a modern plague. According to the Centers for Disease Control and Prevention (CDC), the novel coronavirus, with no vaccination or anti-viral treatment available, transmits from person-to-person in close contact, through respiratory droplets lingering in the air produced by coughs and sneezes, and by touching surfaces or objects contaminated with the virus and then touching your nose, eyes or mouth. According to data provided by the COVID-19 Dashboard by the Center for Systems Science and Engineering at Johns Hopkins University, the lethal contagion surged through 188 countries and regions, infected nearly 9 million people, and left 468,724 dead during its invisible path of destruction as of June 22, 2020.

There are multiple different types of coronaviruses, and they typically cause respiratory illnesses. The common cold, Severe Acute Respiratory Syndrome (SARS), and Middle East Respiratory Syndrome (MERS) are all caused by a type of coronavirus. The virus is named for its multitude of spikes protruding from the surface resembling a crown-like shape. The new coronavirus strain that wreaked havoc across the globe is thought to have originated in Wuhan, China, and causes the disease now known as COVID-19. The CDC has reported that some COVID-19 victims are completely asymptomatic, some only experience

mild symptoms such as a fever or cough, while others encounter emergency or life-threatening complications such as difficulty breathing, chest pains, low oxygen levels, and mental confusion.

### Bureau of Reclamation Response

"Operations cannot stop because of an outbreak. Too many people depend on us for fundamental necessities," said Mike Black, Missouri Basin (MB) Regional Director. "Farmers still need to water their crops, and 31 million people rely on us for their municipal, residential, and industrial water supply needs."



One out of every five Western farmers depends on Reclamation-managed water to provide food to the American people. Twenty-five percent of the nation's fruit and nut crop, and 60 percent of the annual vegetable harvest are grown on farmlands irrigated by Reclamation.

Reclamation doesn't just contribute water to the arid lands of the west, but its 53 hydroelectric powerplants also generate 40 billion kilowatt hours of energy, powering 3.5 million homes.

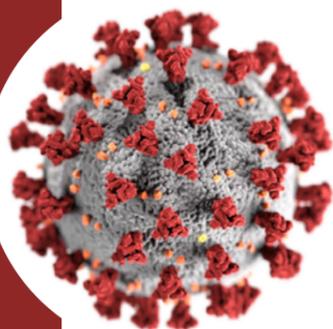
"We had to ensure there were no interruptions in water or power supply during this unprecedented pandemic. I am so proud to serve alongside Reclamation employees who assured our mission essential operations did not falter," Black said.

Missouri Basin Region team members implemented new procedures and adapted to rapidly changing circumstances by overcoming unique challenges while continuing to serve the needs of customers across nine states. Some employees continued to report to dams and field sites to continue critical procedures, while others in support roles transitioned to teleworking from home by mid-March.

### A Management Perspective

Mike Byrnes, a U.S. Navy veteran and manager at the

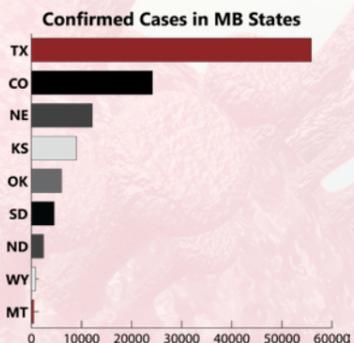
# CORONAVIRUS A TIMELINE



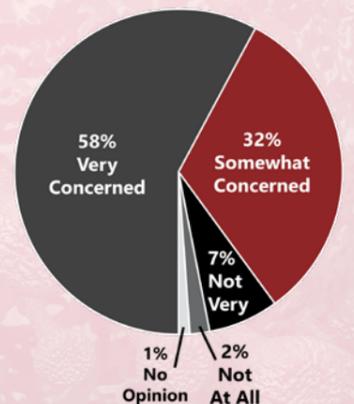
- DEC 2019**  
First novel coronavirus cases discovered in China
- JAN 11**  
China reports first coronavirus-related deaths
- JAN 29**  
President Donald Trump forms an official coronavirus task force
- JAN 31**  
Trump blocks travel from China into the U.S.
- FEB 14**  
First European coronavirus death in France
- MAR 11**  
Trump bans most travel from Europe
- MAR 16**  
Department of the Interior institutes maximum telework flexibility for employees nationwide
- MAR 26**  
America leads world in most confirmed cases
- APR 2**  
Coronavirus cases reach 1 million worldwide
- APR 12**  
All 50 states operate under a disaster declaration for the first time in American history
- APR 26**  
Tyson Foods, one of the country's largest meat distributors, acknowledges shortages and supply chain struggles would likely continue for the duration of the pandemic
- APR 30**  
>30 million American workers file for unemployment benefits due to coronavirus-related hardship
- MAY 20**  
All 50 states relax lockdown restrictions in some form

- JAN 6, 2020**  
CDC issues warnings for Americans traveling to China
- JAN 21**  
Seattle announces first confirmed case within America
- JAN 30**  
W.H.O. declares global health emergency
- FEB 6**  
Earliest U.S. coronavirus death in California
- FEB 24**  
U.S. stock market falls 1000 points
- MAR 13**  
Trump declares a National Emergency
- MAR 17**  
White House issues guideline to slow the spread of the virus, encourages Americans to stay at home
- MAR 27**  
Trump signs a stimulus package, distributing \$1,200 to eligible Americans
- APR 3**  
The CDC recommends Americans wear face masks in public
- APR 21**  
Trump halts immigration into the country
- APR 26**  
Worldwide death toll exceeds 200,000
- APR 28**  
America reaches 1,000,000 confirmed cases
- MAY 19**  
Missouri Basin Regional Director Mike Black holds virtual town halls for employees to address questions and concerns about returning to the workplace
- JUN 1**  
Missouri Basin employees start returning to their offices and work places as circumstances permit

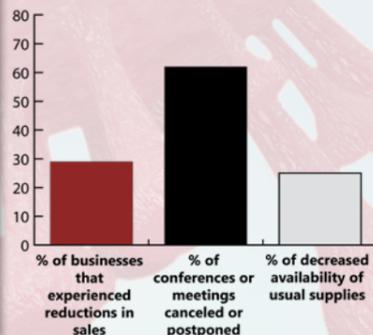
**COVID-19** is a new disease caused by a coronavirus not previously seen in humans



## How Concerned About COVID are U.S. Adults?



## BUSINESS IMPACTS



Statistical data retrieved from Statista.com, and current as of May 25, 2020.

Yellowtail Dam in southeast Montana, and his team modified their standard operations to adapt to the challenges presented by the virus, which were further complicated by the multi-year work to replace the windings and rewind the generators at the facility. With nearly 12 years of government service around the globe, Byrnes was well-suited to lead his staff through this crisis.

“Yellowtail epitomizes Reclamation’s mission of managing water in the west,” Byrnes said. The dam provides storage, peak power generation, silt control, water for municipal, industrial, and irrigation purposes, and plays a pivotal role in taming the Bighorn River that previously led to annual springtime flooding in the area prior to its construction in 1967. Yellowtail also facilitated the creation of the Blue Ribbon Fishery considered by many to be one of the best places for trout fishing in the world.

As a manager, Byrnes’ foremost concern is the safety and well-being of the employees working for him. Extra efforts were instituted to champion healthy practices and reduce risks associated with the virus while continuing to deliver water and power throughout Southern Montana. Byrnes also implemented dispersed work schedules with only one third of the staff operating on site at any given time. Team members were very cautious and practiced social distancing while completing essential operations. Additionally, all employees, contractors, and even delivery drivers were screened upon entrance to the facility. Screening consisted of a temperature check and answering questions about virus-related symptoms from the CDC website. To further stifle viral spread, all Yellowtail workspaces and equipment were cleaned and disinfected daily. These procedures were critical because COVID-19 cases in Bighorn County were increasing in May 2020 while the rest of the state of Montana reported decreases in known confirmed cases.

“Whenever I have to make a decision, I always ask myself ‘What is the right thing to do?’ and then I go from there,” Byrnes said. “Adapting to the new challenges at the beginning when there was a flurry of activity was difficult, but the entire staff was responsive and appreciative of the efforts to keep them safe. Everyone at Yellowtail has been great.”

In Wyoming, Jim Padget, Plant Mechanic Supervisor

II, at the Seminole and Kortess Powerplants, continued to manage hydropower crews to maintain energy production.

To help isolation efforts, Padget split his crew’s shifts by the geographical location they reside in. Seminole and Kortess powerplants are in very remote areas. Most of his employees live in two different towns, the first about an hour north of the plants, and the other about 45 minutes south of the plants. Separating crews and shifts by where they lived limited spread to other communities.

“We have to keep the mission going, the river has to keep flowing, the farmers still need water and power,” Padget said. “Having a power outage on top of everything else would be a disaster for these communities. It would be catastrophic economically and cause immense hardships if the farmers missed a crop season.”

Seminole and Kortess powerplants have supplied hydropower to about 60,000 customers for the last six decades, and the current crews did not allow COVID-19 to interfere with the continued success of energy operations and providing power to locals in the area.

“I am really proud of how the crew responded. It was heartening to see them step up and get things done,” Padget said in praise of his team. “They did a phenomenal job to put us in the best position to succeed during a critical time.”

## A Dam Site and Field Worker Perspective

One of the civil servants who ensured the Oklahoma-Texas Area Office’s responsibilities were carried out through the pandemic was 11-year Reclamation employee Adam Milligan, a civil engineering technician. Milligan is the primary coordinator for various Reclamation programs focusing on emergency management, security, continuity of operations, and is an engineering group inspector.

Milligan was one of several area office employees that continued to monitor abnormal seepage issues at Altus Dam in Oklahoma through field work including instrumentation readings and visual inspections. He also prepared plans for an upcoming emergency

management exercise which will test emergency response capabilities of personnel and facilities. “In the worst-case scenario, if our dams and dikes were not properly maintained, there could be catastrophic failure of structures which could result in loss of life and property without warning. That is why it is important for us to continue our work through the pandemic so we can keep the public safe,” Milligan said. “If we failed to maintain our security program, we may be unable to detect and respond to threats that could occur at our facilities. If we failed to maintain our emergency management program, there would be no coordination with public safety officials that have the authority to issue public warnings or evacuations whenever there is a high-flow event or developing potential failure at a Reclamation facility.”

Tyler Heupel, an electronics technician out of the Bismarck, North Dakota office, continued to provide services to outlying customers and facilities through the pandemic. The former helicopter crew chief and Marine Corps veteran has worked for Reclamation for almost two years. He travels throughout North Dakota, servicing four Native American reservations and six water treatment plants, ensuring availability of high-quality water.

Travel and social distancing restrictions put in place by state governments complicated Heupel’s usual workflows, but he found innovative ways to continue serving the American public by adapting to limitations and prioritizing effective communication with his coworkers.

If possible, he tried alternate methods of problem solving to avoid some travel, such as using phone or video conferencing or practicing social distancing and wearing protective equipment when site trips were required.

### A Teleworker Perspective

The Eastern Colorado Area Office was the first in the MB region to begin maximum teleworking operations during the pandemic. The Loveland office is only about 50 miles north of the hard-hit area of Denver. One of the projects ECAO manages is the Colorado-Big Thompson (C-BT) Project, a large diversion project that delivers irrigation water, municipal and industrial use water, hydroelectric power, and recreational

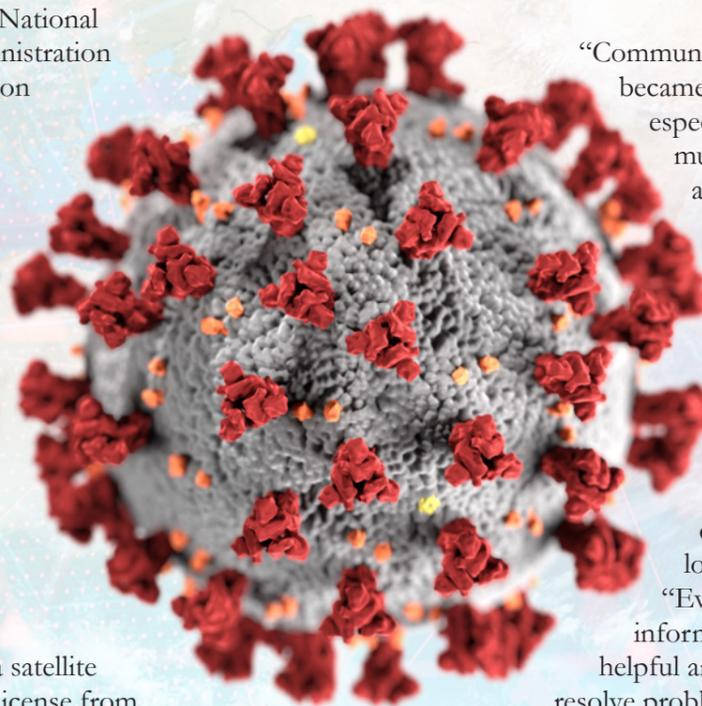
opportunities for the people in the area.

Stephen Middlekauff, a Hydrologic Civil Engineer and Hydrologic Monitoring Program (HyMoP) coordinator, continued to manage water movement through the C-BT, while teleworking and completing necessary field visits to remote gaging stations while complying with official COVID-19 guidance. He also coordinated with multiple agencies to continue the mission, while working around pandemic-related communications difficulties.

One example of federal agency cooperation, resiliency, and responsiveness is a HyMoP project that required coordination between Reclamation, the United States Geological Survey (USGS), and National Oceanic and Atmospheric Administration (NOAA) to complete. Reclamation uses Geostationary Operational Environmental Satellites (GOES) telemetry, which is managed by NOAA’s National Environmental Satellite, Data, and Information Service (NESDIS), to collect stream flow, canal flow, reservoir pool elevation, weather, and other data for safe and efficient operation of Reclamation facilities. Two important gages that inform C-BT operations at Olympus Dam near Estes Park, Colorado were identified as candidates for more frequent data reporting via satellite telemetry but required a special license from NESDIS in order to do so.

“I requested assistance from Lauren Allin at the Missouri Basin Region office and the USGS to petition NOAA for new satellite telemetry licenses allowing sub-hour satellite telemetry. They in turn contacted NOAA to make a case for these special licenses,” Middlekauff said. “Quite surprisingly while working under the challenges associated with COVID-19, two licenses were issued within 48 hours from the request.”

Joshua Neuffer, an Army veteran and Natural Resource Specialist from the Nebraska-Kansas Area Office modified his daily routine to acclimate to unique



circumstances while teleworking. Neuffer lives in a packed house, with chickens, four children under the age of 11, his wife, and sister-in-law. With all the kids being home due to school closures, Neuffer lamented there was little quiet time around his house. He created a dedicated workspace in his bedroom and fashioned a “Do not disturb” sign featuring a skull and crossbones design to reduce interruptions during working hours. Neuffer’s job consists of supporting National Environmental Policy Act (NEPA) and wildlife conservation considerations for Reclamation. One of the important tasks he sustained during the pandemic was the NEPA assessment portion of the Resource Management Plan for Medicine Creek in southwestern Nebraska.

“Communicating quickly and effectively became an unexpected challenge, especially while working with multiple agencies to get things accomplished,” Neuffer said. “I didn’t expect to use and enjoy the simplicity of Microsoft Teams. The software enabled us to continue the mission while overcoming unforeseen barriers presented by the coronavirus.”

Neuffer also encountered problems with network connections and programs loading on his laptop at home. “Even though there were issues, the information technology (IT) staff was helpful and did everything they could to resolve problems quickly,” he said.

While Neuffer said he didn’t enjoy every aspect of teleworking, he did experience some positive moments. “I had the opportunity to teach my kids about my role as a Natural Resources Specialist. I showed them some of the programs I work with, and how I draw boundaries on maps of ongoing construction sites to ensure the safety and survival of endangered animals that may be inhabiting the area,” Neuffer said. “That was pretty cool to share with them.”

### A New Normal

As state restrictions and closures waned, maximum

telework operations were relaxed allowing some MB employees to return to their office environments in early June 2020. Daily routines did not return to business as normal though. Social distancing and elevated health and safety measures became a top priority. The Department of the Interior provided face masks for employees who wished to wear them, hand sanitizing stations were strategically placed throughout buildings, and posters with information about COVID-19 were plastered amongst the walls in hallways, elevators and restrooms. The Regional Safety Office, with assistance from Budget, Property, and Procurement, obtained more than \$100,000 of personal protective equipment and disinfecting chemicals to have available for all facilities and employees.

MB leadership was keenly aware that employees would have varying and unique circumstances that would require thoughtful flexibility for each individual’s return to the office. For example, some employees were caring for sick family members, while others were facing childcare issues because not all daycares had fully reopened yet.

The coronavirus pandemic altered the world in unforeseen ways and changed the lives of millions of people forever. Medical experts are warning of a possible resurgence of the virus sometime in the fall or winter, and some economists believe the U.S. economy might not return to pre-pandemic levels until 2021 or beyond. The pandemic forced Reclamation and all other government agencies to adapt quickly to fluctuating circumstances. Employees developed new workflows and procedures, used their creativity and innovation to overcome challenges, and found several new ways to communicate with their teammates to accomplish the mission.

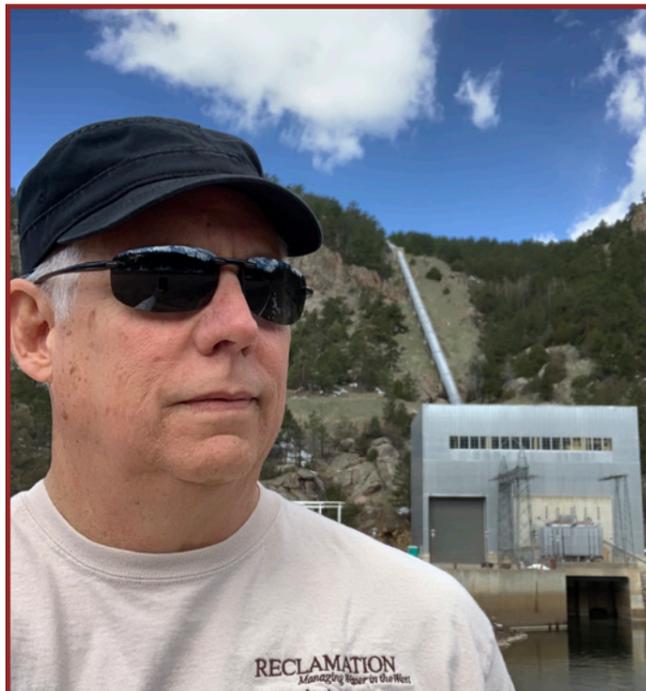
“Reclamation employees never cease to amaze me with their hard work,” said Black. “I watched many of you view this pandemic as an opportunity to use your innovation and experience to continue our mission successfully. Even though this isn’t the way I imagined my last months before retirement unfolding, I am truly humbled by your actions and commitment to service. Thank you.”



# The Mission Never Stops



Stacy Myhre, DKAO, oversees the welding of a custom saddle.



Stephen Middlekauff, ECAO, managed water movement through the Colorado-Big Thompson Project while teleworking and completing necessary field visits to remote gaging stations.



MTAO Yellowtail Dam employees help the Montana Department of Fish, Wildlife and Parks stock the afterbay with trout.



Joshua Neuffer, NKAO, collects chicken eggs with his daughter during a lunchbreak while teleworking.



Tyler Heupel, DKAO, conducts emergency troubleshooting on a malfunctioning well at Spirit Lake Rural Water System Treatment Plant.



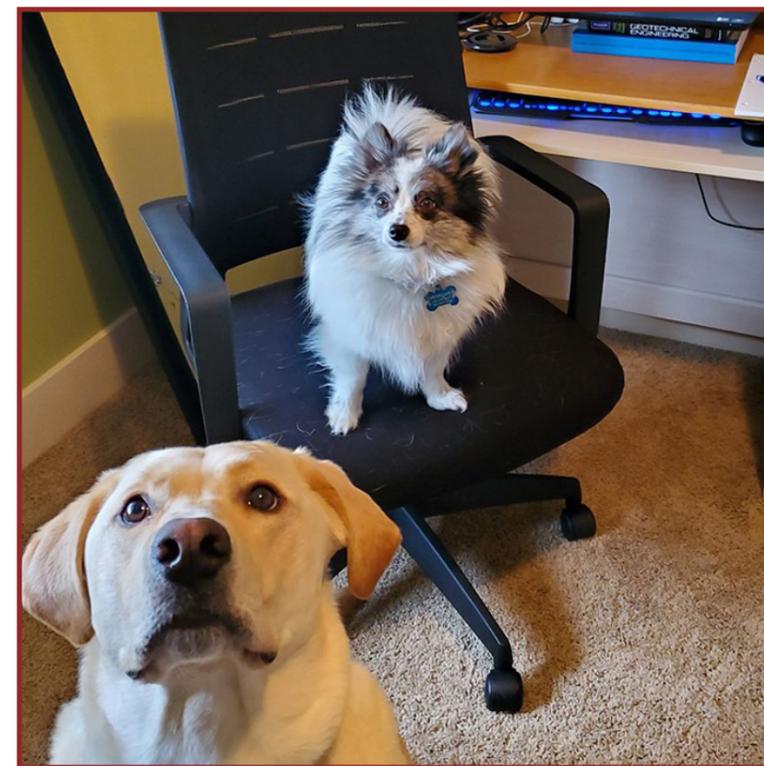
Jim Weigel, DKAO, undoes the work of beavers at Dickinson Dam.



Adam Milligan, OTAO, continued to monitor abnormal seepage issues at Altus Dam through instrumentation readings and visual inspections.



Sam Watt, WYAO, takes plant readings at Kortez Powerplant.

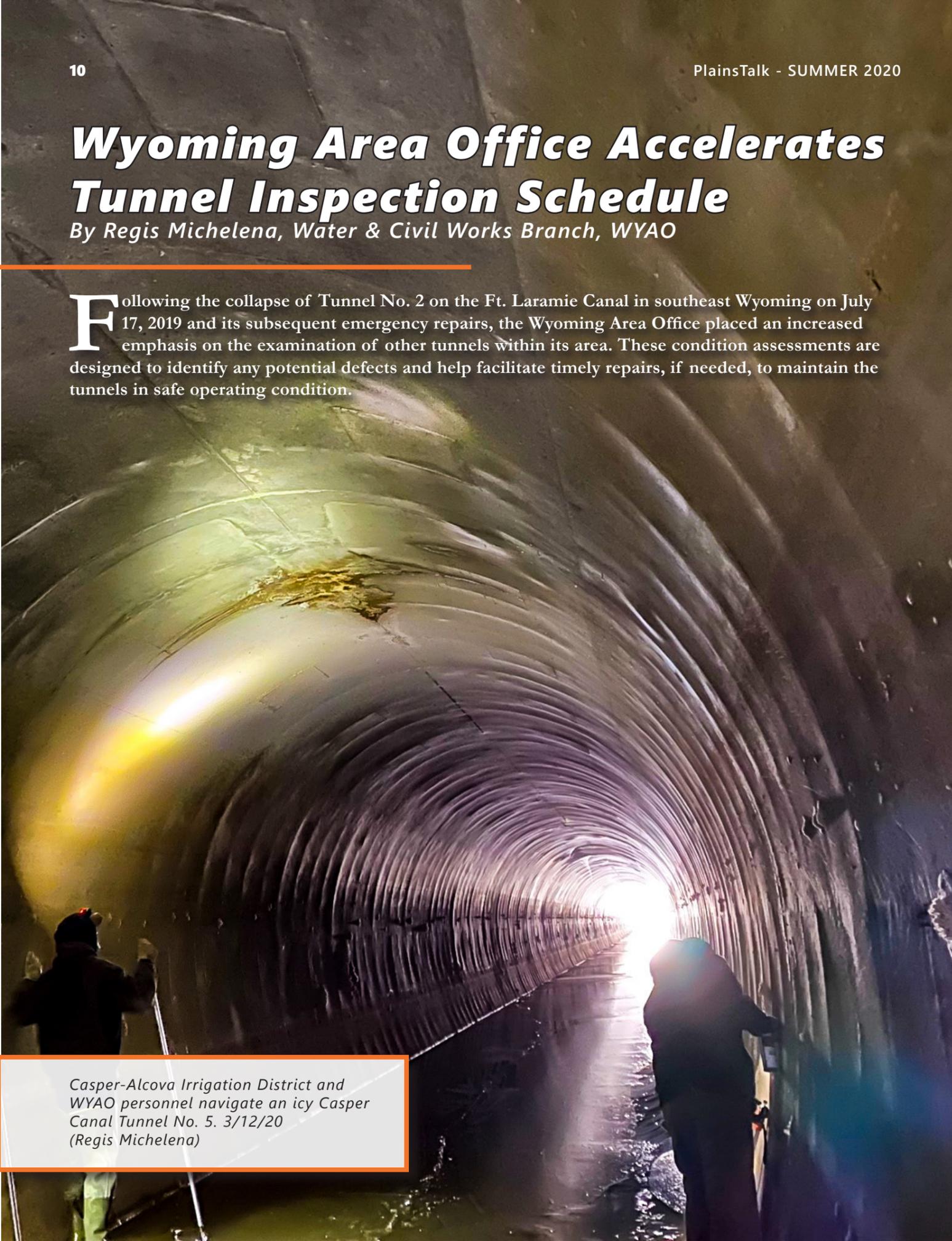


Morgan Clapshaw, MTAO, worked from home with pets planning future projects and supporting field staff.

# Wyoming Area Office Accelerates Tunnel Inspection Schedule

By Regis Michelena, Water & Civil Works Branch, WYAO

Following the collapse of Tunnel No. 2 on the Ft. Laramie Canal in southeast Wyoming on July 17, 2019 and its subsequent emergency repairs, the Wyoming Area Office placed an increased emphasis on the examination of other tunnels within its area. These condition assessments are designed to identify any potential defects and help facilitate timely repairs, if needed, to maintain the tunnels in safe operating condition.



Casper-Alcova Irrigation District and WYAO personnel navigate an icy Casper Canal Tunnel No. 5. 3/12/20 (Regis Michelena)

After the 2019 irrigation season ended, inspections of six tunnels on the Wyoming and Casper Canals were conducted. The Wyoming Canal is operated by Midvale Irrigation District under a contract that transfers the operation and maintenance (O&M) of the Wyoming Canal and a number of other features from Reclamation to the District. A similar contract exists that transfers the O&M of the Casper Canal to Casper-Alcova Irrigation District. Overall, the WYAO has contracts with 14 different irrigation districts that transfer the O&M of irrigation systems to the local level. As part of these contracts, the WYAO conducts regular inspections on the irrigation system. The tunnel inspections discussed in this article are only a portion of the overall inspection program. Inspections of tunnels operated by Deaver and Heart Mountain Irrigation Districts which had been scheduled for the spring, were rescheduled for this coming fall due to COVID-19 travel restrictions in place at the time.

Tunnel inspections are subject to confined space requirements. Confined space permits are required if there are not recorded air quality measurements for five different entries showing a consistently safe atmosphere as well as confined space training for all participants for Reclamation-led inspections. The confined space training was a new requirement for

several of our irrigation districts, at times prompting confusion because “If I can drive my truck through it, how is that tunnel a confined space?” However, last year’s tunnel collapse underscored the need for safety in our inspections, and cooperation was readily forthcoming from the districts.

Inspection teams include the entrants, confined space attendants stationed at the ends of the tunnel, and rescue personnel. Air monitors are used by entrants to document the atmospheric conditions, which, on the tunnels inspected to date, have been uniformly good and often include a natural breeze in the tunnel. Radios used by WYAO personnel were found to be ineffective in the tunnels despite having line of sight, so a system was developed using whistles allowing entrants and attendants to communicate. A single whistle blast is used by the entrants to check in with the attendant and confirm that all is well at a previously agreed upon interval (e.g. 250 feet), with another single blast returned by the attendant to acknowledge. While so far not needed, three blasts is the signal to call in rescue personnel to assist in removing an injured entrant while the attendants remain outside the tunnel to summon emergency assistance.

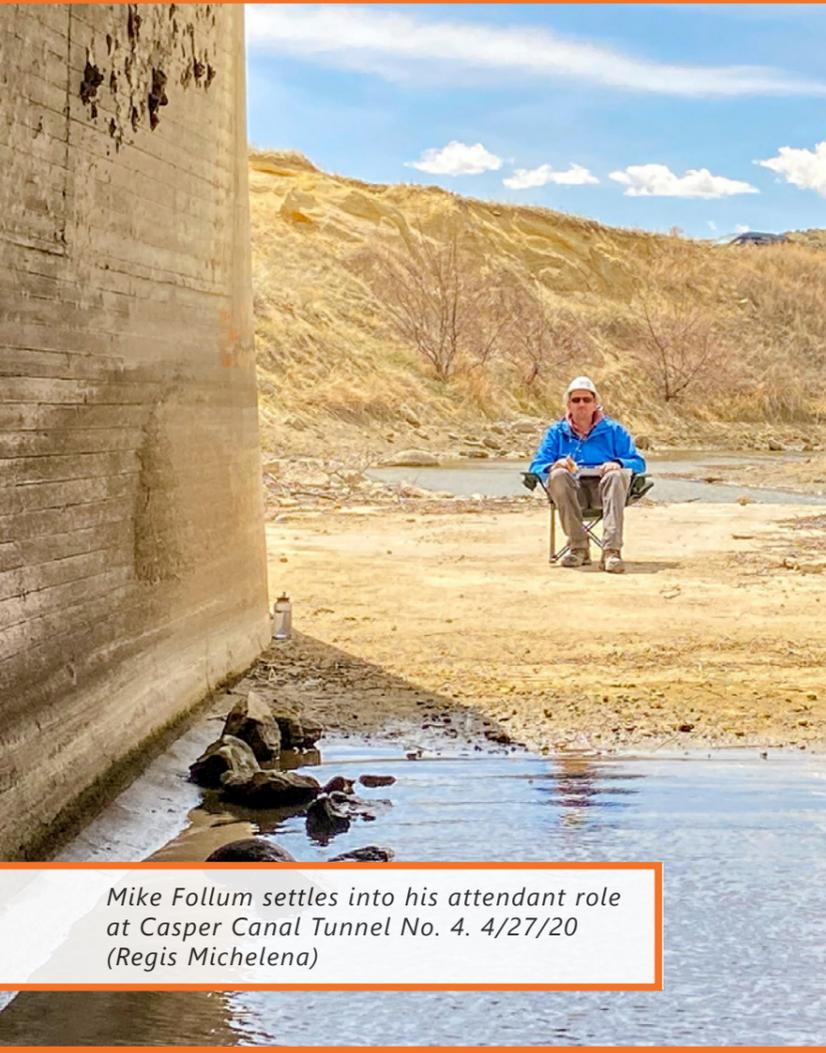
(Continued)

Ice at the outlet of the Wyoming Canal tunnel. 12/10/19 (Matt Wells)

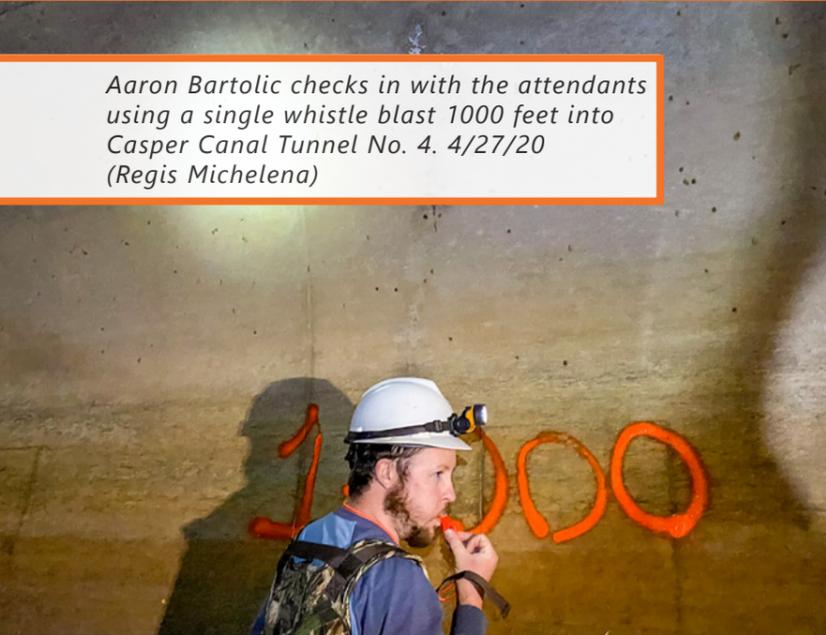


WYAO’s Regis Michelena and Matt Wells enter Casper Canal Tunnel No. 2. 3/11/20 (David Merrell)





Mike Follum settles into his attendant role at Casper Canal Tunnel No. 4. 4/27/20 (Regis Michelena)



Aaron Bartolic checks in with the attendants using a single whistle blast 1000 feet into Casper Canal Tunnel No. 4. 4/27/20 (Regis Michelena)



Aaron Bartolic and Ken Karstoft inspecting Casper Canal Tunnel No. 6. 4/28/20 (Regis Michelena)

*(Continued from previous page)*

Beyond involving confined spaces, the primary hazards faced in these tunnel inspections have been water or ice. Many tunnels are not free draining but have a rise at the end of the tunnel to dissipate energy as water exits the concrete tunnel and returns to an earth-lined canal. Beyond preventing a full examination of the tunnel's floor, water can hide tripping hazards like debris, and ice can cause a slipping hazard. In one inspection by WYAO prior to the current irrigation season, the tunnel appeared to be drained but had a layer of ice on the tunnel floor. The hazard was identified in the job hazard analysis prior to entry, and entrants wore ice cleats to maintain traction. The ice became thinner as the inspection progressed into the tunnel and eventually began to crack, revealing shallow water underneath. Because the entrants had proper footwear for the conditions, the inspection was able to continue to the downstream outlet.

Animals have also presented potential hazards to inspections. Beyond the expected fish bumping into legs, one inspection member was divebombed by an owl at a tunnel inlet and another was subjected to a hit and run by a beaver within a tunnel – not the typical scenarios thought of when the job hazard analysis lists wildlife as a possible hazard and directs participants not to corner wildlife. Despite these challenges, WYAO's tunnel inspections have so far been safely completed and successful in documenting conditions within critical elements of our irrigation infrastructure.





# Yellowtail Powerplant Undergoes Refurbishment

The generators at Yellowtail Powerplant have been undergoing a refurbishment process referred to as rewinding. Generators have insulated copper bars or cables called windings in both the stationary and rotating portions of the generator. Windings are supported by a stack of thin layers of steel. Insulation degradation and mechanical fatigue cause the windings to deteriorate over time. During a rewind, the old copper windings and steel are removed and replaced.



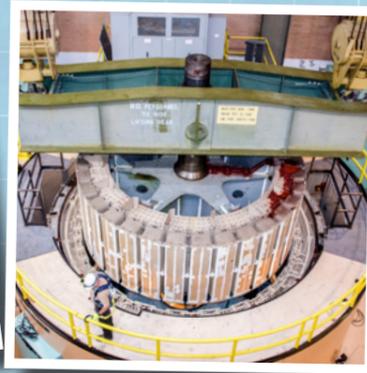
The Yellowtail Powerplant has four generator units. Yellowtail began operating in 1967.



Disassembly begins with the help of an overhead bridge crane built into the facility.



The upper bracket is removed, revealing the rotor below.



The 196-ton rotor is removed using a lifting beam secured to a pair of bridge cranes.



Two skilled crane operators work in tandem to carry the rotor to the machine floor.



An access hatch in the machine floor allows the rotor to rest on a maintenance pedestal.



A powerplant mechanic prepares a bolt to secure the rotor shaft to the maintenance pedestal. There are 16 bolts and nuts used in this process. The bolts weigh about 80 pounds each, and each nut weighs about 15.



The wicket gate operating ring and turbine bearing housing & cooler are removed.



The head cover, which weighs over 17 tons, is removed.



Removal of the wicket gates. There are 24 of these which control the flow of water through the generator.



The stainless steel runner weighs about 36 tons. Water spins the runner which rotates the rotor within the stator. The rotating magnetic field generates electricity.



The rotor is placed under containment for cleaning prior to disassembly and refurbishment. The wicket gates can be seen in the foreground, ready for refurbishment.



The unit is placed under containment while the stator is cleaned in preparation for disassembly.



The rotor and wicket gates are refurbished and ready to be placed back in service.



The new stator core laminations are installed. 36,000 thin steel sheets make up the stator core.

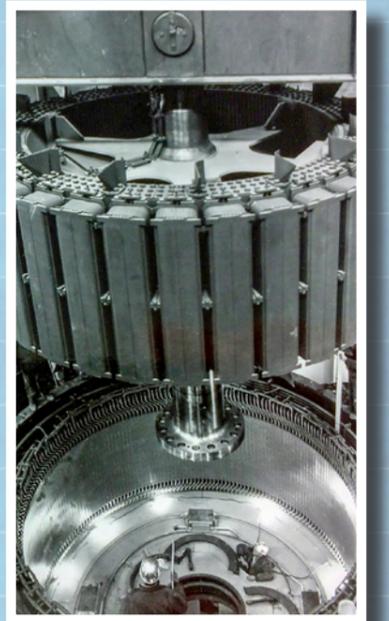


The crane operators return the rotor. The space between the rotor and the stator core is only 0.6 inches.

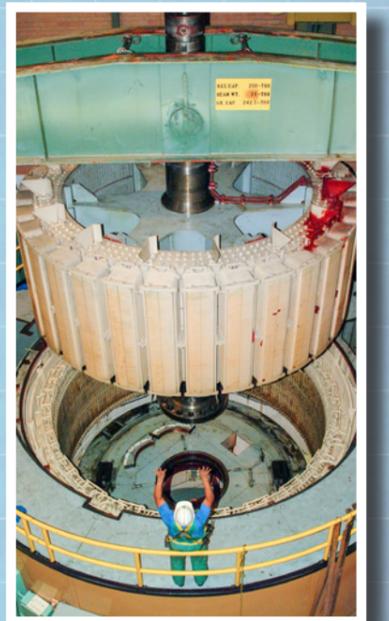


Final reassembly. The entire refurbishment process can take about one year for each unit.

## From the Archives



1966 - Original unit 3 rotor installation

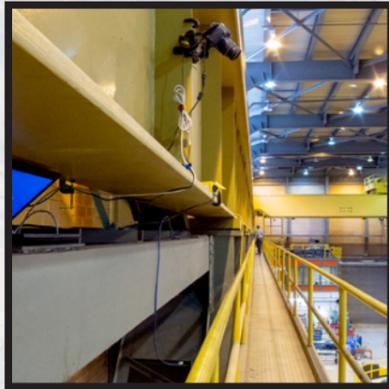


1983 - Rotor removal during previous rewind

# Capturing Yellowtail

By Darryl Asher

Most of the photographs in the photo essay on the previous page were taken by remotely accessed time-lapse cameras.

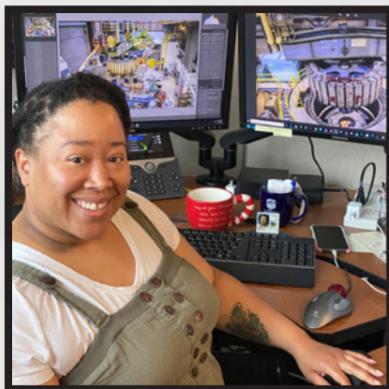


A camera is mounted above the catwalk at Yellowtail Powerplant.

When the Yellowtail Rewind Project began, Engineering Design Group Supervisor David Skinner tasked his staff to look into capturing time-lapse photographs of the process, monitored and controlled from the Missouri Basin Regional Office 90 miles away.

With the help of the Missouri Basin Information Technology staff, a method of controlling the cameras remotely was developed. Two cameras are mounted in the powerplant; one above a catwalk and the other above the office. They are connected to computers which can be accessed over the network. This allows Engineering Support team member Miesha Arnold to remotely monitor the cameras, change time-lapse and exposure settings, and take photographs in real time.

Daily photographs distributed to stakeholders keep everyone informed of the current state of the project. Photos can be used to show months or years of work



Miesha Arnold monitors the remote cameras and distributes photographs to key staff members in Reclamation.

in a short time-lapse video, which is a valuable tool in communicating the scope of work to internal staff or power customers. In addition, archiving the photos can be a valuable resource several decades from now when the rewind process will once again take place.



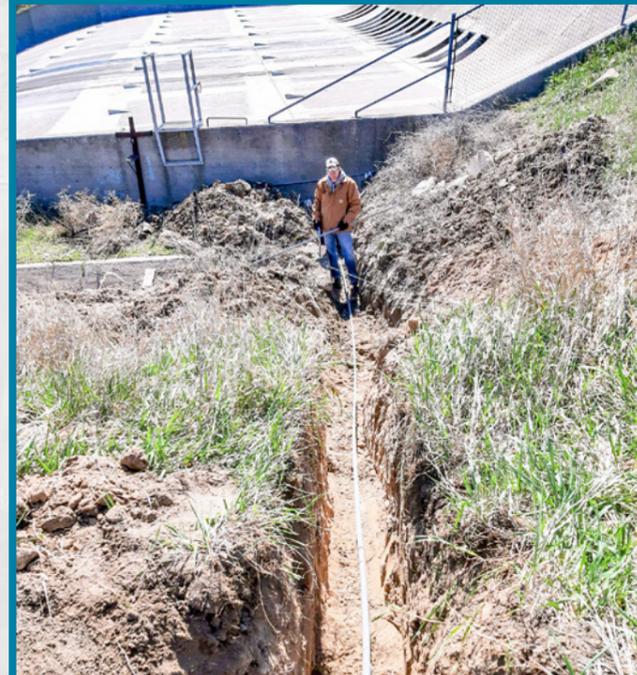
## NKAO Staff Perform Maintenance, Upgrades

### Box Butte Dam Spillway Concrete Repairs



NKAO maintenance staff assists the Mirage Flats Irrigation District with concrete repairs on the chute floor of the spillway.

### Kirwin Dam Communication Line Upgrades



NKAO electronics staff installs new communication cable to facilitate the remote monitoring and control of the NKAO SCADA system.

# St. Mary Canal Repairs Scheduled

by Public Affairs Staff

On Sunday, May 17, a concrete drop structure failed on the Bureau of Reclamation's Milk River Project St. Mary Canal, northwest of the town of Cut Bank in northern Montana, located completely within the Blackfeet Indian Reservation.

This concrete structure is the last of five drop structures that use gravity and siphons to convey water through the 29-mile long St. Mary Canal to the North Fork of the Milk River. Water is diverted into the canal from the St. Mary River, near Glacier National Park and supplies irrigation and municipal water to irrigators and communities along the Hi-line.

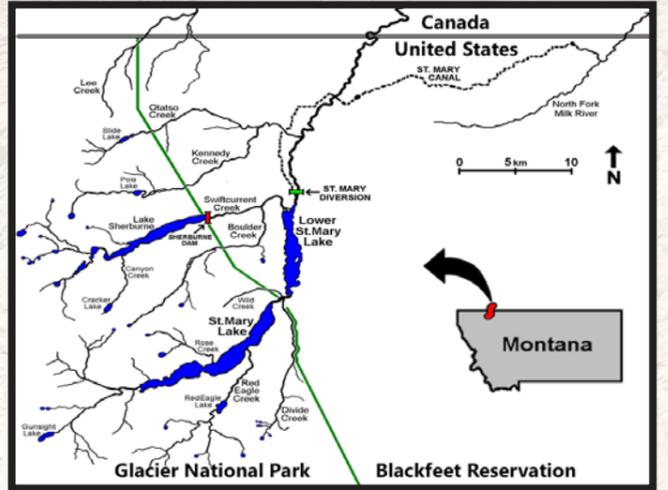
An engineering site inspection concluded that the complexities and costs associated with providing an interim solution to run water this irrigation season could not be justified, considering the anticipated costs and minimal gains in water supply. Subsequently, the decision was made to immediately replace the Drop 5 structure as well as Drop 2, another high risk drop structure, with the intent of completing construction by late this summer.

The permanent repairs for Drop 5 and Drop 2 structures are estimated to be approximately \$8 million. Multiple options for financing are being explored including extraordinary maintenance and emergency extraordinary maintenance funds under Public Law 111-11, State of

St. Mary Drop 5 prior to failure. (Reclamation photo)



Drop 5 after failure. (David Skinner)



Montana Bonding Authority funds, Bureau of Reclamation funds, and Project water user and Federal Government cost sharing possibilities.

The Milk River Joint Board of Control and HDR Engineering will manage the construction project which is scheduled to begin this summer. Sletten Construction Companies will perform the construction of the projects. No St. Mary River diversions will be made until all repairs are completed. If construction timelines are completed as scheduled, moving water in the fall of 2020 is considered possible. Fresno Dam and Nelson Reservoir currently have above average storage levels and will be used to provide irrigation deliveries into July. No municipal water shortages below Fresno Dam are anticipated.

Updates will be posted to the Montana Area Office website at <https://www.usbr.gov/gp/mtao/>.



# Arkansas Valley Conduit: History and Progress

by Elizabeth Jones



On August 16, 1962, President John F. Kennedy signed into authorization the Fryingpan-Arkansas (Fry-Ark) Act that allowed construction to begin upon one of our country's largest water diversion projects: The Fryingpan-Arkansas Project, or "Fry-Ark." Of the plentiful rivers flowing from the tops of the Rocky Mountains the two main rivers involved in this project are the Arkansas River, whose source basin lies in Colorado (in the Arkansas Valley) and flows both east and southeast through Kansas, Oklahoma and Arkansas; and the Fryingpan River, which runs east-west into the Roaring Fork River.

Diversion of the water from the western slopes across mountain passes required more than 20 years of construction to complete six storage dams, 17 diversion dams and structures, hundreds of miles of combined canals, conduits, tunnels, and transmission lines, two powerplants, switchyards and substations. It makes possible an average annual diversion of 69,200 acre-feet of surplus water from the Fryingpan River and other tributaries and provides an average annual water supply of 80,400 acre-feet for both municipal and domestic use (one acre-foot equals about 326,000 gallons, or enough water to cover an acre of land, about the size of a football field, one foot deep). Now, almost 50 years later, the final phase of the project is about to begin: building the last component of the Fry-Ark, the Arkansas Valley Conduit (AVC).

"The AVC is a critical piece of infrastructure that will deliver clean and reliable water to rural communities of southeastern Colorado so they can thrive and grow," said Bureau of Reclamation Commissioner Brenda Burman in response to U.S. Senator of Colorado, Cory Gardner's efforts to secure funding for the AVC in February.

"I am pleased that through hard work and collaboration at the local, state, and federal level, Reclamation and our partners are positioned to move quickly toward construction so that we can deliver water to the communities of the Arkansas Valley," said Burman.

Surface and groundwater in southeastern Colorado has a long-standing history of containing naturally occurring radium and uranium (which in doses too high, can be toxic to humans). Additionally, the high salinity of the water as well as the levels of selenium, sulfate, and manganese exceeds the Environmental Protection Agency's (EPA) safe drinking water standards. The AVC will provide a long-term water supply to over 50,000 people in 40 rural communities along the Arkansas River in southeastern Colorado.

"The Eastern Colorado Area Office (ECAO) is excited about this opportunity to bring much-needed clean drinking water to the residents of Southeastern Colorado, and is working closely with the Southeastern Colorado Water Conservancy District (Southeastern), as well as the dedicated team at the Technical Services Center in Denver, to ensure we move forward on this project as quickly as possible," said Jeff Rieker, ECAO manager.

The specific towns and rural communities that directly benefit from the construction of the AVC are within Southeastern boundaries of Colorado located in Pueblo, Crowley, Otero, Bent, Prowers, and Kiowa counties. The entire project will span 130 miles, so it will be built in stages and will have four physical segments: the Pueblo Dam to connection point; the connection point to Rocky Ford; Rocky Ford to Las Animas; and Las Animas to Lamar/Eads. The first construction contract is expected to be awarded in 2022.

(Continued on page 20)

# Fry-Ark and the AVC

1962

The Fry-Ark Project is signed into law by John F. Kennedy on Aug. 16. The next day, Kennedy comes to Pueblo and delivered a speech at Dutch Clark Stadium



1964

The Bureau of Reclamation starts construction on the Fryingpan-Arkansas Project beginning with the Ruedi Dam and Reservoir



1965

The Charles H. Boustead Tunnel is used to transport water from the western slope to the eastern slope of the Rocky Mountains



1981

Unit 1 of the Mt. Elbert Powerplant is made commercially available to the Western Area Power Administration; in October 1984 Unit 2 comes on line



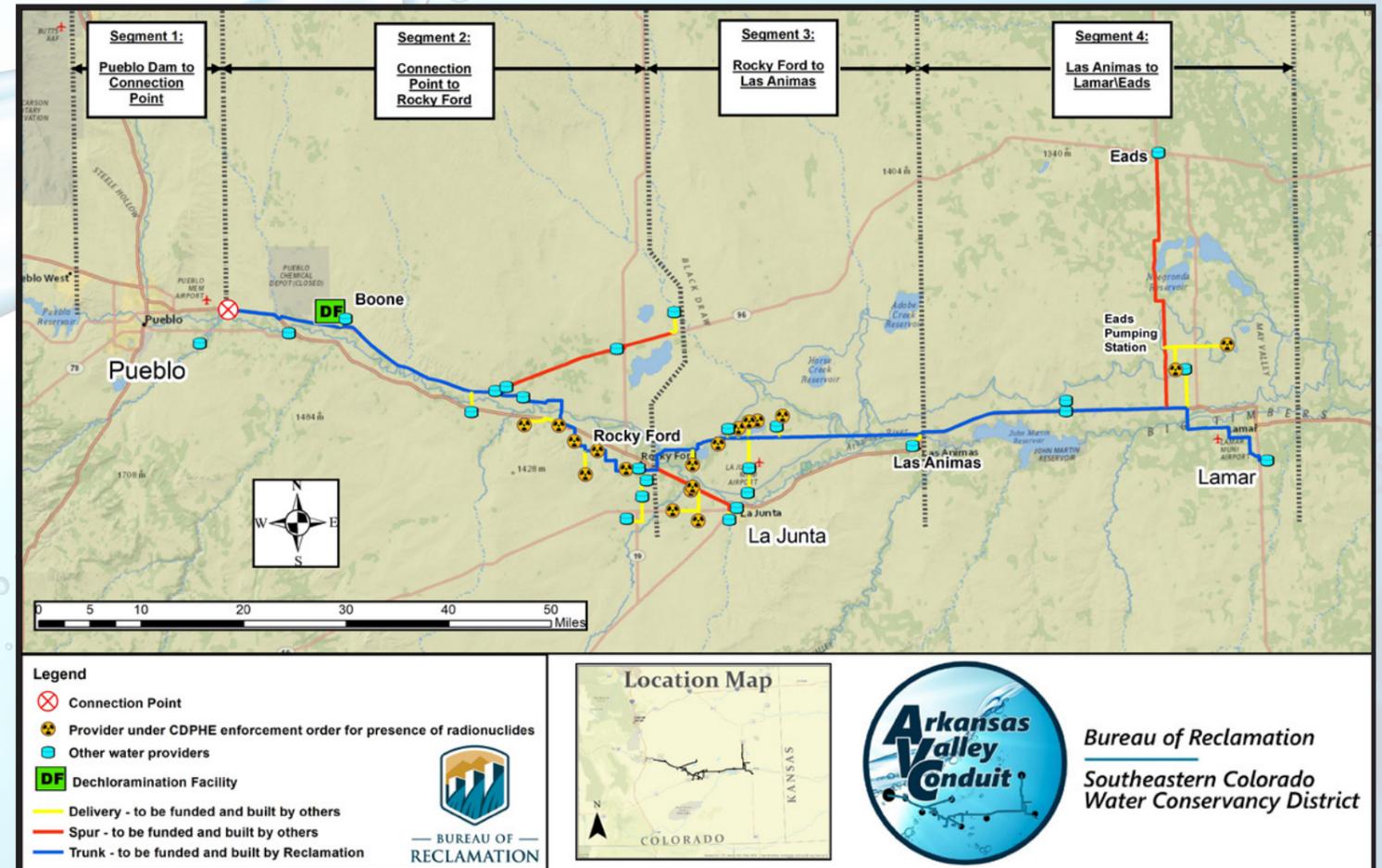
1990

The Project is paused after the completion and dedication of the Fish Hatchery at Pueblo Reservoir



2020

When completed the Conduit will deliver clean drinking water to approximately 50,000 people in southeastern Colorado



(Continued from page 18)

“The first reach of the pipeline will actually be through Pueblo, using existing infrastructure that is owned by the Pueblo Board of Water Works (Pueblo Water). One of the innovative features of this project is that southeastern realized Pueblo Water had excess capacity in its system and would be able to deliver treated water



*Pueblo Dam, origination point for the AVC.* (Adam Northrup)

at the eastern edge of its system,” explained Chris Woodka, Senior Policy and Issues Manager for Southeastern. Through

this collaborative effort between Reclamation and Southeastern, Pueblo’s existing distribution system can be safely utilized. Additionally, Southeastern’s efforts to secure funding for the project’s spurs and delivery lines reduces the total project costs and the need for Reclamation appropriations by \$286 - \$345 million.

Once the infrastructure at Pueblo Water is connected, the first service area of the AVC will be Boone (within Pueblo County), which is a small town of 350 residents that is about 12 miles away from the connection point with Pueblo Water. Both a delivery line and a break-point chlorination facility is planned to be constructed there, as well.

“Southeastern’s first job is to assist the town of Boone in hooking up once the trunk line reaches the town. We have had preliminary conversations with Boone’s hired engineering consultant on how to accomplish this,” explains Woodka.

As each town receives the new water delivery system, Southeastern will be ready to assist with both the set-up of equipment and the guidance and support of developing funding sources outside of Reclamation.

“We are excited about this approach, which we developed with Reclamation in 2019 through Value Planning workshops and subsequent meetings and conversations. This is a unique project, but one which has become more manageable through cooperation between the Southeastern and ECAO. We’re breaking new ground here in more than one way. I think people in the Arkansas Valley are very excited about this. They have waited for generations for AVC to be built, and once it is complete, it will serve generations to come,” said Woodka.



**Crossword Solution**

CAPTION WICKET  
 TH WILDLIFE PH CAN LE  
 R E E O O L E WATER  
 Y E L L O W T A I L C A T W A L K N B W  
 A O O L E B W  
 T T R T L B N C O V I D  
 E I K F L O O D R R N Y N D  
 N M T X G L A C I E R S D  
 E L E C T R I C I T Y C K D E  
 D O N N A C W Y O M I N G  
 C O N S O U T H E A S T E R N L K  
 P C P O N E F R E S N O U F I V E  
 P E T E N C T R A C O L O R A D O S I R  
 B R I D G E R P W A S L M T U  
 T R O T O R A R K A N S A S P E A D S  
 O U N B I R A D I O P U E B L O T  
 T C O N D U I T W I X R  
 E L Y  
 S C R O L L N E L S O N

# Flood Control: Reclamation’s Unsung Hero

By Brittany Jones

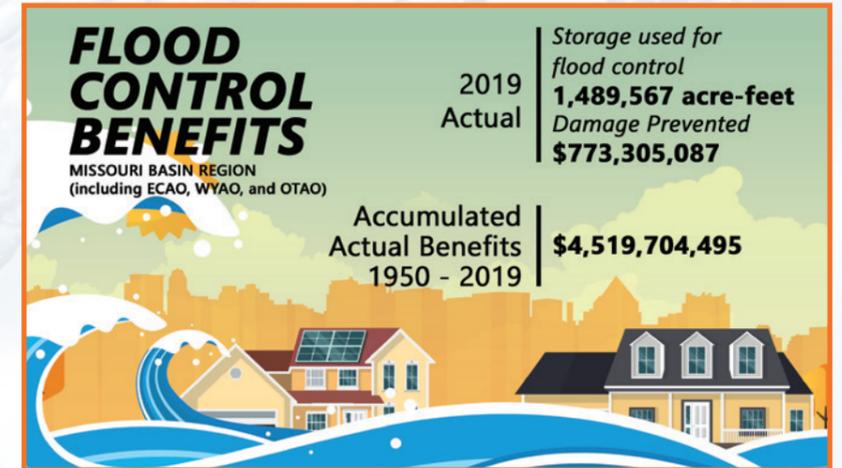
The Bureau of Reclamation supplies water and hydroelectric power to millions of families, farmers and businesses across the Western United States. However, a lesser known use of Reclamation facilities is to provide flood control benefits.

The Flood Control Act of 1944 originally authorized the Pick-Sloan Missouri Basin Program to plan for the conservation, control, and use of water throughout the Missouri River Basin.

“Many of Reclamation’s facilities are multipurpose projects that were designed to also include flood control capacity,” Dale Lentz, Civil Engineer in the Missouri Basin Hydrology and Water Operations Group said. “Flood control benefits can be realized immediately downstream of a project or for hundreds of miles downstream.”

Many dams have flood capacity built into them. This portion of a reservoir is reserved for regulating flood events and reducing downstream flood damage. When Reclamation’s reservoirs move into the exclusive flood pool, the U.S. Army Corps of Engineers operates all the dams in the basin as a system to provide maximum flood benefits.

In spring 2018, Reclamation’s pool of water in Bighorn Lake and Boysen Reservoir, along with its regulation of the waters of the Bighorn River downstream of Yellowtail Dam, prevented flooding in excess of 15,000 cubic feet per second (cfs). This is equal to an olympic swimming pool being released about every six seconds. This was not the only time in recent history that Reclamation prevented or lessened the catastrophic effects of flooding. In a three-month period during the spring of 2019, the Missouri River experienced abnormally high flow events due to snowmelt and heavy rainfall that led to flooding in multiple states across the basin. According to Climate Signals, a non-profit science information project, the flooding event set record river levels at 42 locations across six states.



The flooding destroyed homes and businesses and closed long stretches of roadways across the Plains and Midwest. However, the flooding impacts could have been far worse.

“During this time, all Missouri River headwater projects authorized for flood control held back flood water to help alleviate flooding along the lower Missouri,” Lentz said.

Specifically, the Jamestown Dam in North Dakota saved the nearby town from extreme flooding because Reclamation held back water in the exclusive flood pool for approximately 11 months.

Because of the actions taken by Reclamation and its managing partners, Missouri Basin Region projects prevented more than \$773 million in flood damages in 2019 alone and have thwarted a total of \$4.5 billion overall since 1950.

The multi-purpose use of many dams continues to serve the foresight of Reclamation’s creator, President Theodore Roosevelt who once said, “Do what you can, with what you have, where you are.”



# 2020 Photo Contest Open for Entries

By Darryl Asher

As Missouri Basin Region employees, we are fortunate to work in some interesting places (including our own homes) in a beautiful part of the country. The annual Missouri Basin Photo Contest reflects this through the keen eyes of the team members who submit their photographs.

The submitted photos cover a wide range of subjects, activities, and interests. Past entries have captured everything from serious work activities to whimsical moments; from natural scenery to impressively engineered structures. Contest entries from previous years can be found on the Missouri Basin website.

You can submit your best shots for this year's contest until Friday, September 27 for a chance to be featured in the 2020 Missouri Basin Calendar as well as other materials. Just go to <https://intra.gp.usbr.gov/tmp/exif.htm> and fill in the appropriate information.

Here are a few simple rules: **IMAGES:** Please provide the highest resolution image you have. If your camera allows shooting at different resolutions, set it to the highest one. We want your photos to look their best, so basic editing, such as

adjusting color, contrast, and cropping is fine, as long as it does not affect the authenticity of the photo. Please avoid over-use of "filters," or advanced editing and manipulation, including the adding or removing of significant elements. Please turn off the time/date stamp feature on your camera for images you have not yet taken.

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

**SUBJECT:** All photos must be related to a Missouri Basin Region facility, or feature activities, people, scenery, or wildlife on MB Region lands.

**NUMBER OF ENTRIES:** There is no limit on the number of photos you can enter. However, we may limit the number put up for voting based on quality.

**DEADLINE:** All photos are due by close of business Friday, September 27.

If you have any questions, please contact Darryl Asher at [dasher@usbr.gov](mailto:dasher@usbr.gov) or (406) 247-7608.



Photo: A Beautiful day on Pathfinder Reservoir (Kim Korkow)

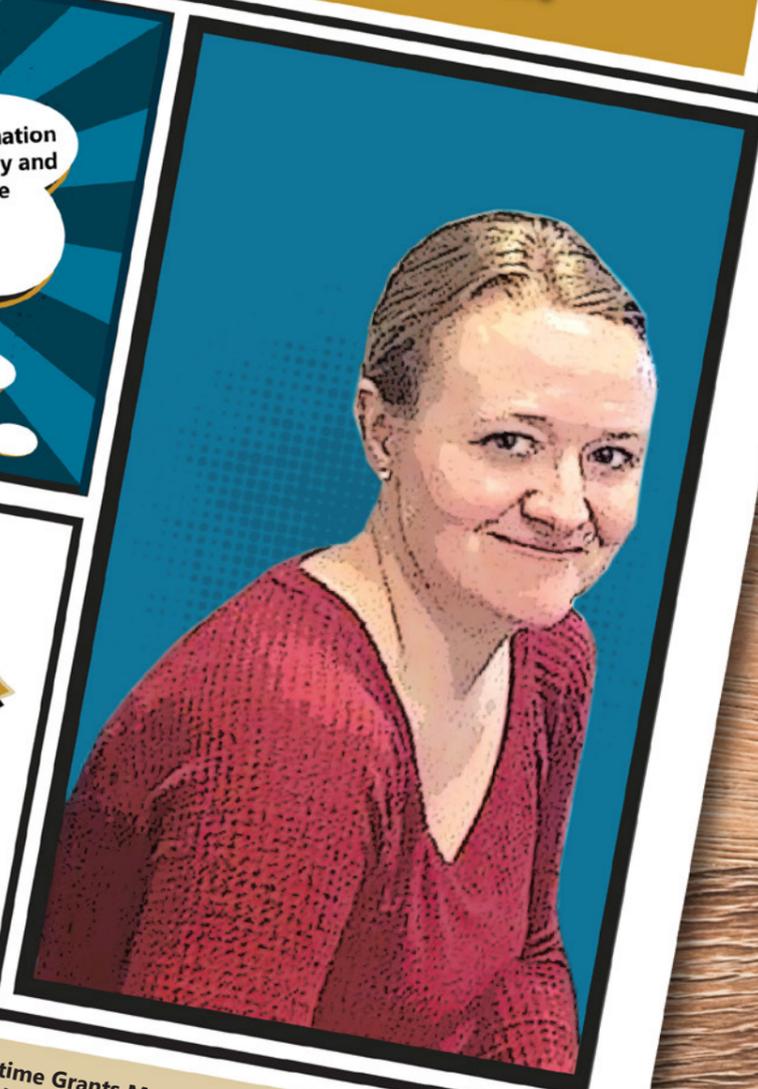


## PATHWAYS

Thrilling Tales of Adventure in the Missouri Basin

Even in my short time at Reclamation I already feel like part of a family and know that I will always have a home here.

WATER



**R**hiannon Briggs was recently hired as a full-time Grants Management Specialist at the Missouri Basin Regional Office Financial Acquisitions department after completing a Pathways internship in March 2020. She supports the grants management staff by conducting file reviews, completing and organizing undelivered order reports, and ensuring the timely reporting of monthly credit card statements. "The most valuable thing that Reclamation has taught me is to always ask for help," Briggs said. My teammates are always willing to help and go above and beyond to make me feel welcome, no matter how many times I ask the same question."

# Reclamation Works with Other Agencies for Bull Trout Protection and Recovery



By Brittany Jones with Lauri Teig

Bureau of Reclamation staff, the U.S Fish and Wildlife Service (FWS), and the Blackfeet Tribe work cooperatively to track the movement and behaviors of bull trout (Salvelinus confluentus) populations in the St. Mary Recovery Unit in Montana. The information gained from studying the fish is used to implement new ways to aid in the recovery and protection of this federally threatened species.

Bull trout were listed as a threatened species in 1999 under the Endangered Species Act. According to FWS, the most significant primary threat factors affecting bull trout include historical habitat loss and fragmentation, interaction with nonnative species, and fish passage issues.

Bull trout appear to have the most specific habitat requirement of all the North American salmonids with distribution and abundance controlled by key habitat characteristics that include the “Four Cs” for ideal reproduction and survival rates:

- **Cold:** Bull trout thrive best in waters ranging in temperatures from 53.6 – 57.2 degrees Fahrenheit.
- **Clean:** They flourish in unpolluted waters with minimal sedimentary residue.
- **Complex:** Bull trout prefer diverse environments including various water depths, undercut banks, and an abundance of logs for protection or finding prey or other nutrients.
- **Connected:** Their habitats must connect to other rivers, lakes, or oceans to facilitate proper migration for feeding and spawning every year.

The cooperative team currently tags and tracks the movements and behaviors of bull trout populations inhabiting the St. Mary Recovery Unit using Passive Integrated Transponder (PIT) technology. To assess the degree of fish movement among the various St. Mary tributaries, PIT tags are injected into the dorsal musculature (directly below and parallel to the dorsal fin) of bull trout. The PIT tags are small chips and antennas housed in glass that are inserted into the

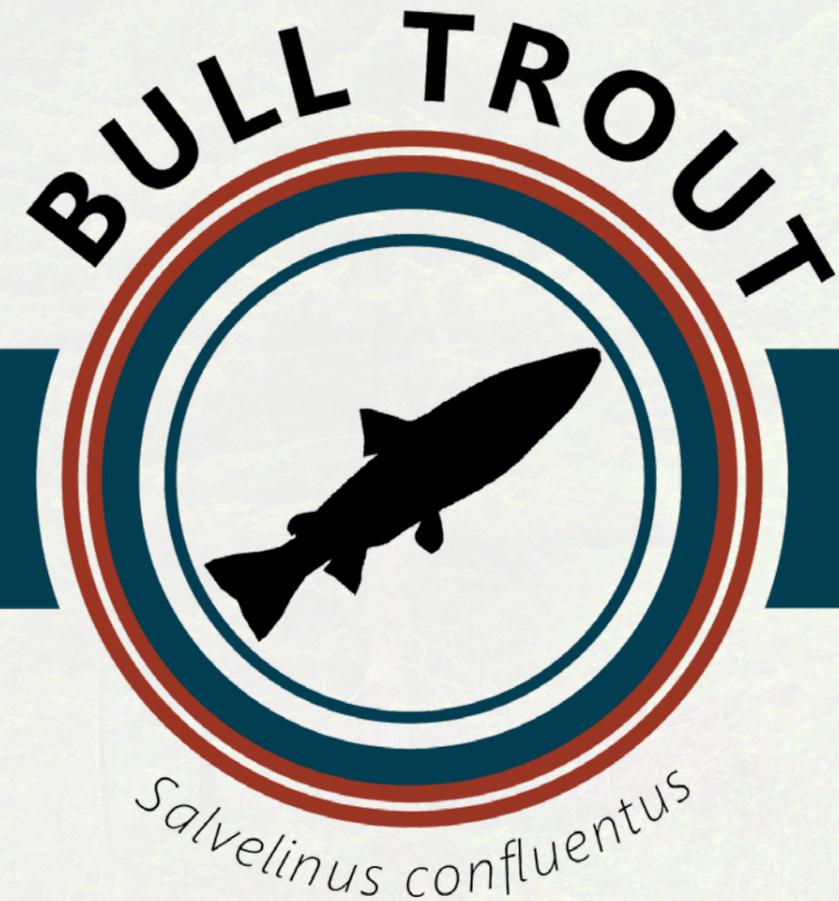
fish using a needle. The tags have been commonly used in the scientific research of fish and wildlife since the 1990s to determine trends in population growth, mortality rates, migration patterns, and food chain information. The tags do not require a power source to operate and use radio signals to transmit data to a scanning device or reader system.



An article published in the Animal Biotelemetry journal states innovations are still needed to create smaller tags and improved tracking across large areas or challenging environments. Furthermore, an article published in the Nature Education journal theorized a supplemental opportunity to use eco-tourism to report tagged fish in support of data collection.

Reclamation’s Research and Development office manages the Science and Technology Program. One of the Regional Director needs in the 2021 Call for proposals was to expand the PIT tag antenna equipment in the St. Mary Basin to better inform mitigation measures associated with Reclamation’s Milk River Project. Eric Best with Reclamation’s Technical Service center will submit a research proposal to expand this research.

*Do you have an idea for how we can improve our tracking of movement and behavior of the bull trout population within the Missouri Basin Region? Please contact Eric Best at EBest@usbr.gov.*



**Status** | Threatened

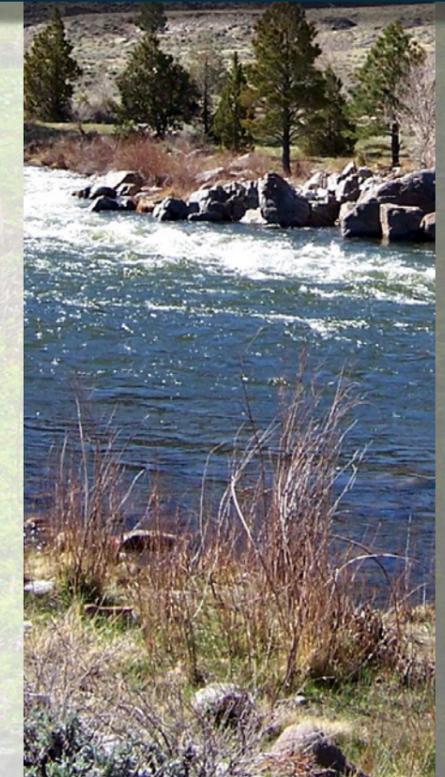
**Habitat** | Streams and lakes in western North America

**Decline** | Habitat degradation, competition with exotic fish, dewatering of streams during irrigation season, and irrigation diversion structures

**Help** | An opportunity exists to expand the use of PIT tag antenna equipment to better inform mitigation measures associated with the Milk River Project

# RECREATION

289 developed areas • 6.5 million acres of land and water • 549 campgrounds • 454 boat ramps • 5,500 miles of shoreline • 12,000 RV sites • 500 day use areas



**BELLE FOURCHE RESERVOIR**  
South Dakota

Itching to get outdoors after staying home all spring? Belle Fourche Reservoir offers 8,000 acres of water surface, 6,700 acres of land and 58 miles of shoreline.

**RUEDI DAM & RESERVOIR**  
Colorado

Ruedi will celebrate its 56th anniversary on July 21, 2020. Make some summer memories hiking or fishing at one of the most beautiful locations in the Missouri Basin Region.

**CANYON FERRY RESERVOIR**  
Montana

Ready for a weekend getaway? Canyon Ferry has increased access to some overnight camping sites, boat launching ramps are open where accessible, and all day use areas are open!

**BOX BUTTE RESERVOIR**  
Nebraska

Do you enjoy bird watching? More than 200 different species of birds have been spotted at Box Butte since 1973.

**LAKE THUNDERBIRD**  
Oklahoma

Lake Thunderbird has extensive recreation facilities including campsites, boat ramps, biking trails, picnic areas, two marinas, restaurants and riding stables.

**MIRACLE MILE RECREATION AREA**  
Wyoming

Miracle Mile features an excellent Blue Ribbon fishery, no-fee primitive camping for tents and RVs, and gorgeous scenery.

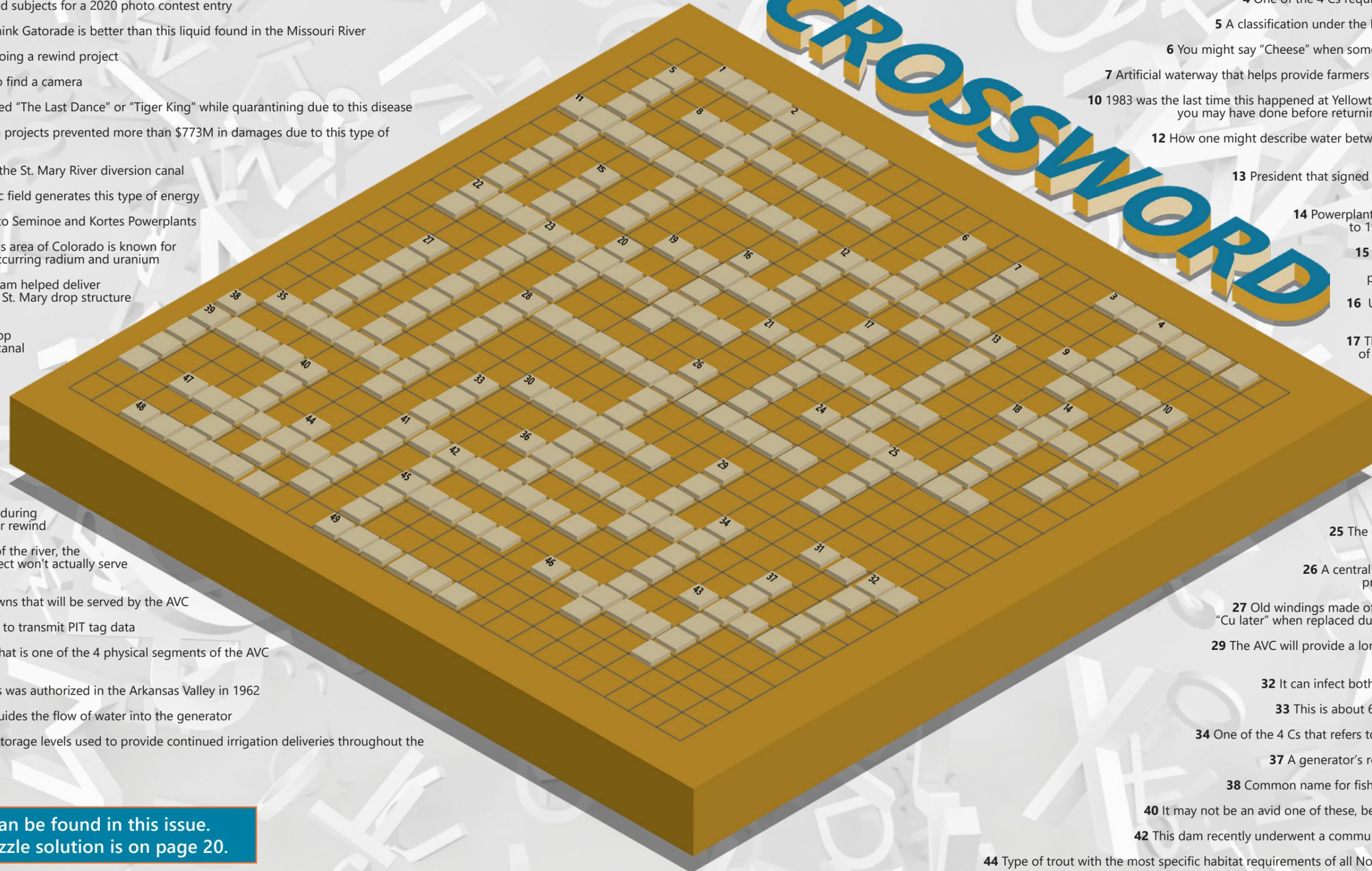
ACROSS

- 1 Informative text accompanying a photo; required for the photo contest
- 3 24 of these gates control the flow of water through each of Yellowtail’s generators
- 8 One of the authorized subjects for a 2020 photo contest entry
- 9 The Florida Gators think Gatorade is better than this liquid found in the Missouri River
- 11 Powerplant undergoing a rewind project
- 12 An unusual place to find a camera
- 18 You may have binged “The Last Dance” or “Tiger King” while quarantining due to this disease
- 19 In 2019, MB Region projects prevented more than \$773M in damages due to this type of disaster
- 21 National Park near the St. Mary River diversion canal
- 22 A rotating magnetic field generates this type of energy
- 24 State that is home to Seminoe and Kortez Powerplants
- 28 Ground water in this area of Colorado is known for containing naturally occurring radium and uranium
- 30 Storage from this dam helped deliver irrigation water after a St. Mary drop structure failure
- 31 Total number of drop structures at St. Mary canal
- 35 Type of crane used during Yellowtail rewind
- 36 The Arkansas Valley Conduit will serve communities in the Southeastern part of this state
- 39 It rests on a maintenance pedestal during one part of a generator rewind
- 41 Despite the name of the river, the new AVC pipeline project won’t actually serve people in this state
- 43 One of the rural towns that will be served by the AVC
- 45 Type of signal used to transmit PIT tag data
- 46 Name of the dam that is one of the 4 physical segments of the AVC project
- 47 Construction of this was authorized in the Arkansas Valley in 1962
- 48 Type of case that guides the flow of water into the generator
- 49 Reservoir with full storage levels used to provide continued irrigation deliveries throughout the Milk River Project area

DOWN

- 2 This allowed Reclamation employees to continue operations during the COVID-19 pandemic “stay at home” period
- 4 One of the 4 Cs required for happy bull trout
- 5 A classification under the Endangered Species Act
- 6 You might say “Cheese” when someone takes one of these
- 7 Artificial waterway that helps provide farmers with water for irrigation
- 10 1983 was the last time this happened at Yellowtail Dam, and something you may have done before returning a VHS to Blockbuster
- 12 How one might describe water between 53.6 – 57.2 degrees Fahrenheit
- 13 President that signed the Fryingpan-Arkansas Act into authorization
- 14 Powerplant constructed from 1947 to 1952 in central Wyoming
- 15 \_\_\_-lapse photography tracks progress, preserves data for future
- 16 Uranium and radium are \_\_\_ substances
- 17 The removal of this piece of equipment may remind some basketball fans of a March Madness tradition
- 20 Passive Integrated Technology
- 23 This type of habitat facilitates fish migration
- 25 The contents of this river do not match its name
- 26 A central North Dakota dam that provides flood protection
- 27 Old windings made of this material might say “Cu later” when replaced during a generator rewind
- 29 The AVC will provide a long-term water supply to 40 \_\_\_ communities
- 32 It can infect both computers and people
- 33 This is about 600 cfs at St. Mary Canal
- 34 One of the 4 Cs that refers to a diverse environment
- 37 A generator’s rotor sits within this core
- 38 Common name for fish in the Salvelinus family
- 40 It may not be an avid one of these, because it weighs 36 tons
- 42 This dam recently underwent a communications cable upgrade
- 44 Type of trout with the most specific habitat requirements of all North American salmonids

CROSSWORD



All answers can be found in this issue.  
Complete puzzle solution is on page 20.

# ***Back in Reclamation History***

Construction of the Boysen Powerplant took place from 1947 to 1952 in central Wyoming. This photo shows construction of the scroll case, which guides the flow of water into the generator. (*USBR Photo*)



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