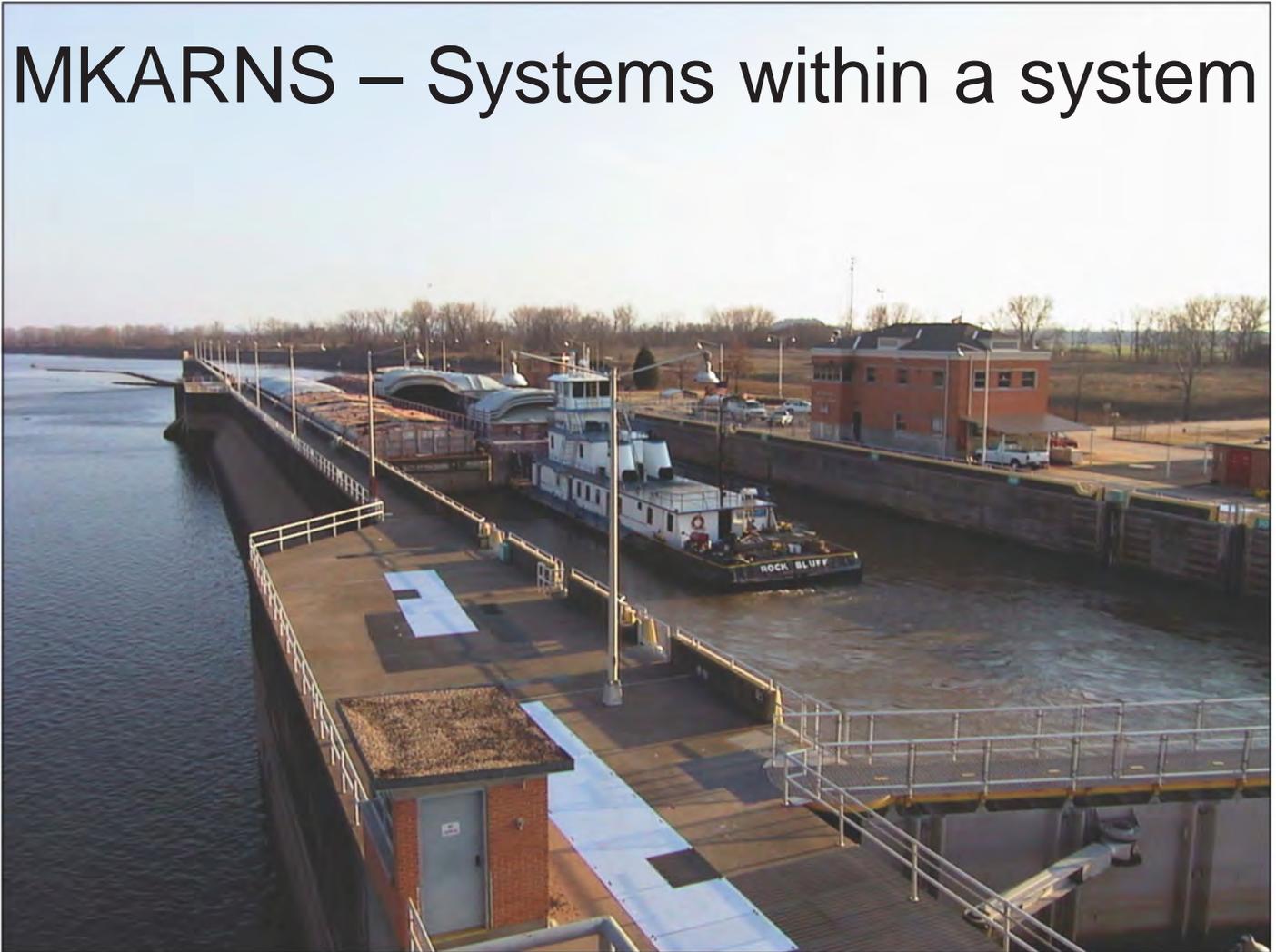




U.S. Army Corps  
of Engineers

# Tulsa District Project Update

## MKARNS – Systems within a system



Barge leaving W.D. Mayo Lock on the McClellan-Kerr Arkansas River Navigation System

**T**he MKARNS, short for McClellan-Kerr Arkansas River Navigation System, serves Oklahoma and Arkansas as a marine highway to the Gulf of Mexico and the world at large. It provides transport of goods to and from these states worth \$1.8 billion dollars annually in local commerce.

That's \$1.8 billion just in the shipping of goods. However, as part of a multi-purpose, multi-beneficiary system, the MKARNS does much more for the local economy. The overall system – the marine highway and the reservoirs that help support it – provides benefits of flood risk management, water supply, water quality, navigation, fish and wildlife habi-

tat, hydropower generation, and recreation to this part of the country. A system that has so much depending on it needs to be reliable, and the MKARNS has proven to be so. It doesn't freeze over in the winter, it is virtually drought proof, and its upstream reservoirs help control flows and keep navigation traffic moving.

The Corps faces a number of challenges to successfully operate this multi-faceted system.

"It really is a magical system. And the emphasis is on the system," according to Earl Groves, Chief of the Operations

Story continues on page 3

# District Commander's Perspective

While the cover of this edition of the *Project Update* has lots of water in it, make no mistake that we are smack in the middle of the second year of this drought. The cover photo of the previous edition showed John Redmond Lake at four feet below the normal pool, so there was practically no water in the photo. As we write this, John Redmond is once again down four feet as the drought has continued and expanded across the country. It makes our collective efforts more critical than ever.

We recently talked with the CBS Evening News about the drought. We began the interview standing on top of one of the turbines inside the Tenkiller Powerhouse. They came to Oklahoma with the premise that the drought meant there was no water for hydropower and, therefore, the region was going to suffer power shortages. As we talked with them and explained the intricate system of natural rivers and manmade reservoirs, we kept talking about "balance." It isn't just about hydropower. It isn't just about flood risk management or navigation or water supply or recreation or fish and wildlife or water quality. It is about balancing all of those often competing priorities.

At the Oklahoma Floodplain Managers Association meeting, we compared the drought to the flood events that they are preparing for. In a time of flood, we are looking for space to put excess water. We have to make the best use of every cubic foot of flood storage in every reservoir and channel. We hold water in some areas while we release water in others, all with the aim of balancing our multiple purposes. In a drought, we must make the best use of every drop of water, and we must balance the water that is available across all of the required purposes.

Balancing all of those different needs is critical to the drought. Take Lake Eufaula as an example. Do you want the water in the lake for recreation and water supply customers? Or do you want to release water for the downstream fisheries? And, if you are going to release water, shouldn't you generate electricity through the Powerhouse? And, by the way, all of the water released from Lake Eufaula travels down the Canadian River and into the McClellan-Kerr Arkansas River Navigation System at Robert S. Kerr Reservoir, which is the water that goods and materials travel on as they head up to the Port of Muskogee, Johnson's Port 33, and the Port of Catoosa. Among the many users of our ports, those goods support the Dal-Tile Manufacturing Plant in Muskogee, which sits 11 miles from the port and 30 miles from Lake Eufaula. So you can't have just one use – you have to balance them all.

So how do you balance all of the needs? You do it as a team. It takes working together with federal, tribal, state, county, and local groups to identify those needs and work out solutions. It really isn't much different than a flood fight – everyone working together to make the best use of our Nation's precious resources.



Colonel Michael Teague  
Commander, Tulsa District

## 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!"



U.S. Army Corps  
of Engineers®

Division for the Tulsa District, U.S. Army Corps of Engineers. “Each part of the Arkansas River system impacts every other part.”

For instance, when you release water from one of the seven hydropower equipped dams that generate electricity to keep our lights on, it sends water downstream to the MKARNS. When a storm occurs and you release water from the flood pools, you send water downstream to the MKARNS. When you lock through a tow that is commerce on the system, you send the water that was used in the lock chamber downstream, which adds to the water available for the next lock to use, and so on down through all the locks on the system. When water quality releases are made from upstream reservoirs, these flows also sustain the navigation system.

Another aspect of the system is flood risk management. When it rains, the Corps is responsible for catching and holding the runoff in an attempt to prevent downstream flooding. The excess rainfall is stored in the flood pool that is the normally dry part of the lake that contains campsites, picnic tables, playgrounds, boat ramps, and other recreation facilities. Recreation users want the water evacuated from the flood pool as quickly as possible.

Once the rain has stopped and downstream conditions permit, the stored flood water is evacuated to prepare for the next round of storms. If the water is released too quickly from the reservoirs, it can impact the movement of barges on the MKARNS because swift water makes for unsafe conditions for barge traffic.

In the opposite extreme, a drought causes recreation interests to be monetarily affected by receding shorelines and low water conditions. Drought also affects the amount of water available for generation of electricity to keep the lights burning, air conditioners working, and barges moving on the MKARNS. The Arkansas Drought Contingency Plan calls for flows of 2,500 cubic feet per second at Van Buren, Arkansas, to maintain pool elevations for navigation. During the summers of 2011 and 2012, Tulsa District met this requirement through normal hydropower and water quality releases. If conditions were to worsen, the minimum flows could still be maintained through releases from navigation storage in Oologah Lake.

Drought also magnifies special interests – stakeholders who lobby to keep water in the lakes, as well as those interested in withdrawing it to fulfill the needs of those who bought and are continuing to pay for water storage for uses such as water supply and hydropower.

COL Michael Teague, Commander of the U.S. Army Corps of Engineers, Tulsa District, explains the challenges this way, “The Corps has built the bathtub that stores water. That water has been bought and paid for by various users that have different ideas on how that water should be used. We have the tough job of trying to balance those needs, come storms or drought. What I have found is if you get these various interests to roll up their sleeves, sit at the table together, and work as a team, they will come up with workable solutions. No one stakeholder is a winner over others; they all win by working together.

“In a drought condition, such as we are now experiencing, all partners work together to make sure every drop counts in some way. Hydropower interests begin to purchase electricity from other sources to preserve water in the lakes. Others, such as International Paper below Pine Creek Lake, implement water conservation plans that help prolong the time the stored water will last. It’s a team effort,” says COL Teague.

According to Groves, “Another aspect of teamwork is the effort to maintain the MKARNS as a year-round waterway. It requires constant vigilance and maintenance. This is one reason we are taking four hours every day to perform needed repairs and routine maintenance. We’ve got to make sure that traffic on the waterway is kept moving year- round,” he added.

An observer and stakeholder, Bob Portis, Executive Director of the Port of Catoosa said, “One of the things that I have always been impressed with by the Corps is their ability to put together a teamwork approach to solving problems. And they keep that teamwork in place. Teamwork is not just within the Corps but they build teams involving customers, stakeholders, and others. It’s a good recipe for success.”



A lock full of barges at Newt Graham Lock and Dam on the MKARNS. The system brings \$1.8 billion in commerce to this part of the country annually.

# Tulsa District's Focus on Military Construction

## Listening to Our Customers

The annual BCE-DPW Workshop was held March 7-8 at Fort Sill, Oklahoma. Topics of discussion included meeting Beneficial Occupancy Dates, providing a Contracting Tools Update, Implementation guidance on the MILCON Project Closeout Enterprise Business Process, and review of the FY11 Military Customer Care Survey. Additional topics and presentations included, Airfield Pavements (Altus AFB), Insulated Concrete Forms Construction (Sheppard AFB), Military Munitions Response Program (Fort Sill), and Railroad Capabilities (McAlester AAP).

The workshop concluded with a tour of the Joint Fires and Effect Trainer System.



From left, Adam Crisp with the U.S. Army Corps of Engineers, Tulsa District, joins Bron Howard and Brian Drake, from Altus AFB.

## Grand Opening



On January 18, 2012, at Altus Air Force Base, the grand opening of the new dental facility in the 97th MDG and the completion of the \$7.25 million facility renovation project was held. Col. Sharon Hunter, 96th Medical Group Commander, Ky Hombaker, United Excel Chief Executive Officer, John Roberts, Tulsa District Deputy District Engineer, and Col. Anthony Krawietz, 97th Air Mobility Wing Commander, cut a ribbon in the 97th MDG waiting room during the ceremony.



## Soldiers return to new barracks at Fort Sill

Fort Sill's new Unaccompanied Enlisted Personnel Housing (UEPH) barracks were constructed by M.A. Mortenson Company who effectively managed and implemented an integrated design throughout construction. The seven barracks, each three stories high, totaled 228,921 square feet. They house 620 soldiers, with shared laundry rooms and janitor closets for each floor, as well as mechanical, electrical, and communication rooms for each building.



## Keeping the power on

The Corps of Engineers Southwestern Division Commander BG Thomas Kula and Tulsa District Commander COL Michael Teague joined Altus Air Force MSG Commander Col. James Peccia in a ribbon cutting ceremony for Phase One of converting the overhead power lines to underground.

The ice storms in 2009-2010 caused Altus AFB to lose power for days due to downed power lines. This long power shortage caused a significant negative impact on the mission of the Base. AAFB Civil Engineering department established a plan to have all the electrical wires placed underground. The Corps, together with the Base Civil Engineer, worked to make the plan become a reality by installing approximately eight miles of new wire, eight new transformers, and making the new street lights more energy efficient by installing 38 LED light poles.

Phase One was started in October of



Bron Howard, Lt. Col. Anderson, COL Teague, Col. Peccia, Henry Edwards, BG Kula, and Randy Tisdell participate in a ribbon cutting for the underground power lines.

2010. With hard work and long hours put in by the Base Civil Engineer, the Corps of Engineers, and the general contractor, The Ross Group, Phase One was finished 25 days ahead of schedule. This was accomplished despite a 120-day delay lost to a wire shortage brought on by the Joplin tornado.



The new Bldg. 2283 multi-bay hangar officially opened for business with a ceremonial ribbon-cutting June 29. Due to flexible material doors that open like window shades, four KC-135 tankers can move into the facility easier -- either one at a time or all six together. A single bay is on the other side of the hangar. Administration and modern break areas are in between the bays, and break areas feature reinforcements that turn them into safe rooms during storms. (Air Force photo by Margo Wright)

## Big doors open for business at Tinker

A 164,760-square-foot multi-bay aircraft hangar served as a magnificent backdrop for its ceremonial ribbon cutting June 29. Approximately 300 people, including Tinker senior leadership, architects, engineers and 76th Aircraft Maintenance Group mechanics, attended the morning event.

The new hangar, or Building 2283, is located within the industrial ramp area, just south of Building 3001. Costing roughly \$43 million, the military construction project houses up to four KC-135 Stratotankers, supports programmed depot maintenance and sustains up to three shifts and more than 180 aircraft maintenance group personnel.

“This facility represents the fulfillment of a vision for Team Tinker,” said Col. Cedric George, 76th Maintenance Wing Commander. “Leaders past and present saw us and said, ‘If you would simply follow a simple operating principle -- if you increase speed and quality, you can deliver more KC-135s to the warfighter and create capacity for additional workload.’ In essence, when they told us that, they saw what we are experiencing here today.

Janis Wood, 76th Aircraft Maintenance Group Deputy Director, agreed. “It is not every day we open a new hangar; this has

been a long time coming,” she said. “One dock, one door; in 2003 or 2004, we started that saying. At that time, it was just a dream, a vision ... but now, today, we get to realize that dream. We have a modern facility that allows us to move aircraft in a much more efficient manner. We won’t have trapped aircraft in Building 2283.”

Designed by LWPB Architecture of Oklahoma City, Korte Construction Company of St. Louis was the general contractor, and the Army Corps of Engineers managed the project.

Painted in neutral tones, the facility is Leadership in Energy and Environmental Design, or LEED, silver. The Air Force requires new military construction projects and major renovations meet LEED silver certification requirements. LEED officials grade the building on five categories – sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environment. The number of points earned determines the energy efficiency of the facility. Construction on the project began in the summer of 2009.

The multi-bay aircraft hangar was also used for the Air Force Sustainment Center (AFSC) activation ceremony on July 10. In that ceremony, the Oklahoma City Air Logistics Center was redesignated a complex and became part of the AFSC.

# New medical clinic opens at Tinker AFB

The newly numbered Building 1094 at Tinker Air Force Base, which officially opened for business July 31, was a crowd pleaser.

“Welcome to your new medical clinic,” said Col. Steven Bleymaier, 72nd Air Base Wing and Tinker installation commander, to a cheering crowd. “This ceremony isn’t just to celebrate a facility or a building; it’s really about a team. The heart of that team is the men and women of the 72nd Medical Group. It’s because the 72nd Medical Group, under the leadership of Col. Dean Prentice, is one of the great enablers of Team Tinker’s ability to provide readiness and put mission ready Airmen and aircraft in the air. The professionals in the 72nd Med Group know it’s not about them, it’s about those they serve... and they answer the call of others, so others can succeed.”

Designed by architectural firm Sherlock, Smith and Adams, Hensel Phelps Construction Company was awarded the construction contract. The clinic is part of the Department of Defense’s Military Construction Program, meaning Congress

approved the project and provided the funds to pay for the \$51 million clinic. The U.S. Army Corps of Engineers managed it.

The new facility will be operated by the medical group. Tenants will include the 507th Medical Reserve Squadron, Navy medical personnel assigned to Strategic Communications Wing ONE and U.S. Department of Veteran Affairs Pre-Discharge Disability Claims Office.

“Today marks a new beginning in the medical group here at Tinker,” said Col. Prentice. “This new facility provides our community another 50 years of quality healthcare. When these doors open July 31 for our first patients, they will be welcomed into a state-of-art facility designed for our patients’ needs. This new facility will help the medical group meet its mission of being leaders and providing world-class healthcare.”

The Leadership in Energy and Environmental Design, or LEED, silver energy-efficient facility features a light-colored roof and paving materials that minimize heat absorption, large windows and sky lights to maximize the use of natural light and to recycle water by capturing water on the roof through drains and using it to flush toilets.



The 72nd Medical Group is another step closer to occupying its new digs. The clinic is located just inside the Gott Gate and will replace the original hospital, Building 5801, that was dedicated in 1960.

## ENJJPT Complex Phase 1 completed at Sheppard Air Force Base

This contract was awarded to MCC/Catamount as a design/build project on September 10, 2010, with a cost of \$13,343,792. Notice to Proceed for design and construction was issued on October 20, 2010. The contract was awarded with two options: to provide and install the equipment and conduits for new audio/visual equipment in the auditorium; and to erect a covered walkway between the new building and the existing Flight Simulator building. The contractor started work on the foundation work once the 65 percent design was approved. The facility is approximately 40,000 square feet and is constructed to house the Operations Squadron of the 80th Flying Training Wing.

The building is constructed as a structural slab supported by drilled piers and the floor is formed using removable pan forms. It has a crawl space under the floor that is conditioned and lighted and serves as the main route for the under-floor utilities. The exterior walls of the building are constructed using insulated concrete forms. The roof system of the building utilizes a standing seam metal roof, polyisocyanurate insulation and three layers of Densdeck. Between the roof, walls and windows, the building has a composite sound transmission class of 65.

The design uses Building Information Modeling to generate 3D images of the



Left to right: 80th Flying Training Wing Commander Col. Dieter Bareihs, U.S. Senator Kay Bailey Hutchison, 80th Operations Group Commander Eberhard von Wintzingerode-Knorr and U.S. Congressman Mac Thornberry cut the ribbon during an opening ceremony for the 80th Operations Group Facility at Sheppard Air Force Base on September 5, 2012. (U.S. Air Force photo Frank H. Carter)

building to assist in the layout and installation of the various mechanical, electrical and structural components.

Mechanical and electrical systems were designed and selected so that, along with the exterior construction, the building will meet or exceed the energy savings required by EPACT2005.

This facility was designed and constructed to LEED Silver standards and has been certified as LEED Silver by the U.S. Green Building Council.



# Tulsa District's Focus on Civil Works

## Tri-State Water Offices Hold Partnering Meeting

John Redmond Reservoir is nearing the end of its economic life. While it continues to provide many of the benefits for which it was authorized, there are maintenance issues commensurate with its age. Siltation is impacting both conservation and flood control storage, as well as diminishing the reservoir's water supply, flood risk management, recreation, and fish and wildlife benefits.

A log jam on the Neosho River upstream of the reservoir continues to grow and, as a result, the river is eroding a channel cut-off through a wildlife area managed by the U.S. Fish and Wildlife Service. Water quality in the lake threatens state total daily maximum limits and impacts water supply and recreation users and the aquatic ecosystem. The population impacted by the reservoir is increasing, and the need for reliable water supply for the Wolf Creek Nuclear Power Plant is becoming more critical.

The State of Kansas focus on watershed protection and reservoir sustainability is enabling sound watershed planning, but implementation is limited by funding and the willingness of landowners to participate. Many of the in-lake impacts of watershed protection won't be realized for many years. Restoration of the reservoir to previous levels of service is becoming more necessary as storage and water quality continue to decline. Corps Operations and Maintenance funding has been level or declining for many years, making it difficult to maintain the aging project features. Recently, individuals from the Institute for Water Resources, Southwestern Division, Tulsa District, Kansas City District, Kansas Water Office, Texas Water Development Board, and Oklahoma Water Resources Board met in Topeka, Kansas, to discuss the Civil Works transformation initiatives for infrastructure sustainability and innova-



Earl Lewis, Assistant Director Kansas Water Office, Tracy Streefer, Director of the Kansas Water Office, J.D. Strong, Director of the Oklahoma Water Resources Board, Carolyn Brittin, Deputy Executive Administrator for Water Resources Planning and Information for the Texas Water Development Board, Michelle Lay, Corps of Engineers, Civil Design Section and John Roberts, Corps of Engineers Deputy District Engineer for Project Management, participate in a tour of John Redmond Reservoir.



Tracy Streefer, director of the Kansas Water Office, Col. Teague and John Roberts participated in the John Redmond Reservoir table top exercise to discuss extensive sedimentation issues at John Redmond Reservoir.

tive partnering. Specifically, the exercise looked at extending the life of a single project, John Redmond Reservoir in Kansas, which has critical water supply requirements and extensive sedimentation issues.

This concept was first introduced to regional stakeholders at the February 2012 Kansas-Oklahoma-Texas Tri-State Summit as a means to examine asset management strategies, tools, and funding initiatives that will help prioritize the future of the nation's civil works infrastructure.



Ground is broken on the Augusta Levee Enhancement project in Augusta, Kansas. The project will raise the height of the levee between two to five feet at various locations and will add another 2,500 feet to the four-mile system.

# Augusta Breaks Ground

The City of Augusta, Kansas, held a groundbreaking ceremony June 22, 2012, to celebrate the start of the Augusta Levee Enhancement project, a project that was 14 years in the making.

Torrential rain Halloween night 1998 flooded the city, which is 19 miles east of Wichita, destroying 650 homes, 92 businesses, and several mobile home parks, causing an estimated \$5 million in damages.

The original levee, constructed in the 1920s and '30s, was not capable of handling such massive amounts of flood water. It was breached at several locations along the west side of Augusta demonstrating a need for improved flood protection. The next year, planning began for the Augusta Levee Enhancement project.

This levee enhancement project will raise the height of the existing levee from two to five feet at various locations and will add another 2,500 feet to the four-mile system.

Crews work to construct a new 2,500 foot section of levee in Augusta, Kansas. This is part of the Augusta Levee Enhancement project.

“The project has overcome several hurdles; it will help to ensure the safety of Augusta’s citizens for years to come,” said former Augusta Mayor Ross Rountree.

“It means so much to me to be able to participate in this ceremony marking the official start of something we began dreaming of some 13 years ago,” he said. “This has been a long and arduous journey, but we finally reached our destination here today.”

The project is 65 percent funded by the Corps and the remaining 35 percent is paid for by the city and its partners. It is scheduled for completion late August 2013.

“I want to express my thanks, for myself and on behalf of the citizens of our community, our gratitude to all of those involved for their foresight and understanding of the importance of this project and for not letting go of the dream for a better Augusta,” Rountree said.





## Learning about climate change on Oologah Lake

Oologah Lake is being used for a pilot study that the U.S. Army Corps of Engineers Tulsa District is conducting along with NOAA to determine what affects climate change has on the water supply.

**H**ave you ever wondered what will happen to our water supply in 25 years? What about 50 or 100? How will the ever changing climate affect our water resources in the years to come? Those are the questions that The U.S. Army Corps of Engineers Tulsa District is trying to answer in a pilot study of the Oologah Lake and watershed in Northeast Oklahoma and Southeast Kansas.

Currently, 117 of the 600 Corps' managed multi-purpose reservoir projects include enough water supply storage to meet the water needs of approximately 85 million American households for a year. In order to effectively manage these reservoirs, USACE is studying the impacts that a change in climate will have on the water supply over time.

The pilot study is just one of the ways the Corps is looking toward the future to come up with a sustainable water supply strategy. The goal of the study is to demonstrate a sustainable local, tribal, state and federal government risk management process associated with climate change impacts to reservoir yield, water quality and soil and water conditions in the watershed. Information gathered from the study can also serve as a template for future reservoir and watershed studies.

"Our intent is to be able to repeat this process as the climate science advances," said Doug Lilly, lead civil engineer for Tulsa District. We want to find some practical ways of leveraging resources for multiple organizations and applying that info in a practical way in a planning study and then providing that information to decision makers."

The Oologah Lake and watershed was chosen because of existing reservoir models and baseline information developed from the Oologah Lake Watershed Assessment Study that was completed in 2012, making the pilot study cost and time effective. "We get more bang for our buck by using Oologah because we don't have to spend pilot money on models," said Lilly. The total cost for the study is \$225,000.

The study is being conducted in partnership with the National Oceanic Atmosphere Administration Southern Climate Impacts Planning Program and the Department of Interior's South Central Climate Science Center at the University of Oklahoma along with other local, tribal, state, federal and non-government organization stakeholders.

The study will take an interactive and collaborative approach by encourag-

ing stakeholder input and information exchange. Climate data will be collected from various global and regional historic climate models and statistical downscaling to produce a future project dataset. The data collected will be entered into a dataset model to be incorporated into existing Lake Oologah and watershed models.

"We're in the process of learning about climate change and its effects on our waters," said Lilly. "What we do know is that there is potential for warmer weather- more extreme events and that may change how sediment is transported in to reservoirs. So, in the future we may learn if we have more extreme drought events we may have less reservoir yield than we previously thought. Our lakes may in the future fill up quicker with sediment if there are more extreme events that transport more sediment. So those are things that are potential issues and that are what we are trying to learn more about- how we would plan for those potential issues in the future?"

The pilot study began at the beginning of 2012 and is expected to be complete by the fall of 2013.

## Partnership Set in Stone



Breaking ground for Harbor Marina are, from left, Ron Howell, Senator Jim Inhofe, COL Michael Teague, and Tulsa Mayor Dewey Bartlet. Not shown, but also in attendance and honored in the plaque shown to the right, was City of Mannford Mayor Johnnie Bozarth.

With more than 100 people in attendance, officials broke ground on March 5, 2012, at the new Harbor Marina at CrossTimbers on Skiatook Lake. This is a public/private partnership among Tulsa developer Ron Howell, the town of Mannford, and the U.S. Army Corps of Engineers.

Located along Basin Road, one-half mile north of Oklahoma Highway 51, the project will include cottages, 450 boat slips, and the largest floating marine store and restaurant in the state.

StateSource, a firm led by Howell, will sub-lease about six acres of land and 19 acres of water from the City of Mannford, which is providing the land for the development through an existing lease with the Corps.



## Federal and State Agencies Take Steps To Save Tenkiller Trout

In August, Tulsa District announced the signing of a contract for construction measures to protect the trout fishery below Tenkiller Lake.

The contract will provide a special low-flow pipe from an existing surge tank at the dam and installation of a supersaturated dissolved oxygen system below the dam. These two items, along with cooperative measures by the Southwestern Power Administration (SWPA) and the Oklahoma Department of Wildlife Conservation (ODWC), are important interim steps while searching for a permanent solution to the sustainment of the downstream fishery.

The agencies are cooperating to implement solutions that could not be accomplished by any single agency. The SWPA funded the low-flow pipe and dissolved oxygen system. The Corps

performed the design, acquisition and contract management. ODWC will maintain and operate the dissolved oxygen system, as well as monitor river conditions and request releases using the low flow pipe. ODWC has installed numerous stream gauging stations using funds donated by Trout Unlimited Oklahoma Chapter and Tulsa Fly Fishers.

As there is no permanent storage in Tenkiller Lake allocated for the fishery, storage for releases by ODWC is being donated by Sequoyah County Water Association, Tenkiller Utilities Authority and Lake Region Electric Development.

Oklahoma Water Resources Board has been actively involved by providing temporary water rights to ODWC for the donated water.

Barry Bolton, Chief of Fisheries, ODWC, said, "I appreciate the Corps of Engineers and Southwestern Power Administration's efforts to more effectively manage this important resource which generates more than \$2 million dollars annually for the economy of northeast Oklahoma."

"We are looking forward to getting these facilities in place to help give ODWC more options in utilizing the donated water storage for the benefit of the fishery below the dam," said Fritha Ohlson, civil engineer (hydrologic), SWPA, U.S. Department of Energy. Ohlson added, "They also provide tools to conserve valuable water resources for all purposes during times of drought."

COL Teague praised the efforts of many people in bringing about these first steps in the efforts to sustain the trout fishery as agencies work together to find a permanent solution.



# Joe Creek Ecosystem Restoration Improvements Near Completion

**J**oe Creek is located within the urban footprint of the City of Tulsa with a drainage area of approximately 17 square miles. It initially flows through the rolling hills of residential south Tulsa until it reaches the large, flat Arkansas River floodplain, along the way touching numerous residential and commercial properties, a few scattered public parks, and two golf courses.

Over the years, due to the significant risk of flash flooding, the Joe Creek channel was heavily modified and its course altered significantly. While the completed modifications, consisting mostly of concrete lined channel improvements, fulfilled the urgent need for flood risk management, the ecosystem was significantly impaired. Recently, the City of Tulsa and the Corps of Engineers have come together and invested significant resources to focus specifically on ecosystem restoration improvements to this watershed. Those construction efforts are now nearing completion.

## Chronology

In December 1963, at the request of the City of Tulsa, the Corps of Engineers became involved with Joe Creek to address continued flooding problems under Section 205 of the Flood Control Act of 1948, as amended. In 1969, final approval of the feasibility report was received from Corps Headquarters, and the project was placed on the backlog list of approved projects ready for construction. In March of 1978, construction began on the Joe Creek Local Protection Project and was completed in November 1980. The project consisted of 10,800 feet of channel improvement along Joe Creek, 300 feet along Little Joe Creek, 360 feet along South Fork Creek, and 1,200 feet along the east bank tributary.

Although this effort fulfilled the need for flood risk management, the improvements took a toll on the ecosystem.

In 2005, with the authority provided from Section 1135 (Improve the environment to projects with previous Federal involvement) of the Water Resources Development Act of 1986, as amended, the City of Tulsa requested that the Corps investigate ecosystem restoration opportunities within the Joe Creek watershed to restore ecosystem functions and processes and improve the aquatic and riparian habitat.

In 2008, a project was recommended that would focus on restoration measures in the riparian corridor, consisting of construction of refuge ponds within the channel and planting native vegetation on the upper banks. Aquatic habitat would be improved with aquatic plantings and bank stabilization measures. A grade control structure would be constructed downstream of the 71st Street bridge to stabilize the channel as it enters the Arkansas River. Any remaining areas of failing bank armoring would be replaced with riprap. The channel flow line would be modified to encourage the formation of a more natural low flow channel.

On June 25, 2009, the Project Partnership Agreement was executed with the City of Tulsa for an ecosystem restoration project with a projected total cost estimate of \$6,365,498, of which \$1,591,374 (\$1,226,374 cash and \$365,000 land credit) would be the city's responsibility, and \$4,774,124 would be federal responsibility (a 75/25 percent cost share).

On April 19, 2011, a construction contract was awarded to Coast to Coast, LLC at a cost of \$4,905,750. Construction efforts are expected to be complete October 19, 2012.



Joe Creek Before



Joe Creek After

# Briefings give status of work on Pine Creek dam

On July 24, 2012, Colonel Teague hosted a tour of the Pine Creek conduit for congressional office representatives and stakeholders. He briefed that all interim risk reduction measures have been completed. After the gates were replaced, inspections inside the conduit revealed deteriorating joint repair and new joint seepage. Additional observations of abnormal instrumentation results have led to the decision to maintain the current pool restriction of 433, five feet below the normal conservation pool level.

Rusty Appleton from Senator Inhofe's office and Hunter Heath from Congressman Boren's office participate in the tour of the Pine Creek Conduit.



Colonel Teague addresses the participants that attended the tour of the Pine Creek Conduit and the stakeholder update of Pine Creek.

**B.A.S.S. sportsman Edwin Evers wants you ...**

**to get 'hooked' on wearing a life vest**

U.S. Army Corps of Engineers

**Protect What's Precious --** Thirteen people have drowned on Tulsa District lakes this year. Always wear a life vest -- even if you don't plan on getting in the water. You never know!

# FY13 Top 15

## Tulsa District Unfunded Maintenance Priorities

**B**y making prudent use of FY12 emergency supplemental and regular Operations and Maintenance appropriations, Tulsa District has been able to successfully address and reduce 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 of our appropriated funds into preventative and critical major maintenance. However, the facilities continue to age.

The following are Tulsa District's Top 15 FY13 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 Oologah Lake, Oklahoma

#### Repair and Replace Service Gates, Hoisting Equipment, and Low-Flow Systems

All four service gates have lost structural strength and need to be replaced. A design to replace the worst service gate, gate 4, and to repair the well liner was completed in FY10. A construction contract was awarded in FY11 for the fabrication and installation of a new gate and to repair the well liner in slot 4 and replace the low-flow valve. The well liner has been repaired and fabrication of the gate is near completion. In FY12, a contract was awarded for repairing the well liner for slot 3 and replacing gate 3. Funds have been identified in FY13 to replace gate 2 and repair that well liner. Gate 1 remains unfunded along with the well liner for slot 1. Without funding, the gate will continue to corrode and erosion of the well liner wall will continue. Currently, up to eight inches in thickness of the concrete well wall has been lost due to the unrepaired well liner.

Repair Cost Estimate: \$2.0 million. If the gate and conduit system repairs are not made, a gate failure could occur. This would result in loss of service to the navigation system and potentially disrupt water supply to the city of Tulsa and other nearby municipalities.



## 2 Broken Bow Lake, Oklahoma

### Replace Floating Bulkhead

The safe operation for the use and performance of the bulkhead has become a concern. The current condition is one of rapid decline – the internal mechanical system is completely deteriorated and the soundness of the exterior skin plates is reduced by severe surface pitting and corrosion. The bulkhead, composed of four different leaves, is a great mechanical design, but some changes are required before it can be utilized to its full potential. Assembling the gate into the appropriate configuration requires considerable scheduling and coordination. Different lake levels require different configurations. A mobile crane is required to maneuver the leaves during assembly. A temporary crane pad must be constructed by use of a dozer. The pad must be located immediately adjacent to the water's edge in order to provide crane access to the bulkhead leaves. A permanent pad is not feasible due to ever-changing lake levels and a corresponding change of the shoreline. As a result of the difficulties in using the bulkhead, Gate Operational Condition Inspections could not be made on all gates. The existing pieces of the bulkhead need to be modified and repaired to ensure its use during all lake elevations and to reduce the manpower and equipment costs each time it is assembled and used. Modification will consist of either a redesign to facilitate full-



time storage in the wet (in the lake) or to change deployment operations so that it's stored on land and transferred when needed. Severe leakage in the spillway gallery has become a Dam Safety concern. Assurance and reliability of the bulkhead to function for a long period of time is required to properly assess and correct this problem.

Repair Cost Estimate: \$1.4 million

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## 3 Kaw Lake, Oklahoma

### Install Seepage Filter Blanket on Downstream Left Groin of Dam

Seepage now emerges from the knoll mid-way down the left valley groin during pools greater than 10 feet above conservation pool. The first occurrence of seepage close to embankment fill was observed in 2007. The swampy area at the bottom of the abutment has constant seepage year round at any pool level. Piezometers in the groin indicate that there are high uplift pressures that fluctuate with the pool level that did not exist prior to 2007. This situation requires immediate repairs to ensure the safety of the embankment. Proposed project is to intercept the seepage with a chimney filter dug deep into the ground.

Repair Cost Estimate: \$1 million



## 4 McClellan Kerr Arkansas River Navigation System, Oklahoma

### Install Pintle Ball on Lock 14 (W. D. Mayo)

During the dewatering of Lock 14 in 2007, rough operation and problems were noted with the upstream landwall miter gate. The miter gate pops on travel, is difficult to miter, and the pintle no longer accepts grease. All are indicators the pintle ball and bushings need replacement. Failure to repair causes stress on the hydraulic system and other sector gear components. The rough travel increases the risk of fatigue cracks in the miter gates. Failure to repair could result in a long-term, unscheduled closure of the navigation system.

Repair Cost Estimate: \$450,000



## 5 Webbers Falls Lock and Dam, Oklahoma

### Replace Lock Pintle Ball



Downstream land-side miter gate is operating jerkily, indicating it is sticking on its pintle ball. It seems to be getting worse. If it gets stuck, the navigation system from L&D 16 to Port of Catoosa will be shut down.

A new pintle ball and all related parts should be purchased and installed. In addition, the downstream miter gates need to be checked for fatigue cracks. Cracks were found in both miter gates and repaired during the 2004 lock dewatering. Several members near tailwater level have laminated rust and should be rehabilitated and re-painted

Repair Cost Estimate: \$1.25 million



## 6 Webbers Falls Lock and Dam, Oklahoma

### Repair and Re-paint Tainter Gates

The gates were last rehabilitated and re-painted between 1998 and 2001. Floating debris swirls in the tailwater, rams members, and wears the paint off lower members within the first few years. Cycles of rusting and



Repair Cost Estimate: \$9.5 million



wear have been going on for the past 11 years. The constant ramming by large driftwood has bent, cracked, and knocked out braces. Two gates are missing members. In addition, some tight or hard to access locations were not well painted, and leaks and splashes are causing them to rust. Several bearings in the pillow bushings for the torque rods on the gates have slipped out of their housings. These repairs and re-painting are necessary to ensure that the tainter gates continue to operate and meet their intended function.

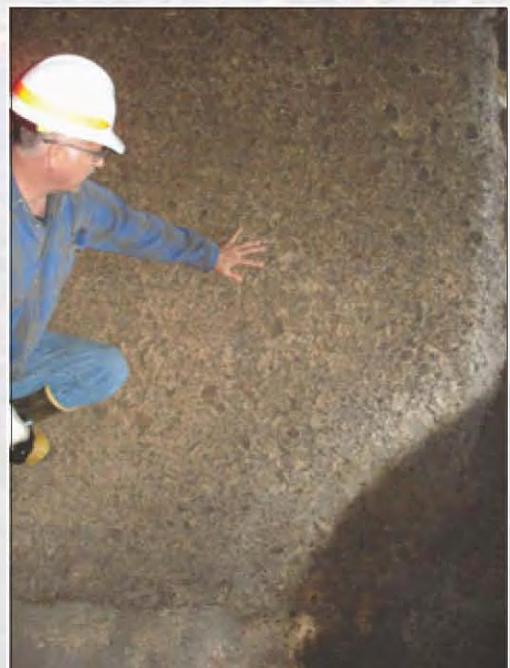
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## 7 Denison Dam, Lake Texoma, Texas and Oklahoma

### Replace Service/Flood Gates

Both the 2002 and 2007 Periodic Inspection reports indicated the service/flood gates leak profusely. The gates, their frames, and the sluiceway liners are more than 50 years old, and accumulative corrosion and cavitation has caused significant damage. There is also some cavitation of the concrete in the transitions. A contract was awarded in FY10 to repair one emergency gate. In addition, FY11 funds were used to complete the design of new service/flood gates with a contract awarded in September 2011 for three new flood gates and the turntable. That leaves three more services gates to replace and the frames, liners, and transitions to repair.

Repair Cost Estimate: Three of the six service/flood gates and all six frames, liners, and transitions remain unfunded at a total estimated cost of \$5 million. Accelerated wear and corrosion will result if funding is not provided. Continued deterioration to key structural members and surrounding conduit is expected.



## 8 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: \$14 million



## 9 Copan Lake, Oklahoma

### Repair and Re-paint Tainter Gates



The gallery sump pump outlet sprayed water onto Gate 2's left strut arm since construction. The years of spray have caused severe corrosion which has eaten away a lot of steel from the middle and bottom members of the left strut arm. Gate 2 needs rehabilitation and re-painting as soon as practical. The other tainter gates have scattered rust spots, and the 25 year old paint has broken down, so all four gates should be re-painted.

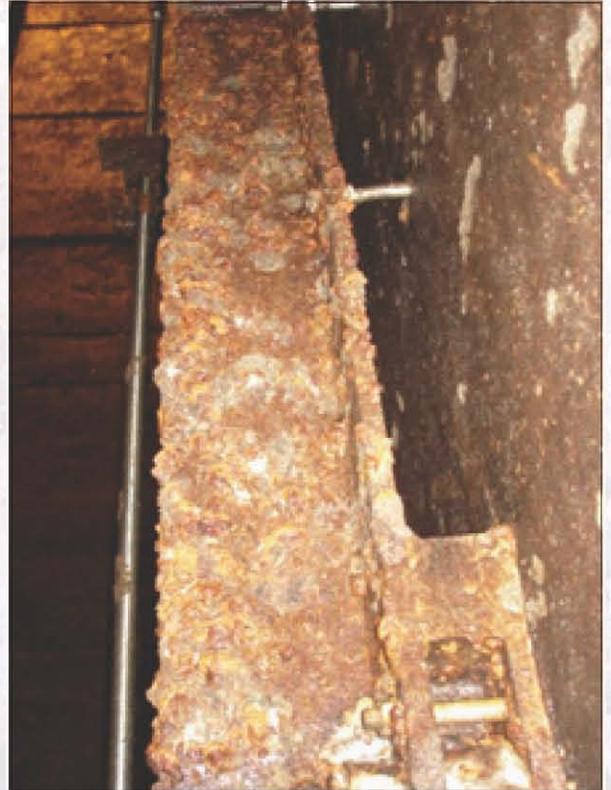
Repair Cost Estimate: \$3.6 million

# 10 Pearson-Skubitz Big Hill Lake, Kansas

## Repair and Re-paint Intake Tower Service Gates

The well gates and service gates in the intake have not been painted since construction of the intake tower, and are now extremely rusted. Some rust blisters have caused deep corrosion pits into the steel. The gate frames and guides are also in need of repairs and painting.

Repair Cost Estimate: \$1 million



# 11 Tenkiller Lake, Oklahoma

## Replace Butterfly Valves

The butterfly valves no longer fully cut off the water to the turbines. When the turbines are dewatered to do maintenance on them, jets of water come out from around the valves that are strong enough to knock a man off of his feet.

Repair Cost Estimate: \$800,000

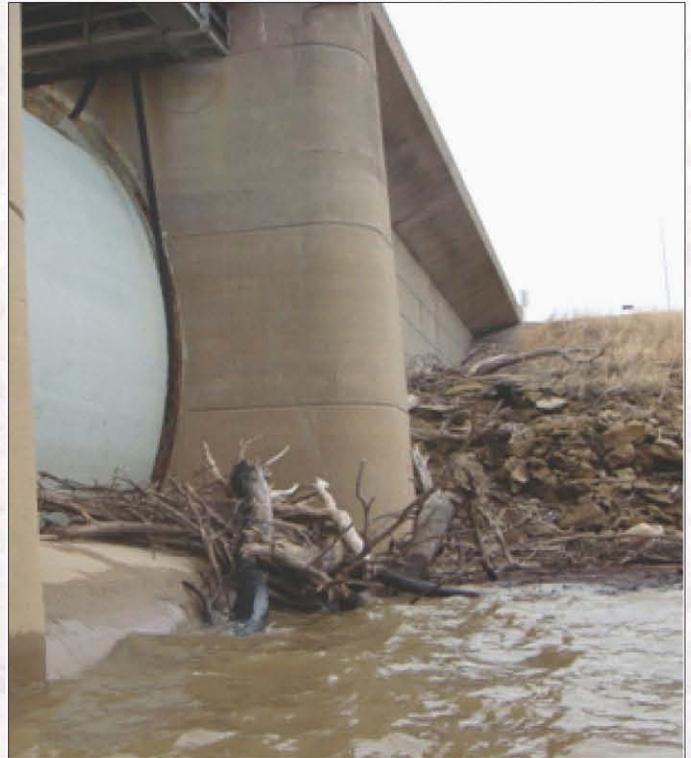


# 12 **Hulah Lake, Oklahoma**

## **Rehab Tainter Gates, Sluice Gate Bulkhead and Debris Removal**

The 2009 Periodic Inspection indicated that the tainter gates had critical deficiencies, including rusty tainter gate chains, rusty critical areas on the tainter gates, rusty tie-back beams, and shallow spalls in piers and weirs. These gates are more than 50 years old and require immediate attention to ensure the gate system does not further deteriorate. A \$960,000 contract for partial repair was awarded in FY10, and construction work has been completed for replacing the tainter gate chains. The gate chains were a critical element in ensuring continual operation of the gates. A modification to that contract was awarded in FY11 to rehabilitate the brake drum systems. The gates and hoist equipment still need to be painted, and if additional funding is not available, this will result in increased future costs and the increased probability of structural failure. Additionally, a new sluice gate bulkhead is required in order to perform needed repairs on the sluice gates.

Repair Cost Estimate: \$6.5 million



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# 13 **El Dorado Lake, Kansas**

## **Repair Emergency Gates and Bulkhead**

Both service gates still slowly drift downward when in an open position. This means personnel from Marion have to constantly re-set the gate openings back to positions required for releases.

The service gates also occasionally vibrate when they are open between two to four feet and the lake level is above 1346.0.

The vibrations have caused damage to the shafts and service gate 1. In an effort to stop the drifting of the gates, the gate cylinders were honed out and new pistons and seals were installed in April 2003. The rehabilitation work did not stop the drift but did slightly decrease it. The gate vibration still occasionally occurs.

Repair Cost Estimate: \$1 million



# 14 Skiatook Lake, Oklahoma

## Repair and Paint Service Gates and Liners

Severe corrosion and pitting were originally reported on these gates, liners, and valves in 2003. This project provides for the repair and painting of two service gates, two emergency gates and a low-flow valve, as well as cleaning, repairing and painting two service gates, two emergency gates, and the low-flow valve and associated metal gate liner plates, frames, air vents, and bonnets. Also, rehabbing gate babbitt sill on service gates and welding repair and machining the bottom sealing surface of the service gates. Skiatook Lake makes continuous water releases through the low-flow valve to meet water quality standards for the City of Tulsa. In addition to flood waters, these water quality releases have taken their toll on all gates and the low-flow valve. Skiatook Lake provided 2 billion gallons of water supply releases in 2008.

Accelerated wear and corrosion will result if funding is not provided. Continued deterioration to key structural members and surrounding conduit will result.

Repair Cost Estimate: \$1.1 million.



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# 15 W. D. Mayo Lock and Dam

## Repair Tainter Gates



Now that the weirs have been repaired, we can rehabilitate the gates without jets of water blasting the paint back off. Several of the gates have problems. Gate 11 at W.D. Mayo had several cracks in it, and the fleet repaired the major ones in 2009. Gate 10 has some minor cracks also. The torque rods are too thin and some have slung themselves apart. We need new brakes.

Repair Cost Estimate: \$12 million



# Arkansas River Basin

## Augusta Levee Local Flood Protection Project

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

Pre-Construction Engineering & Design

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 \$6,661,374. Construction efforts are currently underway with completion expected in August 2013.

## 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 \$167 million, multi-phase Dam Safety project is to correct deficiencies related to stability (movement of the existing spillway), seepage under the existing embankment, an hydraulic deficiency of not being able to pass the probable maximum flood event, and new seismic requirements.

Construction started 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 current relief wells were included in the contract. This contract was substantially completed in December 2010.

The next phase of the project was constructing a new Highway 58A bridge, which spans 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.

The project's most recent contract award occurred in September 2011, with the award of the weir and hydraulic structures contract. 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 performance period of 940 days. The weir is 481 feet long, 65 feet



Augusta Levee



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.

In addition to the weir and hydraulic structures construction activities in 2012, engineering and design was completed for a bridge rehabilitation project on the existing spillway structure. This bridge rehabilitation project is currently scheduled for award in October 2012. Lastly, engineering and design continues on the phase 2 excavation contract, which is scheduled for award in 2014. The entire dam safety modification project is scheduled for completion in December 2016.

## Eufaula Lake EIS for Update of the Shoreline Management Plan and Supplement to the Master Plan

The purpose of the Environmental Impact Statement (EIS) is to address alternatives and environmental impacts associated with an update of the Shoreline Management Plan (SMP) and supplement to the Master Plan (MP), Eufaula Lake, Oklahoma. The EIS would likewise evaluate alternatives and environmental impacts associated

with specific proposals for recreational development facilities on federal lands at Eufaula Lake as identified through the SMP update and MP supplement process.

Eufaula Lake is a multi-purpose reservoir about 12 miles east of Eufaula, Oklahoma, in McIntosh County. At Eufaula Lake, private shoreline uses including private boat docks and vegetation modifications managed under a permit system dependent upon shoreline allocation classifications specified in the SMP. Reviews and updates to SMPs are periodically provided, and the last update to the Eufaula Lake SMP occurred in 1998. Similarly, land resources at Eufaula Lake are managed in accordance with MP requirements. In the land allocation portion of the MP, all project lands are assigned categories that are used for determination of appropriate uses for these lands. The last update to the Eufaula Lake MP occurred in 1977. Owing to the elapsed time since last updated, changed conditions, and the need to assess lake-wide cumulative effects, the Tulsa District seeks to update the Lake Eufaula SMP and supplement the MP by updating the land allocation portion. Actions appropriate for updating these plans and preparing the EIS will occur concurrently.

As the SMP and MP update processes involve public participation and input, it is possible that specific proposals

for recreational or other development features involving project shorelines and/or lands may be received by the Tulsa District. For proposals that have advanced to a planning stage of sufficient detail to allow for proposal-specific alternatives and impact analysis, the EIS would include these analyses. For reasonably foreseeable development proposals that have not advanced to the point where proposal-specific analyses are possible, these will be assessed under cumulative impacts but will require additional analysis under the National Environmental Policy Act (NEPA) prior to their implementation at Eufaula Lake.

Issues to be addressed in the EIS include but are not limited to: (1) socioeconomic impacts associated with allocation classifications and specific development proposals; (2) matters pertaining to shoreline impacts; (3) potential impacts to cultural and ecological resources; (4) public access and safety; (5) impacts to lake use, public parks, and recreation; (6) aesthetics; (7) infrastructure; (8) lake water quality; (9) traffic patterns; (10) terrestrial and aquatic fish and wildlife habitat; (11) federally listed threatened and endangered species; and (12) cumulative impacts associated with past, current, and reasonably foreseeable future actions at Eufaula Lake.

The draft EIS is underway and will be available in December 2012 for public review and comment. All interested agencies, Tribes, organizations and parties expressing an interest in this action will be placed on a mailing list for receipt of the draft EIS. In order to be considered, any comments and suggestions should be forwarded to the Tulsa District Office in accordance with dates specified when the draft EIS is released.

Comments regarding the EIS may be directed to: Dr. Bryan K. Taylor, Project Manager, Programs and Project Management Division or Mr. Stephen Nolen, Chief, Environmental Analysis & Compliance Branch, U.S. Army Corps of Engineers, Tulsa District, 1645 S. 101st East Avenue, Tulsa, OK 74128-4609.

Email: [bryan.k.taylor@usace.army.mil](mailto:bryan.k.taylor@usace.army.mil) or [stephen.l.nolen@usace.army.mil](mailto:stephen.l.nolen@usace.army.mil).

## Grand Lake Comprehensive Study

Section 449 of the Water Resources Development Act of 2000

### Study

Grand Lake was designed and constructed by the Grand River Dam Authority 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 1941 authorized the Corps to manage the flood risk management features. The flood risk management pool limits were established from elevation 745.0 to 755.0 (Pensacola datum). Flowage easements were acquired up to elevation 750.0 by the state of Oklahoma.

Other federal agencies acquired flowage easements from elevation 750.0 ranging up to 760.0. The administrative jurisdiction of the flood risk management flowage easements was transferred to the Corps in October 1959.

In response to public concerns, Congress established Section 560 of the Water Resources Development Act of 1996 that authorized the Corps to conduct a study that considered the combined operating purposes of flood risk management and hydropower. The September 1998 Grand

Lake, Oklahoma, Real Estate Adequacy Study report documents that areas were found around the lake where, using current criteria and based on current lake operations, additional flowage easements would be recommended if Grand Lake were a “new” Corps project.

A letter report was prepared by the Tulsa District to document an initial technical evaluation of historical and theoretical flood events. Based on review of the letter report, the Assistant Secretary of the Army for Civil Works concurred on September 14, 2007, that further detailed study is warranted. With that decision and in accordance with the provisions of Section 449 of the Water Resources Development Act of 2000, the feasibility study could be conducted at full federal cost. However, this provision makes the study totally dependent on available annual funds specifically 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 become more competitive in the Corps’ budget process, and the likelihood of future funding would increase.

FY08-11 activities included the preparation of a Hydrology and Hydraulics Geographical Information System (GIS) Needs Assessment Report, meetings with City of Miami officials, development of a Project Management Plan (PMP), mapping, and Geographical Information Systems support. FY12 activities included the development of mapping products to complement adjacent area maps created by the Federal Emergency Management Agency. The mapping products are now available to help Ottawa County and the City of Miami, Oklahoma, in making short-term floodplain management decisions. A related effort is underway to utilize the Grand Lake mapping, in conjunction with the USACE Silver Jackets Pilot Project Program, to develop

various interim risk reduction flood inundation mapping products for the Miami, Oklahoma, area.

Potential future feasibility phase activities would be dependent upon annual funding. The purpose of the feasibility study would be to identify cost-effective solutions to reduce the risk of flooding and consistent with current federal policies. Categories of alternatives to consider include structural measures (such as levees and bridge modifications), nonstructural measures (such as floodproofing and buyouts of flood prone structures), changes in the system operation, and combinations of measures.

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. While there is only limited and preliminary data at this time to confirm the effectiveness, it is likely that this approach reduces flooding related to the more frequent (minor/moderate) flood events. It is important to note, however, that 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.

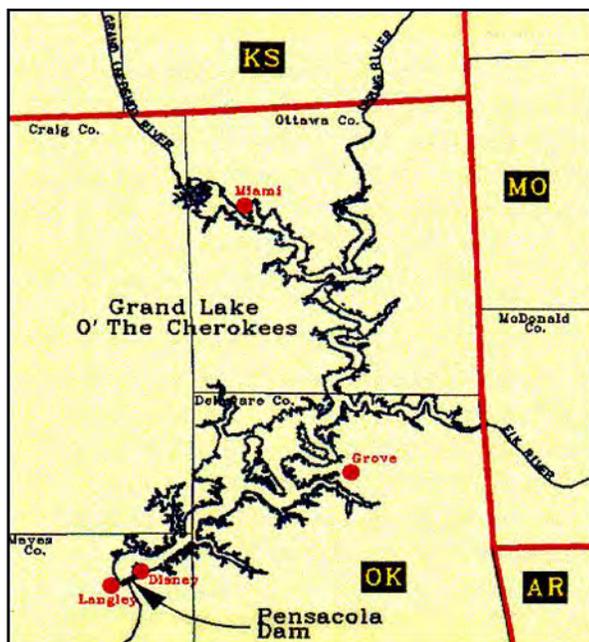
## Joe Creek Ecosystem Restoration Project, Tulsa, Oklahoma

Section 1135, Water Resources Development Act of 1986 (Continuing Authority -- Habitat Restoration)

### Feasibility Study

Joe Creek is a tributary to the Arkansas River at Tulsa, Oklahoma. The Joe Creek Local Protection Project was constructed under the authority of Section 205 of the 1948 Flood Control Act. A majority of the improved channel is concrete lined.

The proposed project will focus on improvements to the riparian stream corridor habitat that was impaired when the



original flood risk management project was constructed.

This project was awarded for construction on April 19, 2011, at a cost of \$4,905,750 to Coast to Coast, LLC. Notice to Proceed was issued on June 2, 2011, and completion is expected in October 2012.

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## John Redmond Reservoir Reallocation Study

Section 208, Flood Control Act of 1956 and Resolution of the 110th Congress 1st Session, United States Senate, Committee on Environment and Public Works, adopted July 31, 2007

### Watershed Study

John Redmond Reservoir is located on the Neosho River in Coffee County, Kansas. The reservoir is located in the lower unit, in a system of three projects in the upper Neosho River Basin in Kansas. The original design for the project included storage in the reservoir to capture an estimated 50 years of sedimentation. Sedimentation has occurred at a higher rate than was originally anticipated and has had a greater impact on the water supply storage than planned for. Storage available for water supply purposes in John Redmond has been steadily depleted by sediment deposition, such that State of Kansas water supply obligations are being infringed upon.

The study and subsequent report are being done in response to Congressional Senate Report 106-58 to study raising the conservation pool at John Redmond Dam and Reservoir to meet the terms of two existing water supply agreements with the State of Kansas. Water storage has been steadily depleted by uneven sediment deposition such that there is infringement on State of Kansas water supply agreements.

Based on the evaluation of several alternatives, the preferred alternative is to increase the top of the conservation pool elevation from 1039.0 feet National Geodetic Vertical Datum (NGVD) to 1041.0 feet NGVD to meet current water supply agreements and water quality demands.

Corps Headquarters reviewed and provided comments on a draft final report

in 2008. The Corps determined that because water supply is the primary reason for the reallocation, all replacement costs will be paid by the beneficiary, the Kansas Water Office (KWO). The KWO asked Tulsa District to hold the report rather than send it for approval with the recommendation that they pay all replacement costs. The District has held the report since November 2008, and during that time encountered another obstacle.

Since Hurricane Katrina, the Corps has increased focus on dam and levee safety. A national team has been inspecting structures and found risks at Hartford Levee, which is part of Redmond Reservoir. Resolution for Hartford Levee risks is nearing completion.

The Tulsa District is drafting comments to the submitted Project Guidance Memorandum. Additional flood storage reduction analysis has been conducted. Also, a more detailed hydrologic and hydraulic analysis of downstream impacts and related increases in risk of economic damages have been evaluated. The Environmental Analysis is currently being updated to include these results. Documentation will be coordinated with the vertical team, and analysis will undergo Agency Technical Review prior to reallocation approval by the ASA. Final approval is expected to occur on April 30, 2013.

Consequently, one positive aspect of our effort on this study is that several of the replacement actions identified as KWO actions are occurring on Corps-owned property. This land is leased to the U.S. Fish and Wildlife Service (USFWS). Because of this, Tulsa District has been able to partner with KWO and USFWS to complete partial replacement of wetlands and bottomland hardwoods.

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## Lawton Wastewater Infrastructure

Section 219(f)(40), Water Resources Development Act of 1992 as amended

### Under Construction

Lawton is located approximately 100 miles southwest of Oklahoma City in Comanche County, Oklahoma.

The project consisted of constructing wastewater infrastructure for the City of Lawton, Oklahoma. Facilities constructed include approximately 9,600 linear feet of sewer pipe and associated manholes. Also constructed was a boring approximately 350 feet in length under Interstate 44.

Fiscal closure is presently underway to determine the final cost-share responsibilities for the project. This action should be completed in 2012.

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## 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 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, 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 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 of 2007 authorizes the expenditure of \$6.5 million in federal funds for completion of the Oklahoma Comprehensive Water Plan. 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 Corps Headquarters for review, at which point it will be submitted to the Assistant Secretary of Army for Civil Works for approval.

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

The first phase of 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.

Phase two of the water plan update 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 third phase of 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 Oklahoma Water Resources Board is drawing upon the expertise of Oklahoma's foremost water experts from various water use sectors; local, state and federal governments, as well as universities, to develop policy recommendations for consideration by the state legislature.

In 2008, we developed a programmatic work plan and developed and distributed a pilot Geographic Information System 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, we completed assessments of water demand and 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, we completed 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; developed a wastewater infrastructure Capital Needs Assessment and Provider Planning Guide; and prepared/submitted final draft reports.

In 2012, we are developing a series of potential alternatives for addressing specific future gaps; making revisions to final draft reports; and will complete model documentation and training for the Oklahoma Gap Tool, Reservoir Yield Model, and Climate Demand Model. The OCWP update was submitted to the Governor and state legislature in February of 2012.

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## Oologah Lake Watershed Feasibility Study, Oklahoma and Kansas

Section 208 of the Flood Control Act of 1965 and Resolution of the 110th Congress 1st Session, United States Senate, Committee on Environment and Public Works, adopted July 31, 2007

### Watershed Study

The focus of this ongoing watershed study is the approximately 2,350 square-mile subset of the 4,300 square-mile Verdigris River watershed upstream of the dam at Oologah Lake in Oklahoma to the dams at the four federal reservoirs in the Verdigris River Basin in southeastern Kansas. The purpose of this watershed study is to assess the existing conditions in the watershed and identify the problems contributing to impairment of the aquatic resources, as well as potential solutions to restore aquatic habitat and quality on a regional basis. The City of Tulsa, as the local partner and sponsor, has worked proactively with the Corps to engage representatives from over 30 federal, state, and local agencies, universities, special interest groups, and individuals throughout the watershed in both Oklahoma and Kansas. Through this collaborative planning process, the stakeholders have identified issues and potential solutions for application on a regional basis to improve the quality of water resources in the watershed. This approach provides the opportunity to achieve sustainable

water resources solutions on a regional basis.

The watershed study was completed in May of 2012. This study presents various management strategies that can be implemented throughout the watershed on a regional basis. Since the majority of the land in the Oologah Lake watershed and study area is privately owned, the potential solutions are those that can be implemented by individual landowners in the basin. Although this effort is led by the Corps and the City of Tulsa, implementation of the many strategies established in the report as a result of the collaborative planning process will occur by other federal, state, and local agencies with authorities to assist the individual landowners in the watershed. Additionally, the report includes appendices with water quality data, water quality analysis, and outputs from the modeling effort that have served as the primary planning tool throughout the study.

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## Spavinaw Lake Watershed Feasibility Study

Section 208, Flood Control Act of 1965 (Public Law 89-298)

### Study

Spavinaw Creek and its downstream impoundments, Eucha and Spavinaw Lakes, are severely impacted by nutrient loading and excessive algae growth as a result of agricultural practices in Arkansas and Oklahoma. Degradation of water quality has led to taste and odor problems, increased treatment costs, and the lakes' decreased recreational and aesthetic value. Together, Spavinaw and

Eucha Lakes provide 47 percent of the water supply for the Tulsa metropolitan area. The Tulsa Metropolitan Utility Authority entered into the feasibility cost-share agreement in June 2004.

Because of extensive ecosystem restoration work being done by the poultry industry in the watershed, this study is focused on in-lake solutions.

In FY08, the alternative analysis and selection was completed.

In 2009, we completed cost estimates that identified project implementation could be done through the Continuing Authorities Program. This means the reports do not have to go to HQ and Congress for approval.

In 2010, the CE-QUAL-W2 modeling, which models how the recommended plan would affect water quality in Spavinaw and Eucha Lakes, was completed. The modeling results show that the recommended plan would achieve its objectives. The model(s) and model documentation were submitted for agency technical review and were approved.

The final Revised Feasibility Report is scheduled to be submitted to SWD on September 28, 2012. The recommendations in the report include implementing the project under Section 206 of the Continuing Authorities Program.

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## Tribal Support Program

10 USC 3036(d)(2)

### Continuing

Oklahoma is home to 38 federally recognized Tribes. Tulsa's program has traditionally consisted of grant applica-

tion support, contract administration support, and construction oversight for HUD Indian Community Development Block Grants (ICDBG) projects. These projects include 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.

In FY12, Tulsa's Tribal Support Team assisted with the completion of a unique project involving the collaboration of five Tribes and the Northeastern Tribal Health System (NTHS). In an effort to provide high quality medical care, five Tribes combined grants, and the NTHS matched the money to construct a \$8.4 million medical facility with multiple specialties.

The District Tribal Team has also developed an interest in our planning expertise. In FY12, Tulsa District worked on two water resource studies for three tribes. One was with the Fort Sill Apache Tribe, and the other agreement includes both the Chickasaw and Choctaw Nations. These studies are being conducted under the Planning Assistance to States and Tribes Authority. The Chickasaw Choctaw study will be completed in September of 2012. The Fort Sill Apache study awaits full federal funding to be completed.

In FY12, we assisted 15 Tribes with grant applications. Of those, eight were selected to receive funding. We have been contacted by Tribes to assist with non-granted projects such as a USDA wastewater project, a housing project, a travel plaza, and more.

Also in FY12, Tulsa District executed an agreement with the Cherokee Nation for technical review of the W.D. Mayo Hydropower Plant. The Cherokees were authorized to construct a hydropower plant at W.D. Mayo Lock and Dam in WRDA 1986; however, it has only recently become economically feasible.

In FY13, Tulsa's Tribal Team will continue to provide much needed technical expertise for construction and water resource issues. We expect to participate in about a dozen construction projects and to complete this phase of the Cherokee hydropower study.



Quapaw Fire and Emergency Medical Services

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## 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 kilowatt (kW), 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 2015. 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. This contract is currently under construction with the first unit successfully beginning commercial operation in September 2012.

In addition to the turbine runners, 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 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 2013.

In December 2010, a \$4.9 million contract was awarded for the rewinding of all three generators. This project is scheduled for completion in November 2016.

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

## Red River Basin

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### Chickasaw Choctaw Water Resource Study

Section 22 WRDA 1974, as amended

The Chickasaw and Choctaw Nations are endeavoring to complete a regional water plan. One of the first steps in this plan is to establish an in-stream flow methodology and a process for gathering and managing infrastructure data. This small effort in the overall plan is a 12-month, \$180,000 study, that is being cost-shared at 50 percent between the Tulsa District and the two Nations. This portion of the study will be completed in September of 2012.

The in-stream flow methodology is of great importance in establishing what minimum flows are needed to support all water needs. To accomplish this, the study team has created a panel of experts from six disciplines and five states. The result of this activity will be a guidance document that scientists, appointed by the Nations, will be able to use to address the specifics of in-stream flows in the region.

The infrastructure activity will involve development of a methodology that considers what data will need to be gathered, how it will be gathered, and how it will be managed. It is complex, as the information will come from Tribes, municipalities, counties, rural water districts, and others in the region that employ a multitude of consultants.

In FY13, the Nations would like to continue their partnership with the Tulsa District as they move to complete their 5-7 year study.

## Denison Land Conveyance (WRDA 2007)

Water Resources Development Act of 2007 Section 3182, (j) and (k)

Conveyance of Land at Lake Texoma, Texas

The Water Resources Development Act of 2007 authorized the Secretary of the Army to convey to the City of Denison up to 900 acres of land at Lake Texoma, which were included in a 2005 lease application. The conveyance is to be at fair market value and is subject to completion of National Environmental Policy Act (NEPA) documentation and other real estate requirements such as survey and appraisal. All costs are to be funded by the city.

A Notice of Intent to prepare an Environmental Impact Statement (EIS) was published in the Federal Register on August 6, 2008. A public information meeting was held September 11, 2008, as a part of the NEPA EIS scoping process. Public comments were accepted and summarized in a scoping report, which is posted to the Tulsa District website.

The draft EIS is complete. A Notice of Availability (NOA) was published in the Federal Register on November 4, 2011. The NOA officially started the 45-day public review period. A public workshop was held in Denison, Texas, on

November 15, 2011. The Public Review period ended on December 21, 2011.

The final EIS was filed with the U.S. Environmental Protection Agency on July 20, 2012. A Notice of Availability for the final EIS was published in the Federal Register on July 27, 2012. The 30-day Public Review Period concluded on August 28, 2012. A Record of Decision is scheduled to be issued on or before September 28, 2012.

With regard to related real estate transaction documents, the survey was completed on June 11, 2012. The draft appraisal was received on August 10, 2012, and is currently being reviewed. The appraisal review is scheduled to be completed on August 15, 2012. Appraisal completion is expected to occur on or before October 1, 2012. The conveyance of lands to the City of Denison is scheduled to take place on February 28, 2013.

## Red River Chloride Control Project 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

The Red River Chloride Control Project is authorized to identify and implement measures to reduce naturally occurring brine emissions into several sub-basins 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.

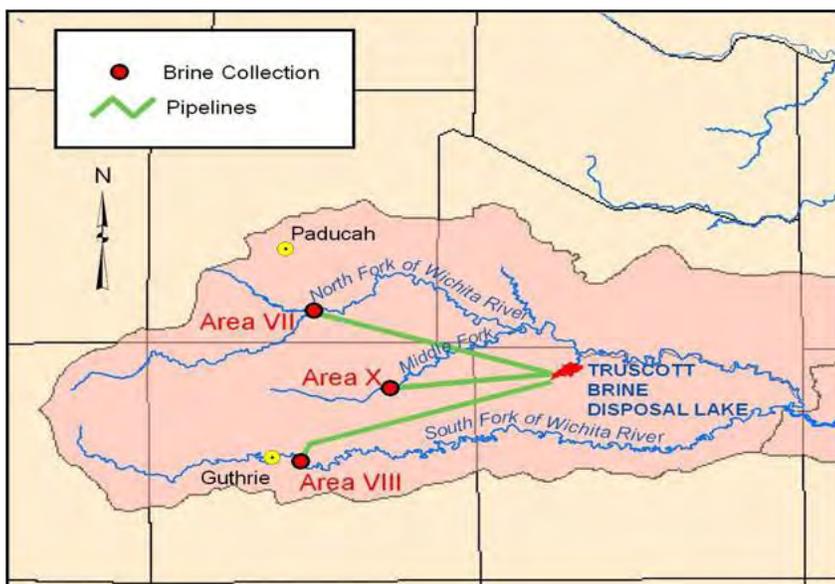
The State of Oklahoma has expressed a renewed interest in the Area VI element of the Red River project, and reevaluation efforts are underway. Area VI is located on the Elm Fork of the North Fork of the Red River in Harmon County, Oklahoma.

Reevaluation efforts at Area VI, Oklahoma, have included significant progress on the feasibility study. The draft document has been completed and includes the following studies without a chloride control in place: municipal and industrial water uses, agricultural uses, recreational analysis, hydrology and hydraulics analysis, and initial array of design alternatives. This document has been submitted for agency technical review. Additionally, significant progress has been made on phase 2 of the studies to evaluate the same studies with a solution for chloride control in place.

Area VI reevaluation feasibility study phase is expected to complete with current funding during FY12.

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

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 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 Project is authorized to identify and implement measures to reduce naturally occurring brine emissions into several sub-basins 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 Red River project, 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.

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## Southeast Oklahoma Water Resource Study

1983 Supplemental Appropriation Act (PL 98-63)

#### Study

This study has been reinitiated to support the Oklahoma Comprehensive Water Plan (OCWP). The Oklahoma

Water Resources Board is the sponsor. This is one of three studies that will result in development of watershed management plans. These plans will be integrated into the OCWP.

In 2008, the Corps developed a programmatic work plan and developed and distributed a pilot Geographic Information System 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, we completed 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, we completed production of Watershed Planning Regional Reports/Basin Technical Appendices; identified potential measures for use in future formulation of hot spot and infrastructure needs alternative solutions; developed a wastewater infrastructure Capital Needs Assessment and Provider Planning Guide; and prepared/submitted final/draft reports.

In 2012, we are developing a series of potential alternatives for addressing specific future gaps; making revisions to final draft reports; and will complete model documentation and training for the Oklahoma Gap Tool, Reservoir Yield Model, and Climate Demand Model.

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## Washita Feasibility Study

Red River and Tributaries above Denison Dam, Texas, Oklahoma, and New Mexico, House Resolution dated Feb. 25, 1938; Senate Resolutions dated Feb. 18, 1954 and June 19, 1962

#### Study

The Washita River is a tributary to the Red River in Oklahoma and flows into Lake Texoma.

The Oklahoma Water Resources Board signed the feasibility cost-share agreement in June of 2008. It was fully executed by the Commander in July 2008. This study is one of three that is being integrated into the Oklahoma Comprehensive Water Plan.

In 2008, the Corps developed a programmatic work plan and developed and distributed a pilot Geographic Information System 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, we completed 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, we completed production of Watershed Planning Regional Reports/Basin Technical Appendices; identified potential measures for use in future formulation of hot spot and infrastructure needs alternative solutions; developed a wastewater infrastructure Capital Needs Assessment and Provider Planning Guide; and prepared/submitted final draft reports.

In 2012, we are developing a series of potential alternatives for addressing specific future gaps; making revisions to final draft reports; and will complete model documentation and training for the Oklahoma Gap Tool, Reservoir Yield Model, and Climate Demand Model.

# New web site goes live

Tulsa District launched its new web site on September 17. The site provides an easy-to-navigate experience for visitors while continuing to offer a wealth of information about the district.

All Corps sites are migrating to the new format that will provide standardized navigation options. Visit the site at [www.swt.usace.army.mil](http://www.swt.usace.army.mil) and take the survey. We welcome your input.

The screenshot shows the Tulsa District US Army Corps of Engineers website homepage. At the top, there is a header with the US Army Corps of Engineers logo and the text "TULSA DISTRICT". Below the header is a navigation menu with links for "ABOUT", "BUSINESS WITH US", "MISSIONS", "LOCATIONS", "CAREERS", "MEDIA", "LIBRARY", and "CONTACT".

The main content area is divided into several sections:

- Water Control Data System**: A blue button with white text.
- Recreation**: A green button with white text.
- Blue-Green Algae**: A teal button with white text.
- Employee Spotlight**: A section featuring a photo of Lance Pardue, an employee, and a caption "Employee Spotlight: Lance Pardue".
- Project Spotlight**: A section titled "Colloids: All Expand All" with sub-items "Eufaula Lake" and "Pine Creek Lake".
- Photos**: A section with a large photo of a lake and a "PREV NEXT" navigation bar.
- Regulatory/Permits**: A section with a green background and the text "Click here for Regulatory Public Notices".
- How Do I...?**: A section with a list of questions: "Contact the Corps?", "Contact a lake?", "Find lake levels?", "Get a job with the Corps?", "Find a hunting map?", "Get a discount card?", "Submit a FOIA request?", and "Buy an annual day use pass?".
- Latest News Stories**: A section with three news items:
  - Final-levver lock repair successfully completed by Tulsa District at Chouteau Lock 17** (2/12/2012): Replacing the pilot ball at Chouteau Lock and Dam on the McClellan-Kerr Arkansas River Navigation System.
  - Drought Update** (2/6/2012): Although Hurricane Isaac helped, approximately 82 percent of the lower 48 states of the country remain in some level of drought. Most of Tulsa District is in extreme to exceptional drought, except for the eastern Red River valley, which is in moderate to severe.
  - Park rangers, volunteers rehabilitate trail at Tenkiller Lake** (5/27/2012): Recently, U.S. Army Corps of Engineers Park Rangers Matt Reeves, Cory Gowin, and Student Conservation Association volunteers have been working to rehabilitate the Tenkiller Ferry Lake Overlook Trail. This trail is a very popular trail that draws in hikers year round.
- Employee Spotlight: Lance Pardue** (5/17/2012): Lance Pardue, Employee Spotlight.
- More Stories**: A link to view more news stories.
- Services**: A grid of icons for "News Releases", "Public Notices", "Contracting", "Water Safety", "Request Speaker", and "FAQs".
- Footer**: A dark green bar with the text "BUILDING STRONG." and social media icons for YouTube, Facebook, and Twitter. Below the icons are links for "Accessibility", "Information Quality Act", "Public Inquiries", "Consent/Us", "Link Disclaimer", and "Site Map", and "FOIA", "Privacy & Security".