



U.S. Army Corps of Engineers®

Tulsa District  
Project Update  
December 2005

# Tulsa District Project Update

## Tulsa District “Expect Change”

Lt. Gen. Strock talked with Corps of Engineer employees on several occasions and he has reviewed the “Soldier’s Creed” with a special emphasis on the admonition to “... always place the mission first.” He stated that with the future will come challenges including: increasing demands with increasing resources for military programs, increasing demands with decreasing resources for civil works programs, and increased competition for discretionary programs. To meet these challenges, Corps of Engineers employees must focus on the mission and embrace change, use efficiencies to generate resources, continue the Corps of Engineers’ 2012 transformation (one headquarters, Regional Integration Teams, Regional Business Centers, Communities of Practice), and take care of our people.

Colonel Miroslav Kurka

Tar Creek is part of the former tri-state mining district of northeastern Oklahoma, southeastern Kansas, and southwestern Missouri. It encompasses what was once the Picher Mining Field in northeastern Ottawa County, Okla., where more than 2,500 surface acres of land are undermined to depths of 90 to 380 feet. Some underground mined areas are 125 feet high and 1,000 feet wide. As the background image shows, it’s not unusual for contaminated chat piles to be considered a recreation area.

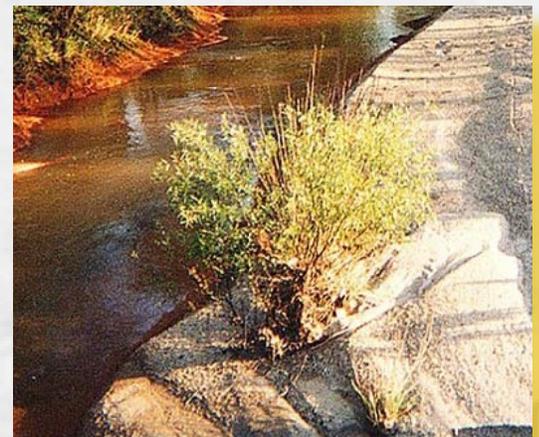
Jonna Polk

## Tulsa continues working Tar Creek challenges

In the 50-square-mile part of Oklahoma known as the Tar Creek Superfund Site, tainted waters run orange in creeks and streams; poisonous mountains of chat define the horizon; hundreds of dangerous and deteriorating open mineshafts dot the landscape; sinkholes constantly threaten; and children have high blood lead levels.

### How did Tar Creek happen?

Tar Creek’s disastrous environmental conditions come from nearly 100 years of hard rock mining for ore containing lead and zinc. Mining began in 1891 and lasted through 1970. The Mississippian Boone Formation, the major source for the lead and zinc, was also saturated with groundwater. Mining companies had to continually pump large volumes of water



from their extensive underground workings. The amount of lead and zinc contained in the crude ore in the Picher Field was the poorest in the world, averaging only four to six percent combined. The low-grade ore meant that about 95 percent of the crude ore mined was discarded on the surface in the form of mill tailings in enormous chat piles and large flotation ponds. Due to inefficient milling processes, only about 80 percent of the lead and 50 percent of the zinc were removed from the crude ore; the rest remained in the mill tailings.

As milling technology improved, increased amounts of lead and zinc were recovered. Between 1916 and 1924, more

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**Col. Miroslav Kurka  
Commander, Tulsa District**

## Corps of Engineers

# Missions

In this issue of Tulsa District's Project Update, a selection of the projects underway are offered to provide the reader a look into the work of the Tulsa District employees in support of Congressionally authorized projects.

Tulsa District is a component of the Corps of Engineers. We are proud of our tradition providing engineering and scientific solutions to civil, military, and environmental problems throughout our region.

After focusing on the hurricane mission and observing our people in action for the past six weeks, I am more convinced than ever that our RELEVANCE, READINESS, RESPONSIVENESS and RELIABILITY are the product of our expert, hard-working, and dedicated workforce. All 650 members of this workforce are serving in the Global War on Terrorism and the hurricane effort. Those who deployed are doing it in the most obvious way. Others are doing their part by working in the Emergency Operations Center or by providing technical reach-back support in the areas of contracting, engineering, and information management.

Everyone else has had to shoulder a larger workload to make up of the 15 percent of the District that is not here due to deployments.

The U.S. Army Corps of Engineers ethos of effort, dedication and devotion to the public service takes decades to build. We must be able to sustain it for the future – we cannot contract for it in private industry. It will be my task as District Commander to ensure these lessons from our hurricane relief effort are captured in the after action review. In our drive to be more efficient, we cannot afford to lose the capability to respond to the unknowns such as terrorist attacks and natural disasters that comes from an in-house dedicated, expert and flexible workforce.

- The mission of the United States Army Corps of Engineers, the world's preeminent public engineering agency, is to provide quality, responsive engineering services to the nation and its armed forces. The Corps plans, designs, builds and operates water resources projects; designs and manages military facility construction for the Army and Air Force at home and abroad; provides design and construction management support for other Defense and federal agencies; cleans hazardous areas across the nation through the Formerly Used Defense Sites program and the Formerly Utilized Sites Remedial Action Program; and conducts state of the art engineering research and design at its Engineer Research and Development Center.
- Over its 230 year history, the Corps of Engineers mission has evolved. What began as a military engineering mission for the nation in the 18th Century adapted into a major peacetime mission in the 19th Century. The Corps helped develop a vast water resource infrastructure, initiated development of the first national parks, and linked navigable waterways together to move commerce across states.
- In the 20th Century, the Corps' civil mission changed again with the adoption of more water resources development and management duties, including flood control, hydropower, recreation, water supply, shore protection, and disaster relief. More recently, environmental protection and restoration missions were entrusted to the Corps.
- As society's requirements and values have changed, the Corps programs have changed to reflect new national priorities.



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# Military Program

FY2005 was another challenging but very productive and successful year for our military program.

We have some new leaders on our regional military installation team. Mr. Randy Butler became the Director, Public Works for Fort Sill in April 2005, preceded a month earlier by the new Fort Sill Installation Engineer, Burl Ragland. Mr. Gene Gallogly assumed responsibilities of Tinker Base Civil Engineer in September 2005. Our Tulsa District Deputy Commander, LTC Brett Perry returned from Iraq on 1 April, however, deployed to support the Corps response to Hurricane Rita in southwestern Louisiana in late September.

Collectively, at all 6 military installations within Tulsa District boundaries (Altus, Sheppard, Tinker and Vance AFBs, Fort Sill, and McAlester AAP), our teams awarded 100 percent of the FY05 MILCON projects, as follows:

- Fort Sill Vehicle Maintenance Shop (1st Quarter Award!)
- Fort Sill DOL Maintenance Facility, Phase III (1st Quarter Award!)
- Sheppard AFB Pipeline Dormitory (1st Quarter Award!)
- Sheppard AFB F/A 22 Technical Training Facility (1st Quarter Award!)
- Fort Sill Junior Enlisted Family Housing (2nd Quarter Award)
- Tinker AFB Upgrade Hydrant Fuels (2nd Quarter Award)
- McAlester Pre-Mix Facility (MMCA, 3rd Quarter Award)
- Fort Sill CIDC Command Facility (Sep – Congressional Insert)
- Altus AFB Base Civil Engineering, Phase II (Sep – Congressional Insert)
- Tinker AFB Integrated Support Facility (Sep – Congressional Insert)

Of our FY06 President Budget MILCON Projects, 7 of 7 were Ready to Advertise by the end of FY05, as follows:

- Fort Sill Railroad Equipment Facility (8 Aug 2005)
- Fort Sill Family Housing Replacement (29 June 2005)
- McAlester AAP Strategic Loading Facility (12 Aug 2005)
- Sheppard AFB T6A COMBS Warehouse (2 Sep 2005)
- Sheppard AFB Student Dormitory/Dining Hall (30 Sep 2005)
- Tinker AFB 31st Combat Communications Squadron Operations (26 Aug 2005)
- Tinker AFB Upgrade Building 3001 Infrastructure, Phase II (2 May 2005)

In addition to the \$120M in MILCON/Family Housing contracts awarded in FY05, we awarded another \$36M in O&M contracts for the installations. We worked to the last minute of the last day of the FY, awarding approximately 100 contracts in the last week of the FY. This reimbursable work is very critical to the installations and helps our district maintain a critical mass of professionals, both in the district office and in our resident offices, to be able to continue to provide quality services.

Three major initiatives in the Army, International Global Presence and Base Strategy (Restationing), the Army Modular Force, and BRAC 05 will require additional permanent facilities and funding above the normal annual MILCON levels beginning in FY06. Because of this, the Army has implemented MILCON Transformation which is defined as “The development of a holistic approach to reduce planning, programming, design, acquisition, and construction timelines and cost to meet all permanent facility requirements by leveraging private industry standards and practices to realize these times and cost savings.” We are anxious to implement these concepts on MILCON and BRAC projects at Fort Sill, and are learning a great deal about the new process through our experiences in assisting Fort Worth District at Fort Bliss.

Thanks to high expectations, partnerships, and in continuous improvement processes, Tulsa District continues to be highly rated in the annual Corps-wide Military Customer Survey. Tulsa ranked 2nd highest overall among all Corps Districts and ranked 1st or 2nd in 20 questions this year (out of a total of 34 questions).

See Military Program ... on page 4



Construction at the Vance Air Force Base Consolidated Logistics facility.

# Environmental

Tulsa District continues to lead regional Corps of Engineers environmental support as the Southwestern Division Hazardous, Toxic, Radiological Waste Design Center. This business-line is evolving as the environmental restoration program matures and other related support requirements emerge.

In FY 05 we supported customer initiatives to use performance-based (PBSA, performance-based services acquisition) contracts for environmental restoration activities. This included awards for Air Education and Training Command (AETC) at Lackland, Little Rock, Vance, Luke and Laughlin AFBs.

We are very proud of the collaborative work with our customers (installation and command) that made a savings (relative cost-to-complete estimates) in excess of \$15 million possible.

We were also able to make PBC awards on behalf of Longhorn Army Ammunition Plant and Fott Sam Houston/Camp Bullis during FY 05. These latter two are guaranteed fixed-price with insurance task orders.

This PBC activity was accomplished using SWT's Comprehensive Environmental Contract and the Louisville District's Environmental Services Multiple-Award Task Order Contract (MATOC). This leveraging of Corps-wide resources is becoming more and more common and has provided substantive advantages to Corps customers.

Environmental compliance support is a vital and growing part of our mission. We expanded support to a number of U.S. Army installations during FY 05 and also increased U.S. Air Force environmental compliance support. Tulsa District is the program and project manager for Military Munitions Range Program (MMRP) projects for both the U.S. Air Force and the U.S. Army. We have successfully leveraged regional resources including the Corps of Engineers South Pacific Division Range Center and the Fort Worth District Ordnance and Explosives Waste Removal capabilities to meet this need.

We continue to monitor and anticipate customer needs and seek appropriate contract vehicles. Tulsa District maintains a

large capacity (several hundred million dollars) for environmental services (including cradle-to-grave capabilities) and environmental A-E services. We are participating in a joint acquisition with Sacramento District for an additional large environmental services MATOC. Tulsa is allocated \$100 million in capacity under these contracts that will be available mid FY 06. This will further enhance a wide range of support capabilities (in-house and contract) available to support customer requirements.

We still have our challenges. We are working aggressively to improve the timeliness of project completion. Construction cost escalation create a challenge developing awardable projects. But, with the spirit of partnership the Tulsa District and our military customers, we will continue to meet the goal of "quality facilities delivered in less time at lower cost."

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## Military Program

Continued from page 3

One of the best learning forums we have each year is our annual BCE/DPW Workshop. This workshop is hosted by Tulsa District with the military installations within the Tulsa District area of responsibility and is aimed at building relationships, improving communication, sharing information, and fostering continuous improvement. The last workshop was held in March 2005 at Quartz Mountain and included Design/Build workshop, an update on acquisition tools, technical presentations on fabric hangar doors used at Vance Air Force Base and resin-modified asphalt used at Fort Sill.

The next BCE/DPW conference will be held in March 2006 at Fort Sill.



Concept of fabrication facility proposed for McAlester Army Ammunition Plant.



# Emergency Response

Under the National Federal Disaster Response Plan the U.S. Army Corps of Engineers is the designated lead Department of Defense agency in support of the Department of Homeland Security/Federal Emergency Management Agency (FEMA). Under the National Response Plan, USACE is the lead agency for Emergency Support Function (ESF) #3, Public Works and Engineering.

The principle items that USACE performs, when so tasked by FEMA, are to provide any or all of the following:

- **Semi-trailer loads of bottled water or bulk water**
- **Semi-trailer loads of bagged ice**
- **Installation of generators at critical public facilities**
- **Debris removal and disposal**
- **Temporary roof installation**
- **Temporary housing (travel trailers & mobile homes)**
- **Technical assistance (all varieties)**
- **Structural safety assessments**
- **Critical public facility repairs**
- **GIS support**
- **Other missions as tasked by FEMA**

To date, 145 Tulsa District employees have deployed into the impacted states of Texas, Louisiana, and Mississippi, in support of the missions just discussed.

To give an indication of the overall impacts the hurricanes have had this year, we can compare to last year. In 2004, thought of four storms hitting one state in one year was considered unrealistic. However, that is exactly what happened in the State of Florida. When it did, the U.S. Army Corps of Engineers was given almost \$980 million from FEMA to execute mission assignments.

This year, to date, the Corps of Engineers has received \$4.4 billion in FEMA mission assignments. That is the equivalent of the entire Corps of Engineers annual appropriation amount now being executed in the states of Texas, Mississippi, Alabama, and Florida. And this amount is being executed by approximately 2,600 employees currently deployed!

For the Tulsa District, we expect deployment opportunities will continue for the next six months as these states continue to slowly recover from this hurricane season.



Part of the Corps of Engineers response in a national disaster includes the deployment of Corps employees from across the nation. Here, Jim Pogue (right) was all smiles when Angela Dickson, ERDC (left) and Mary Beth Hudson, Tulsa District, arrived to provide public affairs assistance.

Photo by Angela McClellan

**Emergency operations and our capability to react in an emergency is important for this nation. It ties very nicely with the Corps identified mission to support national economic development and security.**



This house was in Perlington, Mississippi. Actually, it was found in the roadway in Perlington.

# As a Member of the Debris Mission Team

by Carolyn Niceley  
Tulsa District

I worked in Hancock County, Mississippi, on the debris mission. I was amazed when I got there at the amount of total devastation and could not believe the news media seemed so focused on New Orleans when Mississippi took such a hard hit. The people I encountered lost everything including friends and family members yet still had hope and were all thankful to be alive.

Lunch time at the relief station in Pearlinton, Mississippi, was a great time to sit and listen to the many stories of survival from those who decided to brave it out, after all they said, they had made it through Camille. Not one of those who stayed said they would ever do it again.

One woman spent the night in a tree top fighting off water moccasins who evidently wanted to seek refuge in the same tree she had clung to for her life.

A young single father of three loaded his small children, mother, neighbor and dogs into a small ski boat. The boat was still hitched to its trailer and tied to an old pecan tree. Fortunately the rope held, the boat didn't flip and the shallow rooted tree held to the ground. The young man recalled squeamishly all the leaches that were climbing up the sides of the boat, and how the dog scrambled over his mothers back trying to make it to the boat before she did as they all swam for safety and their house quickly became submerged.



I saw this drum and needed to take the photograph for my husband "the drummer".

I met one particularly salty old fellow, a self-proclaimed pirate. He told how he decided it was time to head for one of his boats when the water at his front steps rose from knee high to hip high in a matter of minutes. He grabbed his personal identification and important papers, put them into a plastic bag and started pulling himself along the tree branches in an effort to reach his boats. He had a couple of hitch hikers on his shoulder, I can't remember what he called them but they are especially large water rats about the size of an otter. He said they hitched along until they found something else to jump on. Everything and everyone was seeking a life raft that day.

Another fellow who managed to survive in the second story of his house recalled having to shoot a 15-foot alligator and several water moccasins that awaited him at the bottom

of the stairs after the water went back down.

The 30-foot wall of water that was sucked out of the Pearl River found its way well into center of town leaving nothing but mud and destruction in its path. The water receded back into the river bank almost as quickly as it rose but not without leaving behind the scars of lost lives, memories and belongings.

The most valuable lesson I've learned is that all people are good at heart. Whether they had little to begin with or much, they all displayed kindness, a willingness to help one another, a shared sense oneness and a resolve to "get 'r" done. I appreciate the experience, as tragic as a disaster is, because it strengthens my faith in our amazing Creator, the power of His might and the beauty and diversity of the people He has placed here solely to love and care for one another.



The sign on the wall of a surviving house says it all, "Gotta have faith."

# Tulsa District's Support for Others

Under the Support for Others Program, Tulsa District provides technical services on a reimbursable basis to Federal, state and local government agencies, and to Indian Tribes. We have met these needs since 1997. This program is created from two basic authorities: Intergovernmental Cooperation Act of 1968 (31 U.S.C. Section 6505). This authority has been modified by the so-called Thomas Amendment, Sec 211, WRDA 2000. The second authority is Chief's Economy in Government Act (10 U.S.C. section 3036 (d)). This second authority is not affected by the Thomas Amendment.

Tulsa District's Support for Others (SFO) customers include the Environmental Protection Agency; Federal Emergency Management Agency; Veterans Administration; state agencies; U.S. Department of Energy; and U.S. Department of Housing and Urban Development (HUD). The HUD program includes public housing inspections as well as work with the Southern Plains Office of Native American Programs which handles HUD programs for Federally recognized Tribes in Oklahoma, Texas, Louisiana and Kansas.

The broadest Support for Others program base at this time is with Native American governments. Tulsa District has inter-agency agreements with 28 of the 39 federally recognized Tribes in Oklahoma. These Tribes are very active. Since 1998, the district has provided inherently governmental services for about \$55 million and 83 projects including day care centers, water treatment plants, fire stations, wellness centers, administration buildings, sewer treatment plants, and water storage and distribution systems.

The State of Oklahoma is not an active SFO customer because state law prohibits pre-payment for services. However, we will continue to work to find a pathway to create an active SFO relationship with the state.

Section 203, WRDA 2000, the Tribal Partnership Program, offers great promise for a substantial new planning program for the Native American Community and would be administered by the Tulsa District. Congress provided limited funds last year and about \$600,000 is earmarked in the current Water & Energy Bill. In 2002, Tribes sought four congressional adds for the FY 03 budget. They were not successful. This program has great potential as Oklahoma has the second largest Indian population in the United States, second only to California.

Oklahoma Indian Tribes are growing economically and politically and we will continue to work with Tribal Governments and other supportable agencies through this program.



Chouteau Lock and Dam on the Oklahoma portion of the McClellan-Kerr Arkansas River Navigation Project.

## Tulsa District's

# Operations & Maintenance

Tulsa District operates and maintains lakes in the 3 state area, operates and maintains navigation on the McClellan-Kerr Arkansas River Navigation system in the State of Oklahoma, and operates and maintains the chloride control project in the State of Texas.

The District also operates and maintains more lakes and has more water supply contracts than any other Corps District. In addition to flood control and water supply, lakes operated and maintained by the Corps provide tremendous recreational opportunities for citizens along with economic development opportunities.

Operation and maintenance funding for projects in the Tulsa District portion of the State of Kansas was \$8.4 million in FY 05 and is \$7.9 million for the FY 06. For the state of Oklahoma, \$59 million was provided in FY 05 and \$45.8 million in FY 06. For the Tulsa District portion of the state of Texas, \$9.8 million was provided in FY 05 and \$7.5 million in FY 06.

Major maintenance projects in FY 05 and FY 06 include contracts to maintain and rehab recreational facilities, ensure proper and safe operation of dams, and maintain navigation.

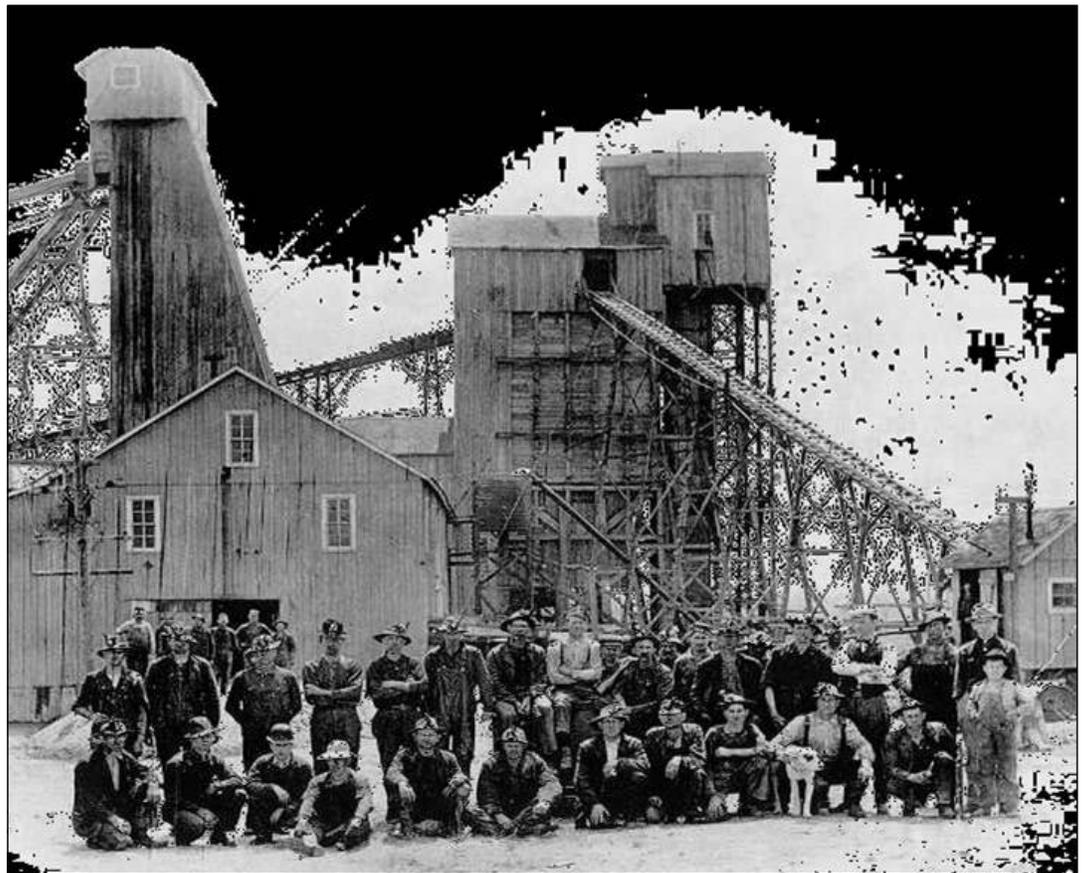
## Tar Creek

Continued from front page

efficient crushers, jig mills, and shaker tables were developed. The improved technology also created the opportunity to remill the tailings stockpiled on the surface. By 1924, a new milling process, flotation, was installed in most mills. Small particles of lead and zinc could be made to float on a chemical bath for extraction. Over the years, almost all of the chat piles were remilled, most at least twice. However, about 10 percent of the lead and 25 percent of the zinc still remained in the tailings.

In 1980, Oklahoma's governor established the Tar Creek Task Force to investigate the acid mine drainage into Tar Creek. In 1981, EPA proposed the Ottawa County area encompassing five communities for the National Priorities List. It was number one on the list at its inception and is still the nation's largest Superfund site.

Since EPA's final listing in 1983, four Operable Units have been established there. OU-1 addressed surface water and groundwater; that work is complete, and cleanup of water was determined to be techni-



cally infeasible. Through OU-2, EPA has remediated more than 2,000 residential yards and public areas. An emergency action, OU-3, removed drums and chemicals from a mining company laboratory. Under OU-4, EPA is investigating chat piles, mine and mill residue, smelter waste, and flotation ponds; a Record of Decision is expected next spring.

### What is Happening Now?

At Tar Creek, federal and state agencies and ten tribal governments face environmental damage issues so severe that no single agency has the authorities needed to undertake them all.

With the support and encouragement of Oklahoma Sen. James Inhofe, a Tar Creek Memorandum of Understanding was signed by the EPA, Department of Interior, and Corps of Engineers in May 2003, with support from the state of Oklahoma and Quapaw Tribe. The MOU has encouraged agencies to work together and share information and resources to identify methods to address the area's many problems. Partners now have joint public

meetings, monthly team meetings hosted and facilitated by the Tulsa District, and a website for information and data exchange.

The Tar Creek MOU assigned the Corps the task of developing a Watershed Management Plan; in August 2004, Tulsa District issued a Draft WMP within budget and on schedule. The federally-funded Reconnaissance Study was completed under the Corps General Investigations civil program. The 12-month process provided an opportunity to build a team of the many stakeholders. The report documents the area's problems as well as past, ongoing, and planned work by various agencies and tribes.

Most importantly, communities identified serious watershed problems not being addressed at all. These included

*“About 5,000 surface acres, including most of the Picher and Cardin communities, are covered with various forms of mill tailings. Large parts of the towns were built on lands that were formerly mill ponds, flotation ponds, or chat piles.”*

hundreds of open mineshafts, the likelihood of more subsidence, flooding, and continuing surface water and sediment contamination.

Gene Lilly, former Tar Creek project manager and the lead planner for the watershed study, notes that Tar Creek problems require the expertise and authorities of multiple agencies. "I believe that the Corps is a tremendous asset to the public in helping identify a holistic watershed approach to resolve the many technical and social challenges. At the same time, the unique challenges at Tar Creek are providing the Corps an opportunity to demonstrate new and innovative approaches to the planning and implementation of civil works projects."

Tulsa District began its construction projects in August 2004; Jim Martell is the lead technical manager. First, the district closed two open mineshafts under a relatively new Water Resources Development Act authority, the Restoration of Abandoned Mines Program. Previously, RAMS funding has only been provided for projects in the western U.S.

Section 111 of the Energy and Water Appropriations Act was written specifically for the Corps to address environmental hazards at the Tar Creek site. It authorized \$15,000,000 for demonstration projects to mitigate hazards to the public, with \$6,500,000 appropriated

over FY 04-FY 05. The Section 111 work is a cooperative effort with the state of Oklahoma to construct projects to protect the community.

One reclamation project has been completed and others are underway. The first – located between the Boys and Girls Club and the Picher-Cardin schools – covered a former flotation pond area with a clay cap and soil and then planted native grasses. Before the work was done, very fine particles with high levels of metals could be dispersed easily in the wind because there was no vegetation.

A Mineshaft Closure Program began in November 2004. Citizens identified 123 open shafts presenting the greatest concern. The sites were prioritized through work with community members; the first was immediately north of the Picher-Cardin schools on Indian Trust lands. Although the property was fenced, the mineshaft was accessible to the public and had a rappelling rope hanging from its edge. About 20 percent of the land within the Superfund site is owned by Quapaw tribal members. Through the Tar Creek MOU with the Department of Interior, the Corps was the first agency to work cooperatively with the Bureau of Indian Affairs and gain access to conduct mitigation work. The program will continue through this next year, and BIA plans

to provide work permits for further closures on Indian Trust lands. A total of 56 shafts have been plugged by the Corps.

E. A. Freeman, mayor of Picher, said, "I'm very satisfied with the work of the Corps, and they've done a good job of taking care of the citizens of Picher. There's still a lot of work left to be done but they've made a great start."

Tulsa District is also leading a multi-agency team (federal, state and contract) to evaluate the relative potential risk for subsidence in parts of Ottawa County. The initial evaluation of high population areas and major traffic corridors is expected to be completed by the end of January 2006.

In February, a Programmatic Agreement was executed to address the National Historic Preservation Act for the area. Because of its complexities and the number of tribal governments potentially affected, the State Historic Preservation Office deferred to the Advisory Council on Historic Preservation. With Tulsa District as the lead, the agreement was executed within a few months with signatures from the advisory council, the preservation office, the Quapaw Tribe, and several state and federal agencies. It allows work in the area to proceed.

John Roberts, deputy district engineer for program management has been involved

in Tar Creek for years. He says, "While participating on the original governor's task force, I had visions of holistic solutions being applied at Tar Creek that would result in both remediation of the health risks and restoration of the environment for future beneficial use. I am so proud that Tulsa District is an integral part of helping make this vision come true. Many people thought that because the site was so enormous and so complex, solutions would never be identified. Because our Project Delivery Team is so talented, so passionate about this project, and so effective in communicating and working with other agencies and the public, I am confident that we will prove them wrong."

It's been more than 100 years since mining began in the tri-state district and more than 20 since clean up started at the nation's longest-standing Superfund site. Tremendous challenges remain. Tulsa District and the other MOU signatories will continue to look for answers and authorities to address problems in the area that's become known as Tar Creek.

# Arkansas River Basin

This section offers a brief look at some of the ongoing and upcoming projects of the Tulsa District.

## Arkansas City Aquatic Ecosystem Restoration

Section 206, Water Resources Development Act of 1996, as amended.

### Feasibility Study

The city of Arkansas City is located at the confluence of the Arkansas and Walnut Rivers in southeast Kansas in Cowley County, approximately 122 miles northwest of Tulsa, Oklahoma.

The proposed restoration site is located within the historic floodplain of the Walnut River. The recommended plan would improve various types of wildlife habitat over a total of 122 acres. Borrow pits would be modified to be productive fish habitat. Constructed wetlands would provide habitat to numerous types of wildlife as well as improve water quality. Species diversity and carrying capacity would be restored to bottomland hardwood stands and prairie grasslands in the project area.

Fiscal Year 2006 efforts will focus on completion of feasibility study efforts that will detail the most cost effective plan to restore this historic floodplain.

## Arkansas City Local Protection Project

Water Resources Development Act of 1986.

### Under Construction

Located in Arkansas City, Kansas, the project provides local flood protection at the confluence of the Arkansas and Walnut rivers in southern Kansas.

The project consists of raising and extending the existing levee and modifying the lower end of the Walnut River Channel.

It includes approximately 4.5 miles of levee along the Arkansas River, approximately 4 miles along the Walnut River, and the rechannelization of approximately 2 miles of the Walnut River, as well as all associated drainage structures.

The Walnut River levee will tie into the Kansas Highway 77 Bypass project embankment. This embankment was constructed to include all the necessary flood control features which allow it to be incorporated into the federal levee system.

The Arkansas City Local Flood Protection Project will be completed in three phases. Phase I and Phase II are complete. The construction contract for Phase III was awarded in February 2003. The project is scheduled for completion in FY 06.

## Arkansas River Corridor

Section 22, Water Resources Development Act of 1974, Public Law 93-251 (Planning Assistance to States Program).

### Study

The Arkansas River is a valuable water resource that provides opportunities for redevelopment to promote economic development, ecosystem restoration, and other initiatives that would improve the quality of life for many citizens living in the Tulsa Metropolitan area as well as visitors to the region.

In 2005, we completed a comprehensive Master Plan that seeks to integrate economic development with ecosystem restoration. This plan identifies specific features and locations based on extensive public outreach efforts and technical analysis of the feasibility of the community's vision.

In 2005, Tulsa County will be the cost share sponsor providing non-Federal funding and coordinating with stakeholders as we move into the next phase. Phase III will identify specific ecosystem restoration features and formulate these into a comprehensive plan. Prior to implementation, in depth environmental studies will be required. One of our next steps will be to establish baseline habitat and population data. Phase III will also identify hydraulics and hydrology flows for both with and without project conditions. Two low water dams have been identified as major components of the comprehensive ecosystem restoration plan.



Bixby, Okla.

They are necessary as hydro-power production at Keystone dam has negatively impacted this riverine ecosystem. Tulsa District will work with the Tennessee Valley Authority to model impacts of various dam designs on the aquatic ecosystem and public safety.

This project has generated great excitement within Tulsa County as well as the region. Other municipalities are close watching the successes of our partnerships with both public and private stakeholders. Tulsa District is committed to providing support to the Tulsa Community as they seek to integrate economic development with ecosystem restoration.

## 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, Kansas, to its confluence with the Walnut River.

The original levee was constructed in the 1920s &

'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 of the city's levee system at several locations along the west side of Augusta. The recommended plan would be to raise and extend the existing levee to provide a 500-year level of flood protection.

Fiscal Year 2006 efforts will focus on completing construction plans and specifications, monitoring real estate acquisition activities by the sponsor and initiating construction.

## Bartlesville Water Supply

Section 22, Water Resources Development Act of 1974

### Study

The Hulah/Copan Reallocation Study will be complete in 2nd quarter, FY 06. This study identifies water supply through 2035. The city of Bartlesville would like to identify solutions to water supply shortages for the next 50 years. Funding for FY 06 will be used to formulate and analyze alternatives that meet this long-term objective. Cost estimates will be an integral part of this study.

The Corps is coordinating with the sponsor, the City of Bartlesville, and stakeholders, the Oklahoma Water Resources Board and the Nature Conservancy.



Bixby, Okla.

## Big Lake Habitat Restoration, Oklahoma

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

### Feasibility Study

Big Lake is a locally-owned lake located along the Verdigris River in Rogers County, Oklahoma, about 10 miles northeast of Tulsa and approximately 15 miles downstream of Oologah Lake and Dam. Due to the Robert S. Kerr Navigation channel and impoundment of Oologah Lake, over 700 acres of forested wetlands are no longer subject to annual flooding.

The recommended plan would improve various types of wildlife habitat for 700 acres of bottomland hardwood forest, restore 100 acres of bottomland hardwood wetlands and an oxbow lake, and simulate natural flooding to the area.

Fiscal Year 2006 efforts will focus on completion of the feasibility study which will detail the most cost-effective plan of improvement for implementation.

## Bixby Creek Local Protection Project

Section 205, Flood Control Act of 1948, as amended, Flood Control.

### Completed

The city of Bixby experienced flooding from Bixby Creek during small rainfall events. Much of the Bixby Creek channel had inadequate capacity.

Under the Continuing Authorities Program (Section 205, Flood Control Act of 1948) the Corps was able to assist the city with evaluation of their flooding situation and implementation of a flood reduction project.

The plan of improvement modified the existing channel, starting at 151st Street for a distance of about 3 miles to the confluence with the Arkansas River. The channel slope varies from 0.03% to 0.09%, and the depth varies from 3 to 10 feet. The channel is grass-lined, with side slopes of 1 vertical to 4 horizontal. Three box culverts were constructed at Mingo Road, Riverview Avenue, and 75th East Avenue. Two low-water crossings were constructed as part of the project. The plan also incorporates a riparian buffer zone of 30 to 100 feet along the project perimeter, construction of wetlands, and excavated pools in the channel as mitigation features. The total project cost is approximately \$5.7 million.

The Contract for Construction of this project was awarded in October 2002 and construction efforts were completed in April 2005.

## Blackwell Lake Clearing and Snagging

Section 208 of the 1954 Flood Control Act, as amended by the 1974 Water Resources Development Act.

### Project Design Analysis underway

Blackwell Lake is located in Kay County, Oklahoma, near Braman, and is a primary recreational feature in this part of Oklahoma.

Due to the ice storm of 2001, a heavy load of logs and other debris have accumulated upstream of the Lake Blackwell Dam and spillway. The log jam is blocking access to the gate controls of the dam structure and has completely overwhelmed the normal maintenance capacity of the Lake Blackwell Trust Authority. The log jam has also significantly increased the flooding risks of the residential community immediately upstream (approximately 200 homes).

The recommended plan of improvement would be to remove the logjam and properly dispose of the accumulated material.

Fiscal Year 2006 activities will focus on completion of the project design report. In addition, construction activities could be initiated in FY 06 as soon as the project cooperation agreement is executed and the non-federal cost sharing funds are provided.



Candy Lake, Okla.

## Candy Lake Land Sale

Water Resources Development Act of 1999

### Land Sale

Candy Lake was deauthorized by publication in the Federal Register in December 1996. WRDA 99 authorized the Corps to sell the Candy Lake project lands at fair market value to the previous landowners or their descendants. The Corps contracted with General Services Administration (GSA) to conduct a land appraisal and identify former landowners or their descendants and complete the Environmental Assessment.

In 2005, we completed the Environmental Assessment and initial coordination with the State Historic Preservation Officer. Offers to purchase were sent to appropriate parties.

Title transfers for Candy Lake land are scheduled to begin in the 2nd quarter of 2006. Further cultural resource investigation must occur on seven tracts of land. Title transfers for those tracts only will occur later. Parcels for which bids are not received from former owners or their descendants will be offered to the Osage Tribe as they have first right of refusal. Any tracts not accepted by the Osage will be submitted to GSA for disposal as surplus property.

## Canton Lake, Oklahoma (Dam Safety)

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

### Under Construction

This is a multi-phase Dam Safety project with the first phase consisting of a Spillway Stabilization Construction Project in which 64 anchors will be installed

into the spillway to correct stability deficiencies. The first phase contract was awarded to Nicholson Construction Company for \$4,525,000 on 17 November 2005. The next phase of the project consists of determining design solutions to all remaining dam safety issues (hydrologic deficiency, seismic and seepage) and the development of plans and specifications for continued construction in FY 07.

## Cowskin Creek, Local Flood Protection Project, Wichita, Kansas

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

### Pre Construction Engineering & Design

The Cowskin Creek Basin is located in the western part of Wichita, Kansas. This basin has sustained significant recurring flooding problems

directly impacting residential areas. The November 1998 flood resulted in significant damage to about 200 homes and many businesses, some of which were damaged beyond 50 percent of their value.

This project is currently in the final stages of development of the construction contract plans and specifications phase. The recommended plan of improvement would include channelization of a portion of Cowskin Creek with construction of an over-bank area to convey the high flows during a flood event.

Subject to the availability of funding, FY 06 efforts will focus on execution of the Project Cooperation Agreement and initiation of construction activities.

## East Tulsa County, Haikey Creek Watershed, Oklahoma

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

### Feasibility Study Phase

The Haikey Creek watershed is approximately 9 miles long and a maximum of 8 miles wide, originating in Broken Arrow, Oklahoma, flowing generally southward within east Tulsa County through portions of the cities of Tulsa and Bixby. The drainage area contains approximately 37 square miles and is largely urbanized in nature.

The city of Bixby requested assistance to reduce flooding and improve riparian habitat in the lower reach of Haikey Creek.

Potential improvements

could consist of channelization of Haikey Creek and/or construction of a levee approximately 2-5 feet high.

Fiscal Year 2006 efforts will focus on completion of feasibility study efforts which will recommend the most cost-effective plan of improvement.

## Grand (Neosho) River Wetlands and Bottomland Hardwoods Ecosystem Restoration, Oklahoma

Section 206 of WRDA 1996, as amended (Continuing Authority -- Aquatic Ecosystem Restoration).

### Planning

This ecosystem restoration project will focus on wetland bottomland hardwood habitat restoration and would extend along the Neosho River upstream of Miami, Oklahoma. Project features could include outdoor classrooms and multi-purpose maintenance trails that will also provide public access for nature related recreation.

Activities for FY 06 will be to complete the Preliminary Restoration Plan report. If the PRP report concludes that the project is in the public interest, cost effective, and improves the quality of the environment, feasibility study efforts would be initiated.

## Grand Lake Comprehensive Study

Section 449 of the Water Resources Development Act of 2000

### Study

Grand Lake became operational in 1941 and its purposes include hydroelectric power (operated by the Grand River Dam Authority) and flood control (directed by the Corps). Grand Lake is located in the Grand (Neosho) River basin (a sub-basin of the Arkansas River basin) and is an integral component of a system flood control operation consisting of 11 principal reservoir projects in the Arkansas River basin. The system operation of the 11 principal reservoirs also affects the McClellan-Kerr Navigation System.

Grand Lake was designed and constructed by the GRDA, an agency of the State of Oklahoma, and initially had a single purpose of hydro-power production. In order to include Grand Lake as part of a comprehensive multi-purpose plan for the Arkansas River, the Flood Control Act of 1941 authorized the Corps to manage the flood control features. The flood control pool limits were established from elevation 745.0 to 755.0. Flood flowage easements were acquired up to elevation 750.0 by the State of Oklahoma. Other federal agencies acquired flood flowage easements from elevation 750.0 to 760.0. The flowage easements are now held by the Corps.

In response to public concerns, Congress established Section 560 of the Water Resources Development Act of 1996 which authorized the Corps to

conduct a study that considered the combined operating purposes of flood control 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 was a “new” Corps project.

The most recent legislation, Section 449 of the WRDA of 2000, directed the Corps to further evaluate the backwater effects specifically due to flood control operations on land around Grand Lake. Activities in FY 05 included development of a working draft Project Management Plan for potential near-term activities and coordination with Ottawa County Commissioners, GRDA, and Congressional interests. FY 06 funds will be used to prepare a letter report and submit to Assistant Secretary of the Army for Civil Works for a final determination on proceeding with a full federally financed feasibility study, in accordance with directions provided in the Section 449 legislation. If the ASA(CW) determines the Corps operation is a significant cause of the flooding, feasibility study activities would be initiated at full federal expense. Potential future feasibility phase activities would be dependent on annual Congressional funding. The purpose of the feasibility study would be to identify a cost-effective solution to the flooding problems consistent with current federal policies. Categories of alternatives to consider include structural measures (such as levees), non structural measures (such as flood proofing and buy-outs of flood prone structures), changes in the system operation, and combinations of measures.

In addition, proactive flood control pool evacuation releases and even pre-flood control pool releases, in accordance with the Tulsa District Water Control Manual, are emphasized in order to minimize potential backwater effects on the Neosho River while maintaining the other purposes of the overall system operation. 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, like those frequent in the late 1980s and 1990s,

## Grand/Neosho Ecosystem Restoration Study

Section 208, Flood Control Act of 1956

### Study

Six multi-purpose reservoirs which provide flood control and other benefits have been constructed in the basin. The 1,800 square miles of uncontrolled drainage areas, along with flooding around Grand Lake and sedimentation problems in John Redmond Reservoir, have increased the need for a basin-wide study. The study addresses flooding and floodplain management problems and opportunities and ecosystem improvements associated with in-channel aquatic habitats, wetlands, and watershed corridors.

Several municipalities as well as the Kansas Water Office have expressed interest in moving into the feasibility phase with this study. Fiscal Year 2006 funding will be used to execute feasibility cost share agreements with multiple sponsors.

## Heyburn Lake Reallocation Study

Water Resources Development Act (WRDA) of 1986

### Study

Heyburn Lake is a relatively shallow lake by design and has received tremendous loads of suspended sediments. Due to increased population in the Tulsa Metropolitan area, this lake is receiving greater pressure for water supply.

In FY 07, the coordination process and action required by NEPA would begin; a social/economic baseline would be established; water supply demand and benefits will be studied; and hydraulics and hydrology analysis will also begin.

## Hulah/Copan Reallocation Study

### Study

Severe drought conditions in 2001-2002 caused Hulah Lake to lose a considerable portion -- over 80 percent -- of its conservation pool. Bartlesville ceased using Hulah Lake for water supply on 18 April 2002 and, on an emergency, temporary basis, began withdrawing water from Caney River made available from Copan Lake water quality storage releases.

The study examined several alternatives to maintain consistent water supply for Bartlesville and surrounding communities through 2035. The report recommends reallocating water from water quality storage to water supply storage. Implementation of this action will cause no adverse impacts to biological or cultural resources. The hydrology analysis indicates that there would be no

affect on downstream flooding. Because this is less than 15 percent of the total usable storage, the reallocation may be done by the Chief of Engineers.

## **Joe Creek Ecosystem Restoration Project, Tulsa, Oklahoma**

Section 1135, WRDA of 1986 (Continuing Authority -- Habitat Restoration)

### **Feasibility Study Effort**

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 control project was constructed.

Fiscal Year 2006 activities will focus on development of an initial Project Management Plan and Feasibility Milestone Report to determine a Federal interest with potential implementation of ecosystem restoration measures.

## **Lawton Wastewater Infrastructure**

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

### **Pre Construction Engineering & Design**

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

consists of constructing wastewater infrastructure for the city of Lawton, Oklahoma.

The city is conducting a 20-year, three-phase \$63,000,000 sewer rehabilitation program in response to a consent order from the Oklahoma Department of Environmental Quality. The program involves total replacement of sewer pipelines and upgrading of other components. The services provided by the city's infrastructure includes off base housing for the Army Command at Fort Sill. The Corps participation in the overall project is limited to \$5,000,000.

The city will provide the construction plans and specifications and the Corps will conduct all contracting and construction administration services.

Ongoing activities include initiation of the Project Cooperation Agreement and finalization of the NEPA approvals. Construction is scheduled to begin in FY 08 and continue for approximately one year.

## **McClellan-Kerr Arkansas River Navigation Project, AR & OK, 12-Foot Navigation Channel**

Section 136, E&WDAA for FY2004 (PL 108-137)

### **Under Construction**

The McClellan-Kerr Arkansas River Navigation project consists of three navigation improvement features 1) navigation channel maintenance dredging to include new disposal sites and in-stream disposal in Oklahoma, 2) flow management modifications to

decrease the number of days with high flows, and 3) navigation channel deepening from 9-ft to 12-ft depth. Estimates for initial costs of the project are \$166 million with annual O&M costs estimated at \$2.8 million. Economic benefits of the project are achieved by deepening the entire system with two-thirds of the benefits being realized in the upper most reach (Muskogee to the Port of Catoosa). Approximately 48 percent of the tonnage traffic and 66 percent of the traffic movement will benefit from the change in depth. The projects estimated annual net benefit equals \$9.8 million with a benefit cost ratio of all components being 1.8 with the deepening component alone being 1.08.

The Final Environmental Impact Statement was prepared in parallel with the feasibility study and in accordance with the requirements of NEPA, regulations promulgated by the President's Council on Environmental Quality (40 CFR 1500-1508) and Engineering Regulations. The Record of Decision for the Environmental Impact Statement was signed on 27 September 2005 by Major General Riley, Director of Civil Works. Mitigation measures include creating 130 acres of higher quality bottomland hardwood forest and 248 acres of higher quality wetlands in Oklahoma to offset impacts to terrestrial habitats. Aquatic mitigation includes replacing gravel bar habitat, dike and revetment notching, backwater channel improvements, and relocation of mussels. The estimated cost for mitigation is \$23.7 million with approximately \$6.7 million of that cost being allocated for adaptive management and long-term monitoring.

Construction is expected to begin in Oklahoma by dredging pool 15 (nautical mile 348-349)

in January 2006. In addition to performing the deepening, the dredged spoil material will be used to construct a 30-40 acre island adjacent to pool 15 for nesting habitat for the endangered Least tern.

## **Meadowbrook Creek, Local Flood Protection Project, Lawton, Oklahoma**

Section 205 of the Flood Control Act of 1948, as amended.

### **Completed**

This flood control project consists of approximately 1,300 feet of modified grass-lined channel extending from south of Cache Road to just below the 51st Street bridge in Lawton, Oklahoma. The 51st Street bridge will also be replaced. Eight residential structures were purchased and removed from the floodplain by the City of Lawton as part of this effort.

With this project in place, the water surface elevation of the 100-year flood event would be lowered approximately 4 feet at the upper end of the project area and 0.5 feet at the lower end of the project. The project will remove 20 structures from the Meadowbrook Creek 100-year floodplain.

The contract for construction was awarded on 8 January 2003, and construction efforts were completed in September 2005.

## Oologah Lake Watershed Feasibility Study, Oklahoma and Kansas

Section 206, Flood Control Act 1958; Resolution adopted on May 25, 1960 by the House Committee on Public Works.

### Study

The Verdigris River basin drainage area is approximately 4,300 square miles and is located in southeastern Kansas and northeastern Oklahoma. This basin is impounded to form Oologah Lake.

The study will address impacts of upstream development on aquatic and terrestrial habitat within the basin. Upstream development has also adversely affected the water quality at Oologah Lake which is a water supply source for the City of Tulsa. In 2006, we will complete alternative analysis and selection and will begin preliminary design.

## Sand Creek Ecosystem Restoration Project, Newton, Kansas

Section 1135 of WRDA 1986, as amended (Continuing Authority - Habitat Restoration)

### Pre Construction Engineering & Design

The Sand Creek Ecosystem Restoration Project focuses improvements along Sand Creek within the city limits of Newton, Kansas. The Sand Creek local flood protection project was completed by the Corps of Engineers in April 1967.

The proposed project will focus on improvements to the riparian stream corridor habitat that was impaired when the original flood control project was constructed.

Fiscal Year 2006 efforts will focus on completion of contract plans and specifications and initiation of the bank stabilization construction efforts.

## Skiatook Lake Dam Safety Project

Flood Control Act of 1962.

### Completed

The Skiatook Lake project is located on Hominy Creek about 5 miles west of Skiatook, Oklahoma, in Osage County. The reservoir impoundment began October 31, 1984.

The dam consists of a rolled earth fill embankment, a gate tower controlling flow through an outlet tunnel, outlet works and outlet channel, and an uncontrolled limited service spillway excavated through the narrow right abutment ridge.

More current hydrologic analysis revealed that the spillway would suffer extensive erosion and, ultimately, catastrophic failure if the probable maximum flood were to occur. Such a condition would cause major flooding, including the possibility of loss of human life in the downstream communities of Skiatook and Sperry.

Construction included approximately 700 feet of a concrete lined spillway chute. The existing spillway was lined with a structural concrete slab and sloped, tie-back concrete walls. A 100-foot-wide, concrete-lined chute was constructed approximately 939 feet long to prevent the head cutting ero-

sion of the spillway. Sections of concrete gravity walls were required where the excavation was not deep enough for the sloped. The tie-back walls were founded on firm material.

Construction is complete.

## 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 FY 05, we completed alternative formulation and began analysis. In FY 06, we will complete alternative selection and begin design and cost estimates.

## Tenkiller Lake Dam Safety Project

Flood Control Act of 1938.

### Under Construction

Tenkiller dam is located on the Illinois River 7 miles northeast of Gore, Oklahoma, and 22 miles southeast of Muskogee, Oklahoma. Construction of the Tenkiller Lake was completed in May 1952.

Recent evaluations, which used current information and analysis techniques, determined that the spillway is inadequate to pass the probable maximum flood (PMF) and if that flood level occurred, the embankment would be over-topped for a duration of 30 hours and a peak elevation of approximately 683.5 feet. The existing spillway would pass about 85 percent of the PMF. Such over-topping would cause dam failure, and severe economic damage would be incurred downstream. The town of Gore is located about 7 miles downstream from the dam; however, the risk of loss of life would not be high as the town would be inundated by flood releases prior to dam failure because of the small downstream channel capacity.

Phase 1 of this two-phased project was completed in FY 03. Phase 2 began in FY 04 and is scheduled to complete in FY 06.

The proposed dam safety project consists of an auxiliary spillway with five 50-foot wide by 35-foot high tainter gates to be constructed near the right abutment of the embankment. The spillway structure will be similar to the existing spillway.

In addition, a new Highway 100 bridge will be built

to carry traffic across the upstream approach channel for the new spillway.

## Tenkiller Lake Reallocation Study

Water Resources Development Act (WRDA) of 1986

### Study

Tenkiller Lake is fully allocated for water supply, and the state has pending applications in excess of 100,000 acre feet. Due to increased population, this lake is receiving greater pressure for water supply.

## U.S. Highway 83 Bridge, Erosion Control Project, Garden City, Kansas

Section 14 of the 1946 Flood Control Act, as amended. (Continuing Authority - Emergency Streambank Protection).

### Pre Construction Engineering & Design

The U.S. Highway 83 Bridge Erosion Control Project is located in Garden City in western Kansas. Bank erosion associated with lateral migration of the Arkansas River is encroaching on the U.S. Highway 83 embankment and approaches to the bridge. The value of the infrastructure at risk is approximately \$5,000,000. The sponsor for this effort would be the Kansas Department of Transportation.

Planning, engineering and design efforts were completed in 2005 and construction efforts are anticipated to begin in early 2006 as soon as all necessary lands are provided by the local sponsor.

## Walnut River Basin Feasibility Study

Flood Control Act of 1965, approved 27 October 1965; Public Law 89-295, HD 232, 89th Congress, 1st Session.

### Study

The Walnut River Basin covers about 2,000 square miles in southeastern Kansas. It covers most of Butler County, about 40 percent of Cowley County, and small portions of five other counties. The Walnut River flows from north to south and combines with the Arkansas River at Arkansas City. The four major tributaries of the Walnut River are Timber Creek (near Winfield), Little Walnut River (near Douglass), Whitewater River (near Augusta), and West Branch Walnut River (near El Dorado). Included with this basin study is the adjacent Grouse Creek watershed which has a drainage area of about 380 square miles. The Grouse Creek watershed is located immediately downstream of the Walnut River Basin.

The Kansas Water Office identifies the Walnut River Basin in the State Water Plan as a priority for restoration and identified the Grouse Creek watershed for protection. Undisturbed riparian habitat once existed in broad and continuous bands along both banks of over 600 primary watercourse miles within the basin. Today, riparian habitat is significantly decreased, and losses are still occurring. Within the 2,000 square mile basin, roughly half of the wetlands, riparian corridors, and in-stream habitat present before settlement have been lost. The quality of in-stream aquatic habitat is also declining. The U.S. Fish and Wildlife Service estimates that

Kansas has lost more than 400,000 acres of its wetlands -- nearly half of the state's total. The vast majority of wetland losses have occurred since 1950.

The Kansas Water Office has entered into a cost-share agreement with the U.S. Army Corps of Engineers, Tulsa District, to begin a Walnut River Basin Ecosystem Restoration and Protection Feasibility Study.

Acceptance and support of this study by local landowners is key to the success of the study and to future implementation of best management practices. A team of local landowners in the Walnut Basin has been established and will assist the state's water and natural resource agencies and the Corps focus on landowner needs and interests and support the public involvement effort. The Restoration Measure Design team will work closely with these local landowners to help identify well-established and functioning riparian and wetland areas in the basin that are in need of preservation and protection. The study team will also identify degraded riparian and wetland priority areas for restoration.

## Webbers Falls Powerhouse Major Rehabilitation, Oklahoma

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

### O&M

The run-of-river power plant contains three 20,000 kilowatt, (kW) inclined-axis Kaplan-type generating units with a total rated generating capacity of 60,000 kW. These turbines are

the first tube turbines of this magnitude ever built and placed in operation. As a result, the design did not consider all of the factors that would be specific to the operation of slant-axis turbines, consequently the project has been plagued with mechanical reliability problems during its operation. Currently one turbine is non-operational with the other two turbines being close to breaking down as well. The major rehab project will replace all three turbines resulting in \$440k of net benefits per month per turbine to the nation.

## Wister Lake Watershed Study

Resolution adopted January 28, 1955 by the Senate Committee on Public Works.

### Study

Wister Lake is an important water supply resource and provides important aquatic and terrestrial habitat for wildlife as well as recreational opportunities for citizens of Oklahoma and Arkansas. However, excessive sedimentation, turbidity and nutrient loading are impacting the aquatic ecosystem and water supply at Wister Lake. Wind and wave action combined with shoreline erosion and nutrient inputs contribute to habitat loss and degradation in the lake.

This study is analyzing alternatives to be implemented within the lake to restore the aquatic ecosystem. The cost share sponsor for this study is the Oklahoma Water Resources Board in partnership with the Poteau Valley Improvement Authority. This project is strongly supported by the state congressional leadership. The schedule developed for this study is abbreviated in order to take quick restorative actions.

# Red River Basin

## Area VI, Red River Basin Chloride Control Project

Water Resources Development Act of 1986.

### Study

Area VI is located on the Elm Fork of the North Fork of the Red River in Harmon County, Oklahoma. The purpose of this project will be to provide chloride control measures to allow improvements to water quality for municipal, industrial and agricultural uses.

The three major chloride sources of Area VI are in Salton, Robinson, and Kaiser Canyons along the south bank of the Elm Fork. These narrow canyons emit over 420 tons per day of brines in high concentrations.

Detailed formulation efforts for this portion of the Red River Chloride Control Project were last performed in the late 1970s. Due to advances in technology and approximately 30 years of time that have elapsed, a general reevaluation of the Area VI chloride control plan will be the focus of FY 06 efforts.

## Bowie County Levee

Energy and Water Development Appropriation Act (EWDAA) of 2001 and 2002.

### Pre Construction Engineering & Design

The Bowie County Levee is located near Texarkana, Texas, in Bowie County, Texas. The existing levee is 8.8 miles long

and was built in 1913. The locally preferred plan, known as Alternative B, is the plan which will be constructed. This plan consists of restoring 6.0 miles of existing levee, constructing 4.0 miles of new levee, and constructing 2.4 miles of channel to divert Barkman Creek flows to the Red River.

Ongoing activities include resolution of significant archaeological issues and updating of existing project design documents. Activities which will begin during the current year include initiation of plans and specifications as well as the Project Cooperation Agreement.

The schedule, which still contains many variables, shows construction scheduled to begin as early as FY 08 and end an estimated two years later.

## Kemp Lake Reallocation Study

Water Resources Development Act (WRDA) of 1986

### Study

Lake Kemp is located on the Wichita River at river mile 126.7 in Baylor County, Texas. Lake Kemp was originally constructed in 1924 by the Wichita County Water Improvement District #1. The lake was constructed for the primary purposes of irrigation, water supply, and related uses.

The project is operated and maintained by the Wichita County Water Improvement District #2 and the city of Wichita Falls, Texas. During

the design and reconstruction of Lake Kemp, sedimentation was a key consideration. Design Memorandum No. 1 recommended raising the conservation pool after 40 years of operation to recover conservation storage lost to sedimentation. The latest sedimentation survey performed at Lake Kemp was in 1973, and it indicated an expected high level of sedimentation. In recent years, during drought conditions, the upper portions of Lake Kemp appear severely impacted by sedimentation.

Funding received in FY 07 would be used to begin the coordination process and action required by NEPA. Economic studies would begin, as well as a water supply demand and benefits study, and hydraulics and hydrology analysis. For the most appropriate reallocation, a sedimentation survey will need to be completed.

## Lake Texoma Land Sale

Water Resources Development Act of 1999

### Study

The Water Resources Development Act of 1999 authorized the Corps to sell 1,580 acres of Lake Texoma land in Marshall County, Oklahoma, at fair market value. It further specified that the transfer will occur at no cost to the federal government. The State of Oklahoma Commissioners of the Land Office provided funds to administer the sale in August 2004. The Oklahoma

Department of Tourism and Recreation owns and leases lands adjacent to the tract that will be sold and is an active part of our project delivery team. The deed and the finding of suitability to transfer was sent forward to our headquarters and the Assistant Secretary of the Army for Civil Works in November 2005 for approval and signature. After the deed is signed and returned to the district, it will be filed in Marshall County thus completing the sale.

## Mangum Geotechnical Study

Section 22 of the 1974 Water Resources Development Act

### Study

We recently completed geotechnical investigations and stream loss studies of a proposed dam site near Mangum, Oklahoma. The Oklahoma Water Resource Board was the cost share partner. Foundations conditions at the proposed Mangum dam site, 2 miles southwest of Mangum on the Salt Fork of the Red River, appear to be favorable. Complex geology and karstic conditions impose limits on elevation, size and capacity of Mangum Reservoir. While the proposed dam site was proven feasible, the elevation would be 1550 feet (MSL) rather than the preferred 1560 feet. The difference in elevation reduces the acre feet of storage by half.

Further study could be focused on further characterization of foundation conditions, hydrogeology and water loss.

## Texoma Reallocation Study

Water Resources Development Act (WRDA) of 1986

### Study

The Water Resources Development Act of 1986 authorized the Secretary to reallocate 300,000 acre feet of storage from hydropower to water supply storage at Lake Texoma. The law specified that 150,000 acre feet of storage would go to Texas and Oklahoma with 50,000 acre feet of the Texas total going to the Greater Texoma Utility Authority. The North Texas Municipal Water District (NTMWD) has expressed an interest in the remaining Texas storage.

The final public review of the Environmental Assessment on the Reallocation Report ends in December 2005. After comments are incorporated, the report and a water supply contract for NTMWD will be sent to Corps Headquarters in the 2nd quarter of FY 06.

## Washita Feasibility Study

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

### Study

The Washita River is a tributary to the Red River in Oklahoma and flows into Lake Texoma. The reconnaissance study identified a federal interest for flood damage reduction and ecosystem restoration. We have identified a potential sponsor in Oklahoma Department of

Wildlife Conservation. They are interested in a study of golden algae. This algae can create a toxin which is deadly to fish. This toxin has the potential to have very serious impacts on the regional economy due to the striped fishery on Lake Texoma.

## Wichita River Basin Chloride Control Project, Texas

Water Resources Development Act of 1986.

### Final Design and Construction

This project is located in the Wichita River Basin, a tributary of the Red River west of Wichita Falls, Texas.

The purpose of this project will be to provide chloride control measures within the Wichita basin to allow improvements to water quality for municipal, industrial and agricultural uses.

The project is designed to divert natural chloride brine emissions at three major source areas upstream of Lake Kemp, Texas, and convey the captured brines to a brine containment facility located at Truscott, Texas.

Improvements include constructing a low flow dam, pump stations, and diversion pipelines, and raising Truscott Brine Dam to accommodate additional inflow. A portion of this project -- the diversion facilities at Area VIII, pipeline, and the Truscott Brine containment facility -- have been constructed and have been in operation since 1987.

Fiscal year 2006 efforts will focus on completion of contract plans and specifications at Area X and continuance of baseline environmental monitoring activities.



Webbers Falls Lock and Dam on the Oklahoma portion of the Arkansas River Navigation System.



**For updated project information,  
access our web site at:**

<http://www.swt.usace.army.mil>

or call

1-918-669-7366