



U.S. Army Corps  
of Engineers®

# Tulsa District Project Update

## Bridge over Keystone Dam reopens



**Tulsa District Commander COL Richard Pratt, City of Mannford Mayor Tyler Buttram, City of Tulsa Mayor Dewey Bartlett, Oklahoma Secretary of Transportation Gary Ridley and other dignitaries cut the ribbon at the dedication of the newly replaced Highway 151A Bridge over Keystone Dam and celebration of the dam's 50th Anniversary, November 14, 2014.**

**L**ate in 2013, Keystone Bridge closed to traffic for the complete replacement of the Highway 151A bridge over Keystone Dam. Kiewit Construction did the work at a cost of \$15.6 million. The roadway was scheduled to be closed up to 13 months, and as promised, the work was completed within that period. The reopening of the roadway to traffic coincided with the 50th anniversary of the Keystone project being placed into flood control operation. Both events were celebrated with a ribbon cutting and remarks from Tulsa District Commander COL Richard Pratt, Jay O'Meilia, the artist who painted the murals in the powerhouse, State and local officials.

See "Bridge over Keystone" on page 3

# District Commander's Perspective

**W**ell, another year is in the books! As I reflect about the year 2014 and consider all that we accomplished, it is clear to me that the credit for this success goes to you, the 700 passionate, dedicated and determined employees of Tulsa District.

This year, we celebrated our 75<sup>th</sup> anniversary, the 50<sup>th</sup> anniversary of three of our dams, and provided support to our warfighters through our Military Construction program, and service to the Nation through our Civil Works program. Tulsa District enjoys a stellar reputation among our USACE community and stakeholders. I have to think it is because of the 75 years of outstanding professionalism and customer service of our Tulsa Team predecessors. They set the standard that we now strive to meet, or even exceed.

I mentioned that we celebrated 50 years of service to the nation of three of our District dams this year—John Redmond, Eufaula, and Keystone. Each of these celebrations was a success due to the productive customer relationships we have with the local community and stakeholders. The surrounding communities that benefit from the flood risk reduction, hydropower, water supply and recreation provided by these projects led all three of these celebrations. Once again, it was the people, our team, who have these relationships with their customers, who worked together to commemorate these landmark occasions.

Speaking of partnerships and Keystone, the Tulsa Team successfully led the work to replace the Highway 151A Bridge over Keystone Dam on schedule this year. This project would not have happened without the Oklahoma Department of Transportation (ODOT). The agency contributed \$6 million to the project and proved an excellent partner, supporting our inspections and participating in the design review. When we gathered to celebrate the 50<sup>th</sup> anniversary and the ribbon cutting and commemoration of the new bridge, it was indeed a special day. Our ODOT partners, local officials, and members of the community acknowledged that the new bridge was possible because of people and partnerships.



**Colonel Richard Pratt**  
Commander, Tulsa District

See "Commander" on following page

## USACE Commander's Vision

A GREAT engineering force of highly disciplined people working with our partners through disciplined thought and action to deliver innovative and sustainable solutions to the Nation's engineering challenges.

### Mission:

Provide vital public engineering services in peace and war to strengthen our Nation's security, energize the economy, and reduce risks from disasters.

### Commander's Intent:

The U.S. Army Corps of Engineers will become a GREAT organization as evidenced by the following in all mission areas:

- Delivers Superior Performance;
- Sets the standard for our profession;
- Makes a positive impact on the Nation and other nations;
- Is built to last as evidenced by our strong "bench" - educated, trained, competent, experienced, and certified.

We will deliver superior performance through disciplined people, thought, and action. We will use the Campaign Plan as a component of our Corporate Strategic Management Process to establish our command priorities, focus our transformation initiatives, measure and guide our progress, and adapt to the needs of the future.

We will align and synchronize our work throughout the Corps and make deliberate and informed corporate decisions on the best use of our resources. If any requirements outside the Campaign Plan arise, we will make a corporate decision to either divert resources or incorporate new objectives and adjust work priorities, as necessary.

My intent is for the Corps to be **ONE DISCIPLINED TEAM** – in thought, word, and action – and to meet our commitments, with and through our partners, by "SAYING WHAT WE WILL DO, AND DOING WHAT WE SAY."



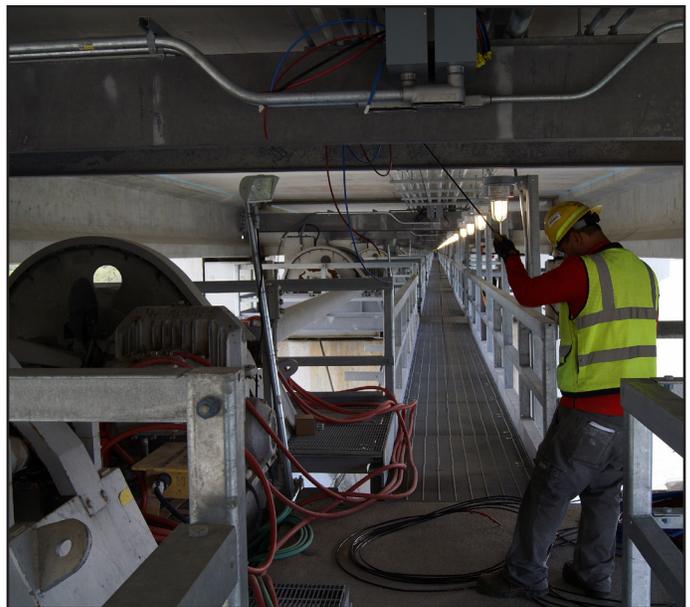
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**“Bridge over Keystone” continued from page 1**

The design of the structure is innovative and atypical of bridges. Precast concrete components were a part of the design to speed construction. The structure is not just a bridge; it serves as a work platform for maintenance and dam safety operations.

A special gantry crane was constructed on the bridge and was used to remove the old span segments and move and place the new catwalk and precast segments.

The project would not have been possible without the support of the Oklahoma Department of Transportation. The agency proved to be an excellent partner on the project, contributing \$6 million and supporting the inspections and participating in the design review.



**Top right, the gantry crane moves a segment of the new catwalk into place on the new bridge. Bottom left, a view of the bridge with the precast concrete beams and new catwalk in place before the bridge segments were placed. Bottom right, a worker installs electrical wiring on the catwalk under the bridge.**

**“Commander” continued from previous page**

Tulsa District is proud to support our warfighters. At Fort Sill, we provided construction management for a 93,000 sq. ft. Reception Battalion Complex, which will process the initial entry of training Soldiers, a Terminal High Altitude Area Defense Training Facility, a Chapel, and a Physical Fitness Center. We also saw the KC-46A Aerial Refueling Aircraft Program bed-down announced at Altus and Tinker Air Force Bases, which gives us new opportunities in military planning, design, and project and construction management.

These are just a few of the successes the Tulsa Team is responsible for this year; there are so many it's impossible to mention them all. The important thing to note is that our District's success is the result of the dedicated people who work here. We wrapped up the year by welcoming home some of these dedicated team members December 8, when the 59<sup>th</sup> Forward Engineer Support Team-Advance (FEST-A) arrived in Tulsa, ending a seven month deployment to Afghanistan. Major Christopher Jones, SFC Class Frederick Bompuku, Dale Davidson, Steve Issacs, and Chuck Miles from the Tulsa District were on the deployment to help Afghan forces make the transition as they take over Kandahar Air Base. Of all the great things that happened this year, having our team members come home safely was the best.

Essays!

# Tulsa District's Focus on Civil Works

## Mississippi River Commission inspects McClellan-Kerr Arkansas River Navigation System



**Left, Oklahoma Governor Mary Fallin and Oklahoma Secretary of Energy and Environment Michael Teague greet members of the Mississippi River Commission at a reception on-board the Motor Vessel MISSISSIPPI. Right, the vessel docked at R.S. Kerr Lock and Dam in Oklahoma.**

**T**he U.S. Army Corps of Engineers, Tulsa District hosted the Motor Vessel MISSISSIPPI (MVM), the largest diesel towboat operating on the Mississippi River, for the Mississippi River Commission's (MRC) annual low-water inspection trip, August 8-11, 2014.

Sunday, August 10, the MRC arrived in Tulsa and received a tour of the ports of Catoosa, Oakley's and Muskogee, with the Port Directors providing the narration about the importance the facilities and the McClellan-Kerr Arkansas River Navigation System (MKARNS) play in the state's economy. Stakeholders attended a dinner on board the vessel that evening while it was docked at the Port of Muskogee.

Throughout the day Monday, August 11, stakeholders listened to briefings presented to the MRC by Oklahoma Secretaries of State Transportation, Commerce, Agriculture, and Energy & Environment. Each presentation affirmed the very positive economic impact the navigation system has upon the State of Oklahoma. Stakeholders from the public and private ports, shippers of grain, steel, fertilizer, and other finished products also presented their economic impacts to the MRC.

The Tulsa District portion of the trip culminated with an on-board dinner Monday night with Oklahoma Governor Mary Fallin and Assistant Secretary of the Army for Civil Works, the Honorable Jo Ellen Darcy, in attendance. Discussions continued throughout the dinner concerning future needs, potential partnerships, and shipping/towing issues on the MKARNS.

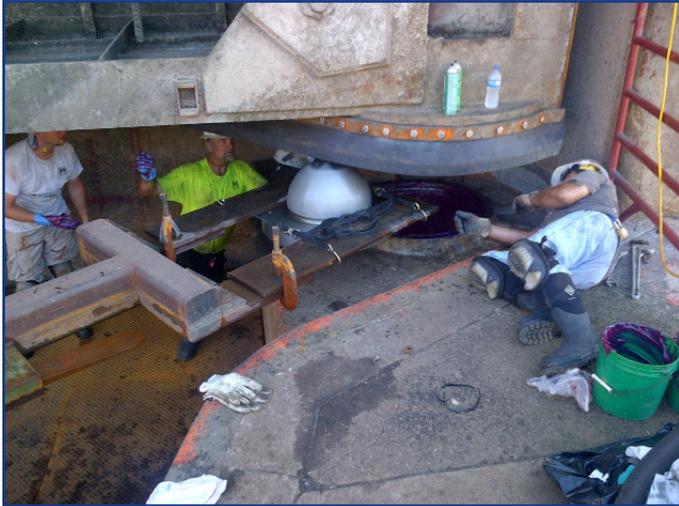
Throughout the three days that the vessel was in Tulsa District waters, more than 1,000 guests, stakeholders, and congressional representatives boarded the vessel. Tulsa District and MVM staff hosted two open houses – Friday, August 8 and Saturday, August 9 – with approximately 800 guests boarding to take a tour of the boat. The visit was very successful and brought much needed attention to the MKARNS and the significance it serves to this region of the Nation.

The MVM is 241-feet long and 58-feet wide. The 6,300 horsepower vessel serves as a working towboat 90 percent of the time.

Also a passenger boat, the vessel houses 22 staterooms, a dining room that seats 85 and a conference room that seats 115 people. The MRC flagship can accommodate 150 passengers.

The vessel's primary mission is to move barges in support of bank stabilization work on the lower Mississippi River. Each spring and late summer, the MRC conducts a series of public meetings aboard the vessel. This allows the public a greater voice in shaping federal policy by discussing their concerns with those individuals responsible for improving the condition of the river, fostering navigation, promoting commerce, and reducing flood risk along the watershed.

## In-house crews finish major lock and dam work ahead of schedule



**Left, at W.D. Mayo Lock & Dam 14, the new pintle ball is moved into place where it will function as a “hinge” for the gate. At right, an overall view of the dewatered lock chamber and the staging area for the work.**

Using in-house crews, Tulsa District replaced the pintle balls and bushings on the upstream miter gates at W.D. Mayo Lock and Dam 14, over the period August, 31 – September 12, and performed other needed repairs, completing the work three days ahead of schedule.

This huge undertaking, outside the normal maintenance work done along the McClellan-Kerr Arkansas River Navigation System (MKARNS), took two years to plan. It required procuring and getting in place the necessary equipment, parts and supplies, and then executing the work in a three-week window during which the lock was dewatered.

After close to 45 years in operation, the bushings and the pintle ball, essentially the hinge that the gate swings on, were in danger of wearing out. Before the replacement,

the gate was sitting flat on the pintle ball preventing grease needed to lubricate the cross-area from getting to the pintle ball.

Over time, if the needed repair was not done, the bushing would wear down causing the gates to drop, damaging the upper linkage and forcing the gates out of alignment. Should the bushing wear down to the gate or the concrete, it could result in an unscheduled long-term shutdown. Such a closure would have a detrimental impact to the shipping industry and to local economies.

During the dewatering, repair crews used specialized equipment needed to raise the 375,000-pound miter gates 18 inches using two 200-ton jacks. They then crawled under the massive miter gates to remove and replace the pintle ball and bushings. They lined up the gates and set them back into place, flooded the chamber, and returned Lock 14 to operation.

While the lock chamber was dewatered, crews performed as much maintenance to other areas of the lock as possible within the execution window. Crews did inspections on the lower miter gates, spot painted and sandblasted and repaired corroded areas on the miter and quoin areas of the gates.

The District undertook the entire effort using in-house marine fleet personnel, as well as several support personnel from across the District.

This is the second time Tulsa District replaced pintle balls at an MKARNS Lock and Dam. The first occurred two years ago at Lock and Dam 18.

The District coordinated with stakeholders so that the work occurred at the least disruptive time for ports and shipping interests who rely on the MKARNS to do business.



**An up-close view of the location on the miter gate where the pintle ball and bushing are located.**

## Outstanding partnerships yield positive results in continued drought

The 4-year drought loosened its hold on some of Tulsa District's 38 projects in 2014, but where it persisted, significant impacts remain. Relationships among Federal, Tribal, State and local entities permitted us to make the best of a bad situation.

Each Corps conservation pool is generally allocated to various purposes, some complimentary, some competing. It is not well known that the pools are sized to meet the allocated needs though the historic period of record drought, which if it occurred again, would completely consume the conservation storage before refilling.

Our formal method of bringing agencies together to identify all the issues, collaboratively identify, and implement solutions is defined in our Drought Contingency Plans for each lake. These actions ensure the pool is operated in the best manner possible. When a lake reaches Drought Level 3 (an alert lake level established at each lake that initiates a series of actions, notices and meetings), Tulsa District convenes an Interagency Drought Management Committee (IDMC). We have consistently deviated from the Drought Contingency Plans in a proactive manner, scheduling the IDMC meetings much earlier, rather than waiting for the lake to reach Drought Level 3. A few examples follow:

**Canton Lake** — This oasis in western Oklahoma is a water supply source for Oklahoma City, in addition to having flood risk management and recreation. When it became necessary for Oklahoma City to draw water from Canton to meet water supply demands, concerns were voiced about the sustainability of the fishery. Tulsa District, the Oklahoma Department of Wildlife Conservation (ODWC), the City of Oklahoma City and the Canton Lake Association, developed an action plan for the deployment of solar powered water circulation pumps to sustain the fish population during the hot and stagnant summer months of 2014. The ODWC took water quality samples at various times to gauge how well the circulators affected dissolved oxygen, temperature and algae production. A video about this is available online at <http://youtu.be/MLRaK2bBOD4>. The IDMC included representatives from the Oklahoma Water Resources Board (OWRB), the Cheyenne-Arapahoe Tribe, and congressional offices and resulted in improvements in lake access, protection of artifacts, and shoreline cleanup.

**Waurika Lake** — The Waurika Lake IDMC focused on availability of remaining water supply. Waurika provides water supply to 250,000 Oklahomans, including Lawton, Fort Sill, Duncan and Waurika. Over time, the channel from the Waurika Master Conservancy District intake structure silted in, leaving about one year of water supply inaccessible to the intake structure. Tulsa District and the Conservancy District are working on a Section 408 permit for modification to the project to dredge and/or place a pipeline to the deepest part of the lake.



**Placing the solar powered water circulators at Canton during the summer of 2014.**

**Skiatook Lake** — An IDMC meeting was held in October 2014. At Skiatook, water quality storage accounts for about 80 percent of the conservation pool, while the remaining 20 percent is allocated to water supply. Releases are made for water quality control for the City of Tulsa to maintain the Environmental Protection Agency (EPA) flow requirement at the Sperry Gauge for the North Tulsa Wastewater Treatment Plant. The IDMC addressed project impacts, primarily recreation, but could impact water supply and Tulsa's permits if the drought persists.

**Lake Texoma** — Lake Texoma continues to fulfill its project purposes of flood risk management, hydropower, water supply, recreation and others, continuing to provide benefits to the public in the worst of droughts. Southwestern Power Administration (SWPA) continued to manage power sales in an efficient manner, periodically switching to other sources of power to save this resource for potentially even greater demands in the future. Recreation access improved, localized dredging permits were approved to facilitate docks and marinas and lake cleanup efforts were coordinated. An IDMC, a meeting with elected officials, a public meeting hosted by the Lake Texoma Association, and congressionally coordinated meetings identified and addressed concerns. The Lake Texoma Advisory Committee remains as the legislated group involving all interests to advise the Corps on lake operations.

**Tenkiller Lake** — Perhaps the best publicized inter-agency cooperative effort was the teamwork that went into addressing the trout fishery in the Lower Illinois River below Tenkiller Dam. The ODWC, SWPA, Tulsa District, Trout Unlimited, Tulsa Fly Fishers Association and several water districts worked together to pool resources to install a low flow valve and a supersaturated dissolved oxygen system to improve quantity and quality of flow. Much improved water quality measurements are being used to establish a more scientific approach to managing the fishery.

**Pine Creek** — The first Tulsa District lake affected by severe drought effects, in this drought, was Pine Creek. It serves as a water supply source for the major employer

See "drought" on following page

# Eufaula Lake and Dam marks 50 years of service to the nation

The communities surrounding Eufaula Lake and Dam in central Oklahoma gathered for a celebration commemorating the 50<sup>th</sup> Anniversary of the lake and dam at Dam Site South, September 25, 2014.

President Lyndon B. Johnson presided over the Eufaula Dam opening in September 1964. During the ceremony Johnson delivered a speech that outlined the positive economic, recreation and navigation impacts the lake would have on Oklahoma.

Fifty years to the day, Eufaula native and retired U.S. Representative, J. C. Watts, delivered the keynote address honoring the historic event.

According to Watts, who worked at the Eufaula powerhouse during the summer of 1973, Eufaula Lake and Dam are woven into the fabric of Eufaula and the communities surrounding the lake.

During the ceremony, a proclamation from the Lyndon Baines Johnson (LBJ) Foundation to the U.S. Army Corps of Engineers was read, and Michael Teague, Secretary of Energy and Environment of Oklahoma, presented a commendation from Oklahoma Gov. Mary Fallin.

Volunteers from Eufaula Middle School prepared a future wildflower meadow near the dedication site. The meadow will be called, the Lady Bird Wildflower Meadow in honor of first lady Claudia “Lady Bird” Johnson.



**Dignitaries and students from Eufaula Middle School with the interpretive sign describing the dam’s dedication.**

“drought” continued from previous page

of Southeast Oklahoma International Paper (IP), as well as for downstream water quality, which protects several endangered species of freshwater mussels.

The IDMC included Tulsa District, ODWC, Oklahoma Department of Environmental Quality (DEQ), US Fish and Wildlife Service (FWS), Oklahoma Department of Agriculture (ODA), IP and others. Extraordinary cooperation and conservation efforts for both water supply and water quality releases resulted in extending the longevity of the use of the conservation pool while still meeting minimum requirements for both IP’s operation and the downstream users and endangered species.

**Deviations to conservation pool levels** — Considering the extended drought, Tulsa District coordinated with the many stakeholders at lakes throughout Texas, Oklahoma and Kansas and, where possible, within project purposes and allocations, requested deviations to hold conservation pool levels at higher levels during the summer when the threat of spring rains had passed.

These deviations were approved in 2014 at the following lakes: El Dorado, Elk City, Fall River, Fort Supply, John Redmond, Kaw, and Toronto.

This very proactive strategy mitigated adverse impacts during the drought.

# Tulsa District's Focus on Military Construction

## Groundbreaking held for Altus AFB KC-46A Pegasus Construction projects



ALTUS AIR FORCE BASE, Okla. – Members of the official party, including the Commander of Air Education and Training Command GEN Robin Rand and 97th Air Mobility Wing Commander COL Bill Spangenthal, break ground for new KC-46A Pegasus construction projects during a ceremony August 7, 2014. In Southwest Oklahoma fashion, the group wore cowboy construction hats for the dig. The new construction is estimated at \$56 million and will include a flight training center, a fuselage training facility, new aircraft hangars and renovations for a combined squadron operations and aircraft maintenance unit facility. (U.S. Air Force photo by S SGT Nathanael Callon/Released)

## Fort Sill Reception BN Complex and THAAD Missile Learning Center



Soldiers at Fort Sill now have a new one-stop Reception Complex to use. The Reception Complex was completed in December 2014. Features of the complex include a Central Initial Issue Point, Personnel Affairs Division processing point, Medical/Dental/Audiology I Optical processing point, bank service area and an Army Air Force Exchange Service branch area.



Tulsa District Commander, COL Richard A. Pratt, participates in the ribbon cutting for the Terminal High Altitude Area Defense (THAAD) Center at Fort Sill in January 2015. The THAAD system destroys ballistic missiles. The Tulsa District, Corps of Engineers played a major role in the construction and quality assurance of the facility.



# FY15 Top 10

## Tulsa District Unfunded Maintenance Priorities

In FY 14, Tulsa District successfully addressed and reduced the backlog of critical maintenance and repair of its water resource infrastructure. Every effort is being made to reduce operations costs to be able to invest more appropriated funds into preventative and critical major maintenance. However, the facilities continue to age.

The following are Tulsa District's Top 10 FY15 unfunded priorities for critical maintenance. Critical maintenance are repairs that, if not performed, could result in failure of

the component, resulting in potential loss of the project and the protection of downstream property and population.

As always, public safety will continue to be the primary focus as the District allocates our available resources.

### 1 Webbers Falls Lock and Dam, Oklahoma

#### Repair miter gates

The downstream miter gates need to be checked for fatigue cracks and repaired. Several structural members near tail-water level have laminated rust and should be rehabilitated and painted. Failure of structural members could cause the gate to cease functioning, resulting in an unscheduled shut down of the navigation system.

Repair Cost Estimate: \$2.1 million

Included in FY16 President's Budget



## 2 R.S. Kerr Lock and Dam, Oklahoma

### Rehabilitate tainter gates and operating equipment

The 2008 Periodic Inspection, as well as the 2009 Annual Inspection reports, indicated floating debris that passes through the gates continues to cause damage to the gate paint and members. Gates 11 and 12 have bent strut arm braces. Just about every gate has some slightly twisted girder braces, and many of the rib and girder stiffeners are severely rusted and thin. Additionally, the remote controls for the tainter gates have proven unreliable and are no longer used. Many of the control inclinometers have been damaged by debris and are unusable. These gates and the operating equipment are more than 40-years-old and need immediate repair to extend their useful life.

Repair Cost Estimate: \$3.5 million



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## 3 Webbers Falls Lock and Dam, Oklahoma

### Repair and repaint tainter gates

Webbers Falls tainter gates were partially rehabilitated and repainted during the period of 1998-2000 by contract. The last structural inspection of the tainter gates found members missing, damaged members, and severe rust in places.

Repair Cost Estimate: \$2.8 million



## 4 Copan Lake, Oklahoma

### Embankment slide repair

An embankment slide occurred just downstream of the embankment crest near Station 76+00 in 2013 after heavy rains followed an extended drought period. The slide has been temporarily repaired twice by Operations Division personnel. Another slide is beginning to develop near station 48+00 and the guardrail is damaged and unsafe. A permanent repair solution is required to prevent the slide from advancing and jeopardizing the embankment crest.

Repair Cost Estimate: \$300,000



## 5 R.S. Kerr Lock and Dam, Oklahoma

### Replace lock pintle ball

Downstream landside miter gate is operating jerkily, indicating it is sticking on its pintle ball. If it gets stuck, the navigation system from Lock and Dam 15 to the Port of Catoosa will be shut down. A new pintle ball and all related parts should be purchased and installed.

Repair Cost Estimate: \$850,000



## 6 W.D. Mayo L&D (MKARNS) Oklahoma

### Rehabilitate and repaint tainter gates

Cracks have been found in some of the tainter gates and stiffeners and braces are corroded and thin. Torque rods are inadequate and sagging. The brakes and gears need to be replaced and cracks need to be repaired. Gates need to be rehabilitated and repainted.

Repair Cost Estimate: \$3 million



## 7 Denison Dam, Lake Texoma, Texas and Oklahoma

### Replace service gate hoist equipment

The sheaves and wire ropes are failing more often, reducing the capability of flood releases. The sheaves were undersized to begin with and the years of rusting have weakened them even more. Recent load measurement on the gantry crane and hoists' wire ropes indicate that they are exceeding design loads to break gates open. All of the hoist equipment at the service tower needs to be replaced with higher load limits.

Repair Cost Estimate: \$1.6 million

Included in FY16 President's Budget.



## 8 Hulah Lake, Oklahoma

### Repair four tainter gates

New chains were installed but the gates need to be rehabilitated and repainted. There is advanced rust at the strut arm/girder connection points and significant rust spots on each gate. The paint has broken down, and there is laminated rust present. The lack of side seals has allowed water to splash on the gates and debris to collect on the downstream gate members wearing down the paint near the sides. Water may be entering the tie-back beam cavities inside the piers during high pools through joints and cracks in the upstream sides of the piers.

Repair Cost Estimate: \$3.3 million



# 9 Copan Lake, Oklahoma

## Caney Levee analyze and correct freeboard deficiency

Hydraulic and hydrologic evaluation of the levee was performed as part of the National Flood Insurance Program (NFIP) Evaluation Report prepared for levee certification purposes. The report identified a potential freeboard deficiency along the levee north of County Road 1400 on the order of 0.8 feet and a freeboard deficiency at County Road 1400 of 1.1 feet which prevents certification. Additional survey data may be required and hydrologic modeling should be revised based on all available data to further evaluate the potential deficiency. Repairs should be performed as required to permit certification and accreditation of the levee and ensure the population at risk is adequately protected and the levee can be certified and accredited for FEMA flood mapping purposes.

Repair Cost Estimate: \$350,000

Included in President's FY16 Budget



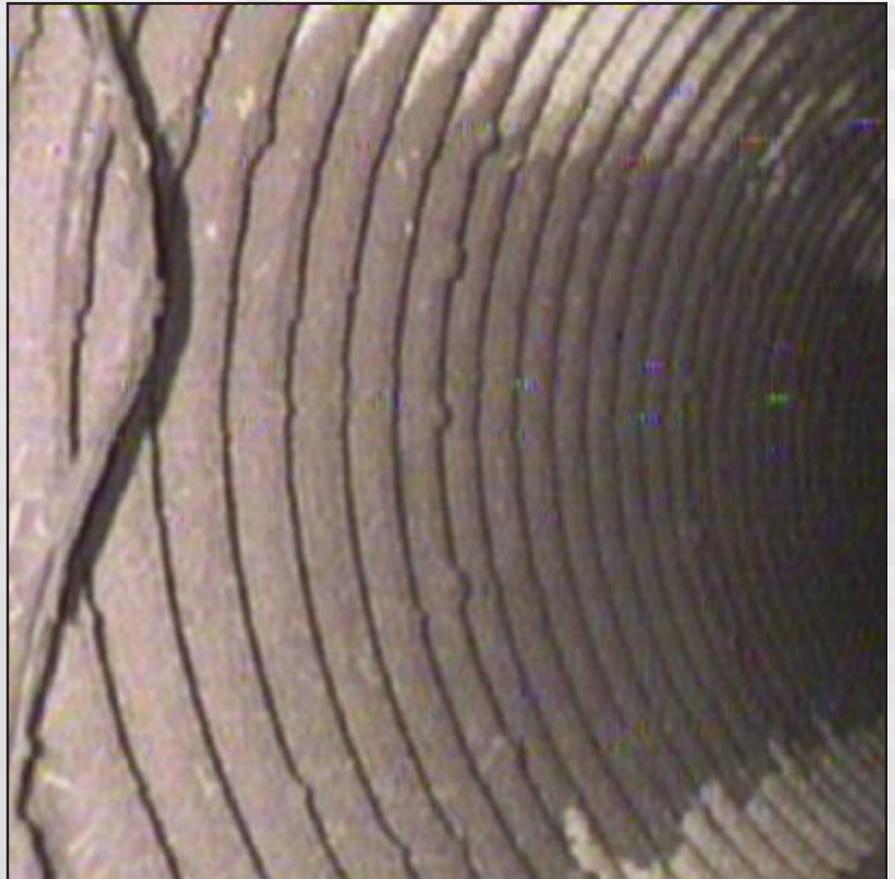
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# 10 Copan Lake, Oklahoma

## Caney levee slipline corrugated metal pipe discharge conduits

The corrugated metal pipe (CMP) conduits running through the levee do not meet current design criteria and are beginning to rust since the bituminous coating is gone. If left unrepaired, levee materials could eventually erode into the conduit leading to a levee breach during a high pool event. The aging CMP was also a driving factor for the current risk rating at the project.

Repair Cost Estimate: \$350,000



## *Kansas Area Office Spotlight*

### **Extensive repair project at Fall River's Badger Creek Crossing**

In October 2013, following a significant flood event and an additional rain event, the staff at Tulsa District's Fall River Project recognized that one of the four five-foot culverts on the upstream side of the Badger Creek low water crossing had failed. There was also severe cavitation around the failed culvert and the three remaining culverts displayed multiple problems, which suggested that they too were subject to eminent failure.

Badger Creek Crossing is the primary traffic route to the Corps' popular Whitehall Bay Campground and Whitehall Bay residential area, so management quickly decided that the extensive repair project would be a priority for the Kansas Area Project Offices. The repairs would need to be an in-house project using the equipment and staffs from several Kansas Area Projects to expedite the work.

In January 2014, after Tulsa District Engineers completed a detailed extensive repair plan, work was set in motion. Roughing elements such as rain, snow, high winds, ice buildup, deep mud and sub-zero conditions, the repair crew started by building an access road and a coffer dam and initiated the difficult demolition of the existing concrete intake structure. Once demolition was completed, the repair crew started the framing and rebar placement for the intake face, wing walls and apron as dictated in the new design. In March 2014, the final concrete pour was completed for the project. Four days after the completion of the project, the structure was tested by a significant rain event, which raised the creek level to approximately eight-feet above the new low water crossing intake structure. Once the water receded, it was evident that the staff had completed an excellent and swift repair to the vital structure, as no damage resulted.



**Before and after photos of the repair work on the Badger Creek Crossing at Fall River.**



### **Kansas Area Office Volunteer Program enjoys another successful year**

The Kansas Area Office enjoyed a successful year in 2014 with the volunteer program.

The overall volunteer program for Kansas Lakes logged approximately 5000 hours in 2014, saving approximately \$100,000 in labor expenditures to the project.

These individuals performed a variety of duties to include being camp hosts, mowing, equipment maintenance, painting and park cleanings.

# Arkansas River Basin

## Arkansas River Corridor

### Feasibility Study

The 42-mile long study area is along the Arkansas River, from Keystone Dam to the Tulsa/Wagner County boundary, in Tulsa County, Oklahoma. Extreme flow variability, resulting from Keystone Lake operations, has negatively impacted the aesthetic, environmental, and aquatic and riparian ecosystem conditions of the Arkansas River, limiting economic development potential along the river corridor.

Following a 2003 voter approved initiative, the Indian Nations Council of Governments began a comprehensive public involvement and planning effort, which culminated in the Arkansas River Corridor Master Plan. In response to multi-community support for the Master Plan concepts, Congress authorized construction of ecosystem restoration, recreation, and flood risk management components of the Master Plan in Section 3132 of Water Resources Development Act (WRDA) 2007. Implementation guidance for Section 3132 directs completion of a feasibility study for the project. The Arkansas River Corridor (ARC) general investigation feasibility study was initiated October 6, 2010, but due to funding constraints, the study never fully got underway.

Previous studies examined the removal of a re-regulation dam on the Arkansas River, immediately below Keystone Dam. The dam was designed to provide downstream water quality storage and to control flow variations as a result of hydropower operations, and constructed as part of the Keystone Lake project. The Corps removed the re-regulation dam in the mid-1980s because the structure did not perform as expected and created a life-safety hazard; sixteen drownings occurred at the dam. This feasibility study will investigate the potential of federal responsibility for reconstruction of the dam. In October 2013, funding became available to conduct a planning charette and the study team rescoped the ARC Investigation to the new USACE specific, measurable, attainable, risk informed and timely (SMART) planning process for completion within three years at a cost of \$3 million. At the charette, the study focus was narrowed by examining problems within the study area, making a determination regarding what components in the Master Plan had potential USACE interest, and establishing preliminary study objectives.

Upon receipt of funding in 2015, the study will begin with execution of a revised project management plan to reflect a more focused scope of study. A letter report to address the re-

regulation dam will be developed by the vertical team for policy decision. The alternatives milestone package will be prepared, the Hydrology and Hydraulics (H&H) regional model will be updated and evaluation of alternative plans initiated. Cost is estimated at \$330,000.

The President's 2016 budget allows \$815,000 for the study, and the team will submit an alternative milestone package, update regional H&H models, create flood evacuation plans, evaluate alternative plans and initiate Independent External Peer Review (IEPR).

## Augusta Levee Local Flood Protection Project

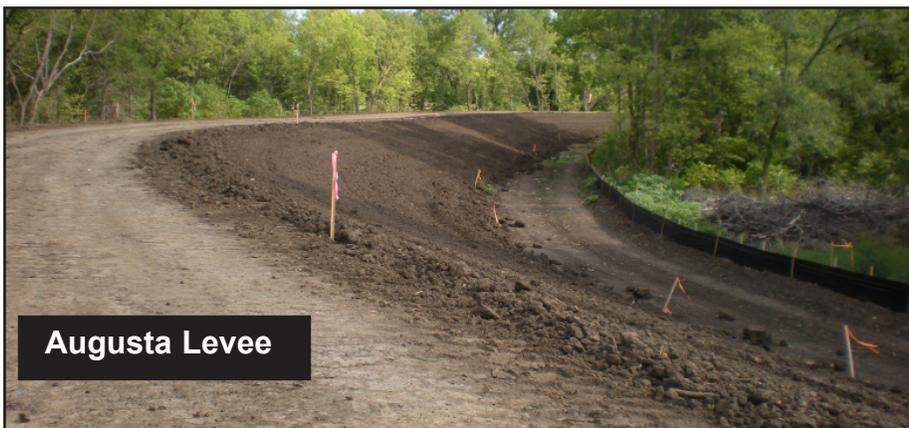
Section 205 of the Flood Control Act of 1948, as amended (Continuing Authority - Flood Control)

### Under Construction

Augusta is about 19 miles east of Wichita, Kansas. The Whitewater River runs through Augusta to its confluence with the Walnut River.

The original levee was constructed in the 1920s and '30s through private and public sponsorship, and was incorporated into the Federal Levee Inspection Program in the 1940s.

The November 1998 flood damages were caused primarily by the Whitewater River breaching the city's levee system at several locations along the west side of Augusta. The recommended plan is to raise and extend the existing levee to provide a 500-year level of flood protection. On March 3, 2008, the Project Cooperation Agreement for construction of this important project was executed.



On September 30, 2011, the contract for construction of the Augusta Levee Project was awarded to Terra Construction, Inc., Oklahoma City, Oklahoma, for \$6.6 million. Construction efforts are complete and the project was formally turned over to the City of Augusta for Operation and Maintenance responsibilities on September 5, 2014.

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## Canton Lake, Oklahoma

### (Dam Safety)

Flood Control Act approved June 28, 1938 (Public Law 761); Flood Control Act approved July 24, 1946 (Public Law 526) (irrigation storage); Flood Control Act approved June 30, 1948 (Public Law 858); and the Water Resources Development Act of 1990 (Public Law 101-640) (water supply storage)

Under Construction

This \$183 million, multi-phase Dam Safety project is to correct deficiencies related to stability (movement of the existing spillway), seepage under the existing embankment, a hydraulic deficiency of not being able to pass the probable maximum flood event, and new seismic requirements.

Construction began in 2006 with a \$4.5 million contract to stabilize the existing spillway with 64 anchors drilled into the downstream spillway weir. In 2007, work commenced to resolve the remaining deficiencies with the construction of a new auxiliary spillway channel with the excavated material being used for a seepage berm on the downstream face of the existing embankment. Construction of the auxiliary spillway channel required two preliminary contracts to facilitate the excavation. These included relocating Highway 58A for \$3.1 million and reconfiguring the current project office for \$900,000. In 2008, a \$41.1 million contract for the first phase of the auxiliary channel excavation was awarded. This contract included 1.3 million cubic yards of excavated material being used to construct a seepage berm on the downstream toe of the existing earth embankment. In addition to the excavation, concrete diaphragm walls and aprons, channel riprap, a channel cut-off wall, new piezometers, and extension of the cur-

rent relief wells were included in the contract. This contract was substantially completed in December 2010.

The next phase was to construct a new highway bridge, spanning the newly constructed Phase 1 auxiliary channel. The bridge is a 540-foot long, six-span concrete bridge. The contract was awarded in August 2010 for \$4.1 million and was completed in January 2012.

In September 2011, the weir and hydraulic structures contract was awarded. This contract includes a reinforced concrete weir, intake conduit, wet well, upstream and downstream concrete aprons, and fuse gates. The contract was awarded to ASI Construction for \$37.5 million with a contract completion date of November 2014. The weir is 481 feet long, 65 feet wide, and 36 feet deep while the nine fuse gates are 53 feet long, 21 feet wide, and 32 feet tall. The concrete structures total 65,000 cubic yards of concrete and 1,250 tons of reinforcing steel.

The existing spillway structure was deemed deficient and a subsequent project was designed and awarded in October 2012. The final major contract for the project is the Phase 2 channel excavation. It consists of excavating the final one million cubic yards of concrete and tying the diaphragm wall into the existing dam abutment. It was awarded to Kiewit

Infrastructure South Corp. in August 2014 for \$26.9M. All construction activities for the entire dam safety modification project are scheduled to be complete by January 2017.

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## Crow Creek Aquatic Ecosystem Restoration

Section 206 of Water resources Development Act of 1996, as amended (Continuing Authority - Aquatic Ecosystem Restoration)

Planning

Crow Creek is an intermittent tributary of the Arkansas River that runs through part of Tulsa, Oklahoma. It has a drainage area of about two square miles. In the first half of the 20th century, the Works Progress Administration (WPA) lined the banks and bottom of the main stem of Crow Creek with hand-placed stone blocks, creating a trapezoidal channel. Much of the stone has failed or is in poor condition, leading to streambank and bed erosion in areas of the creek.

The Feasibility Study effort is exploring opportunities for aquatic ecosystem restoration in and along Crow Creek from Cincinnati Street upstream to Peoria Avenue. Aquatic ecosystem restoration features were explored, such as a placement of riprap in reaches of streambank failure, floodplain bench and constructed wetlands through placement of nine rock cross vanes.



In December 2014, while conducting a thorough review on the tentatively selected plan, it was determined that the proposed plan of improvement does not meet federal standards of resource significance or cost efficiency and the study effort will be terminated. Although federal participation with the project implementation effort are not possible at this time, the final feasibility report will provide recommendations and detailed design criteria to allow local interests to continue to pursue aquatic ecosystem restoration improvements within this watershed.

### **Fort Sill Apache Master Plan Study**

At publication of this update, the Fort Sill Apache Tribe and Tulsa District planned to complete a Master Plan Study in early 2015.

The plan focuses on infrastructure and development of the Tribal Headquarters, and housing and economic development near the City of Apache, Oklahoma.

The Tribe contributed by participating in facilitated meetings to identify Tribal priorities, and procured and provided a topographic survey of the headquarters and surrounding property.

The District estimated costs and made recommendations for water and wastewater solutions, as well as future water demand scenarios.

### **Grand Lake Comprehensive Study**

Section 449 of the Water Resources Development Act of 2000

Study

Grand Lake was constructed by the Grand River Dam Authority (GRDA) and initially had the single purpose of hydropower production. In order to include Grand Lake as part of a comprehensive multipurpose plan for the Arkansas River, the Flood Control Act of 1944 authorized the Corps to manage the flood risk management features. Easements

were acquired up to elevation 750.0 Pensacola Datum by the State of Oklahoma. Other federal agencies acquired approximately 12,000 acres of flowage easements over lands above the GRDA's fee taking line. The flood flowage easements were later transferred to the Corps in 1959. In response to public concerns, Congress authorized the September 1998 Grand Lake, Oklahoma, Real Estate Adequacy Study. The study found that additional flowage easements would be recommended if Grand Lake were a "new" Corps project.

A report was prepared by the Tulsa District to document an initial technical evaluation of historical and theoretical flood events. On September 14, 2007, the Assistant Secretary of the Army (ASA) for Civil Works (CW) concurred with report findings that further detailed study is warranted. With that decision, and in accordance with the provisions of Section 449 of the Water Resources Development Act (WRDA) of 2000, the feasibility study could be conducted at full federal cost. However, this provision makes the study totally dependent on available annual funds provided by Congress because it is not consistent with Administration budgetary policy. If a non-federal cost-sharing partner can be identified, the study could be more competitive in the Corps' budget process.

FY08-12 activities included the preparation of a Hydrology and Hydraulics (H&H) Geographical Information System (GIS) Needs Assessment Report, meetings with local officials, development of a Project Management Plan, GIS support and mapping products to complement adjacent area maps created by the Federal Emergency Management Agency (FEMA). A related effort completed in FY13 utilized the mapping, in conjunction with a USACE Silver Jackets Pilot Project Program, to develop a provisional interim risk reduction flood inundation mapping tool for the Miami, Oklahoma, area. Potential

future feasibility phase activities that focus on priority flooding issues in the vicinity of Miami, Oklahoma, would be dependent upon the participation of a non-federal cost-share sponsor and annual funding.

In the short-term, a strategic activity conducted by the Corps is the management of flood risk management pool releases, consistent with the current system operating plan, to potentially reduce impacts of minor flood events. However, large flood events overwhelm available flood storages, significantly limit the ability to transfer flood waters to downstream lakes quickly, and cause significant flooding with or without operational modifications.

In addition to the flooding issues discussed above, the Corps began working with GRDA in FY14 to identify alternatives to resolve the problem of thousands of existing encroachments on the flood flowage easements owned by the United States. Types of encroachments range from sidewalks to entire houses.

### **Luther Road Streambank Protection**

The Luther Road Section 14 Emergency Streambank Protection Project is located along Luther Road and the North Canadian River within Oklahoma County, approximately 10 miles east of Oklahoma City, Oklahoma.

Bank erosion associated with lateral migration of the North Canadian River is encroaching on the Luther Road embankment, significantly affecting use of this county road and associated public utilities.

The value of the infrastructure at risk is approximately \$8.3 million. The local sponsor is the Board of County Commissioners of Oklahoma County, Oklahoma.

The recommended plan will stabilize approximately 3,500 linear feet of streambank of the North Canadian

River adjacent to the west side of Luther Road, near Harrah, Oklahoma County, Oklahoma.

Streambank stabilization will consist of riprap being placed along the toe of the slope, shaping the bank at a three-foot horizontal to a one-foot vertical slope, to the one-year frequency elevation, and balancing cut and fill of the existing slope.

Fiscal year 2015 efforts are focused on completion of the right of way acquisition efforts by the Local sponsor, Oklahoma County, and final contract plans and specifications, to allow award of the construction effort in June 2015.

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## John Redmond Dredging Initiative

Ongoing

John Redmond Reservoir was constructed in 1964 by the U.S Army Corps of Engineers (USACE) with a design life of 50 years. At construction, the reservoir had a surface area of about 9,800 acres and a water storage capacity of 82,200 acre feet (AF).

In 2007, the Kansas Biological Survey completed a bathymetric survey of the reservoir and concluded that the surface area had reduced to about 8,800 acres with a water storage capacity of 50,200 AF.

The State of Kansas is proposing to dredge John Redmond Reservoir to restore water supply lost to sedimentation. This sedimentation has attributed to the decreases in surface area and volume of this reservoir.

Since 1964, John Redmond has lost an estimated 42 percent of its conservation-pool storage capacity (as of 2010). The estimated sedimentation rate of 739 AF per year is about 80 percent more than the 404 AF annual sedimentation rate originally projected for the conservation pool by the Corps at the time of completion.

The Kansas Water Office (KWO) has initiated a request, through the Corps, to dredge John Redmond Reservoir. Dredging sediment from the conservation pool would restore water supply storage for the benefit of regional water users.

Dredging would also restore lost aquatic habitat for the benefit of public recreation and the lake ecosystem.

The Corps has partnered with the KWO to provide technical oversight and input to ensure the successful completion of the John Redmond Dredging Initiative.

The KWO partnered with the Corps to complete a Programmatic Environmental Impact Statement (PEIS) for the removal and disposal of sediment and restoration of water storage at John Redmond.

The final PEIS was filed with the Environmental Protection Agency (EPA) on September 10, 2014. A Notice of Availability was published September 19, 2014 that announced the public review period for the PEIS. The public review period extended through October 20, 2014. A preliminary draft Record of Decision was completed October 24, 2014.

A District led Agency Technical Review (ATR) has been completed for the Section 408 request. The District determined that the proposed alteration would not impair the usefulness of the project or be injurious to public interest.

The District also determined that the completed Section 408 package meets all legal and policy requirements.

The Section 408 package was forwarded to the Southwestern Division (SWD). The SWD completed their review and endorsement of the package.

The SWD will forward the package to USACE Headquarters for review and decision, which is expected by March 2015.

## McClellan-Kerr Arkansas River Navigation System, Arkansas and Oklahoma, 12-Foot Navigation Channel

Section 136, energy and Water Development Appropriations Act, fiscal year 2004 (Public Law 108-137)

Authorized (Not Started)

The McClellan-Kerr Arkansas River Navigation (MKARNS) System is approximately 445 miles long, consists of 18 locks and dams, and provides nine-foot deep inland navigation from the Mississippi River to Catoosa, Oklahoma.

This project will deepen the navigation channel to a minimum depth of 12 feet, thereby increasing the efficiency of the system. Deepening of the channel will be performed by a combination of techniques including altering the flow management, constructing dikes and jetties, and dredging the channel. This project also includes a significant environmental component to include creation of bottomland hardwood forests and high quality wetlands, as well as other environmental enhancements.

The projected cost estimate of \$185.5 million is cost-shared with the Inland Waterway Trust Fund, and is jointly managed by Little Rock and Tulsa Districts. To date, \$7 million have been provided through an FY05 congressional add to complete the feasibility study and the Environmental Impact Statement (EIS), as well as to start dredging activities and construction of dikes and jetties.

During FY06, dredging commenced and was completed at mile 348 in Pool 15 in Oklahoma, which also included construction of a Least Tern island with rock protection that was accomplished in conjunction with the dredging activities. Design of river structures was accomplished for Pools 2, 7, and 5. Stone structures were constructed in Arkansas to improve self-scour of the river, and design of upland dredge disposal sites was also completed in Oklahoma. Mitigation activities, including aquatic and terrestrial surveys, were performed in

both Oklahoma and Arkansas. A five-year project plan has been developed that includes an integrated project breakdown of activities and associated costs that has been vetted through the navigation stakeholders.

This project has not been in the budget since FY05, and all funds have been exhausted resulting in no further work on the project.

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## Oklahoma Comprehensive Water Plan

### Study

The Oklahoma Water Resources Board (OWRB) is working with multiple federal, state, Tribal and other stakeholder organizations to update the Oklahoma Comprehensive Water Plan (OCWP). Tulsa District is providing technical planning assistance for this effort through the Planning Assistance to States (PAS), Southeast Oklahoma General Investigation Study and the Washita River General Investigation Study authorities. The data, tools, and prioritization of needs information associated with the OCWP update are shared resources of the studies and will be used, contingent on approvals and funding, for future phase detailed investigations.

Additionally, the Water Resources Development Act (WRDA) of 2007 authorizes the expenditure of \$6.5 million in federal funds for completion of the OCWP. It further specifies that this effort will be completed with a 75 percent federal and 25 percent non-federal cost-share. To date, no funding has been appropriated. Implementation Guidance is at U.S. Army Corps of Engineers (USACE) Headquarters for review, at which point it will be submitted to the Assistant Secretary of Army (ASA) for Civil Works (CW) for approval.

The OCWP update process has three phases. Currently, the Corps is authorized to participate only in the studies.

The OCWP update includes the development of water demand projections by county and region throughout

forecast year 2060, as well as a comprehensive inventory and analysis of the state's water supplies. The update also identifies the local and regional problems and opportunities related to the use of water for public supply, agricultural, industrial, recreational, and environmental uses. This particular segment of the planning process, involving close partnerships with both municipal and rural water system representatives, identified infrastructure needs, management options, and other measures to maximize the efficiency of Oklahoma's public water suppliers.

The state water planning process involves the implementation of planning initiatives and tools derived from the issues, problems, and needs identified during phase two. The OWRB is drawing upon the expertise of Oklahoma's foremost water experts from various water use sectors; local, state and federal governments; and universities to develop policy recommendations for consideration by the state legislature.

In 2008, Tulsa District developed a programmatic work plan and developed and distributed a pilot Geographic Information System (GIS) project and an infrastructure survey for municipalities and rural water districts. Coinciding with these integrated efforts was an extensive public participation program to create a transparent and open planning process.

In 2009, Tulsa District assessments of water demand and of ground and surface water supplies. The results of these two assessments were compared to define gaps where supply is inadequate. In 2010, conservation assessments, refinements to demand projections, and regional supply alternative assessments were completed.

In 2011, Tulsa District production of Watershed Planning Regional Reports/Basin Technical Appendices; identification of potential measures for use in future formulation of hot spot and infrastructure needs alternative solutions; a wastewater infrastructure

Capital Needs Assessment and Provider Planning Guide; and preparation/submission of final draft reports. Phase 1 of the OCWP update was finalized and approved by the OWRB on October 17, 2011.

Phase 2 has been ongoing from 2012 to present. It involves site specific investigations to address OCWP priority issues within specific watersheds in Oklahoma and would include the National Environmental Policy Act (NEPA) documentation, recommendations for congressional authorizations, implementation of watershed management studies. For some areas, we have specific study resolutions that can be used for budget requests for implementation of Phase 2 target areas. Priority recommendations from Phase 1 include: water project and infrastructure funding, regional planning groups; excess and surplus water, instream and environmental flows, state and Tribal water consultation and resolution, water conservation, recycling and reuse, water supply reliability, and water quality and quantity monitoring

Conservation, Efficiency, Recycling and Reuse identifies innovative solutions to forecasted water shortages in line with the Water for 2060 initiative. The Water for 2060 Act sets a state-wide goal of consuming no more fresh water in 2060 than we consume today. An Advisory Council (supported through Corps PAS funding) will make recommendations.

Water Supply Reliability ensures water availability for future growth through fair and sustainable water allocation utilizing aquifer yield studies and stream water allocation models; as well as analysis of groundwater-surface water interactions, seasonal permitting, and conservation-oriented permitting approaches.

2015 activities include instream flows and water supply reliability analysis.

As part of the Oklahoma Instream Flow Advisory Group's effort in 2013 to further define whether and how an instream flow (ISF) program might be

implemented in Oklahoma, an ISF pilot study scope of work was prepared under Phase 1 and submitted to the OWRB, USACE and the ISF Advisory Group. The object of the pilot study is to gain a better understanding of the implications of a process to deal with instream flow issues consistent with the overall goal of managing water resources in Oklahoma for multiple uses. An Instream Flow Incremental Methodology (IFIM) process was deemed most suitable for addressing the prevailing comments and concerns of the ISF Advisory Group. The pilot study would look at the upper Illinois River above Tenkiller Reservoir, including Baron Fork and Flint creeks. The OWRB is requesting additional funding under the USACE PAS to initiate the Oklahoma ISF Pilot Study. Because of the uncertainty in availability of funding, the proposal for this phase is broken down into five primary tasks.

A recurring obstacle encountered during the 2012 OCWP update was lack of reliable water supply yield information for many of Oklahoma's local municipal water supply lakes. A Reservoir Yield Analyses Phase 1 was initiated under the 2013 proposal for tasks under the PAS/OCWP letter agreement. Under that task, the approximate cost of conducting a firm yield analyses is being developed for up to ten priority reservoirs. Within funding constraints, reservoir firm yield analyses will be conducted on priority reservoirs. The goal of Phase 2 is to conduct yield analyses for additional priority reservoirs within the constraints of funding made available through the USACE PAS program.

## Tribal Support Program

10 USC 3036(d)(2)

Oklahoma is home to 38 federally recognized Tribes. Tulsa District's Tribal program has traditionally consisted of technical support for grant application, contract administration, and construction for Housing and Urban Development (HUD) Indian Community Development Block Grants (ICDBG) and various other grant and

Tribally funded projects. These projects include independent elder living centers, wellness centers, food distribution centers, medical clinics, substance abuse centers, and many more. The impact these projects have on quality of life for an often underserved demographic is tremendous.

Oklahoma Tribes have also found an interest in the District's planning expertise. In FY14, Tulsa District completed four water resource studies. The Fort Sill Apache are cost sharing a study to investigate water supply and fire protection issues resulting from a two-inch water supply line. The study will result in a recommended solution. Aging infrastructure solutions, grant application packages, and business feasibility analysis are also being prepared.

The Choctaw and Chickasaw Nations are sharing costs for a study on wastewater re-use. The study team developed criteria for analyzing proposed projects, identified potential projects, and is conducting fatal flaw analysis on the potential projects.

The objective is to reduce demand on potable water supply by reusing wastewater for irrigation and industrial applications. These studies used the Planning Assistance Authority.

The Tonkawa Tribe provided funding for a two-year study to examine the impacts of climate on the vulnerability of two watersheds within their tradi-

tional area. The Chilocco Creek and Chikaskia River Watersheds are important ceremonially and for subsistence for many Tribal members.

In FY15, Tulsa's Tribal Team will continue to provide much needed technical expertise for construction. We expect to participate in at least six construction projects, including a hotel. The Chickasaw and Choctaw Nations hope to fund a third phase of studies as part of their comprehensive water resource planning effort.

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## Yukon Waterline Project

The City of Yukon is located just west of Oklahoma City in Canadian County, Oklahoma. This project consists of the construction of a one million gallon water storage tank, approximately 8500 linear feet of associated piping, and all appurtenances required to incorporate these facilities into the existing domestic water supply system of the City of Yukon. Cost sharing for project construction is 75/25, with federal appropriations limited to \$4.1 million. Work-in-kind is not authorized on this project.

A total of \$4 million was provided to the project in the FY14 work plan. These funds will be used to develop plans and specifications, complete environmental compliance documents and initiate construction on the project. Project is expected to be completed in FY18.



Quapaw Fire and Emergency Medical Services

## Webbers Falls Powerhouse Major Rehabilitation, Oklahoma

River & Harbor Act, approved July 24, 1946; Project Document HD 758, 79th Congress, 2d Session

### Under Construction

The run-of-river power plant contains three 23,000 inclined-axis, Kaplan-type generating units with a total rated generating capacity of 69,000 kW. These turbines were the first tube turbines of this magnitude ever built and placed into operation. As a result, the design did not consider all of the factors specific to the operation of slant-axis turbines, and the project has been plagued with mechanical reliability problems during its operation.

The major rehabilitation project will replace all three turbines resulting in \$1.32 million of net benefits per month to the nation. In addition to rehabbing the turbines, the generators will be rewound and upgraded, which will increase the capacity of the plant by 8.5 percent.

In February 2001, the Corps of Engineers Hydroelectric Design Center (HDC) recommended that the Ozark

and Webbers Falls turbine replacements be combined into one contract for a savings of more than \$5 million to the government and power customers. The Webbers Falls turbine replacement contract was subsequently included as an option under the Ozark contract that was awarded in May 2005.

The Webbers Falls Powerhouse Rehabilitation project's current cost is \$72.7 million with a scheduled completion date of May 2016. The project scope includes the turbine rehabilitation, generator rewind, rehabilitation of the intake/tail race gantry cranes, the bridge cranes, the intake gates and bulkheads, and installation of new 13.8KV breakers.

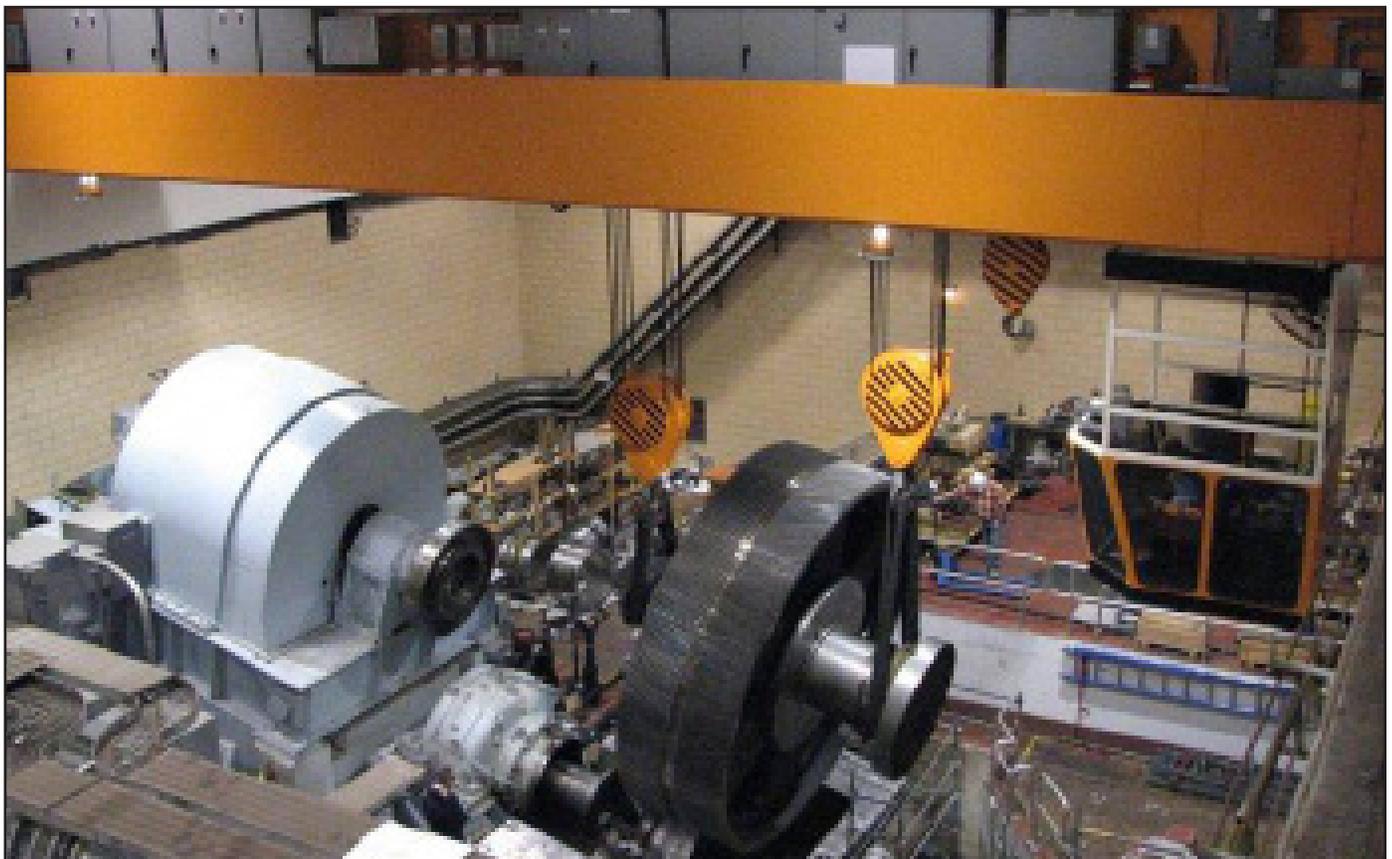
In 2008, the three turbine runner options were awarded to Andritz, Inc. for \$39.1 million. The contract cost is currently \$4.6 million. This cost increase is the result of technical changes as well as a built in escalation clause in the contract. The contract is 67 percent complete with Unit Three successfully beginning commercial operation in September 2012. Unit One is scheduled to complete the 72 hour commercial operation test in March 2015, while

Unit Two commenced disassembly in January 2015 and is scheduled for completion in June 2016.

Additionally, the turbine and generator bay bridge crane rehabilitation contract was awarded and completed in 2008 for \$2.3 million, and the intake and tail race gantry crane rehabilitation contract was awarded in 2009 and completed in 2010, for \$3.8 million using American Recovery and Reinvestment Act (ARRA) funds. In September 2010, a \$3.1 million contract was awarded to rehabilitate four intake gates, four tailrace bulkheads, and three intake bulkheads. The gate and bulkhead job is anticipated to be completed in 2015.

In December 2010, a \$4.9 million contract was awarded for the rewinding of all three generators. This project ongoing and is integrated with the turbine rehab work to minimize plant outages.

All work, with the exception of the gantry cranes, is funded by customer funding sub-agreements through the Southwestern Power Administration.



# Red River Basin

## Chickasaw/Choctaw Water Resource Study

Section 22 WRDA 1974, as amended

The Chickasaw Nation and the Choctaw Nation completed Phase I of a Wastewater Reuse Study.

This phase examined wastewater reuse strategies and applications, associated financial and economic costs, and risk benefit determinations to identify 11 potential water providers which have the best circumstances to develop water reuse as a long term supplemental water supply strategy.

Phase II will be completed in 2015 and will be a more detailed but limited feasibility analysis of the potential providers. It will result in a list of three to five feasible, cost effective water reuse projects.

## Lake Texoma (Denison Dam) Oklahoma and Texas

Flood Control Act Approved June 28, 1938

The Texoma Powerhouse contains two 35,000 kilowatt (kW), vertical Francis-type generating units with a total rated generating capacity of 70,000 kW. The first unit was placed on line in March 1945, and the second in September 1949. After more than 50 years of service, these units are worn out, have become inefficient, and are being replaced.

This project will replace the existing Francis runners and wicket gates, as well as overhaul the other turbine and auxiliary components to include replacing the oil filled transformers with sulfur hexafluoride (SF6) gas insulated transformers, installation of a new bus, governors and rehabilitation of the bridge crane. The primary purpose for this work is to increase the units' hydraulic efficiency and power output. The secondary purpose is to provide increased reliability and reduced maintenance costs.

This project is a multi-phase project which commenced with the award and construction of the bridge crane that is currently scheduled for completion in June 2015. The bridge crane project was followed by the award of the Francis runner and wicket gate replacement contract, which was awarded in August 2014, to Voith Hydro, Inc, for \$23.5 million. The project duration is 1,581 days and includes modeling, design and manufacturing of replacement components. During this same time period, an additional contract will be awarded to replace the transformers, bus and switchgear. The entire project is scheduled to be complete in January 2019.

All work is paid for by customer funding sub-agreements through the Southwestern Power Administration.

## Pine Creek Dam Safety Modification

Pine Creek Dam is located on Little River at mile 145.3, about five miles northwest of Wright City in McCurtain County, Oklahoma.

The features comprising the dam include an embankment section, an uncontrolled saddle spillway section, outlet works and an earthen dike. The embankment section consists of random fill with an impervious fill core.

The outlet works consists of a three-foot thick and 13-foot inside diameter reinforced concrete conduit formed and constructed in a narrow cut through bedrock.

A downstream horizontal filter exists from the springline to about four to five feet above the conduit. A blanket (horizontal) drain through the length of the embankment is believed to tie into the existing chimney filter and horizontal filter near the chimney filter.

The results of studies and geotechnical explorations provided critical information leading to identification of the presence and extent of a void around the conduit, loss of material through the conduit joints or at the downstream exit face of the filter surrounding the conduit, and a hydraulic fracture or other defect within the embankment, and the results confirm the existence of significant and credible potential failure modes.

Post-operations of the conduit for flood control releases likely resulted in pressurization of the conduit an average of two to three times per year over the life of the project.

This was prior to imposing restrictions to the amount of flow (not to exceed 4,000 cubic feet per second) during floodwater releases.

Pressurization of the conduit led to saturation and development of pore pressure in the embankment surrounding the conduit, as well as development of a "surging" effect that likely caused embankment material loss through the conduit joints.

The solution to install a cut off wall, a chimney filter and a downstream filter in the embankment and a steel liner in the conduit has been designed.

A contract was awarded in November 2014.

International Paper has 100 percent of the water supply storage under contract.

Water supply storage MRR&R is eight percent of the costs.

Reimbursement payments will be initiated during the first year of construction.

## Red River Chloride Control Elm Fork (Area VI)

This project was authorized for construction by the Flood Control Act of 1966, approved November 7, 1966, Public Law 89-789, SD 110; as modified by the Flood Control Act approved December 31, 1970, Public Law 91-611; and as amended by the Water Resources Development Acts of 1974 and 1976. The Water Resources Development Act of 1986, Public Law 99-662, amended the above authorization to separate the overall project into the Arkansas River Basin and the Red River Basin. Section 3136 of the Water Resources Development Act of 2007 reaffirmed that operation and maintenance responsibilities would be at full federal expense

Feasibility Study, Inactive

The Red River Basin Chloride Control (RRCC) Area VI project is located in southwest Oklahoma on the Elm Fork of the North Fork of the Red River in Harmon County.

This project is designed to control natural chloride brine emissions from three canyons, Robinson, Salton and Kiser. The study purpose is to improve water quality for municipal, industrial, and agricultural use. Section 3136 of the Water Resources Development Act (WRDA) of 2007 reaffirmed that operation and maintenance responsibilities of the project would be at full federal expense. By letter dated December 14, 2004, Oklahoma Governor Brad Henry requested that a re-evaluation of the Area VI portion of the Red River Chloride Control project be conducted. Area VI reevaluation efforts completed the scoping meeting phase in December 2012 and will not progress further until additional funds are made available.

USACE policy issued via LTG Walsh's memo dated February 8, 2012, requires the subject project be "re-scoped using rigorous management controls, and the principles of the new planning paradigm to support efficient completion of the study in 18 months to three years and cost no more than \$3 million." Additionally, this same policy requires the project be made inactive due to lack of new funding in the prior three years.

Finally, Engineer Circular (EC) 11-2-204 requires the feasibility study be cost shared 50/50 with a non-federal entity to be in accord with policy.

In conclusion, to move this project forward, RRCC Area VI will need to be made active again, have a 50/50 cost share partner and be re-scoped to fit the 3X3X3 planning paradigm.

## Red River Chloride Control Project (Wichita River Basin)

This project was authorized for construction by the Flood Control Act of 1966, approved Nov. 7, 1966, Public Law 89-789, SD 110; as modified by the Flood Control Act approved Dec. 31, 1970, Public Law 910611; and as amended by the Water Resources Development Acts of 1974 and 1976. The Water Resources Development Act of 1986, Public Law 99-662, amended the above authorization to separate the overall project into the Arkansas River Basin and the Red River Basin and authorized the Red River Basin for construction subject to a favorable report by a review panel on the performance of Area VIII. Section 3136 of the Water Resources Development Act of 2007 reaffirmed that operation and maintenance responsibilities would be at full Federal expense.

Under Construction

The Red River Chloride Control (RRCC) Project is authorized to identify and implement measures to reduce naturally occurring brine emissions into several subbasins

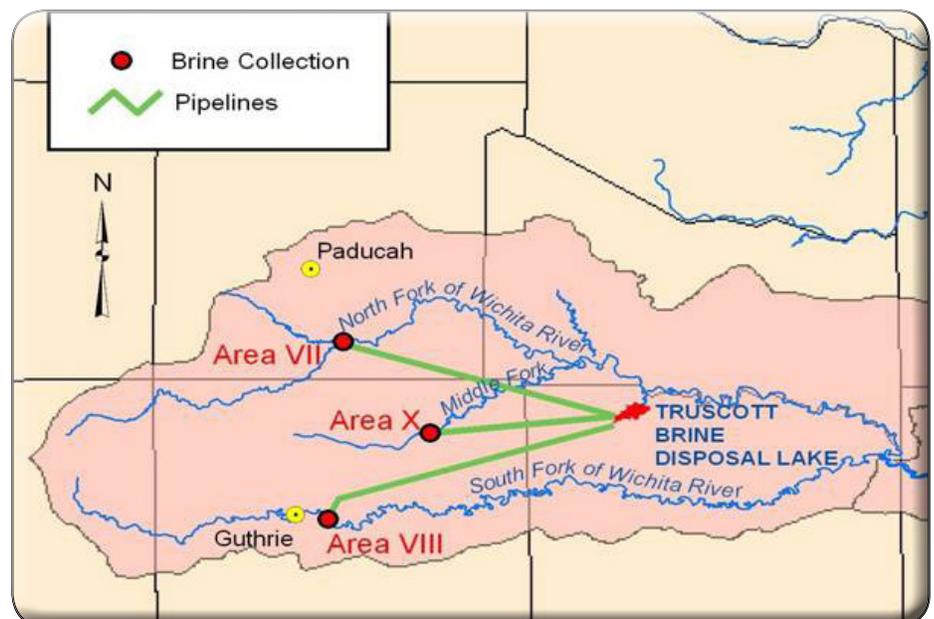
within the Red River Basin in northern Texas and southern Oklahoma.

The project's primary purpose is to improve water quality for municipal, industrial, and agricultural uses along the Red River within Oklahoma, Texas, Arkansas, and Louisiana.

Improvements include construction of low-flow dams, pump stations, and diversion pipelines to impoundment facilities.

This project is a select major water strategy of the 2007 Texas Water Plan for the region. The State of Oklahoma has expressed a renewed interest in the Area VI element of the RRCC, and reevaluation efforts are underway. Area VI is located on the Elm Fork of the North Fork of the Red River in Harmon County, Oklahoma.

Portions of the Wichita River Basin Chloride Control element, located in northwest Texas, have been constructed and in operation since 1987. Features include two low-flow collection dams, a pump station, and diversion pipeline to the Truscott Brine Disposal Reservoir. Additional construction efforts at the Area X pump house were completed in August 2010. Due to lack of funding, project construction efforts have been suspended.



## Rangers and troopers reward kids for wearing life vests

**T**ulsa District U.S. Army Corps of Engineers park rangers in Oklahoma and Oklahoma Highway Patrol (OHP) Marine Patrol troopers handed out tickets to children caught wearing their life jackets for the past four years and will do so again in 2015.



The ticket is a coupon for a free Frosty frozen treat if any child is caught wearing a life vest when they are boating or swimming at an area patrolled by these troopers.

“You Have Been Ticketed for Wearing Your Life Vest” is sponsored by Wendy’s in partnership with Safe Kids to promote water safety to Oklahoma youngsters. State law requires children 12 and under to wear a life vest while on a boat that is underway. It is always best practice for a child to wear a life vest when around water.

Safe Kids partnered with OHP and the Tulsa District ,Corps of Engineers because of the relationship between the agencies and Safe Kids. “Safe Kids asked OHP troopers and Corps park rangers to hand out these tickets to the children because our rangers and troopers are the ones out making contact with the children and their families,” said Amanda Palmer, natural resources specialist, Tulsa District, Corps of Engineers.

The ticket is redeemable at any Wendy’s location in Oklahoma. If a child does not own a life vest, there are loaner vests available. Safe Kids continues to make loaner life vests available through the Brittany Project at most Corps Lakes, and many Oklahoma State Parks offer loaners through the Loaner Board Program.

Wendy’s Corporation, Safe Kids, the Oklahoma Highway Patrol, and the U.S. Army Corps of Engineers want to “treat” kids this summer with a free Wendy’s Frosty.

