RECLAMATION
Managing Water in the West

Winter 2013-2014

Plains Talk

NEWS FROM THE GREAT PLAINS REGION

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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 406-247-7610.

Cover: The scene below the Big Thompson Siphon several days after the peak of the Colorado flooding in Sept. 2013.

Back Cover: Maintenance at Shoshone Power Plant.

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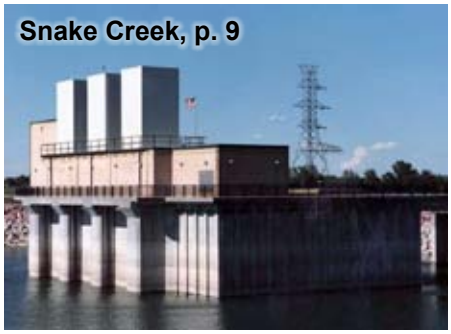


contents

ECAO Bounces Back From Historic Flooding

(Top) Road entering the Big-Thompson Canyon during the Colorado flooding Sept. 2013. (Bottom) Dille Dam during the flood the morning of Sept. 13.

ECAO Staff Report

In September 2013, a series of heavy rainstorms from the Gulf of Mexico stayed stationary against the Continental Divide, impacting much of northeastern Colorado.

From September 9-16, rain fell in record amounts, elevating the region from drought status to above average seasonal precipitation.

The area of Estes Park received nine inches of rain in a 24-hour period between midnight September 11-midnight September 12.

The east slope of the Colorado-Big Thompson Project runs through this region of the state.

Several of ECAO's C-BT facilities were impacted: East Portal, Lake Estes, Pole Hill Afterbay, Little Hells Diversion Dam, Dille Diversion Dam, Big Thompson Siphon and the Big Thompson Power Plant.

During the storm, Reclamation operated the C-BT in accordance with the Emergency Action Plan.

On September 16, ECAO activated a Damage Assessment and Recovery Team to assess and rehabilitate C-BT facilities impacted by the storm and flood.

"The first thing we learned," said Monica Griffitt, ECAO's Chief of Engineering, "was that the East Slope of the C-BT was partially operational, but we had our work cut out for us."

Wind River had rerouted itself around East Portal, overflowing its culvert and running directly into the small afterbay.

Little Hells Diversion Dam, located below a rock-cut out designed to reroute the north fork of the Little Thompson River away from Pole Hill Power Plant, saw native rain run-off flows of over 200 cubic-feet-per-second.

Typically, native flow in the small canyon is less than 10 cfs.

The 200 cfs had cleared decades of trees and undergrowth from below the dam and washed debris into the power plant's afterbay.

The most telling impacts were at the facilities at the mouth of the Big Thompson Canyon.

Little Hells Canyon reached 200 cfs during the flooding, effectively clearing vegetation downstream of the dam.

More than eleven feet of sediment was deposited by the flood across the mouth of the canyon.

The sediment buried the tail race at the Big Thompson Power plant and the trunk of a tree was driven part way through the plant's upstream side.

Sections of Highway 34 broke away from the retaining wall and wrapped partially around the pier of the Big Thompson Siphon.

The Siphon, a 220-foot pipe that carries water from Flatiron to Horsetooth Reservoir, spans the canyon mouth.

For Reclamation, one of the most striking images from the flood was that of Dille Diversion Dam in the "Narrows" section of the canyon.

It took several weeks for flood waters in the Big Thompson River to recede enough for safe access to the site. Once access was possible, a full assessment of Dille's true condition was conducted.

"After each facility assessment was complete, our next step was to draft a plan of action for repair," Griffitt said. "For facilities like East Portal, this was done immediately and Wind River was rechanneled to its rightful place within a handful of days," she said.

"We were able to clear debris from the Pole Hill afterbay almost immediately. But for other facilities, like Dille and the Big T plant, long term work is being planned."

Part of what made repair and rehabilitation efficient was a strong support network.

"We had support from across Reclamation," Griffitt said. "Fry-Ark O&M staff came over from their facilities to spend days at a time assisting their C-BT counterparts.

"Staff came from Billings and Denver to conduct assessments; and the Provo Team from the Upper Colorado Region detailed to our office to help clear debris and repair access roads."

By December, short term repairs were completed, and the C-BT Project resumed operations December 12, 2013.

"Considering the magnitude of the flooding, our work came together in relatively short order," Griffitt said. "Team work is what really pulled us through."

The Colorado-Big Thompson P

Flood of 2013

Horsetooth Reservoir

Fort Collins

Loveland

Pole Hill

Flatiron

Pinewood Reservoir

Carter Lake

Dille Diversion

Big Thompson Power Plant

Big Thompson Siphon

Simplified Project Overview with Impacted Facility Images

N

0 1 2 5 10 miles

power plant

project canal, conduit or tunnel for water delilivery

Area of Detailed Map

September 20, 2013

RECLAMATION
Managing Water in the West

SNOWED IN

An early October snowstorm blanketed the Black Hills, South Dakota, area with between 19 and 55 inches of snow. Rapid City set a record for a single-day snowfall of 13.4 inches on Friday, October 4. Reclamation reservoirs experienced vastly increased inflows as a result of the storm and were carefully monitored. These images show the Rapid City National Weather Service Office and parking lot during the storm.

Diamond Creek Shines with New Pump Motors

(Above) Workers guide electrical cables as the pump assembly is lowered into place at the Diamond Creek Pumping Plant, near Buffalo Bill Reservoir in northwestern Wyoming.

By Jay Dallman, WYAO

Two worn out pump/motor assemblies were replaced this year at the Diamond Creek Pumping plant adjacent to Buffalo Bill Reservoir in northwestern Wyoming.

The most recent replacement was accomplished during the week of September 23.

When Buffalo Bill Dam was raised 25 feet in the late 1980s and early 1990s, Diamond Creek Dike was constructed to prevent flooding in the Irma Flat residential area on the reservoir's east side.

Diamond Creek Dike is 7,700 feet long and has a crest elevation of 5412 feet. The dike impounds the reservoir on its west side and captures natural drainage and irrigation return flows on its east side in Diamond Creek Pond. Diamond Creek Pond's drainage basin is approximately 15 square miles and average irrigation season inflows are approximately 35 cfs.

The normal pond surface elevation is maintained at elevation 5340.0 feet (more than 50 feet lower than a full conservation pool in Buffalo Bill Reservoir) by Diamond Creek Pumping Plant.

(Above) The crew lowers the pump assembly into the well (looking south along the east face of Diamond Creek Dike).

There are five pump/motor assemblies at the pumping plant. Each pump/motor assembly is a 125 horsepower, 480 volt, linear induction motor design.

Each unit is capable of pumping 5,600 gallons per minute (12.5 cubic feet per second). Total pumping plant capacity is 62.5 cubic feet per second if all five pumps are on-line and operating at full capacity.

The pumping plant provides the only means of maintaining the pond elevation and evacuating Diamond Creek flood volumes into Buffalo Bill Reservoir.

In addition, the pond serves as a sump to help minimize groundwater problems in the surrounding areas.

Unfortunately, the pump/motor assemblies are prone to failure.

They can last up to several years, or, they may last less than a year. The pump/motor assemblies are long-lead-time procurement items and take approximately 4 to 6 months for delivery once a contract has been awarded to a vendor. For this reason, WYAO keeps two spare assemblies in stock.

One of the spares was utilized this past July to replace a failed assembly. The second spare was installed during the week of September 23 to replace another failed assembly.

Replacement of a pump assembly is accomplished in-house by WYAO personnel.

Heavy equipment operator Dave Kuehl transports the Grove Crane up to Cody from Casper. He then assists Buffalo Bill O&M Personnel with the replacement which usually takes several days.

Bighorn Basin Facility Manager Mark Skoric emphasized the importance of a team effort.

"WYAO Operations and Maintenance personnel must work together as a team in order to install a new pump assembly as quickly as possible to restore critical pumping plant capacity," Skoric said.

With each pump assembly replacement, Skoric's team is becoming more familiar with the Diamond Creek Pumping Plant and gaining valuable experience. Their knowledge and skills related to plant maintenance will ensure continued reliable operation of the plant well into the future.

(Above) Crews inspect the pump assembly prior to installation.

OTAO Archeologists Recover Ancient Mammoth

(Above) Mammoth remains recovered at Foss State Park, Oklahoma.

By Kate Ellision, OTAO

On Nov. 12, 2013, the Foss State Park Manager notified Reclamation's Oklahoma-Texas Area Office (OTAO) that a local resident had found portions of an exposed mammoth skull and tusks on the shoreline at Foss Lake in Oklahoma.

The remains had been exposed due to record low water levels caused by current drought conditions.

On Nov. 14, OTAO archeologists Kate Ellison and Bob Blasing accompanied State Park employees to the site to confirm that the remains were indeed that of a mammoth.

Reclamation has a five year cooperative partnership with the Oklahoma Archeological Survey (OAS) at the University of Oklahoma (OU), to protect or recover human and cultural remains that are exposed or endangered in unanticipated emergency situations.

A new modification was issued under this agreement for the excavation, evaluation and possible recovery of the mammoth remains.

On Dec. 11, 2013, Dr. Lee Bement and a crew of students from OU began excavation.

Archeologists Kate Ellison and Bob Blasing from Reclamation's OTAO assisted as well as person-

(Above) OTAO Staff, OU team and Foss State Park employees excavate mammoth remains discovered at Foss State Park, Oklahoma.

nel from Foss State Park.

It was determined by Dr. Bement that the remains belonged to a young Columbian mammoth.

Columbian mammoths were herbivores, eating varied plants ranging from grasses to conifers.

This particular species lived in the area from 11,000 to 30,000 years ago.

After testing parts of the skull and the surrounding soil, a more exact date may be reached.

The mammoth remains were found in the lake bed, which has been covered by water since 1960 until the drought of the last three years.

With an estimated weight of 600 lbs, removing the skull out of the excavation unit would prove a challenge.

A State Park employee skillfully used a backhoe to lift the skull out of the ground.

All of the mammoth remains were taken out of the excavation, and trenches were dug on all four sides to see if any other remains were there.

Nothing else besides the skull and tusks were found; the entire area was filled back in on Dec. 16.

The mammoth remains and a separate soil sample were brought back to the OAS for cleaning and testing to determine age.

The original locator of the remains turned in the mammoth tusks, teeth, and other bones collected at the lake.

For more information about the Columbian mammoth, visit: http://en.wikipedia.org/wiki/Columbian_mammoth.

Mammoth display at at the Royal British Columbia Museum, Victoria, British Columbia.

Dakotas Snake Creek Pumping Plant Revitalized

Snake Creek Pumping Plant prior to beginning the demolition and reconstruction of the brick walls. The plant is located on Lake Sakakawea north of Bismarck, ND.

By Patience Hurley, DKAO

Reclamation awarded a $3.2 million contract to Graycon Corp. of Loveland, Colo., to replace the Snake Creek Pumping Plant brick walls and roof.

The process of demolition and reconstruction is expected to continue through January 2014.

"The brick walls and roof replacement are critical to assure the pumping plant retains its integrity into the future," said Dakotas Area Office Area Manager Dick Long.

"The extent of damage to the brick could no longer be repaired and needed a total replacement to ensure continued operation of the pumping plant."

Reclamation began pumping water into Audubon Lake May 14, filling the lake to an elevation of approximately 1847.2 feet in an effort to maintain acceptable lake levels throughout the demolition and construction.

Reclamation discontinued pumping water into Audubon Lake during the work on the pumping plant, as the construction left the pumping plant inoperable since this initial spring pump-

Nov. 2013 - Extreme weather conditions made working conditions challenging at Snake Creek Pumping Plant

ing. Based on water loss and evaporation, and water deliveries to irrigators through the McClusky Canal, Audubon Lake has receded to elevation 1845.2.

The pumping plant pumps water from Lake Sakakawea into Lake Audubon and serves irrigators and provides fish and wildlife benefits. In addition, the plant pumps water for the Chain of Lakes Area.

The only impacts were anticipated to include dock owners on Lake Audubon needing to move their docks closer to the lake as water levels declined throughout the summer.

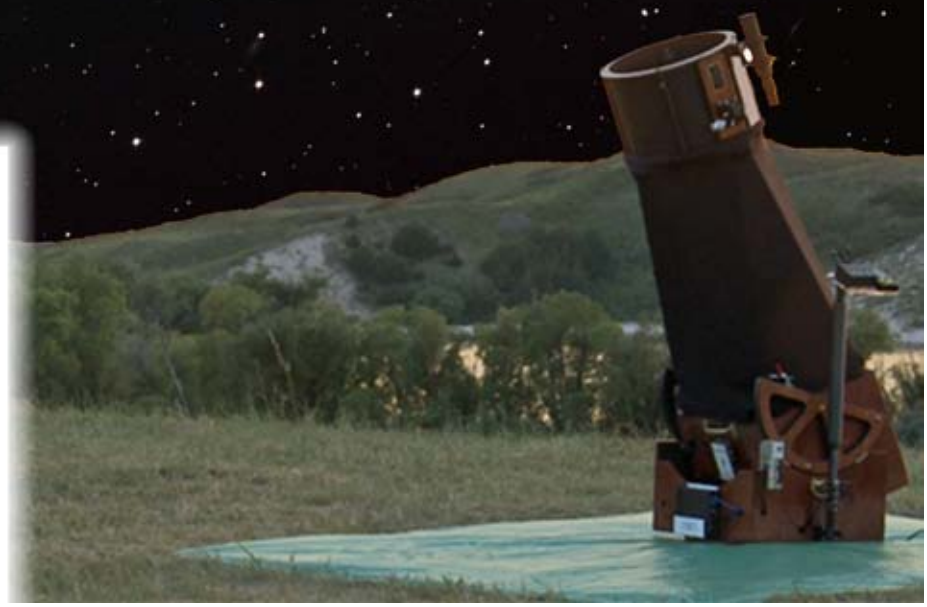
Boaters were also encouraged to pay extra attention to unexpected shallow areas rarely seen on the lake.

Normal pumping operations will resume in 2014.

June 2013 - Snake Creek Pumping Plant modifications to brick masonry walls and steel structure.

The Darkest Skies in the Country

Story Originally Published on 1011now.com, Lincoln, Neb.



Astronomy and outdoor enthusiasts gather every year at the Nebraska Star Party, located in the Sand Hills in Cherry County, Neb. This area is known to have some of the darkest skies in the country, offering some of the best views the night sky has to offer.

By Zach Thompson

It's a party like no other and one of cosmic proportions.

The Nebraska Star Party is the meeting ground for astronomy and outdoor enthusiasts and celebrates an important milestone this year.

Come out to the Sandhills of Nebraska, in Cherry county, and you will see more stars than you've ever seen in your life.

That's because these are some of the most clear and dark skies in the country. And for one week in August, this is where the Nebraska Star Party happens.

For founder Tom Miller, this is the perfect spot to look at the night sky.

"I looked at a dark sky map and this was like a black hole on that map! We checked the place out and we couldn't even find the road or see our car. You can't get much darker than that."

Merritt Reservoir, just south of Valentine, was the designated place for the party and it's been going strong for 20 years now; drawing people from all across the country all looking for the same thing.

"Two words: 'dark skies'", says Jim Hopkins of Illinois. "I live in light-polluted Chicagoland and this is a place where you can actually find the objects that you know are in the sky, that you can't see when you're in Illinois. So it's worth the 740 mile drive, which I've made for 10 years in a row, to see these dark skies."

These skies are so dark that under the best conditions, the Milky Way Galaxy has been known to cast shadows.

But there's more to the Nebraska Star Party than just observing dark skies. It's also about getting people excited about astronomy while meeting new friends who share that same love for the final frontier.

It's for these reasons that a star much closer to home, Nebraska's own astronaut Clay Anderson, is checking out these dark conditions.

"I can only imagine what it might be like for a young kid to come out here and see the Milky Way and see the Space Station pass over; to see meteors and planets," says Anderson. "I just think it's a wonderful experience for all kids. And like me, back in Ashland, Nebraska, looking through a telescope is what got me excited about space."

Cherry county isn't the only place in Nebraska to enjoy the night sky. Go out on a clear evening away from town or city lights and just watch and wait. Check out astronomy clubs in your area to learn about what's up in the night sky. Because it's when the sun disappears below the horizon and the sky begins to light up under a mosaic of constellations and cosmic wonders, that we understand our place in the ever-unfolding story of the Universe.

MTAO Supports Day of CARING 2013

(Above) Anthony Chavez and Kathy Samuelson volunteer at the annual Day of Caring event in Billings, Mont.

Montana Area Office employees Kathy Samuelson and Anthony Chavez are no strangers to volunteering. They got the volunteer bug early in their professional careers, while serving in the military, having logged hundreds of hours of volunteer service both in the U.S. and abroad.

So, when St. John's Lutheran Ministries asked for assistance through the United Way Day of Caring, it was no surprise that both Samuelson and Chavez would answer the call.

The 2013 Day of Caring event took them to St. John's Lutheran Ministries Senior Center to participate in the 50th anniversary of "The Amazing Walk".

The volunteers were paired with two residents, Mildred and Donna, who were very excited to get their Amazing Walk underway and enjoy the beautiful Montana day.

Kathy and Anthony assisted Mildred and Donna on a one-mile walk around the St. John's campus stopping every 500 feet, at a prescribed location, for health information, treats and fun prizes.

The afternoon was filled with laughter, deep thought, and assurance that both will be back next year to participate in this great opportunity to support the community.

Both Chavez and Samuelson expressed their appreciation for MTAO allowing them the opportunity to take time off from work.

The Day of Caring is an excellent way for Reclamation employees to give back to the community. This year the "Day of Caring" event celebrated 21 years of service, with 708 volunteers and 73 projects across Yellowstone County, totaling 1,827 hours of volunteer service.

In one day, 35 non profits received a total of $40,460.85 worth of volunteer impact.

Discover Our Shared Heritage Travel Itinerary

Shoshone Chosen for CyArk and NPS Website

Shoshone Power Plant is among Reclamation's projects listed on the National Park Service website designed to provide online tourism. Each itinerary listed is a self-guided tour to historic places, most listed in the National Register of Historic Places. The entries spotlight different communities, geographic regions and themes across the country, and expose on-line visitors to a variety of places significant in American history, architecture, archeology, engineering and culture.

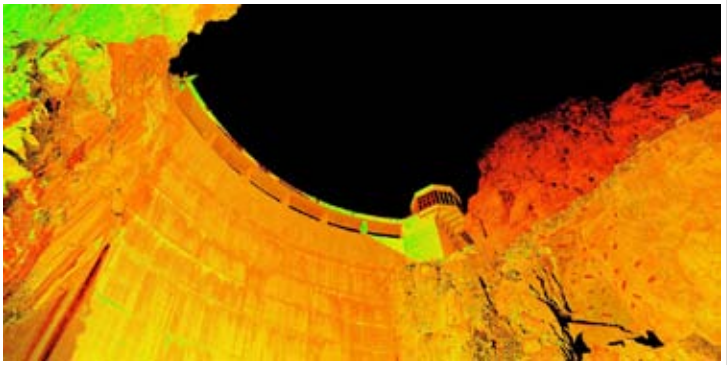
"Reclamation approached the Park Service about highlighting some of their engineering landmarks in the Shared Heritage Travel Itinerary," said Christina Dickinson, a historian for the National Park Service.

"Together Reclamation and NPS chose ten hydroelectric sites to illustrate power development in the western United States, ranging from early plants like Minidoka in 1909, to Freemont Canyon built in the 1960s," said Dickinson. "Shoshone was chosen because it was built in the 1920s to provide power for construction of another Reclamation project and later supplied excess electricity to Wyoming towns. Shoshone illustrates one of the ways Reclamation got into the power business."

The goal of the travel itinerary is to provide opportunities to learn about Reclamation's role in developing the West. Shoshone was chosen to be the only Reclamation power plant digitally interpreted because it remains largely intact as originally constructed.

"Shoshone will be available to visitors to explore online and encourage them to come visit the dam and visitor center," Dickinson added. "Its neat that this engineering feat became a popular place to visit along the scenic highway to Yellowstone Park."

Reclamation's Travel Itinerary, including Shoshone as shown above, can be found at http://www.nps.gov/history/nr/travel. Other GP sites chosen include Gibson, Belle Fourche, Glendo, Guernsey and Pathfinder Dams.



A CyArk view of the crest of Buffalo Bill Dam from the perspective of the canyon floor.

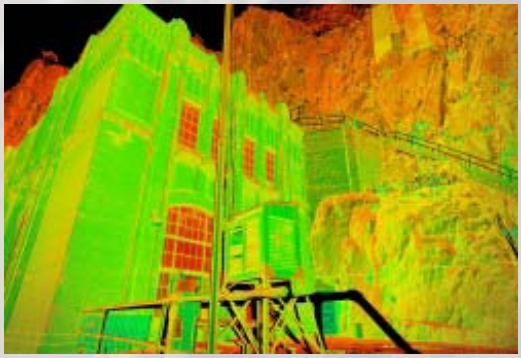
“Our Heritage is much more than our collective memory, it is our collective treasure.

We owe it to our children, our grandchildren, and the generations we will never meet to keep it safe and pass it along.”

Ben Kacyra,
CyArk Founder

CyArk

3D Imaging Shoshone Powe



A cloud of points image of the power plant exterior from the CyArk Shoshone Project.

Different scanners were used to obtain reference points for each surface of the facility from multiple angles. The large scanner (above left) and a smaller unit in the background image (black tripod on the generator floor) were the workhorses for most of the project.

Handheld units gathered details from more intricate surfaces. Reclamation staff and CyArk personnel were recorded moving about during the scanning process but will be removed before modeling is completed.

Digitally Mapping a Historic Reclamation Facility

Historic power generation met modern technology as CyArk arrived at the Shoshone Power Plant near Cody, Wyo. For a few days in September, the facility was recorded inside and out for future display as part of the National Park Service's *Discover Our Shared Heritage Travel Itinerary* (see story page 13).

Reclamation joined with the Park Service to highlight significant facilities. CyArk is documenting a select few of these structures to preserve their original engineering details, making them available to the public and classrooms. Shoshone is a natural fit because it is a National Engineering Landmark.

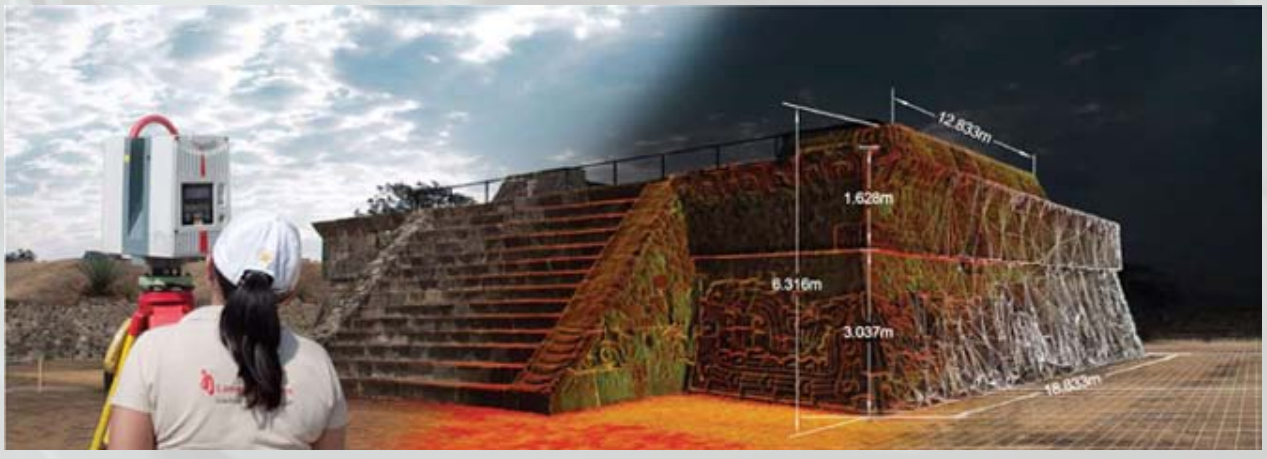
The face of Buffalo Bill Dam and the canyon downstream to the power plant were scanned to provide context for the building. When complete, website viewers will be able to see the power plant in detail from every angle inside and out.

Cy-Ark's founder, Ben Kacyra invented the groundbreaking 3D scanning system that was used. In 2001, the Buddhas of Bamiyan, two 6th century monuments of Buddha carved from native rock in Afghanistan, were destroyed by the Taliban. This triggered Kacyra's interest in digital historic preservation.

Today, CyArk partners with like-minded organizations scan, preserve, and make available to the public world heritage sites in archival detail. Their challenges and accomplishments are documented at www.cyark.org.

A member of the CyArk team uses a hand-held device to record detail of the original Shoshone Power Plant control panel. Digital images from multiple devices and angles will be combined to create an accurate 3D image map of both the interior and exterior of the plant.

The diagrammatic image below is of Xochicalco (a pre-Columbian site in Mexico) showing field data collection using a scanner and the resulting 3D cloud of points image with dimensional data. CyArk uses 3D laser scanning, photogrammetry and other advanced technologies to capture 3D measurable data. The resulting data is highly accurate and can be used for many different purposes. Photo courtesy of CyArk.



(Left) Original diversion headworks shortly after placed into operation in 1910 alongside newly compleated headworks and fish screens (right).

Fish Passage at Lower Yellowstone Intake

Diversion Dam: History and Progress

By Gerald Benock, MTAO

The Lower Yellowstone Project in east-central Montana and western North Dakota includes the Lower Yellowstone Diversion Dam, Thomas Point Pumping Plant, the main canal, 225 miles of laterals and 118 miles of drains. The Lower Yellowstone Project is authorized as a single-purpose project to furnish a dependable supply of irrigation water for 53,000 acres of fertile land along the west bank of the Yellowstone River. About one-third of the project lands are in North Dakota and two-thirds in Montana.

The Lower Yellowstone Diversion Dam is located approximately 16 miles downstream of Glendive, near Intake Montana (Figure 1). The original project was completed and ready for use during the 1909 irrigation season.

Lower Yellowstone Project location.

The Lower Yellowstone Project delivers water diverted from the river to irrigate about 400 farms and approximately 53,000 acres of farmland in Montana and North Dakota. The original intake diversion weir was a 12-foot-high wood and stone structure that spans the Yellowstone River and raises the water level to provide for diversion of water into the Lower Yellowstone Project's main canal.

The system remains in place today and requires rock to be added regularly to maintain the water level required to divert irrigation water from the river. Intake Diversion Dam has impeded movements of pallid sturgeon upstream since its construction.

Pallid sturgeon, a federally listed endangered species, was historically present in the Yellowstone River upstream to at least the confluence with the Tongue River (Brown 1971). Although wild adult pallid sturgeons are regularly documented immediately below Intake Diversion (Backes et al. 1994; Bramblett and White 2001) upstream encounters have declined over the years. Since 1991 only two adults have been recorded and these recordings were over the last two years following the historic river flows of 2011.

The restriction to upstream migration has created a need to take action to provide safe passage of the Pallid Sturgeon to critical and historic spawning habitat 165 miles upstream on the Yellowstone River.

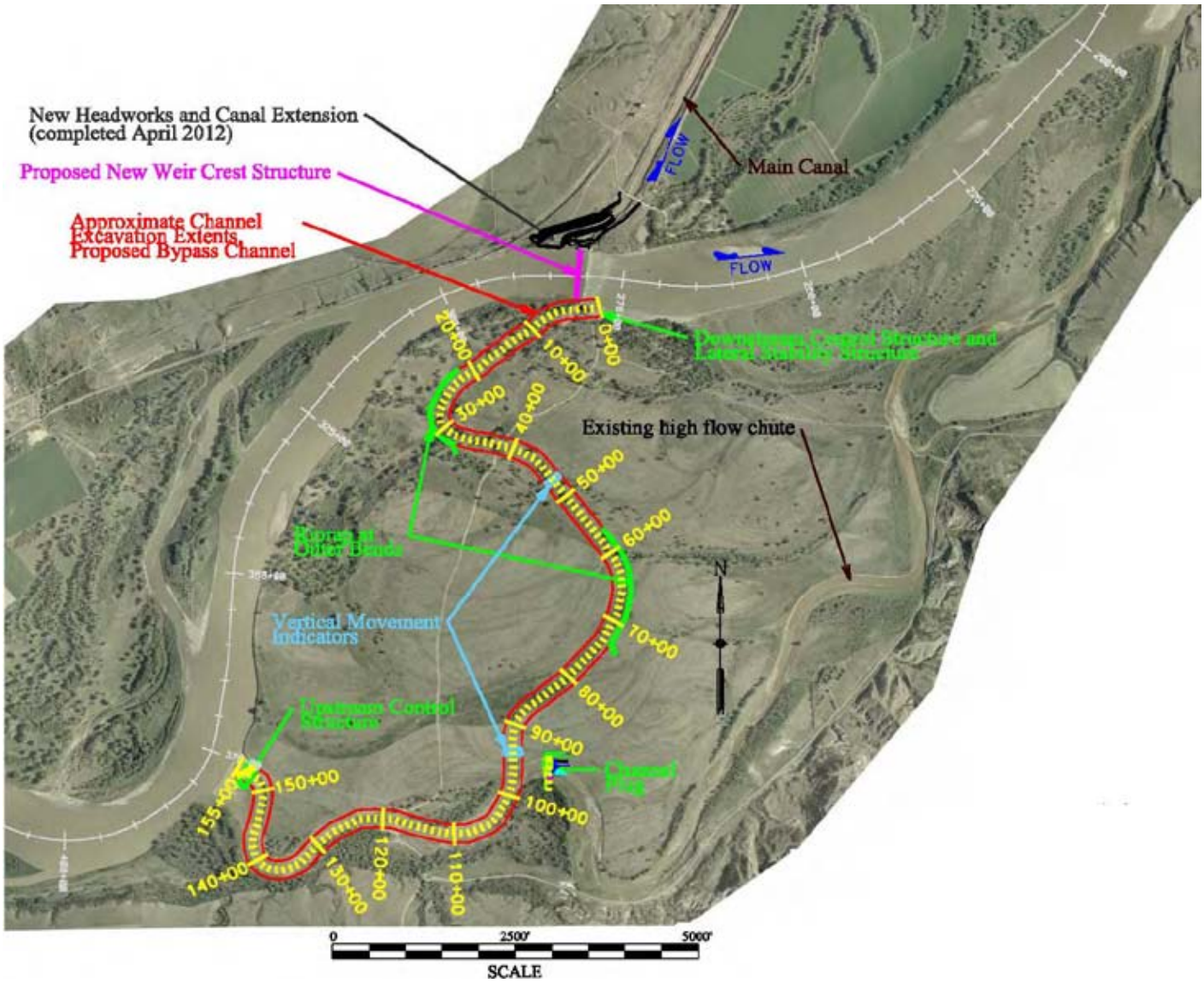
The new system must also prevent future fish loss and entrainment in the main irrigation canal while providing a secure irrigation water supply to the Lower Yellowstone irrigators. Additionally, fish trapping and monitoring data has identified that on average up to 500,000 fish of 36 species could be entrained annually in the irrigation canal system.

The United States Army Corps of Engineers (USACE) is a joint lead agency on the project. They received authorization as part of the 2007 Water Resources Development Act to assist Reclamation in the design and construction of the Lower Yellowstone Project for the purposes of ecosystem restoration.

In addition to USACE, Reclamation has partnered with other Government agencies such as the Montana Department of Fish, Wildlife, and Parks, Montana Department of Natural Resources and Conservation and the United States Fish and Wildlife Service along with the Lower Yellowstone Irrigation Project (LYIP) Board of Control.

Over the years numerous studies have been conducted and design alternatives evaluated for fish passage and entrainment control. As a result of this comprehensive planning study process, an alternative was selected in 2009 and identified as the preferred alternative to achieve both fish passage and entrainment control. In this alternative, entrainment control consisted of a new irrigation headworks structure on the irrigation canal that incorporated mechanical fish screens. The new struc-

(Below) Location of the proposed bypass channel in relation to the new headworks (top of image).



ture was completed in the spring of 2012 and operated successfully for the first time during the 2012 irrigation season.

In the pictures below you can see what the old diversion structure looked like shortly after it was placed in operation in 1910 (top photo) and how it looks today next to the newly constructed headworks (bottom photo).

Additionally, fish passage was to be provided by expanding the height and length of the rock ramp structure across the river. After additional design and costing efforts, significantly new information on the cost and the ability to construct the rock ramp were realized. Because of this new information it was determined that the USACE and Reclamation needed to reconsider previously dropped alternatives for fish passage. This decision was reach based on a number of factors including increased project cost, additional construction challenges and the lack of confidence in the ability of the system to achieve and maintain long term fish passage without substantial operation and maintenance resources.

In an attempt to provide fish passage at Intake, Reclamation took the lead in re-initiating the planning study effort in 2013 along with the other partners. The process included re-visiting fish passage alternatives considered in previous studies and developing new alternatives in an effort to determine an alternative that would meet design criteria for fish passage, be cost effective and be acceptable to stakeholders.

After numerous meetings, the planning team identified a potentially viable alternative that included a Bypass channel around the old timber/rock weir and replacing the old rock weir with a new diversion structure. This system is depicted in the following two figures.

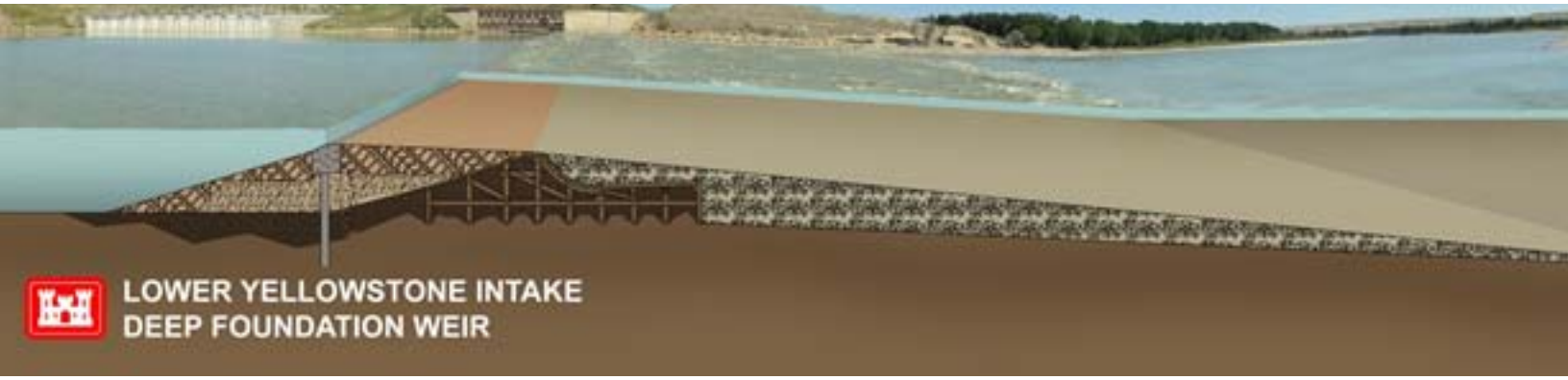
Reclamation and USACE are currently working on National Environmental Policy Act Compliance documents along with additional design work for the preferred alternative. Subsequent to final NEPA compliance and final designs, The USACE expects to award a construction contract for the selected alternative in fiscal year 2014. The total federal cost contributed by USACE to assist Reclamation with this effort, which includes both the fish passage and entrainment protection components, is approximately $90 million.

The challenge is to provide a fish passage system that meets design criteria developed by a team of fish and hydraulic specialist that will ensure the best opportunity to achieve passage for pallid sturgeon and other fish species and to continue providing irrigation water to the LYIP.

James Bower, manager of the four irrigation districts in the LYIP, had this to say about the ongoing project effort, "the Districts that I represent have appreciated the initiative and effort that Reclamation undertook to re-engage the agencies and successfully re-focus the team in working together to find the most acceptable solution that would benefit the endangered species, the farmers, and the local community.

The challenge remains, however, to keep all agencies focused on making progress so that the best alternative can be implemented with available funding so that this project becomes a reality."

The environment will benefit if we are successful in achieving passage of pallid sturgeon and other native fish at the Lower Yellowstone Dam. The State of Montana, LYIP, USACE and Reclamation are partners in this effort and are all playing important roles in working to accomplish this goal.



Overlay of the currently proposed weir design on existing timber structure at intake.

Photo Q & A:

Which image is an official Reclamation record?

The camera creates it

Digital camera file = a film negative

Over the years finished prints have been considered reference material – it was the negative that was important. More prints could be made from negatives without risking the loss of image information. In fact, original negatives have been printed on modern photographic paper a hundred years later with results that are superior to surviving prints made at the time.

The same principle applies to the modern equivalent of a negative. A camera-original image file is deemed a Reclamation record because unlimited copies can be produced from it without loss of information.

WARNING

Never open camera-original files in software and then save them as record files. This simple act may damage the file and delete valuable information.

Use copies for placement in documents.

Always rename camera files in a directory instead of opening them.

The Lower Yellowstone Project headquarters at Newlon, Montana, as seen on Dec 11, 1904. This is a portion of Lower Yellowstone photo number 41 (the 1904 print was rubber stamped). The number, a description and date was written on the negative sleeve. This system of numbering and captioning was later expanded and formalized by Reclamation as the volume of records grew.

As a result, the camera-original image should not be modified in any way: no changing of file types, cropping, color correction, resizing, recompression or retouching of any kind. Preserve the camera original image information with all its glory and flaws. Any changes that need to be made to an image for its immediate use should only be made to a copy – and after the camera-original has been preserved.

Some of the reasons this is required:

Reclamation photography is similar to forensic imaging where a *"chain of custody"* is critical for some uses.

Intentionally modifying image information is like cutting a negative in half and discarding the unused part – information lost can never be retrieved.

- The simple act of opening an image in software and resaving it can significantly degrade the quality of the image.
- Improvements in technology may allow better use of the image later.

Superimposed images of the Jamestown flood of 2009. Left of red lines was recovered from a Word document and the right is the camera-original.

GP's Drill Crew Conducts Exploration at Seminoe Dam

Cody White, former drill rig operator helper, is showing the drill rig operation setup.

By Kari Scannella, GPRO

Being a federal employee is not a 9-to-5 job.

Over its 111-year-history, Reclamation has built more than 600 dams and reservoirs.

Reclamation is the largest wholesaler of water in the United States, providing irrigation for more than 60 percent of the nation's vegetables and 25 percent of its fruits and nuts.

Reclamation also manages 53 power plants, generating a billion dollars in power revenue each year and providing enough electricity for 3.5 million homes.

Maintaining this critical infrastructure is more than a full-time job.

In the Great Plains Region, like the rest of the bureau, public safety and protection of our facilities are top priorities.

From June 20, to Sept. 12, 2013, the Great Plains Region's exploration crew worked 10 to 12 hour days under grueling conditions to gather critical information about Seminoe Dam in Wyo.

"GP's crews are in the field for extended periods under extreme working conditions with temperatures ranging anywhere from 120-degrees-above-zero to 40-degrees-below-zero."

The crew worked a 10-day-on/4-day-off schedule addressing Safety of Dams (SOD) recommendations to assess the dynamic changes of Seminoe Dam.

"These explorations are hard work and challenging," said Mike Kocian, exploration supervisor.

Since 1951, Seminoe Dam has been studied through multiple investigations (1979; 1998; 1999; 2003; 2009; 2013) to monitor the on-going and progressive alkali-silica reaction (ASR) in the concrete, which is also referred to as alkali-aggregate reaction.

The exploration crew is preparing to hoist the double-tube core barrel assembly with cutting bit and lower it back into the bore hole.

ASR describes a chemical reaction in the concrete between the high alkalis in the cement (sodium and potassium); reactive forms of silica in certain aggregates (i.e. opal, chert, and certain quartzitic and volcanic rocks); and water, which forms an expansive silica gel by product.

ASR only occurs due to moisture. As the gel absorbs additional moisture, it swells, creating pressure that can result in cracking and expansion of concrete structures.

The cracking and expansion in the upper portion of Seminoe Dam is enhanced by cyclic freeze/thaw actions due to the extreme climate conditions.

Expansion of the concrete from the ASR also increases compressive stresses within the dam, resulting in the dam "growing" upward, know as heaving, and also displacing in the upstream/downstream direction.

"Wyoming is a rugged place," said Coleman Smith, Wyoming Area Manager.

"Our facilities are required to be engineered to manage tremendous water flows, as well as tremendous swings in temperature and environmental conditions.

"Having folks like the explora-

Close up view of the cutting bit (drill bit).

tion crew available to provide information on our dams is critical to enabling the safe and effective operation of our dams and reservoirs," Smith said.

Evidence of concrete expansion and displacement has been documented at Seminoe Dam since 1979 through various testing programs.

Five metal settlement and deflection points were set in the concrete on the dam crest in 1979 to monitor the structural behavior of the dam. In 2001, 30 more measurement points were added across the dam crest.

Crest measurement points are read twice a year and reveal that the dam has been expanding upstream at a rate of 0.02 feet per year since 1979, and the dam has been expanding upward at a rate of 0.01 feet per year since 1988.

The 2013 concrete drilling program provided information to compare with historical data to assist Reclamation's assessment of the extent and rate of concrete deterioration at Seminoe Dam.

The exploration program included drilling five bore holes through the dam crest to depths between 35 and 130 feet using the mobile LF70 skid drill rig.

"It might seem odd to drill holes in a dam" said Chuck Sullivan, TSC project geologist, "but these operations are vital to gather information about the dam's structural integrity as well as expected future conditions."

In the past, conventional rock coring methods have been used at Seminoe Dam.

This process employs a series of connected, long hollow tubes (rods or pipes) attached to a ridged, double-tube core barrel assembly with cutting bit. The core barrel assembly is approximately 6-inches in diameter, five-feet long, and consists of an outer tube and an inner tube.

The double-tube core barrel assembly is removed from the bore hole after completing the 5-foot sampled interval and lowered onto the "horses".

The outer barrel is a solid tube designed to withstand heavy feed pressures during bore hole advancement through hard or compact bedrock.

The inner barrel is split lengthwise into two halves and is designed to make core sample retrieval easier and reduce core loss.

To deepen the hole, a 5-foot-long rod is added to the top of the drill string above the ground surface.

After an approximately five-foot-long sample interval, each 5-foot-long rod is removed one at a time from the drill string in the bore hole until the sample barrel assembly is retrieved.

The process is then reversed to continue advancing the bore hole.

"The drilling process was slow and time consuming, and the sample quality and recovery was poor," said Mike Edmondson, drill rig operator. "The bulk of the concrete samples were not intact."

For these reasons, the Geology and Exploration Services Group purchased a new wireline system for the LF70 skid drill rig in Nov. 2012.

The wire line is a thin, braided cable that attaches to the drill rig and is used to hoist the split-tube inner barrel from the bottom of the bore hole.

With the new system, core samples are removed from the bore hole without removing any of the rods or outer core barrel.

The split-tube inner sample barrel is removed from the bottom of the hole using an overshot system (core barrel retrieval) which attaches to the top of barrel.

Drill Rig Operator lowers the double-tube core barrel assembly with cutting bit into the hole and prepares to take another 5-foot sample.

The wire line is then hoisted or "reeled in" and the inner barrel is disengaged from the outer barrel and slowly pulled from the bore hole.

"The new drilling system also allowed the exploration crew to collect more intact core samples, enabling the concrete cores to be strength tested at the TSC," said Kocian.

"In previous years, explorations were completed in 3 to 3-1/2 months; however, with the new coring system the 2013 project was completed in approximately two and a half months."

In Mar. 2014, the TSC Seismotectonic and Geophysics Group will conduct in situ geophysical tests in each bore hole, including acoustic televiewer, sonic, and density logging surveys.

Surveys are designed to evaluate and detect fractures, and verify the structural integrity of the dam's concrete.

Subsequent to the completion of the surveys, the exploration crew will backfill each bore hole with a grout mix specified by the TSC laboratory.

"I'm proud of these crews that work so diligently to ensure our facilities operate both safely and effectively," said Mike Ryan, Great Plains Regional Director.

"The diversity of skills we have across the region is amazing – and every employee contributes to delivery of power and water to the American people."

Although working for Reclamation is not a 9-to-5 job, the mission of managing water in the West continues to be critical to ensure a vibrant national economy.

Through the efforts of Reclamation's employees, millions of Americans receive inexpensive, green, hydropower; an abundance of fresh fruits and vegetables; ample water-related recreation opportunities; and a strong agricultural economy.

(Contributing: Michael Edmondson, GPRO Drill Rig Operator; Richard Markiewicz, TSC Geophysicist; Jay Dallman, WYAO Natural Resource Specialist)

Dakotas Welcomes YCC, Supports Youth Initiative

Larry Kuntz (far right) takes a break to pose for a photo with the Youth Conservation Corps volunteers working at Heart Butte Dam in Grant County, North Dakota.

By Patience Hurley, DKAO

The Dakotas Area Office welcomed three Youth Conservation Corps crews this past summer.

Partnering with the YCC reduced fencing contract costs and developed the youths' skills.

Projects were completed at Keyhole Reservoir, Wyo.; Shadehill Reservoir, S.D.; and Dickinson Reservoir, N.D.

YCC volunteers walk new fence line.

DKAO's work supported the President's America's Great Outdoors program, focusing on areas that help Americans reconnect with the great outdoors.

The program includes job and volunteer opportunities related to conservation and outdoor recreation, while supporting existing programs and that educate and engage Americans in our history, culture, and natural bounty.

The partnership helped Reclamation and our partners to administer land resources and create better habitat.

Projects ranged from constructing boundary fence, repairing interior fence and removing dead trees from shelter belts.

Although fence construction was new to many on the crews, the crew's ability to learn quickly and work hard made the projects successful.

Lower Rio Grande Study Shows Shortfall in Future Water Supply

In Dec. 2013, Commissioner Michael L. Connor released the Lower Rio Grande Basin Study, evaluating the impacts of climate change on water demand and supply imbalances along the Rio Grande at the U.S./Mexico border from Fort Quitman, Texas, to the Gulf of Mexico.

"Basin studies are an important element of the Department of the Interior's WaterSMART initiative and give us a clearer picture of the possible future gaps between water demand and our available supplies," Connor said.

"This study of the lower Rio Grande basin will provide water managers with science-based tools to make important future decisions as they work to meet the region's diverse water needs. In addition, the study will help inform water management discussions between the U.S. and Mexico through the International Boundary Water Commission."

(Above) Cameron County Irrigation District #2, Rubicon flume gate near Brownsville, Texas. Reclamation's basin study finds shortfall of 678,522 acre-feet of water per year in 2060 due to increased demand and climate change.

The study concludes that climate change is likely to result in increased temperatures, decreased precipitation and increased evapotranspiration in the study area.

As a result of climate change, a projected 86,438 acre-feet of water per year will need to be added to the 592,084 acre-feet per year of supply shortfall predicted in the existing regional planning process in 2060, for a total shortfall of 678,522.

Water supply imbalances exacerbated by climate change will greatly reduce the reliability of deliveries to users dependent on irrigation.

The study includes an acknowledgment that all water management strategies recommended through the recently adopted regional water plan are part of a needed portfolio of solutions.

Seawater desalination, brackish groundwater desalination, reuse and fresh groundwater development were examined as alternatives to meet future water demands.

The study found that brackish groundwater development was most suitable. An appraisal-level plan formulation and evaluation process was conducted to determine potential locations of each regional brackish groundwater desalination system.

The Lower Rio Grande Basin Study was developed by Reclamation and the Rio Grande Regional Water Authority and its 53 member entities. It was conducted in collaboration with the Texas Region M Planning Group, Texas Water Development Board, Texas Commission on Environmental Quality and International Boundary and Water Commission. It covered 122,400 square miles. The study cost $412,798 with the RGWRA paying for 52 percent.

The basin study was conducted as part of WaterSMART. WaterSMART is the U.S. Department of the Interior's sustainable water initiative that uses the best available science to improve water conservation and help water resource managers identify strategies to narrow the gap between supply and demand.

Basin studies are comprehensive water studies that define options for meeting future water demands in river basins in the western United States where imbalances in water supply and demand exist or are projected to exist. Since the program's establishment, 19 basins have been selected to be evaluated.

For more information see www.usbr.gov/WaterSMART/bsp.

Great Plains 2013 Photo Contest

The 2013 GP Photo Contest produced the most photo entries for the contest to date, with 117 images submitted showing the diverse activities, facilities, people, and wildlife in the Great Plains Region. Nearly 150 votes were cast for more than 40 assorted photos, but top honors go to three photographers and their great images.

Jeff Ticknor, Civil Engineer (GPRO), wins first place with his photo of the Olympus Dam, located in Estes Park, Colo. Gary Valasek, Construction Control Inspector (GPRO), earns second place with his scenic photo of Cemetery Island on Canyon Ferry Reservoir, Mont. Michael Mangum, Electrician (WYAO), takes third place with his photo of Seminoe Dam on a rare, windless day.

Keep an eye out for all photo contest images in a variety of Reclamation publications, including the 2013 GP Region Calendar, Plains Talk Magazine, presentations and in our multimedia gallery on the Internet at www.usbr.gov/gp/multimedia.

Thank you photographers for the great images! And thank you everyone who took the time to view the photos and vote for their favorite.

1st Place

(Above) Olympus Dam, located in Estes Park Colo., normally utilizes one of the five spillway radial gates to make releases to the Big Thompson River (photo by Jeff Ticknor).

A mother duck with her three ducklings at Jamestown Dam.

Cemetery Island shoreline stabilization equipment barge.

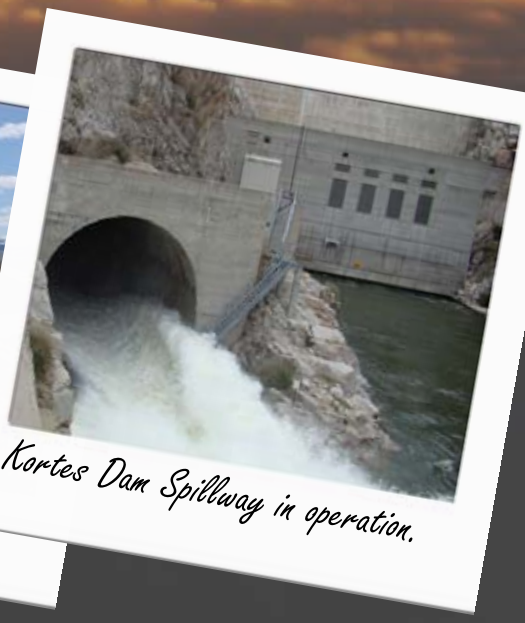
A day of ice fishing on Canyon Ferry near Silos Campground.

2nd Place

Cemetery Island on Canyon Ferry Reservoir, Mont., viewed from the north (photo by Gary Valasek).

Snake Creek Pumping Plant, Lake Sakakawea, North Dakota.

Armstead Island in Clark Canyon Reservoir.

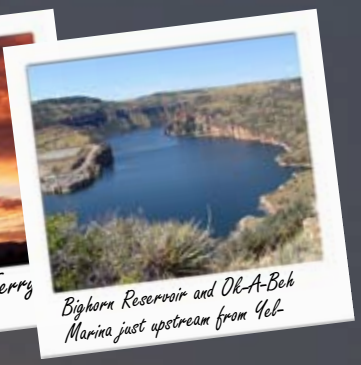


Kortes Dam Spillway in operation.

(Background image) Sunset over the Rosebud Indian Reservation during the 2013 Periodic Security Review (photo by Joe Rohde).

A pelican soars over Canyon Ferry Reservoir near Silos campground.

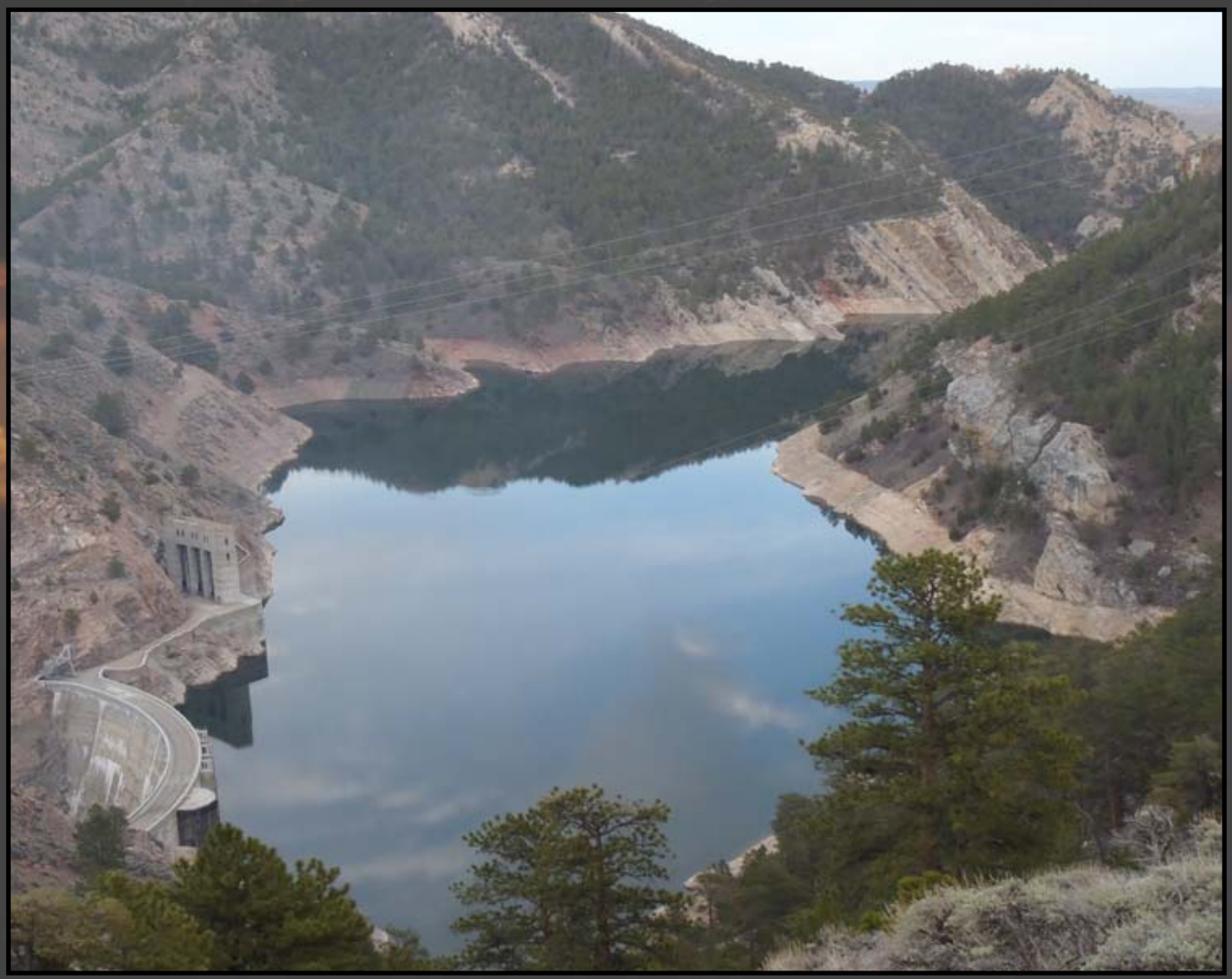
Sunrise at the Canyon Ferry Field Office.



Bighorn Reservoir and Ok-A-Beh Marina just upstream from Yel-

3rd Place

(Below) A rare no wind day at Seminoe Dam (photo by Michael Mangum).



Engineer of the Year

For the Great Plains Region

David Scanson, left, receives the 2013 Great Plains Engineer of the Year Award from Regional Director Mike Ryan. Scanson will go on to compete for the Reclamation-wide Engineer of the Year award.

David Scanson, Regional Safety of Dams Coordinator, has been awarded the 2013 Great Plains Engineer of the Year Award. Scanson is now a nominee for the 2013 Reclamation Engineer of the Year Award.

Scanson serves as the Regional Safety of Dams Coordinator at the Great Plains Regional Office, Billings, Mont. He helps ensure that Reclamation dams do not present unreasonable risk to people, property, and the environment. Reclamation owns 77 high or significant hazard dams in the Great Plains Region and continually assesses the risks posed by each of these dams. Risks are mitigated when they exceed Reclamation's Public Protection Guidelines, subject to funding availability and prioritization against other known risks at dams within all of Reclamation. When a risk or potential risk is first identified, an evaluation and risk analysis are performed to determine if the risks justify corrective action. If deemed necessary, a Corrective Action Study is conducted to identify a preferred alternative. Design and construction commence after a Modification Report is approved by Congress. Total project costs for a Corrective Action Study and subsequent modification ranges from $15-65 million.

Test Your Knowledge

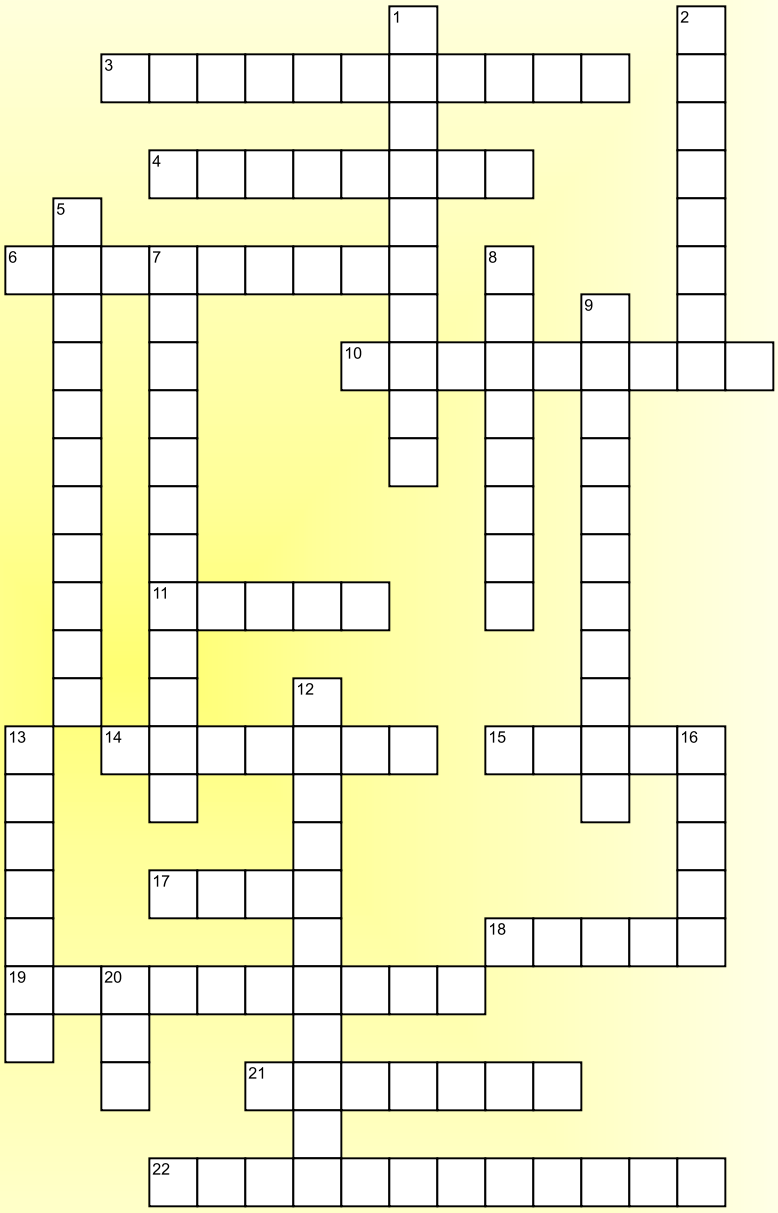
all answers in this edition

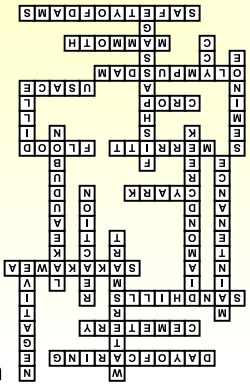
ACROSS

3 Three word event for volunteers
4 Island photo 2nd place winner
6 Nebraska location of star party
10 Lake location for Snake Creek
11 Visited Shoshone Power Plant
14 Reservoir at Nebraska Star Party
15 Event depicted on cover
17 Never do this to record image
18 Joint lead agency for Lower Yellowstone mod.
19 At Estes Park (2 words)
21 Recent discovery
22 Engineer of the Year coordinates

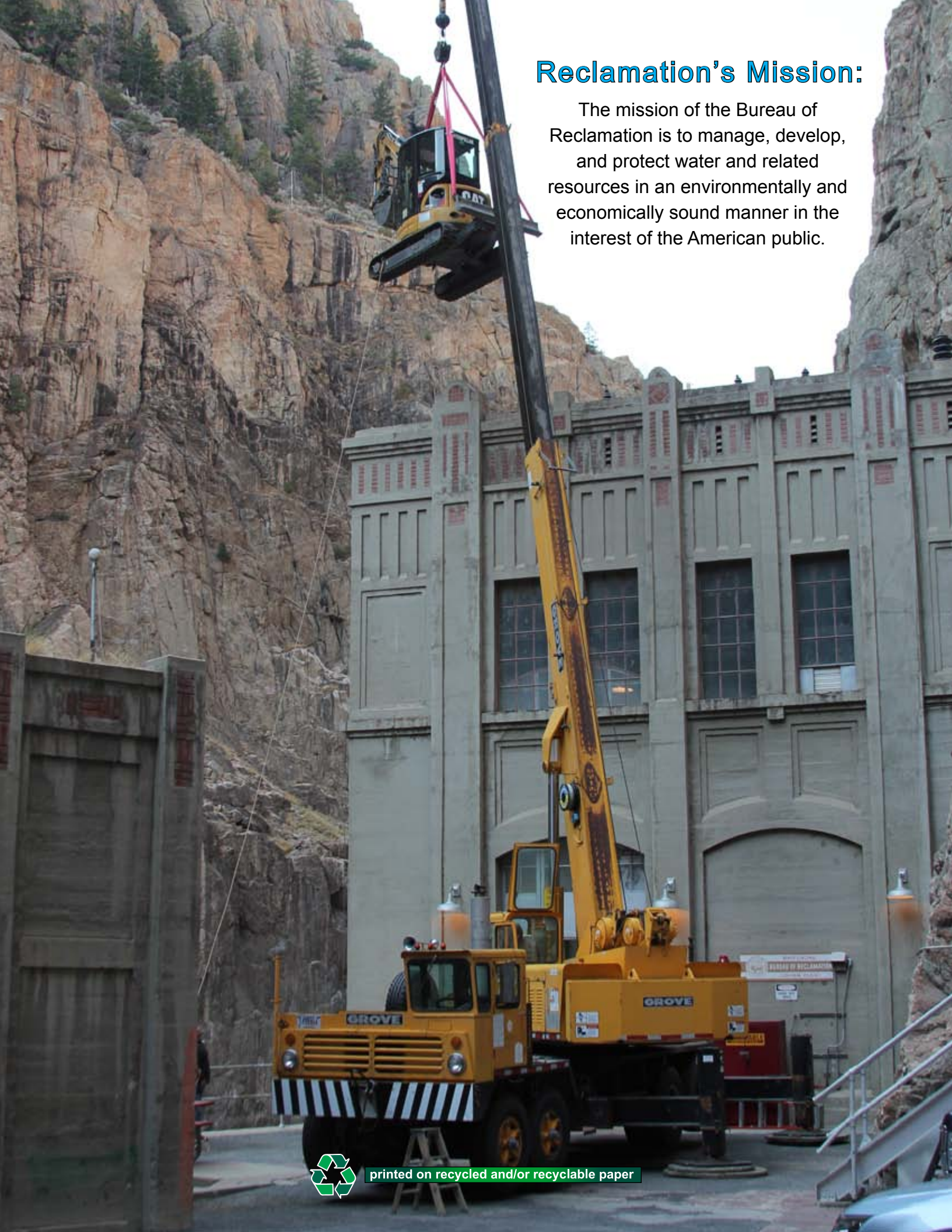
DOWN

1 DOI's sustainable water initiative
2 Old-school photo equivalent of digital file
5 Activity illustrated on back cover
7 Refurbished pumping plant (2 words)
8 ASR: Alkali-silica _____
9 Snake Creek fills (2 words)
12 Why modify Intake (2 words)
13 One drill crew work site
16 Flooded diversion dam
20 Works under Great Outdoors initiative





Solution



Reclamation's Mission:

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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