Our Mississippi

PARTNERING TO KEEP
AMERICA'S RIVER GREAT

SUMMER '14

PHOTOS BY BRUCE REID AND RAY EMERSON

ENGINEERING ECOSYSTEM RESTORATION

A Partnership Approach

By Deanna Prestwood and Angeline Rodgers
Contributing to this article were Steve Coleman, David Mooney, and Charles Stokes Jr.

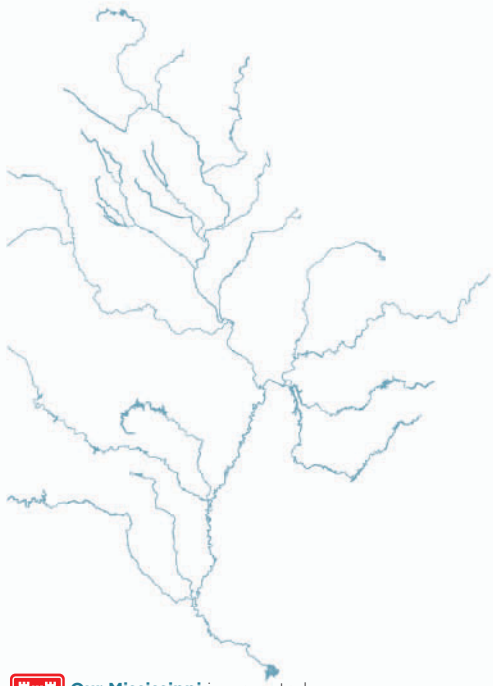
In the mid-1980s, the U.S. Army Corps of Engineers Mississippi Valley Division began incorporating environmental features into various civil work projects; however, the highest priorities for the division remained those of navigation, flood damage reduction and watershed planning. Through the years, the Corps continued to recognize the importance of ecosystem restoration and in 2003 it became designated as one of the civil works program's top four mission priorities.

Today, the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service (USFWS) Southeast Region, Mississippi River Trust and Lower Mississippi River Conservation Committee (LMRCC) work together to improve habitats for species in the lower Mississippi River without compromising the vital navigation and flood risk reduction systems. The LMRCC is a coalition of 12 state natural resource conservation and environmental quality agencies in Arkansas, Kentucky, Louisiana, Mississippi, Missouri and Tennessee. Formed in 1994, the committee is dedicated to conserving the natural resources of the lower Mississippi River floodplain.

ABOVE: Construction contractor Mississippi Limestone, Inc., worked under the guidance of the Corps to construct notches and degrade dikes along the Mississippi River in 2013.

Several federal agencies participate in the coalition including USFWS, which provides staff and support to the LMRCC. In 2000, the LMRCC, the Corps and other partners outlined strategies for restoring aquatic resources within the 2.5 million-acre active floodplain that stretches from Cairo, Ill., to the Head of Passes in the Gulf of Mexico. Restoring aquatic habitats and biological resources was one of the goals. From 2001 to 2004, LMRCC hosted state-level planning meetings for watershed partners to identify projects that would improve these aquatic habitats and improve public access to river habitats. Through this process, the coalition identified 239 projects and rolled them all into the "Restoring America's Greatest River" plan. They selected projects that enhance habitat complexity in the main channel but also chose projects that would restore floodplain hydrology and connectivity between the river and its floodplain. Restoration of secondary channels was a high priority and the Corps' Engineer Research and Development Center developed a ranking system for the proposed work by establishing an Index of Habitat Quality. Projects were ranked according to how they improve habitat quality and their cost-effectiveness; this information proved useful for project selection.

Continued on page 2 >>



Our Mississippi is a quarterly newsletter of the U.S. Army Corps of Engineers about its work in the Mississippi River Basin. It is published in cooperation with other state and federal agencies and other river interests with whom the Corps collaborates and partners toward long-term sustainability of the economic uses and ecological integrity of the river system.

TOP: The Catfish Point and Below Prentiss projects were completed in November 2013. Here is a completed notch in Bolivar County, Mississippi.

Secondary channels, also called abandoned channels, side channels or chutes, are formed as flow from the main channel cuts through sand and gravel bars that have grown larger within the dike field. They are an important component of the lower Mississippi River habitats because they support a diverse assemblage of aquatic species. Dikes are important structures used by the Corps' Channel Improvement Program to direct water flows into the navigation channel during lower river stages. These stone structures are constructed perpendicular from the river bank to the main channel. The structures increase the velocity of the river's current, thereby increasing sediment transport that helps maintain a 9-foot channel for safe navigation. A series of dikes, also called dike fields, are constructed and the slack water between the dikes can result in a buildup of sediment, creating sandbars. An additional consequence of dike construction is the disconnection of side channels from the main channel and the loss of aquatic habitat during low river stages. To counteract the loss of aquatic habitat, a dike notch is sometimes constructed to provide a flow to secondary channels. A notch is created by removing a section of stone from an existing dike. Site reconnaissance, aerial photography and hydrographic surveys are used to determine the most suitable place for such notches.

Each partner agency has a unique role in completing these secondary channel restoration projects. The Corps provides engineering design and technical assistance during preconstruction and construction. They also provide construction oversight. The LMRCC secures all necessary permits for regulatory compliance, coordinates all activities and procures the construction contract. Mississippi River Trust provides support for project implementation. Funding for the construction is provided by the USFWS through the Fish Passage Program.

The Vicksburg District Channel Improvement Team and LMRCC meet annually to evaluate portions of the river in the Vicksburg District Area of Response. The team reviews all available information to identify potential projects. In 2013, the district identified two areas, Catfish Point at river mile 570L (left descending bank) and Below Prentiss at river mile 580L, on which to focus restoration efforts that year.

The Catfish Point and Below Prentiss dike fields, both in Bolivar County, Miss., were constructed in the 1970s by the Vicksburg District. Sediment accretion, which is an accumulation of sediment over time, had disconnected the secondary channels in both areas from the main channel at lower river stages. Two dikes in each field were notched by removing stone from sections with an approximately 50 foot bottom width and 150 foot top width, with varying depth. A 10- to 12-foot pilot channel was dug between the dikes at each location to create a natural flow of water into the secondary channel.

A stone dike structure prior to the 2013 construction. It was constructed in the 1970's within the Vicksburg District in Bolivar County and has silted in over time.

Approximately 20,000 tons of stone were degraded from the dikes. A total of 8 miles of secondary channel were restored through these efforts. Annual hydrographic surveys, aerial photographs and state-level monitoring will help the district and LMRCC observe changes that develop in these areas.

In October 2011, the Vicksburg District partnered with LMRCC to complete a restoration project at Island 70 (river mile 610L) near Dennis Landing, which is near Clarksdale, Miss. The notching through this project restored flow to more than three miles of secondary channel habitats. In March 2009, prior to this work being completed, fish sampling was performed in this area. Catfish were captured, but there was no evidence of sturgeon. However, when sampling was performed in the same area in March 2012 using the same methods, shovelnose sturgeon and pallid sturgeon were captured and the species richness had increased. These sampling efforts show that the dike notching program benefits the aquatic ecosystem. The Vicksburg District has approximately 75 dike notches in their area of response, and it is planning future work at Boundurant Towhead at river mile 395R (right descending bank) near St. Joseph, La., and Wilson Point at river mile 500R near Lake Providence, La. Since 2006, the LMRCC, the Corps and USFWS have restored more than 55 miles of secondary channel habitats in the lower Mississippi River.

PHOTOS BY BRUCE REID AND RAY EMERSON

Larry Jankowski (right) explains the Metals Unit's CNC plasma cutting table to USACE Mississippi Valley Division Commander Brig. Gen. Duke DeLuca (left of Jankowski) during his visit to USACE Memphis District's Ensley Engineer Yard and Marine Maintenance Center Dec. 10, 2013. Memphis District Commander Col. Jeffery A. Anderson (left) and Curtis Pigram look on. (USACE Photo/Brenda Beasley)

The Role of the Ensley Engineer Yard

The Ensley Engineer Yard, located in Memphis, Tenn., is a full-service marine maintenance facility operated by the U.S. Army Corps of Engineers. The primary mission of Ensley and its staff of 278 workers is to keep personnel and equipment ready to respond at a moment's notice to emergencies that may arise along the Mississippi River.

Over the past two years, Ensley's metals unit has been busy replating old barges for other districts and federal agencies. As the cost of new barges has increased upwards to around $2 million each, the replating of existing barges, which can be done for between $500,000 to $1,000,000, is more economical. According to Andrea Williams, chief of the plant section at the Memphis District, replating saves taxpayers millions in both maintenance and replacement costs.

PHOTO BY USACE

Other critical work being accomplished by the men and women at Ensley includes revetment work to slow the erosion of riverbanks by clearing and grading the banks in preparation for a "sinking unit" from the Vicksburg District to come along and lay an articulated concrete mattress along the bank. These mats or mattresses help stabilize the banks and slow erosion caused by river current. The mat loading unit, which is also a part of the revetment section at Ensley, loads and tows barges of the articulated concrete mattress to the selected area for the sinking unit.

Navigation is also an important part of Ensley's mission. During low-water periods, the Navigation section's Motor Vessel George C. Grugett is put into service and works with the Coast Guard to set buoys that help define the channel and guide river traffic. The Navigation section is also home to the Dredge Hurley, which is a dustpan dredge and works much like a giant vacuum cleaner to suck up sediment and place it outside the channel area.

Aerial View of Ensley Engineer Yard
MARINE MAINTENANCE CENTER, MEMPHIS, TN

The Hurley, along with other contracted dredges, is responsible for maintaining the required 9 foot depth to keep the Mississippi River navigable.

Another important part of the overall Ensley mission is delivered by the Plant section, which serves as the support unit for both navigation and revetment. This section operates three dry docks; one is 3,200 tons and two are 400 tons in capacity. In addition to the ability to dock the vessels of both revetment and navigation, the plant section is able to perform maintenance on these vessels and their engineering equipment using its team of welders, machinists, carpenters, electricians, pipefitters, and heavy mobile equipment mechanics.

LEFT: Shows the discharge end of the dredge pipe. It looks white, which indicates that it is just pumping water (not actually digging). When the dredge needs to move out of the channel to allow vessels to pass, it does not stop pumping; it just raises its dredging ladder from the river bottom.

Currently, the Ensley Engineer Yard is fabricating a new dredge ladder for the Dredge Hurley and Vicksburg's Dredge Jadwin. The dredges are an important part of navigation on the Mississippi River, Williams said. Many industries have to lighten their loads on their barges during low-water periods because the channel does not have enough water to accommodate the draft of the barge with a normal or heavy load. The dredges remove built up sediment and deepen the channel so that vessels and their barge tows can take on normal loads and proceed up and down the river safely.

PHOTO BY DAVID RAY

The ladders on the front of the dredges raise and lower the attached dustpan that actually moves the sediment. Having spare ladders keeps the dredges in operation for longer periods of time. The dredge ladders are constructed of steel and have many joints and parts that are continuously exposed to the fast river currents and large debris that may cause damage. Over time, the ladders will crack and wear down, often in their most critical areas. It is imperative that each dredge have a spare ladder so that when one is disassembled for repair, it can be replaced by the spare and dredging operations can continue.

Ensley is also home to the Mississippi River Commission's Motor Vessel Mississippi, an inspection vessel and working towboat aboard which the commission holds its public meetings. The MV Mississippi is owned by the Mississippi River Commission, but it moors at Ensley Engineer Yard. The Mississippi River Commission was established by an Act of Congress on June 28, 1879. Congress charged the Mississippi River Commission with the mission of developing plans to improve the condition of the Mississippi River, foster improved navigation, promote commerce, and prevent destructive floods—perhaps the most difficult and complex engineering problem ever undertaken by the federal government up to that time.

Today the Mississippi River Commission, which is headquartered in Vicksburg, Miss., provides water resources engineering direction and policy advice to the Administration, Congress and the Army relevant to a river drainage basin that covers 41 percent of the U.S. and parts of two Canadian provinces. The intent behind the mission of the Mississippi River Commission today is the same as the mission placed on the commission at its creation—to lead sustainable management and development of water related resources for the nation's benefit and the people's well-being.

The Mississippi River Commission makes trips up and down the river at least twice per year aboard the MV Mississippi: the "High Water Inspection Trip" in the spring and the "Low Water Inspection Trip" in August. The Mississippi River Commission makes the journey on the river to hear testimony during public meetings at select sites including Memphis, New Orleans and Vicksburg to learn about citizen's concerns related to navigation, flood control and other water related issues. When the MV Mississippi is not in use by the Mississippi River Commission, it serves as a working towboat for the Memphis District revetment section's mat loading unit pushing barges of articulated concrete mattress to the location of Vicksburg District's mat sinking unit.

Partnership Works to Benefit the River

This past May, the Corps Upper Mississippi River Basin Association and the Upper Mississippi River Restoration Environmental Management Program (UMRR-EMP) Coordinating Committee met in St. Louis to discuss issues and possible solutions for the Mississippi River. While those in attendance agreed that there was much that needed to be done to address the aging infrastructure, there was also concerns about navigational safety and protecting the river ecosystem.

Thomas A. Holden, Jr., PE, acting chief of the Mississippi Valley Division's Regional Business Directorate, spoke to the group about the economic advantages the river offers for the transportation of both imported and exported goods. According to Holden, transporting materials by roadway increases the cost Americans pay for commodities. He explained, by investing in infrastructure on the Mississippi River, it will help keep the price of American goods competitive with global markets, which in turn helps to promote exports and keep Americans working.

Col. Christopher Hall, St. Louis District commander, pointed out that cargo transported by rail or highways face the risk of slowing down because of congestion caused by rising demand. As the economy grows, Hall suggested a commitment to a reliable, safe transportation system on the Mississippi River becomes more critical.

Currently the Corps is engaged in repairing the main lock chamber at the Melvin Price Locks and Dam, in Alton, Ill., which is scheduled to remain closed until mid-August. The project includes replacing the lift gate cables on the main lock. While the main chamber is out of service, navigation traffic is being rerouted through the 600-ft. auxiliary chamber which causes traffic to move slower due to increased lockage times.

Attendees discussed methods that might help fund the cost of needed maintenance and repairs to the river's aging infrastructure. Gary Meden, PE, deputy for programs and project management in the Rock Island District, suggested exploring alternative financing methods including increased collaboration between federal and state agencies.

PHOTO BY D.CLARK

ABOVE: UMRBA and UMRR-EMP met in May to discuss action steps to promote investment in the Mississippi River, collaboration among related organizations and care for the river's ecosystem.

Invasive plant and aquatic species in and along the river, was also discussed. These invasive species pose a danger to native plants and fish. Marv Hubbell, project manager in the Rock Island District, and Karen Hagerty, UMRR-EMP Long Term Resource Monitoring program manager, discussed the District's ongoing efforts to help raise public awareness of invasive species through formal and informal information exchange that could effectively advise the public on ways they can help. Hubbell and Hagerty plan to identify a writing team for the Aquatic Invasive Species Strategy and have a final draft of their plan prepared for the UMRR-EMP at the coordinating committee's February 2015 meeting. ting committee's February 2015 meeting.

PHOTO BY USACE

Combating the Effects *Climate*

Everyone who lives and works along the Mississippi River has been forced to deal with the effects of flooding and drought. The U.S. Army Corps of Engineers is on the frontline in the fight to prevent such flooding and to protect every American along the waterway from harmful effects attributable to global climate change.

"We, as an agency, are very cognizant of climate change and the impact it's having on water resources," says Thomas A. Holden, Jr., PE, the acting chief of the Mississippi River Division's Regional Business Directorate. At the Mississippi River Commission presentations in April, Brigadier General Duke DeLuca, commander of the Mississippi Valley Division and president-designee for

NASHVILLE, Tenn. — Members of the U.S. Army Corps of Engineers Post-Flood Performance Assessment team watch sluicing operations at Center Hill Dam. The team visited several Nashville District project sites to observe how water management operations within the Cumberland River Basin affected flood operations on the Mississippi River.

FROM VISION TO REALITY

REPORT CARD FOR THE MISS. RIVER WATERSHED

America's Watershed Initiative is a partnership alliance representing both public- and private-sector interests from 31 states that seek solutions to ensure the Mississippi River and its tributaries remain viable for future generations. America's Watershed is working to produce a report card that will provide Americans with a complete picture of the health of the entire Mississippi River watershed.

Developing a report card for the Mississippi river and its major tributaries is a big and challenging undertaking—especially when looking at broad social, economic and natural goals. But since 2012, that's what America's Watershed Initiative has been working with dozens of partners and hundreds of experts to do. The results and a draft report card will be shared at the America's Watershed Initiative Summit, Sept. 30-Oct. 2 in Louisville, Kentucky.

The collaborative nature of America's Watershed includes a steering committee that is comprised of leaders from businesses, organizations, academics, and local, state and federal agencies who are working together to bring a broad perspective to some of the most pressing challenges facing the entire watershed.

In 2012, America's Watershed Initiative convened a summit in St. Louis. One of the key outcomes was the endorsement of the need to develop a report card for the Mississippi River watershed—looking at critical social, economic and natural measures. This report card is intended to help those who are working to create a shared vision and roadmap to pave the way for the improvement and long-term sustainability of the Mississippi River and its tributaries.

The report card is a tool to bring together—for the first time in one place—a summary of the current status and trends throughout the entire watershed. It will measure conditions for six goals, including:

- Maintaining supply of abundant clean water
- Providing reliable flood control and risk reduction
- Supporting local, state and national economies
- Supporting and enhancing healthy and productive ecosystems
- Providing world-class recreation opportunities
- Serving as the nation's most valuable river transportation corridor

With a watershed that includes all or part of 31 states and more than 40 percent of the United States, the report card project needed to build a foundation formed from each of the major river basins—the upper Mississippi, Ohio River, lower Mississippi River, Arkansas River, Red River and Missouri River. America's Watershed Initiative has worked to identify and collaborate with key organizations, leaders and associations in each of these basins throughout the report card process. Combined, dozens of groups have worked alongside America's Watershed Initiative and a team from the University of Maryland Integration and Application Network to produce the report card.

One- and two-day workshops were held in each of the major basins, starting in the upper Mississippi River last September and followed by the Ohio River basin in Cincinnati, the lower Mississippi basin in Memphis, the Arkansas River and Red River basins in Tulsa, and the Missouri River basin in Rapid City, South Dakota. In addition to these workshops, the team scheduled additional meetings, conference calls and webinars to collect feedback and information about the each of the major basins.

More meetings are planned throughout the summer and into the fall before the draft report card is released at the America's Watershed Initiative Summit this autumn. Additional background documents and information is available at **AmericasWatershed.org/reportcard**.

Since the process kicked off, more than 200 experts from 23 states have helped developing the report card. These participants represent businesses, organizations, local, state and federal government agencies and academic institutions. Participants brought their knowledge and experience in a variety of disciplines and sectors, including navigation and transportation, conservation, water quality and water supply, water treatment, economic development, and recreation.

Leaders from each of the river basins and national leaders are anticipated to attend the summit to help review the report card and chart a collaborative path to improve the health and productivity of the Mississippi River basin. Learn more about or register for the summit online at **www.conference.ifas.ufl.edu/AWI/**.

Harald "Jordy" Jordahl serves as director of America's Watershed Initiative. He can be reached via e-mail at hjordahl@tnc.org.

the Mississippi River Commission, outlined the importance of adapting to the "changed environment" and for funding needed updates to the river's aging infrastructure system. Otherwise, the General warned, we will all pay the price -- both economically and environmentally -- in the future.

Holden said, "We're also seeing stronger hurricanes along the coast and more droughts interspersed with large, intense storms." He also predicts things could get even worse, saying, "If the earth's coping mechanisms respond as they have in the past, then we should not be surprised to see bigger, more intense storms... and more threats to our coastal areas."

Dr. Barb Kleiss, lead scientist at the Mississippi River Commission, says, "We know there's an increase in very expensive weather events and one possible explanation is climate change. There are correlations right now, but it's more difficult to establish cause and effect." She points out that most river measurement and recording instruments have been in place for less than eighty years. "There are still questions about whether or not the differences in intensity of storms are due to climate change, or whether they represent a normal cycle that occurs every 500 years - because we don't have data for 500 years," she adds.

What we do know is that higher concentrations of greenhouse gases have been recorded, relative to the temperatures that exist today. "It's a pretty good 'guesstimation' that the increase in temperatures are related to CO2," Kleiss concedes.

Finding solutions is more important than ever, as our economy relies on the river's navigation system for economical, reliable transportation. "Potential climate change effects could significantly affect the economies of the communities in the Mississippi River Valley," Kleiss says, explaining that if flows in the river increase, then the heights of the levees and navigation structure may also increase. This could impact the availability of water for irrigation, which in turn could change the location of where certain crops are grown and where items are manufactured. "That could also have an effect on the use of the river for transportation," she concluded.

As General DeLuca underscored, the lack of investment in our infrastructure has become a growing concern. "We don't have all of the funding required to maintain the infrastructure at the level it needs to be," Holden says, citing the increase in downtimes of navigation locks. "And that's just for current conditions," he continued, stressing that funding levels today will not meet new operation and maintenance costs that will likely be needed to address the impact of sea-level rise and other climate change related events.

As the Corps continues to deal with the changes in our environment, Kleiss advises, "We need to continue to monitor, be aware and be prepared to adapt." Holden added, "Not just we the Corps, but everybody that's in the Mississippi River Valley because it impacts thousands of communities. It's not just us; it's everybody."

The Face Of The Corps

PHOTO BY USACE

By Kimberly Rea, Recreation/ISOP Manager at the Rivers Project Office

The Mississippi River is one of the largest and most socially and economically important watersheds in the world, covering more than 40 percent of the continental United States. With a rich history, the river has many stories to tell; stories that highlight just how intertwined we are with the great river. The river's stories are told by park ranger staff who have been dubbed "the face of the Corps" because of their front line work and interaction with the visiting public. The Interpretive Services and Outreach Program (ISOP) is an essential part of the Corps of Engineers.

The ISOP staff has the responsibility to communicate with and educate visitors about the agency's missions, telling the agency's story and intertwining natural and cultural history with the created environments, according to Roseana Burick, St. Louis District, ISOP Program Manager. Indeed that is what rangers do every single day. An ISOP ranger's days are filled with program planning and execution, visiting with the public and sharing their knowledge of the Corps, the resources, and properties that we manage. "To get people to care about anything, they have to understand it," Angie Smith, St. Louis District Natural Resources Specialist states. "If they understand how things work together and why things are important in their lives, they are more likely to take action, to really start making decisions that have positive impacts not only for themselves but for others. You have to tap into and connect with them on an emotional level." ISOP rangers work within the community and partner with agencies and organizations to promote the Mississippi River as a shared resource. Through these partnerships, the Corps of Engineers is able to offer diverse programs and activities that promote public awareness and understanding of the Mississippi River, the environment and the dynamic interaction between the river systems and the human and wildlife communities that border them. By working together, each organization leverages its expertise in their shared goals of education, outreach and habitat conservation.

"We are fortunate to have partners and supporters who share the Corps' commitment to stewardship," St. Louis District commander Col. Chris Hall said. "It is through our partners and the support of the community that we have been able to continue expanding environmental education and outdoor recreation opportunities."

One of the keys to a successful education and outreach program is the ability to reach diverse audiences and connect them to the natural environment and to also encourage healthy lifestyle choices. Throughout the Mississippi Valley Division, Corps lands offer unique opportunities for place-based education and they are ideal for learning about the environment, the natural, cultural, and historical importance of the Mississippi watershed and also about how the Corps of Engineers plays an important role in the overall management and protection of the Mississippi River.

"The programs we offer enhance our participants' experiences, positively impacting the way they feel and think about the outdoors," Smith said. "Through these immersive activities, we hope to foster a sense of stewardship, connecting participants to the outdoor world that inspires engagement and personal growth."

For young people seeking adventure, the Army Corps of Engineers offers a variety of summer programs through its various Mississippi River districts. Many of the events and activities show students and families the great benefits of the river's resources, the importance of taking care of such resources, and the practical ways to become involved with caring for our environment.

Lake Red Rock - Knoxville, Iowa
Lake Red Rock offers diverse, free programs, most of which do not require preregistration. Park Ranger Tracy Spry said the paddling activities and night hikes are both very popular. Find out more by calling their office at **(641) 828-7522** or check out the "Summer Fun Guide" online at **www.lakeredrock.org**.

Saylorville Lake - Johnston, Iowa
At Junior Ranger Camp July 14th through 18th, children are introduced to basic nature safety, history and environmental stewardship skills through daily hikes, plant and animal identification instruction and recreational safety games. The Rock Island District staff is also partnering with the Iowa Department of Natural Resources to promote water and swimming safety at an Iowa State Fair booth in Des Moines from August 7th through the 17th. In September, the public is invited to venture out into a tall grass prairie and learn about plants, insects and other wildlife through completing a prairie passport. There is a wealth of knowledge available through interactive exhibits at the Saylorville Lake Visitor Center and through the Saylorville Lake website. Contact the Saylorville Lake Administration office at **(515) 276-4656** to learn more.

Vicksburg's Army Engineering and Construction Camp - Vicksburg, Mississippi
Forty high school students from across the nation will come together to learn more about engineering this summer at Vicksburg's Army Engineering and Construction Camp from June 22 through June 28. Vicksburg District partners with the Society of American Military Engineers to produce an inspiring, hands-on experience for boys and girls that propel them into the engineering field. To learn more about the camp, contact Camp Administrator Henry Dulaney, PE, at **601-631-7724** or **henry.a.dulaney@usace.army.mil**.

The Audubon Center at Riverlands, West Alton, Missouri

National Great Rivers Museum - Alton, Illinois
St. Louis District's National Great Rivers Museum offer several camps every summer. At "Adventures in Dirt: Can you Dig it?", children ages 8 and up joined archaeologists to learn about everyday ancient life along the rivers at mock archaeological excavations at the Riverlands Migratory Bird Sanctuary in early July. "BrainSTEM" campers develop and design their own engineering marvels using science, technology, engineering and math to solve everyday problems July 21st through 23rd at the National Great Rivers Museum.

TO LEARN MORE

NATIONAL GREAT RIVERS MUSEUM
Call Roxane Krutsinger at the National Great Rivers Museum at (618) 462-6979 or learn more at www.meetingoftherivers.org.

The Army Corps of Engineers' Interpretive Services and Outreach Program leads a variety of programs throughout the Mississippi Valley Division including summer camps, pond studies, and hikes that promote understanding the environment within the Mississippi River watershed.

One way the Corps reaches the communities it serves is through summer programming and camps. While many of the summer programs are geared towards youth, there are also programs geared towards families and people of all ages. Tracy Spry, a park ranger for Lake Red Rock Project in Knoxville, Iowa, says summer programs can inspire families who visit the parks to strive for better caretaking of the environment. "Offering summer programs and activities often provides the gateway to new experiences in the outdoors," Spry said. "Many visitors may only experience a particular park they camp at or visit with family. Programs can encourage participants to explore new park lands, experience new activities - geocaching, pond study, hiking on a trail at night to listen for owls, etc. These experiences can create the feeling of ownership of the park, which then encourages stewardship. We want our visitors to feel close to the resources - they in turn may help protect the environment for future generations."

The importance of the Interpretive Services and Outreach Program can be validated by visiting any Corps location and attending a program, camp or special event and watching the faces of the participants. The Mississippi River has stories to be told; stories from the past, current stories and the stories that seem to unfold before us as we move into the future. "It is our responsibility as public land stewards to provide not only access to the lands we manage but access to the history and culture, access to the heartbeat of the Mighty Mississippi, access to showcase the Corps of Engineers missions and work and to show people that this river is indeed a part of us all," Burick said. "It is our job to make sure people have the opportunity to experience the Mighty Mississippi so they can become a part of that history and continue to help write her history for generations to come."

Rangers at the Rivers Project Office use geocaching as a tool to get visitors out and exploring nature.

Saylorville Lake in Iowa offers a Junior Ranger Camp led by park rangers and volunteers where kids can learn more about nature, safety, history and environmental stewardship skills. (Photo by Brian Nail)

PHOTOS BY USACE

An interagency meeting was held at the U.S. Department of Interior, Washington, D.C., April 29, regarding the celebration of the U.S. Fish and Wildlife Services/U.S. Army Corps of Engineers collaboration on the Lower Mississippi River conservation plan to protect three endangered species: the Interior Least Tern, Pallid Sturgeon and Fat Pocketbook Mussel.

Pictured (left to right) are Stephen Ricks, Field Supervisor, Mississippi Field Office, USFWS; Daniel M. Ashe, Director, USFWS; Lt. Gen. Thomas P. Bostick, Chief, USACE; Steve Stockton, Director of Civil Works, USACE; Dr. Barbara Kleiss, Director of Mississippi River Science and Technology, Mississippi Valley Division, USACE; Sally Jewell, Secretary of the U.S. Department of Interior; Eddie Belk, Director, Programs Directorate, MVD, USACE; the Honorable Jo-Ellen Darcy, Assistant Secretary of the Army for Civil Works; Paul Hartfield, USFWS; Dr. Jack Killgore, Team Leader, Engineer Research and Development Center/Environmental Laboratory; Dr. Beth Fleming, Director, ERDC/EL; and Cynthia Dohner, Southeast Regional Director, USFWS. (Photo by Gavin G. Shire, USFWS)

U.S. Fish and Wildlife Service Director Honors U.S. Army Corps of Engineers for Collaborative Conservation Action

By Tom MacKenzie, USFWS, and Gene Pawlik, USACE

U.S. Fish and Wildlife Service (USFWS) Director Dan Ashe praised a collaborative effort across the lower Mississippi River Basin between the USFWS and the U.S. Army Corps of Engineers that has helped advance conservation for three endangered species.

The collaboration highlights the responsibility and opportunity for all federal agencies to conserve endangered and threatened species under the Endangered Species Act. The joint effort by the Corps and the USFWS helps demonstrate that by working to incorporate the needs of threatened and endangered species in the work they perform, federal agencies can help endangered species recover.

DID YOU KNOW?

The U.S. Fish and Wildlife Service lists about 1,200 animals and 750 plants as either endangered or threatened in North America.

The largest endangered species in North America is the American Wood Bison. About 11,000 woods bison exist today in conservation herds.

Only about 500 grizzly bears exist in the lower 48 states today; most of them are found in Yellowstone National Park.

One of the smallest endangered sea creatures in North America is the pygmy seahorse, which is typically less than one inch long.

Many of the endangered birds listed by the U.S. Fish and Wildlife Service are native to the Hawaiian Islands where development has destroyed their natural breeding grounds.

For more information, visit the U.S. Fish and Wildlife Service website at www.fws.gov.

Specifically, it lays the foundation for broad habitat conservation actions that will help scientists meet population objectives more quickly for the endangered Interior Least Tern, Pallid Sturgeon and Fat Pocketbook Mussel. The resulting habitat improvements will also benefit other fish and wildlife that rely on the Mississippi River Basin.

Both the overall approach and the techniques the agencies have developed under it can be implemented nationwide.

"The U.S. Fish and Wildlife Service and the U.S. Army Corps of Engineers are seeing positive conservation results already thanks to steps included in this cost-effective approach," Ashe said. "This is significant as it demonstrates that conservation can coexist with transportation, national security and the region's economic needs."

The success stems from progressive steps the Corps and USFWS took that helped transform the Corps' Channel Improvement Program into a primary conservation tool for the three listed species. The Corps is using water and sediment that previously flowed directly down the river to now enhance aquatic habitats in the lower Mississippi River Basin. This will provide better opportunities for Americans to fish, bird watch and boat on one of the nation's great rivers. Not only will the listed species benefit, but so will recreational species such as bass, catfish and crappie, which will help boost local economies.

"The U.S. Army Corps of Engineers appreciates this recognition today of the successful collaboration between our agencies and specific contributions by USACE team members," said Lt. Gen. Thomas P. Bostick, U.S. Army Corps of Engineers commanding general. "The Corps of Engineers, together with our partners, is committed to a 200-year vision for the Mississippi Watershed - America's Watershed - that balances the nation's needs, such as flood risk reduction and management, environmental sustainability and recreation. The Lower Mississippi Conservation Plan is a stellar example of that commitment."

The USFWS is using the success of the Corps' Mississippi Valley Division conservation program to bolster efforts to expand this approach nationwide for both agencies and is looking at similar opportunities with other federal agencies.

MY MISSISSIPPI

Carol Fitzsimmons; fourth-grade teacher at The College School

"We use a thematically integrated, multidisciplinary approach to learning at The College School here in St. Louis. The Mississippi River is a quintessential topic to study because it has plenty to teach us – math, science, history, even journaling about the Mississippi.

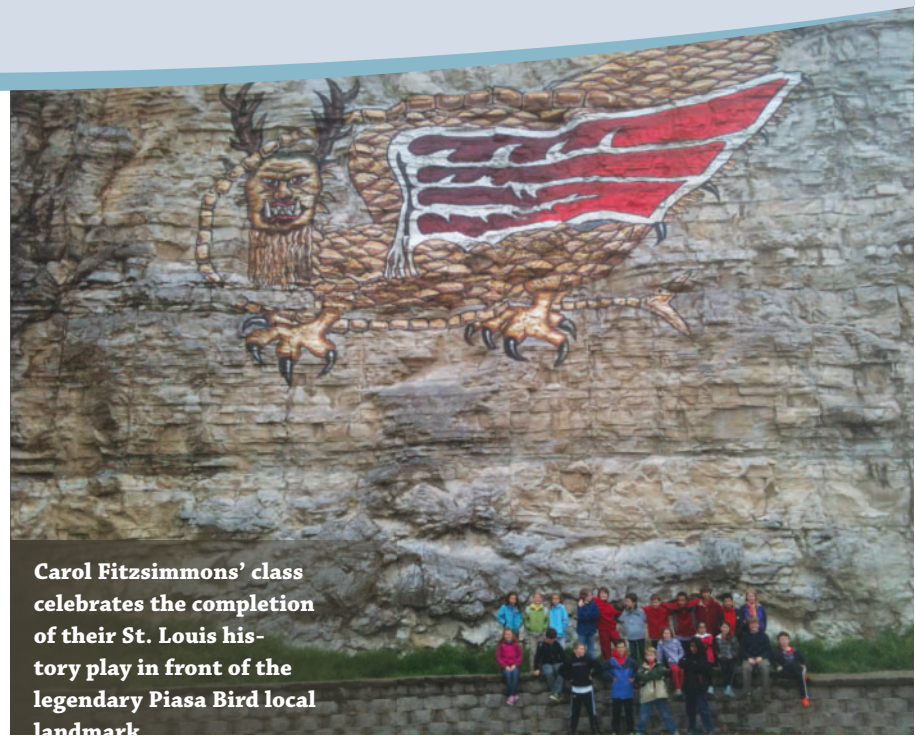
The students study water in fourth grade through a variety of activities including lots of field trips. We went to the Melvin Price Locks and Dam this year and studied the history and socioeconomic impact of the river. We also take part in the Missouri Department of Conservation's Missouri Stream Team, which is a citizen science program to improve the health of creeks in the area through water quality monitoring. This past winter, fourth- and fifth-graders put on a play written by the drama teacher that was all about St. Louis history. The Mississippi River connected all the stories of the play, which reflects the extensive impact of the Mississippi on St. Louis.

Before becoming a teacher at The College School, I first came to really know the Mississippi while studying biology and education at Principia College, which is a bit north of St. Louis. I enjoyed eagle watching along the river and spent a lot of time riding up and down the Great River Road and sitting on the bluffs looking out across the Mississippi.

At the end of May, I also led a Women's Adventure Group kayaking trip on the Mississippi with the Army Corps of Engineers. It was amazing and we loved it, but the Asian carp were not so great! While we were kayaking through a slough, they frightened us by jumping out of the water and splashing us pretty hard. It was a great education on invasive species!"

What's your Mississippi? Email responses to: editor@ourmississippi.org

PHOTOS BY THE COLLEGE SCHOOL



Carol Fitzsimmons' class celebrates the completion of their St. Louis history play in front of the legendary Piasa Bird local landmark

College School's fourth-graders look over the Mississippi from the tall bluffs near Alton, Ill.

OUR MISSISSIPPI KIDS

Be A Bird Detective - The Three B's Of Birding

When trying to identify many birds of the Mississippi River, it's easy to get your feathers ruffled. But if you remember a few things to look out for, it can be easier to identify most of the birds that you see.

Look at the size and shape of the bird's **B**eak. It can give you a clue as to what your bird might eat and how they use their beak to survive. Look at the bird's **B**ody. Is it small, or does the bird have a large wingspan? Does it have webbed feet, large talons or long legs? What color is its plumage (feathers)? And always watch for their **B**ehavior. What are they doing and where are they as you observe them?

Here are a few of the birds that you can spy on at the Mississippi River. Match the bird's **B**eak, **B**ody or **B**ehavior to the bird's name.

1. BALD EAGLE
2. GREAT BLUE HERON
3. AMERICAN ROBIN
4. DOUBLE-CRESTED CORMORANT

A
BEAK is large and hooked
BODY is very large – black or dark in color, large talons
BEHAVIOR – seen soaring high and near water

B
BEAK is large and long with a hook
BODY is very large – black or dark in color, long neck
BEHAVIOR – seen in the water swimming and diving for fish

C
BEAK is long and blade-like
BODY is very large – blue gray color, long neck
BEHAVIOR – spotted at a bank, very still, moving slowly, stalking prey

D
BEAK is smooth and straight, yellowish
BODY is medium sized and round, gray/brown body, orange breast
BEHAVIOR – seen walking quickly with beak pointed upright, also seen singing early in the day

A=1, B=4, C=2, D=3

Think Safety Before You Go On or In the Water

As the nation's largest provider of water-based recreation, the U.S. Army Corps of Engineers is dedicated to making sure public lands and waters are safe places to enjoy America's great outdoors. Here are some water safety tips from the Corps' National Operations Center for Water Safety to ensure that your next trip along the Mississippi River is a safe one.

Wearing a Life Jacket Can Save Your Life

Each year, more than 3,400 people drown in the U.S., according to the Center for Disease Control. Drowning is the second leading cause of accidental deaths for persons 1–14 years of age and the sixth leading cause for all ages. The majority of water-related fatalities on Corps waterways involve males 18–53 years old not wearing a life jacket.

One way to ensure survival from unexpected slips or falls overboard while boating is to always wear your life jacket. It will keep you afloat and buys time for you to be rescued. Statistics show that 9 out of 10 drowning accidents occur within a few feet of safety and involve boats less than 20 feet long. Most drowning victims had access to a life jacket, but they did not wear it. Boaters think they will have time to prepare for an accident. In reality, on average, it takes 10 minutes for a strong swimmer to put on a life jacket after entering the water, and it only takes an adult an average of 60 seconds to drown.

Learn to Swim Well and Never Exceed Your Swimming Abilities

Besides wearing a life jacket, learning to swim well is one of the best defenses against drowning. Teach those you love and practice simple survival floating skills; remembering how to relax and float when exhausted can save your life. Regardless of how well you swim, you could have to fight for your life due to unexpected conditions such as waves, current or exhaustion.

Steer Clear of Commercial Vessels

Commercial vessels have to stay within the navigation channel on rivers. An average towboat pushing barges can take 3/4 to 1-1/2 miles to come to a stop. If you cannot see the pilot, he or she cannot see you, because a commercial pilot's blind spot can extend for several hundred feet to the front and sides of the vessel.

Alcohol and Water are a Deadly Combination

When under water and under the influence of alcohol or drugs, a swimmer can suffer from an inner ear condition (caloric labyrinthitis) that causes the swimmer to become disoriented and not know which way is up. Also, boaters can develop "boater's hypnosis," a condition in response to sun, wind, noise, vibration and motion that causes fatigue and slows reaction time. Combining these conditions with alcohol or drugs greatly reduces coordination, judgment and reaction time.

PHOTO BY USACE

Involuntary Gasp Reflex can be a Killer

According to the Corps, falls contribute to 19 percent of all water-related fatalities on Corps-managed waters. A sudden unexpected fall into water causes an involuntary gasp (or torso) reflex, making it difficult to catch your breath and resulting in hyperventilation, fainting and drowning before you are able to calm down your breathing. The gasp reflex is delayed when under the influence of alcohol or drugs, which can lead to a last breath of water, instead of air. It takes less than half a cup of water in the lungs to drown.

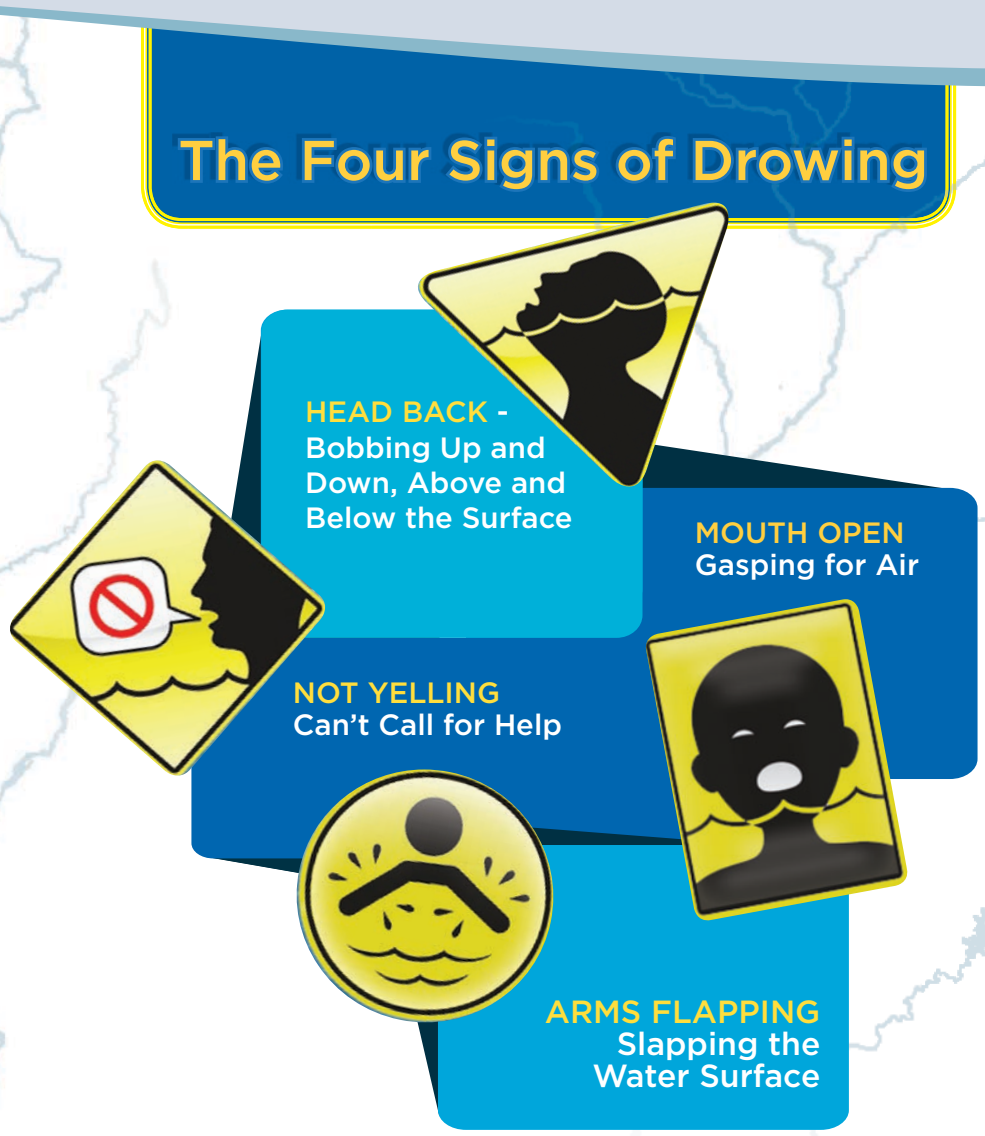
Watch Your Children

Children are naturally curious and have an attraction to water. Center for Disease Control statistics show an average of over 800 children under the age of 15 drown each year. It only takes an average of 20 seconds for a child to drown, so always make sure they are wearing a life jacket when boating and pay close attention when they are around water.

Take a Boating Course

Learn valuable tips that can help save your life in unexpected situations by taking a NASBLA (National Association of Boating Law Administrators) approved boating safety course. Many insurance companies offer discounts to boating safety course graduates.

PHOTO BY USACE



Prepare for Sudden Weather Changes

Always check the weather conditions and file a float plan with a responsible person before you go boating. Take a weather radio with you so you can check weather conditions while boating. If you are caught in an unexpected storm, make sure everyone is wearing a life jacket.

Be Aware of Carbon Monoxide Poisoning

Carbon monoxide (CO) is a colorless, odorless gas that can harm and even kill you while you are inside your boat or swimming outside of it. CO is lighter than water, so it can sit on the water's surface. Prevent the unexpected by learning more about where CO may accumulate and how to recognize the symptoms of CO poisoning.

Boat with Consideration for Others

You are responsible for any damage that your vessel or your wake causes. Be cautious and aware of your surroundings at all times. Obey all signs, buoys and posted restrictions. Typically, irresponsible actions of boat operators lead to accidents, so please boat responsibly.

Inspect Your Equipment

Before every trip you should perform a safety check of your vessel. It is your responsibility to make sure you have all the required equipment on board, including life jackets, a throwable device, a fire extinguisher, visual distress signals, sound-producing devices and whatever additional items federal and state laws require. Check your engine, ventilation, backfire flame arrestor, electrical systems and trailer before you go.

Stay Informed and Stay Safe

Find more water safety tips from the Corps' National Operations Center for Water Safety at **www.CorpsLakes.us/watersafety** and the North American Safe Boating Campaign at **www.safeboatingcampaign.com**. Above all, know your capabilities as a boater and a swimmer before you go out on the water. A little planning beforehand can prevent disasters later.

MY MISSISSIPPI

Laurent Rigaux; photographer, civil engineer and Marine Ernoult; writer, environmental lawyer

"We left Paris in September 2013 to explore nine different rivers around the world. We want to discover how people are living along these rivers, raise awareness of ecological and social aspects of the rivers, and show the rivers' beauty through photography and blogging. We are also asking the hundreds of people we meet, 'What is a river?' and comparing their answers at the end of our one-year trip.

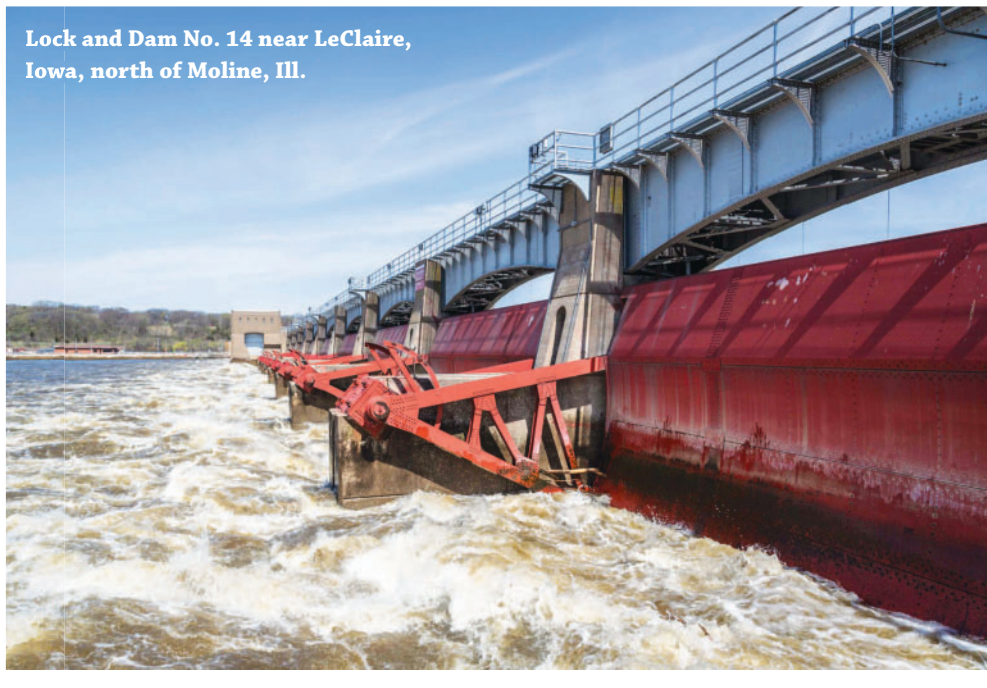
When choosing the rivers we would study, we selected the Mississippi River immediately because it is so important in culture and history. We wanted to see it very much because of Mark Twain's books.

Along our journey from Itasca State Park in Minnesota to the Gulf, we met a lot of people who shared their stories and insights about the Mississippi River - its history, influence on culture and the economy. Some we met even hosted us in their homes as we wanted to share in the daily life of people who live along the Mississippi. The Mississippi River means a lot to them because it's the lifeline of all the states, essential to navigation and culture. All the people we met agreed that the river has to be managed in a sustainable way in the future, not only for the ecological restoration but also to sustain the economic development of the country.

We also noticed lots of wildlife - swans, eagles, beavers. Every mile along the Great River Road, there's a refuge, a sanctuary. We are very happy to see this protection. With the view during sunset and sunrise, the Mississippi was so beautiful and peaceful. The people who live along the Mississippi are very lucky."

French photojournalists Laurent and Marine plan to present their work in an exhibition in mid-2015 in Saint-Mathurin-Sur-Loire, France. See english.ungranddetour.fr for more details about Laurent and Marine's expedition.

Laurent and Marine visited Itasca State Park in Minnesota along their Mississippi journey.



Lock and Dam No. 14 near LeClaire, Iowa, north of Moline, Ill.

PHOTOS BY LAURENT RIGAUX AND MARINE ERNOULT.

Our Mississippi

PARTNERING TO KEEP
AMERICA'S RIVER GREAT

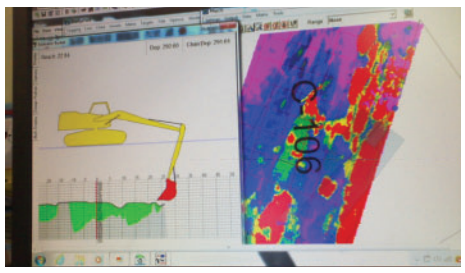
Pinnacle Rocks Removal - Corps' Progress on Easing Navigation at Thebes

The U.S. Army Corps of Engineers St. Louis District recently completed another phase of work on the Middle Mississippi River at Thebes, Ill., that removed rocks posing a threat to navigation during low river stages.

The rocks were part of a large natural formation, most of which was removed by the Corps in the late 1980s. With new advances in survey technology, the Corps was able to discover remaining outcroppings – referred to as pinnacles – along two stretches of the river near Grand Tower, Ill., and Thebes, Ill.

After finishing about 12 percent of the pinnacle rock removal, the St. Louis District is suspending work due to high river water levels associated with spring thaw and rain. Project Manager Michael Rodgers, PE, said the Corps will resume the work in late fall or early winter when the water levels recede to a stage of 10 feet or lower at the Cape Girardeau river gauge. Water levels need to be low so the Corps can use track hoes, grapples and hydrohammers to break up and move the roughly 25,000 cubic yards of sedimentary rock. Hydrohammers are huge, underwater jackhammers that are mounted to the front of an excavator.

The Corps is working alongside other state and federal agencies including the U.S. Fish and Wildlife Service, the Missouri Department of Conservation and the Illinois Department of Natural Resources, which conduct testing and sampling during the project to ensure safety for fish and other wildlife. Rodgers said their cautious action has resulted in no recorded fish kills. The Corps is also carefully moving the rock into nearby, predetermined scour holes to keep it within the river's ecosystem. This helps maintain the rock's environmental benefits, which include serving as a hiding spot for fish and a home for small invertebrates.



Photos by St. Louis District Public Affairs Office

The Corps is mandated by Congress to provide a navigation channel 9 feet deep and at least 300 feet wide, with more room around river bends to allow tows to pass safely.

Scan here with your smartphone to go to the *Our Mississippi* website. There, you can subscribe to our e-edition, read past editions and find river-related education materials.

Send story ideas to ourmississippi@usace.army.mil

Our Mississippi

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