

Our Mississippi

PARTNERING TO KEEP
AMERICA'S RIVER GREAT

WINTER '10

Tipping the balance to help America's 'Great River' thrive

By most any definition, the Mississippi River lives up to its most frequent superlatives. Mighty. Great. America's treasure.

More than 900 species of birds, mammals, reptiles, fish and mussels call the river's extensive basin home. It's an ancient migratory flyway, used by 60 percent of our birds, including the majestic bald eagle. And an entire commercial industry revolves around the 119 species of fish that navigate its waters.

Humans rely on it too, not just for water—it supplies 18 million with the freshwater source—but for relaxation, recreation and relatively inexpensive access to food and supplies. More than 100 million tons of cargo pass through the system's locks and dams annually, cargo that includes more than half the country's grain exports.

From the fateful day in 1823 when the Virginia managed to navigate the Upper Mississippi—the first steamboat to do so—the evolution of the river into a commercial highway was somewhat inevitable, says the National Park Service's John Anfinson, historian and cultural resources specialist with the Mississippi National River and Recreation Area.

"From this time on, most who relied on a navigable river would find its natural character troublesome and call for the river's transformation into a commercial highway," Anfinson wrote in his book, "The River We Have Wrought: A History of the Upper Mississippi."

That next year, Congress passed the first River and Harbors Act, authorizing \$75,000 to clear sandbars and remove snags from the Ohio and Mississippi rivers. But it

would be another 43 years before it would authorize the four-foot channel, establishing the first major government role in the management of the river with the founding of three U.S. Army Corps of Engineers districts.

Over the next 100-plus years, the government would use the Corps to gradually reshape the river through projects known as the 4.5-, 6-, and 9-Foot Channel Projects, progressively deepening the navigation channel linked together by locks and dams and establishing the river as a major commercial export source.


Along the way, preservationists like the Izaak Walton League's Will Dilg warned that destroying river wetlands could have dire consequences. He was the impetus behind the 260-mile Upper Mississippi River National Wildlife and Fish Refuge.

"Our Mississippi" chronicles the work the Corps of Engineers is doing in partnership with five states, other federal agencies, and groups representing environmental, conservation, navigation, and industry groups such as Izaak Walton League, The Nature Conservancy, the Audubon society, the Waterways Council, Inc., and the Corn Growers—to strike that ever-crucial balance and sustain the river for a variety of human and wildlife interests.

The work's being done through several existing programs, primarily the 9-Foot Channel Project and Environmental Management Program. The Illinois River Restoration Program and the Navigation & Ecosystem Restoration Program when fully implemented will expand capability. Outreach through the "Our Mississippi" initiative will focus on the river's regional and national significance and the collective responsibility for its preservation, says Chuck Spitzack, regional project manager.

"We may have individual perspectives on the river, but successful management requires an integrated and collective effort. 'Our Mississippi' says it very succinctly."

"Our Mississippi" chronicles the work the Corps of Engineers is doing with partners to strike that ever-crucial balance and sustain the river for a variety of human and wildlife interests.

 **Our Mississippi** is a quarterly newsletter of the U.S. Army Corps of Engineers about its work in the Upper Mississippi River Basin and its tributaries. 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.

Read all about our new name and look on page 4.



Agencies team to save scenic Lake Pepin

Ask “Why is Lake Pepin so murky?” and today’s answer is likely to go well beyond the obvious: sediment carried from further up the river. Technology now allows sleuthing scientists to figure out exactly where the debris originated through a sediment “fingerprinting” process—and that’s a key step in restoring and preserving a lake notable for its sublime scenery, towering limestone bluffs and vibrant art communities. It’s also one notable example of the way it’s taking many agencies working together in innovative partnerships to restore and sustain the Upper Mississippi River System, says Dan Wilcox, a water resources planner with the U.S. Army Corps of Engineers’ St. Paul district. A case in point is the Integrated Watershed, Water Quality and Ecosystem Restoration Study for the Minnesota River Basin which links together diverse expertise and projects already underway. All recognize the need to look at a system as a

There’s a sense of urgency about the work because sedimentation is a serious problem in Lake Pepin, famed as a frequent setting for stories penned by “Little House on the Prairie” author Laura Ingalls Wilder, whose birthplace is nearby. The lake is filling with sediment at a rate 10 times what it was prior to European settlement of the region. At this rate, the upper lake is predicted to turn into a shallow marsh in 90 years; the entire lake is projected to fill in about 300 years. The Minnesota River, from which the most sediment is flowing, contributes about half of the phosphorus load to the lake as well, increasing noxious blue-green algae blooms and problems with dissolved oxygen. Most forms of aquatic life, including fish, need adequate concentrations of dissolved oxygen in water.

The Interagency Study Team for the Minnesota River Basin study will simulate the effectiveness and economic implications for different solutions that involve moderating water flow and reducing the sediment and phosphorus loading, or rate of transport, to the Minnesota River.

Scientists from the St. Croix Watershed Research Station of the Science Museum of Min-

nesota have done much of the research on sedimentation in Lake Pepin and “fingerprinting” the sources of sediment using sediment mineralogy, Wilcox says, analyzing the varying compositions of glacial drift sediments above Lake Pepin to identify its areas of origin and quantify the relative contribution of each source.

Research scientists from the Minnesota Geological Survey and the University of Minnesota have been studying the flow of sediment in the Minnesota River Basin. What research has so far shown is that the origins of sediment reaching the Minnesota River have shifted from primarily field (agricultural) sources to non-field sources, with more coming from ravines, stream banks and bluffs.

As currently conceived, the Minnesota River Basin Watershed, Water Quality and Ecosystem Restoration Study will involve creating various watershed models of what currently exists and setting objectives for what the future ecosystem conditions should be.

PHOTO: PAUL STAFFORD/EXPLORE MINNESOTA TOURISM

At this rate, the upper lake is predicted to turn into a shallow marsh in 90 years; the entire lake is projected to fill in about 300 years.

whole to make river restoration most successful, Wilcox says. “We have new tools that can show us how water and land use choices in one part of the basin affect conditions downstream,” he said. “It helps us understand how our watershed and river management decisions affect everyone’s interests: local landowners, local, state, federal and tribal agencies and all those who use the Mississippi River for commerce and recreation.” Projects like the integrated study of the Minnesota River Basin link together diverse expertise and projects already underway. Among those is the setting of pollution loading limits to Lake Pepin, defined as the TMDL (total maximum amount by weight) of a given pollutant that can enter the river each day. Currently, Lake Pepin is experiencing excess suspended sediment and phosphorus, Wilcox says. And the Minnesota Pollution Control Agency and the Wisconsin Department of Natural Resources are working to set the target limits.

Mississippi benefits from stimulus funding

More than \$227 million in federal stimulus funding is flowing toward improvements to the Upper Mississippi River.

The funds, allocated under the American Recovery and Reinvestment Act of 2009, will be shared among some 200 projects and used primarily for Corps of Engineers operations and maintenance efforts—repairing locks, improving channels and habitat, controlling erosion, beefing up flood control measures and upgrading visitor centers.

The St. Louis District has allocated \$55 million to repairs to Lock and Dam 27, in Granite City, Illinois. More than 73 tons of cargo passed through the locks in 2006, according to the Corps of Engineers. The locks were built between 1946 and 1953, and the funds will go toward new lock gates and culvert machinery to control the locks.

The St. Louis District also plans over \$24 million in other operations and maintenance projects on the river. Projects include funding exhibits at the National Great Rivers Museum in East Alton, Illinois, construction of an interpretive Nature Trail at Calumet Creek, Missouri, repairing riverfront erosion in the city of Clarksville, Missouri, repairs to Lock and Dam 24 and 25 north of St. Louis, and a range of upgrades and repairs to the Melvin Price Locks and Dam in Alton, Illinois.

The St. Paul District’s construction plans call for \$70 million in rehabilitation to Lock and Dam 3, six miles upriver from Red Wing, Minnesota. The improvements are needed to modify the channel and extend a guidewall in order to reduce an outdraft current that pushes barges and towboats towards the dam and has caused multiple navigation accidents, and to repair deteriorating embankments.

More than 1,000 commercial vessels carried over 7 million tons of cargo through Lock and Dam 3 in 2007, according to the Waterways Council, Inc., an organization advocating for a national system of ports and inland waterways.

Stimulus-funded projects in the Rock Island District include channel restoration and habitat improvement. In total, some of the Corps’ stimulus funding is earmarked for operations and maintenance backlog issues on locks and reservoirs. Some of the money also went for flood recovery work in Cedar Rapids.

In addition, funding has allowed the Corps to complete systemic floodplain elevation and bathymetry mapping on the river system through its Environmental Management Program. This data will be used across many programs for flood damage reduction, ecosystem restoration, monitoring, research, some navigation improvements, refuge management and more.

Altogether, the St. Paul, Rock Island and St. Louis districts are slated to receive nearly half a billion dollars in federal funding through the act funding.

The study will also simulate the way sediment and plant nutrients flow downstream, identify ways to reduce those flows and determine what combinations of management and restoration measures are the most ecologically and financially effective.

Once those strategies are determined, the study team will use socio-economic models that determine the effect of various strategies on farm income and rural communities. If one solution recommended planting perennial groundcover on what’s now row-cropped agricultural land, the models would look at the resulting effect on the agricultural economy, Wilcox said. The American Recovery and Reinvestment Act of 2009, better known as the stimulus bill, is supporting early work on this study.

The state of Minnesota is currently working on collecting elevation data. The Corps of Engineers, meanwhile, is assisting the state of Minnesota in developing a TMDL for phosphorus loading reduction in the lower Minnesota River, Wilcox says. The river quality model has been developed at the Corps’ Research and Development Center in Vicksburg, Mississippi, in conjunction with the Minnesota Pollution Control Agency and the Metropolitan Council of the Twin Cities.

The Vicksburg laboratory staff, as well as experts from the University of Minnesota, will use that data to help the Minnesota River Basin Watershed, Water Quality and Ecosystem Restoration Study team identify the most effective way to obtain the water quality objectives in the lower Minnesota River, Mississippi River Pools 2 and 3, and Lake Pepin.

The study will include development of a system to help decision makers determine the most cost-effective ways to insure good water quality along the whole river system, Wilcox said.

“We want to find how we can implement things further up river and in the Minnesota River Basin that will help us attain those TMDLs (water quality standards) farther on down the Minnesota and Mississippi rivers,” he said.

“For the Lake Pepin project to be successful, there will need to be work done in the Minnesota River Basin. That’s how they’re linked.”



Take a virtual river tour

COMPLIMENTS OF THE NATURE CONSERVANCY

Perhaps you can’t visit the Upper Mississippi River National Wildlife and Fish Refuge to see one of the biggest reconstruction projects on the Upper Mississippi River System. There, public tours have

been highlighting the restoration of 26 islands wiped out by high water after Lock and Dam 8 was constructed back in 1937.

Or maybe you’ve only seen part of the river—not the entire stretch from the headwaters to the Gulf. The Nature Conservancy can now be your guide as it travels the length of the river and flies over restoration projects like that in Pool 8, on video clips on their website (NATURE.ORG/GREATRIVERS). A filming crew spent nearly two weeks on the river to highlight river issues and ongoing solutions, the culmination of its massive Great Rivers Project (NATURE.ORG/WHEREWORK/GREATRIVERS) which includes a focus on both the upper and lower stretches of the Mississippi.

FROM THE REGIONAL PROJECT MANAGER

Navigation & Ecosystem Sustainability Program



Chuck Spitzack,
Regional Project Manager

The headline for the lead article in the January 2008 newsletter was "Construction gets green light; funding wait begins." And while that's still the case with the Navigation and Ecosystem Sustainability Program (NESP), the project team has not been idle.

We have accomplished many key milestones since authorization of NESP in 2007 and have the program ready for construction and successful outcomes. The Corps' Director for Civil Works signed the Record of Decision, completing the feasibility process and opening the door to construction. The Assistant Secretary of the Army issued guidance on implementation of NESP incorporating input from the interagency partnership. Environmental compliance for new lock chambers at Locks and Dams 22 and 25 was completed. System-wide mitigation studies have been completed.

And there's more.

An interagency partnership finalized system-wide goals for both navigation and ecosystem restoration and set objectives for reaches of the UMR-IWW System. We have developed a process for selecting and sequencing ecosystem restoration projects and refined the master plan for implementing those. The interagency partnership developed proposals for an Advisory Panel, which will include state and federal representatives and non-government interests, and is preparing for a possible transition of work now done under our successful Environ-

mental Management Program (EMP) to NESP.

The bottom line is that we are ready to successfully implement NESP as soon as funding becomes available. Congress authorized the program for implementation in 2007, 14 years after initiating a feasibility study, but funding has been limited to pre-construction, engineering and design work of about \$10 million a year. That's not a large amount in a program that calls for a total of \$4.2 billion in spending for navigation efficiency improvements and ecosystem restoration.

The hold-up in construction funding is multifaceted. One challenging issue (though not the only issue) is funding for navigation improvements.

Capital improvements to the navigation system are generally cost-shared at 50 percent from general revenues and 50 percent from the Inland Waterway Trust Fund. The trust fund, which is funded through a 20-cent-per-gallon fuel tax on system users, is not keeping up with capital investment needs. A government team working with industry is now tackling the issue. That team is refining and prioritizing capital investment needs. Uncertainty in predicting outcomes well into the future and the difficulty of introducing a new program into an already-packed federal budget present more challenges.

We come to work every day with the expectation that funds will be appropriated for construction under NESP in the next budget cycle; that gives us a sense of urgency and focus, so that we will be ready when it happens. I believe strongly that NESP is a critical tool for management of the river toward sustainability of the economic uses and ecological integrity of this great river system.

NESP in a Nutshell

The program calls for dual-purpose operation of the UMR-IWW system and a total of \$4.2 billion in navigation efficiency improvements and ecosystem restoration. Authorized navigation improvements include adding second lock chambers at seven existing lock and dam sites on the Mississippi River and Illinois Waterway System as well as small-scale improvements for the purpose of increasing navigation efficiency and reliability. Ecosystem restoration will consist of over 200 projects that restore natural river processes and create habitat throughout the 1200-mile system.



Newsletter gets new name, broader focus

Above: The newsletter's new logo suggests water, land, structure, and the integration of those elements.

"Our Mississippi" is published by the U.S. Army Corps of Engineers in cooperation with other partner agencies and organizations. For several years, the newsletter has chronicled the progress of the Navigation and Ecosystem Sustainability Program (NESP), authorized by Congress in 2007 to integrate restoration of the river's important habitats with modernization of the navigation system to reduce barge traffic delays on the Upper Mississippi River system. This month, the publication gets a new look and name and a broader focus. Chuck Spitzack, regional project manager, explains why.

Q: Why has the newsletter changed its name and look?

A: We are adjusting the direction and focus of our public outreach. We think a more holistic approach will be better understood and more meaningful to river interests and the general public. NESP is only one of many programs that the Corps has for management of the Upper Mississippi River and Illinois Waterway System, not to mention the many initiatives of others with whom we collaborate on management of the system.

Q: How'd you arrive at the new name?

A: We consulted with other state and federal agencies and non-government organizations with whom the Corps traditionally collaborates on management of the system on how to make outreach more effective. Naming was part of the process. We wanted a name that has Mississippi embedded in it, reflects the importance of the Mississippi River, reflects inclusiveness, and recognizes that we embrace the Mississippi for different reasons and from different perspectives. It is a national resource shared for different purposes.

Q: What will readers notice as far as difference in content?

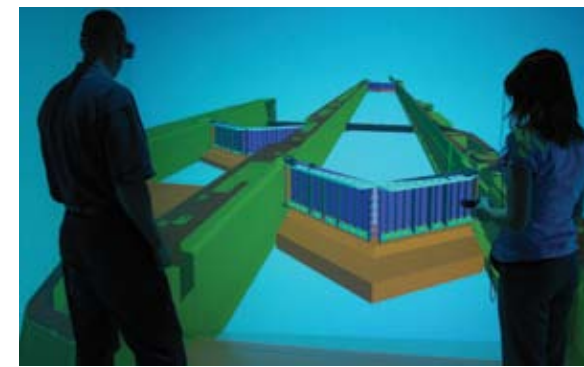
A: We hope that readers will notice a more holistic presentation about Corps work on the river system and how Corps work relates and integrates with the work of other agencies and organizations toward a healthy and sustainable river system. We also hope for the newsletter to generate thought and consideration of the river's importance to communities and individuals.

Q: For example?

A: I had originally thought a good name would be "Upper Mississippi River Works," which relates to the concept of "a river that works and a working river," but through the process I have come to appreciate "Our Mississippi" as a better fit. It emphasizes the national and regional significance of the resource and that we have a collective responsibility to preserve it. It is a reminder that the river is a shared resource serving many purposes. Preserving and enhancing the value of the Mississippi requires a proper balance that allows these purposes to be exercised harmoniously and sustainably. We may have individual opinions, but successful management requires an integrated effort. "Our Mississippi" says it succinctly.

Q: How does this connect with the broader outreach effort that represents a 200-year vision for the watershed?

A: I see the visioning process being done under guidance of the Commander of the Corps' Mississippi Valley Division, Brig. Gen. Michael Walsh, as a way to share and bring together visions of the Mississippi River watershed for the long term. Our outreach efforts regarding management of the Upper Mississippi River - Illinois Waterway System contribute to the vision but also address how we work toward it through planning and actions now.



Above: Engineers used a 3D virtual environment to engineer new gates for the opening of Upper Mississippi River locks.

Technology boosts efficiency in lock part designs

Cutting edge technology is being used to design new gates at the openings of some Upper Mississippi River locks, gates that haven't been modernized since the 1930s, when the locks were built.

Miter gates are the giant double doors closing the

lock, getting their name from the fact they meet at an angle pointing upstream and resemble a miter joint. They're generally sturdy but not easily repaired when damaged by barge impact or worn by age.

The new gates—initially planned for Locks 20, 21 and 22—are particularly maintenance friendly. Parts are bolted together so they can be easily unbolted and replaced. They're also designed so that many parts are interchangeable between different gate heights.

But just as important is the way the design process is using Building Information Modeling,

according to the engineering team working on the process. Building Information Modeling uses a 3-D model that allows the gates to literally come to life through just a design model. In the four-sided virtual environment, designers can almost walk between gate doors, as can lock operators, maintenance crew members, divers and others who'll be involved with the gates on a day-to-day basis. That allows them to more easily catch any potential glitches and makes the lock design process more efficient.

Designers have used that feedback to make important changes, says Jeff Stamper, NESP Technical Manager for Engineering. They've also used the model to catch potential conflicts among the thousands of parts that make up the gates, he said.

"The gate is made up of a bunch of pieces that have a particular size and shape and location in space," he said. "The model tells you if there's any conflict with each or they are occupying the same volume."

DID YOU KNOW?

Sixty percent of all North American birds (326 species) use the Mississippi River Basin as their migratory flyway

Barges replace islands as habitat for endangered shorebird



They may seem like unlikely conservation tools, but two barges anchored off the Mississippi River serve as the front lines in an effort to return an endangered shorebird to the river's upper reaches. The barges served as home to dozens of interior least terns this summer. The species is rarely seen north of St. Louis since changes to the river to aid navigation have wiped out most of the sandbars where the terns prefer to nest.

The tern repopulation project started in 2008 when the Illinois Department of Natural Resources and Illinois Natural History Survey approached the U.S. Army Corps of Engineers Rivers Project Office, asking about creating an artificial floating sandbar for nesting. A similar program in Washington's Puget Sound, where barges were successfully used to attract and study nesting pairs of Caspian terns, became a model for the project. Surplus pontoon dredge barges were located and modified to provide 1,500 square feet of nesting area.

The barges were lashed together and covered with a mixture of sand and gravel. Pieces of driftwood were scattered across the surface to provide shelter, and pairs of tern decoys were placed, along with solar-powered boxes that broadcast recordings of the terns' calls.

On April 30, the barges were pushed into place in Ellis Bay, a backwater off the Mississippi River within Missouri's Riverlands Migratory Bird Sanctuary, across the river from Alton, Illinois. Two weeks later, least terns were spotted landing on the barge, and by July 7, a dozen nests had been built.

Sarah Miller, a biologist with the Corps of Engineers' Rivers Project Office, said the artificial island eventually drew between 32 and 36 of the endangered birds, which built 16 nests between them and laid two to three eggs per nest. More than two dozen hatchlings were spotted in the weeks that followed, and the Illinois Department of Natural Resources and Illinois Natural History Survey banded 20 of them to track their movements.

"In the beginning, we were just hoping we'd have a couple of birds show up," Miller said. The birds have now headed south for the winter, but the barges will be back in place for the next nesting season. A previous effort to bring the interior least tern back to the area was less successful. In 2002, the Corps of Engineers and St. Louis Audubon Society partnered to create habitat by constructing a permanent island nearby. Although several terns were seen in the area, none made nests on the island over the next several years. One theory for the failure is that the island was located too close to the main shore and predators, making it an uninviting nesting location for the terns.

Terns draw tourist crowds as they nest on surplus barges within the Riverlands Migratory Bird Sanctuary.

Above, from left: One of the more than two dozen least terns that hatched on the barges this summer; a fledgling's flight feathers; and the barges as they appeared while anchored in Ellis Bay.

Mississippi monitoring a model for the Yangtze



The Long Term Resource Monitoring Program is part of the Corps of Engineers' Environmental Management Program and is widely thought to be the world's best source of ecological data on large rivers. For more detail on its specific monitoring projects, go to: umesc.usgs.gov/ltrmp.html

THE ECO-FRIENDLY BARGE

According to a recent study of freight transportation impacts, river barge transportation has comparable ground options beat when it comes to such factors as cargo capacity, fuel efficiency, accident rates and even carbon emissions. The year-long study compared inland river to highway and rail transportation and concluded:

- One 15-barge river tow carries the same amount of freight as 1,050 trucks or 216 rail cars pulled by six locomotives.
- On a single gallon of fuel, carrying one ton of cargo, a barge can travel 576 miles compared to 413 for a train and 155 for a truck.
- For every barge-related fatality, there are 22.7 rail fatalities and 155 by truck.
- Inland waterways transport generates relatively fewer emissions of carbon monoxide, nitrous oxide and hydrocarbons than rail or truck.

STUDY CONDUCTED BY THE TEXAS TRANSPORTATION INSTITUTE'S CENTER FOR PORT AND WATERWAYS AT TEXAS A&M AND WAS COST-SHARED WITH THE U.S. MARITIME ADMINISTRATION.

DID YOU KNOW?

The Mississippi River Basin, or Watershed, drains 41 percent of the continental United States and includes 31 states and 2 Canadian provinces.

A 20-year-old environmental monitoring program unique to the Mississippi River is becoming a model for other major world river systems, including the Yangtze. Four Chinese scientists spent nearly a month along the Mississippi earlier this year, studying the Corps of Engineers' Long Term Resource Monitoring Program (a component of the 24-year-old Environmental Management Program) and other ecosystem sustainability projects in the hopes of launching similar initiatives in China. It's an exchange from which both countries—indeed, all the world's river systems—will benefit, said Dr. John Chick, who visited the Yangtze last year as part of the exchange and this summer hosted his Chinese counterparts. "A long-term goal for everyone involved with this would be to see comparable monitoring begun in China on the Yangtze and hopefully expand to other rivers internationally," said Chick, field



Top: The Yangtze River. Above, left: Duan Xinbin, of the Yangtze River Fisheries Institute in Jinzhou City, holds an Asian carp retrieved near Alton, Ill., while Xiaoming Sun, The Nature Conservancy's Yangtze River project assistant, listens to Zack Lancaster (seated center) and Eric Ratcliff of the Illinois Natural History Survey talk about these invasive fish. Above, right: Eric Ratcliff, assistant field station director of the Illinois Natural History Survey's Great Rivers Field Station, assists Duan Xinbin, Xiaoming Sun and Lou Weili, researchers and scientists visiting from China, as they identify species of Mississippi River fish.

RESEARCH PHOTOS COURTESY OF LEWIS AND CLARK COMMUNITY COLLEGE

"What we've done to care for the river shows up to someone who lives on a river that's perhaps in a little bit more degraded state than the Mississippi... they could see the foresight of people creating a refuge on the river and what it might be able to do for them in the future."—GRETCHEN BENJAMIN, ASS'T. DIR. OF THE NATURE CONSERVANCY'S UPPER MISSISSIPPI RIVER PROGRAM

station director at the Great Rivers Field Station in Brighton, Ill. "It would be such a great thing to have comparable data from several river systems."

One thing the rivers have in common, one of the Chinese scientists noted, is the way each sits at the heart of each nation's history, culture and economy. There are other similarities, notably the establishment of large dams at various points of the river and the hypoxic dead zone forming at some parts of the Yangtze, not unlike the mouth of the Mississippi at the Gulf of Mexico.

But differences were evident during both formal and informal interaction, on the visit by the Chinese scientists this summer and a similar exchange in May 2008 during which American scientists visited the Yangtze.

What struck him most vividly, Chick said, was China's rate of growth; he and his colleagues gave up counting the number of bridges being constructed over the Yangtze because they

couldn't keep up, he said. The intensely personal way the Chinese people interact with the river—and the longevity of those interactions—also left a lasting impact.

"Every ½ or ¼ mile there'd be stone staircases carved into the rock, staircases 1,000 years old, so people could get access to the river. The number of people swimming and fishing and doing laundry was truly striking."

The Chinese scientists, on the other hand, commented both on the massive scale of river restoration projects and on the Mississippi's "abundance," said Chick and Gretchen Benjamin, the assistant director of The Nature Conservancy's Upper Mississippi River program. The Nature Conservancy sponsored the exchange, along with the two countries' governments.

"They commented on how there were so many birds, how they were catching so many fish, that everything seemed to be plentiful on the river," Benjamin said. "What we've done to care for the river shows up to someone who lives on a river

that's perhaps in a little bit more degraded state than the Mississippi... they could see the foresight of people creating a refuge on the river and what it might be able to do for them in the future."

The Chinese scientists are looking to establish long-term monitoring methods; they'd also like to establish a fish refuge for their native fish populations, of which there are 275, Benjamin said. One expressed strong interest in systems developed by the Corps to allow fish to pass through dams—especially critical since the massive Three Gorges Dam will be followed by the construction of many more.

The project offers a true exchange, Chick said. China has a sophisticated water quality monitoring program, for example. It also reflects the growing international reputation of the Long Term Resource Monitoring Program, created in 1986, and the success of partnerships between various U.S. entities with a role in river management.

"It's the story of Mississippi River partnerships all along," Benjamin said. "They just keep growing. And because of that growth, we're able to do more and more with what we learned about what we can physically do on the river, then go beyond our borders and help others and learn from them as well."

For more detail on its specific monitoring projects, go to: umesc.usgs.gov/ltrmp.html.



MY MISSISSIPPI

Heidi Dunn, 52, founder of Ecological Specialists Inc., O'Fallon, Mo.

"I tell people I play in the mud for a living. We do surveys of the river, and if we find anything endangered, we help the client or the Corps come up with a strategy. Sometimes, with freshwater mussels, for example, we have to move them.

"It's dark down there. . . So you work mostly by feel. We wear thin gloves. You can feel the difference between a rock and a mussel, or even different species of mussels. Some at maturity are an inch in diameter. They're kind of like trees, laying down annual rings. Some live up to 100 years.

"And sure, you find other stuff. If somebody leaves it in their yard or in the street, it eventually finds its way to the bottom of the Mississippi. We've found toilets and washing machines. Once we found a pile of mislabeled tombstones, with the dates of death before the dates of birth.

"The Mississippi is an animal. It's got a definite purpose, and a health of its own. And crawling around on its bottom, you become part of it."



MY MISSISSIPPI

Chuck Theiling, 46, aquatic biologist, Army Corps of Engineers, Rock Island, Ill.

"My relationship with the river started professionally, in 1990, but quickly became a passion. It's a great place to do science. I work with everybody from botanists to archeologists to fishery and wildlife people, to policy makers and farmers.

"I'm lucky to be able to wear jeans to work every day, and fish on my way home whenever I can, for walleye, bass, sunfish. I'm also part of a growing herd of kayakers—my whole family and all my friends. Whenever you take somebody out, they run home and buy a kayak.

"A few years ago I put a vanity plate on my car (a 1999 racing-green BMW convertible) that says GR8RIVR. It's cheap advertising. I take it to meetings up and down the river, and on summer nights I love to just cruise the river in it, getting people to think about what we have in our midst."

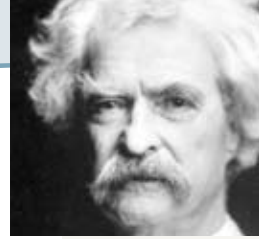
EXPLORE Your Mississippi

Trivia Down the River

1. How long does it take water to travel the length of the Mississippi?
2. Where and when was the sport of water skiing invented?
3. Where does half the money for improvements on the nation's waterways come from?
4. The first bridge across the Mississippi River was considered "a hazard to navigation" by steamboat pilots fearful of competition from the railroads. Two weeks after the bridge opened, it was rammed by a steamboat and started on fire. When and where was the bridge built?
5. What river once flowed into Lake Michigan, in 1900 had its flow reversed using a series of locks, and now flows into the Sanitary and Ship Canal? It is dyed green every year on St. Patrick's Day.
6. The song "When the Levee Breaks," made famous in the version performed by Led Zeppelin, was inspired by what historical event?
7. What important transport hub is located at the confluence of Ohio and Mississippi Rivers?

ANSWERS:

1) The retention time from Lake Itasca to the Gulf of Mexico is about 90 days. 2) Lake Pepin, spring of 1922. 3) It comes from the user tax that barges pay, 20 cents a gallon on fuel. This amounts to \$100,000,000 a year. 4) The bridge from Rock Island to Davenport was built in 1856. 5) Chicago River. 6) It was composed by Memphis Minnie McCoy in 1929 after the Great Mississippi Flood of 1927. 7) Cairo, Illinois.



It's a Mark Twain Word Search!

S N A K E C D I K Y R E V A L S
 C L S A L G U O D N V S D I S N
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| CAVE | HARPER | SLAVERY |
| CLEMENS | HAUNTED | SNAKE |
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| ESCAPE | JIM | VEXATION |
| FAMILY | JOE | WHITEWASH |
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| FINN | KNIFE | |

DID YOU KNOW?

One barge-load of wheat is equivalent to 58 semi trailers, enough to bake 2.25 million loaves of bread.

How can you help sustain the Mississippi River?

One organization lets you count the ways: 1 Mississippi, 2 Mississippi, 3 Mississippi, and so on. The tagline for the 1 Mississippi campaign, in fact, is "Can the river count on you?" Suggestions include volunteering for the benefit of the river in clean-ups, tree plantings or restoration workdays or simply getting to better know the river by visiting a park with a picnic, signing up for a canoe trip or attending a riverside festival. Learn more about the project and how to be a better "river citizen" at 1mississippi.net.



MY MISSISSIPPI

Jeremy Beasley, 22, third-generation fisherman, Beasley Fish Market, Grafton, Ill.

"I was 5 when my dad started taking me and my younger brother out with him at midnight to fish. He'd do most of the work, hauling in 300 or 400 pounds. And we'd try to sort 'em out, throwing the shorts back in, but sometimes we'd fall asleep on the nets.

"Sometimes he'd give us 5 or 10 bucks, but mostly it was a treat to go out with him. We'd beg him for a week, and then on Saturday he'd come into our room, and shake us, and say, 'Hey, guys, hey bud, ready to go out today?' We'd stumble out of bed and have coffee or tea, then go out.

"On a clear night you could see everything. A mile and a half up the river. Every star in the sky as bright as can be. Plenty of nights I'd see more shooting stars than most people see in a lifetime. And you'd see a deer or a beaver jumping in the river, and with a big old golden sunrise. A big old flock of ducks would fly up over you, like in a movie."



Crews work near the Lockport dam to shore up a wall lining the Chicago Sanitary and Ship canal. Above right: A barge and tow navigates the Chicago Sanitary and Ship Canal, a man-made connection between Lake Michigan and the Illinois River, past the project site.



Illinois River canal gets new life

A project that's shoring up the embankments along the Chicago Sanitary Canal to protect the downstream city of Joliet from potential flooding is well underway, thanks in part to significant funding from the American Recovery and Reinvestment Act.

The \$110 million project is being constructed in three phases, one already completed. Two stages are designed to reinstall seepage barriers on both sides of the canal, one as long as two miles. The third will renovate the historic system used to control water levels in the Ship Canal. The construction is designed to allow barges to continue running at the busy Lockport lock.

The project became necessary when the concrete in the rock embankment, originally built in the late 1800s, started weakening and allowing flows through the embankment, said Steve Russell, the project manager based at the Corps' Rock Island District. This section of the canal, part of the Illinois River, was originally built 30-40 feet above the adjacent Des Plaines River to ensure water flowed into the Illinois River, not back toward Lake Michigan.

Similar to a dam, the walls and embankments serve to retain water, and here, they also provide a guide wall for barges entering and exiting the lock. Over time, though, the original limestone/cement mixture originally constructed in the late 1800s has begun to deteriorate, Russell said. The emergence of sinkholes was indicative of further destabilization, he said.

The project was given priority funding because it was given the Corps' dam safety classification 2, defined as a dam determined to be unsafe or potentially unsafe. Nationwide, several projects have been given a comparable safety ranking level, but this is the only one on the Upper Mississippi River System to have such a ranking currently, said Frank Monfeli, the original manager on the project, now a risk management manager with the Corps' Lakes and Rivers division. It's also located in a major metropolitan area.

Approximately 58 million of the total funding is being provided by the stimulus package. And that has allowed the Corps to repair the problem before the concrete deteriorates any further, Russell said.

The project's first phase, already completed, involved the creation of a 4,300-foot-long, 30-foot-high concrete wall within the existing embankment, a way to shore up the existing dike upstream of the lock pool.

The next two stages are taking place concurrently. One involves the application of pre-cast panels in front of the existing, crumbling wall, backed by a second layer of concrete. The other phase involves the replacing of the coverings of what's called the "controlling works," the place where water levels are raised and lowered. There, layers of brick and mortar, granite and other materials protect the base concrete. Engineers are hoping to replace the original material, some of it being recovered from the river bottom, because the structure now has historic status.

Holding the Torrent in Thrall

The Chicago Sanitary and Ship Canal was originally developed to protect the city's drinking water by diluting pollution into the river system. In the late 1800s, most of the canal's construction involved work in the main channel. But the project also involved the construction of 13 bridges, the relocation of the Des Plaines River and the construction of a controlling works (now removed) at Lockport—at the time known as Bear Trap Dam because it was said to resemble a bear trap.

The controlling works released water from the main channel (which came from the south branch of the Chicago River and Lake Michigan beyond) through a dam. In 1896, Chief Engineer Isham Randolph described the process, writing:

*We have fitted mighty valves of steel
 A thwart our giant groove...
 The turning of a sea capstain,
 The winding of a chain,
 Will hold in thrall this torrent
 Or turn it loose again*

SOURCE: CHICAGO HISTORICAL SOCIETY



MY MISSISSIPPI

Angela da Silva, 55, cultural preservationist and re-enactor, St. Louis

"I didn't grow up on the river, but my aunt and uncle farmed a property that came to them through many hands, from the white master. And periodically they flooded out, and the rest of the family had to kick in and help replace everything.

"We understood the awesome power of the river from the very beginning. It was just the way the river runs.

"My mother's ancestors were slaves near the Missouri, but my father's were on the Mississippi. There were slave-breeding plantations near the confluence of the rivers, which was a perfect transportation corridor for shipping them to the South.

"I give tours of the black history of this area, and I take people to the banks and ask them to imagine being a slave on the Missouri side. I say, 'That Mississippi River is both a boundary and a horizon. It is the boundary to keep you in slavery, but you see freedom 400 or 500 feet away (in Illinois.) But how do you get there?'"

"I live seven blocks off the river, and sometimes I go to that spot to sit there in solitude and try to imagine what could be so terrible to make me get on that great river in a small boat in the darkness."

Reach Angela at tourism-network.net

Ambitious Illinois River Project Launched

FIRST STEP DEEPENS MUD-CHOKED PEORIA LAKE.

A Great Blue Heron watches

from the shallows near shore as the arm of a massive crane dips deep into the Illinois River, scoops up the jet black sediment from the bottom, then drops it into large beige tubes looped around to resemble sandbars.

It's as if the impressive bird knows what's in store and is cheering the process along.

For throughout the summer and fall, the Army Corps of Engineers has been dredging mud and silt from Lower Peoria Lake in an effort to restore its previous depth of anywhere from four to eight feet and bring back the once fertile backwater habitat for fish, mussels, waterfowl and other aquatic creatures. But the project is making sure that the sediment is put to good use. It's sifting that into geotextile (permeable fabric) containers and forming those into makeshift islands upon which it hopes will grow plants and trees attractive to other wildlife.

And this is just the first project in an ambitious Illinois River Basin Restoration Program authorized by Congress almost a decade ago in partnership with the state of Illinois. The Illinois Rivers 2020 initiative envisions a comprehensive upgrade of the 30,000-square-mile basin over 20 years.

The Peoria riverfront project kicks off the restoration's construction phase. It has been on the drawing board since 2004, when approval was granted to build the first island. Known as the Upper Mid-Sized Island, it will total 21 acres. Fifteen additional projects are in the planning and design stages, including two at Pekin Lake that are ready for building.

Plans here call for using the material that is dug up to create three islands with a combined area of 75 acres. The \$2.7 million presently available for the project, contributed by the federal government and the state of Illinois, is enough to pay for just one of the islands. But it's a start.

"The real purpose of the project is to restore depth in the lake lost to fisheries," says Marshall Plumley, project manager with the Corps' Rock Island District.

"Essentially, the Illinois River has thousands of acres of backwater lakes like this, that average 1.5 feet deep. In colder months, fish have a tendency to slow down and seek refuge, but there's no refuge outside of the navigation channel left in the Illinois River. This is providing scarce habitat for fishery species."

During the initial stage of the Peoria project, two channels are being dredged. One will provide access from the main navigational channel to the location of the future island; the other will encircle it.

Three rows of geotextile containers, each 6 feet high, are being erected to form the perimeter. They're being filled in



Sustaining the river for multiple uses—for the heron above, and the barge pictured here near a bridge in Peoria—is a goal of projects like this innovative island building effort on the Illinois River.

with dredged sediment. Also planned is a 200-foot-long test section where yet another container will be stacked on top of the lower three and berm will be placed behind it.

This will be followed by a second phase in which another layer of geotextile containers will be placed on top of the first row. Rocks will be placed at the site to provide habitat and prevent erosion. A total of 55 acres of shallow lake bottom will be dredged, producing more fill material for the island's interior. If money can be found, Phase 2 will begin next year.

When Congress gave the restoration program the green light in 2000, lawmakers called for it to utilize "new technologies and innovative approaches." In that spirit, the Army Corps' use of geotextile containers was a first for the Illinois River, although this type of container tube has been used previously for sediment placement in coastal areas.

Admittedly, the artificial island won't be much to look at during the early stages. Plumley says it will resemble "a big white doughnut sitting out there in the lake." But once the island is finished, vegetation will sprout quickly, he says, describing the dredged material as a virtual "seed bank."

Aside from being visually appealing, another goal is to make the islands high enough to make them hospitable to mast-producing trees. In the days before humans flooded or otherwise destroyed the river valley, it was home to thousands of acres of oaks and other tree species. Trees would boost the islands' value as wildlife habitat.

The Illinois River Basin Restoration Program is one of several Corps programs that provide mechanisms for integrated management of the Upper Mississippi River and Illinois Waterway System for multiple purposes.



Flood repairs lead to archeological find

Engineers from the U.S. Army Corps went to repair an Iowa levee after the flooding of a small village last year and in the process of trying to save one small town discovered another—from around the year 300 AD.

The prehistoric town, ironically about the same size as the flooded village of Oakville, was at one time slightly raised over a marshy area of the river, perhaps fortified by a fence or blockade of some sort, with houses arranged in a ring around a central plaza, says James Ross, an archeologist with the Corps' Rock Island district.

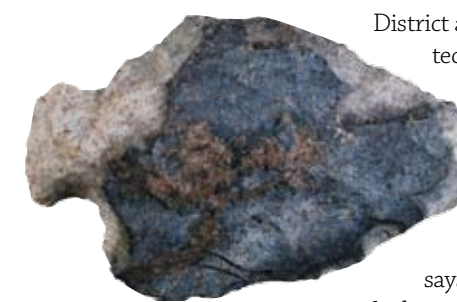
Archeologists define the site as a ringed midden village because of the dark midden (trash) deposits also found around the open area. And the distinctive pottery found at the site dates it to the middle to late Woodland period of about 300-450 AD.

The find, still being analyzed, is significant because so little is known about this village type, Ross said, making the find eligible for the National Register of Historic Places. It's also located near the Toolesboro Mound group, a significant ancient native burial site. And it represents just one of several important archeological sites near the confluence of the Iowa and Mississippi rivers and throughout the river basin.

"The river provided resources and a means of transportation," Ross said. "It was the focal point."

Some 7,000 sites have been recorded in the Mississippi River basin in just the states of Illinois, Iowa, Wisconsin and Minnesota; 500 of those are under the purview of the Corps since federal law gives the Army Corps of Engineers responsibility for protection of both potential historic resources and endangered species, as well as flood control here on the river.

When the Two Rivers levee was breached in a June 2008 flood, flooding 22,500 acres including the town of Oakville, Iowa, the Corps of Engineers constructed a \$1 million temporary berm of shot rock, completing that levee before the floodwaters receded. The Two Rivers Levee and Drainage



District also kept water draining from protected areas by digging ditches deeper or wider at select locations and setting up temporary pumps.

The Corps opted to place the new permanent levee back a few hundred feet where the river came through with less force, says Scott Whitney, senior programmer for levee system flood repairs (PL 84-99).

While conducting the required cultural resources survey, they discovered evidence of the ancient village type not only rare but uniquely preserved—in fact, one of the best preserved examples of this type found to date, according to Ross.

"So many sites are disturbed from farming practices or erosion on the Mississippi River," Ross said. "So when you find a site like that that's undisturbed and essentially been covered by flood deposits—not only three feet of sand but an additional two feet of flood deposits that are 300-500 years



Above: A crew from Bear Creek Archeology Inc. works methodically to document some 100,000 artifacts that may date back to 300 AD. Right: This temporary structure was put up to allow archeologists to continue the dig even as temperatures dipped well below zero.



old—it was kind of like a needle in a haystack that we found it. But we did."

The site contained no human remains, which expedited the excavation process; Ross speculates that residents of this village buried their dead in one of the many nearby mounds on bluffs overlooking the Iowa and Mississippi rivers.

The process wasn't exactly easy, though. To prevent delays in constructing a new permanent levee, experts from Bear Creek Archeology worked throughout the winter documenting the site, even constructing a tent-like structure so they could continue the painstaking documentation and artifact recovery work even as mercury dipped well below zero.

Even with such a well preserved site, there's likely no way to determine the tribal affiliation of these villagers, archeologists say. The Ioway and Otoe tribes lived in the region some 400-500 years ago, the Sac and Fox tribes an estimated 300-400 years ago. But this culture is too ancient to determine much more than its diet and habits, archeologists say.

Experts are continuing analysis on plant remains, the many bones found of turtles and fish—undoubtedly dietary staples—as well as spear points, storage pits, and distinctive Woodland tribal pottery likely used for cooking, drinking, eating and storage.

Some 100,000 artifacts were identified in all, all taken from the actual levee trench with the rest of the site left undisturbed. After the artifacts are cleaned and analyzed, Ross hopes many will be permanently displayed by the Louisa County Historical Society and perhaps at a state curation facility in Iowa City. Related educational materials also will be developed for local schools.

Meanwhile, construction on the permanent levee has been completed, along with 27 others also breached in the 2008 flood.



DID YOU KNOW?

According to the Environmental Protection Agency, more than 50 cities rely on the Mississippi River for daily water supply.



Tell us what you think.

For questions or comments, please contact the following U.S. Corps of Engineers regional outreach specialists: Kevin Bluhm, St. Paul, 651-290-5247; Angela Freyermuth, Rock Island, 309-794-5341; Laurie Farmer, St. Louis, 314-331-8479, or Kimberly Rae, West Alton, 636-899-0050. Or email story ideas, questions or comments to editor@ourmississippi.org.

For more information or to view the newsletter online at ourmississippi.org. There, you will find a "subscribe here" link if you'd prefer to get this quarterly newsletter sent to you via email.

What's your Mississippi? We'd like to share your answer to the question, "My Mississippi is..." in future issues. Email editor@ourmississippi.org with a short anecdote about your unique river connection.

This newsletter is a quarterly update of ongoing efforts in the Upper Mississippi River Basin and does not necessarily reflect the views of the U.S. Army.

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It's eagle time

Spot America's great symbol on America's great river.

"My Mississippi is a liquid jewel that brings the magnificent bald eagles each winter," says Bob Motz, a former biology teacher who leads eagle safaris in Rock Island each January and February.

Motz is just one of many river dwellers taken by the majestic bird. Tens of thousands of people flock to the Mississippi River every year to catch more than a glimpse of the national symbol; thousands of bald eagles spend their winters along the Upper Mississippi River near locks and dams that keep water open all winter long and also disorient fish and make them easy prey for the hungry birds.

Eagles can be seen frequently from mid-December through early March, with peak viewing and many eagle watches taking place through January and February.

Motz offers tours at \$20 an hour (for up to four people), even offering a money-back offer. Spot no eagles, and you get a full refund. And he isn't risking much, it turns out. One winter eagle count identified more than 4,000 along the Mississippi in a 100-mile stretch between Clinton and Keokuk. Those sensitive to the need not to disturb the eagles view them with high-powered spotting scopes. Binoculars magnify the thrill, allowing the visitor to "see the yellow around the black center of the eye, nostrils in the beak, black talons coming out of yellow toes, and the whole bit," he said.

Book a safari

Email Bob at eaglemotz@aol.com or call 309-788-8389, or 309-269-3922 (cell).

Join an eagle party

Eagle Days in Rock Island are held in early January (visitquadcities.com or 309-794-5338) and the Masters of the Sky weekend is Feb. 11-15 at the National Great Rivers Museum (mtrf.org) in St. Louis. Red Wing, Minn., Prairie du Chien and Cassville, Wis., and Guttenberg and Dubuque, Iowa, also sponsor annual eagle-watching weekends.

Follow eagle etiquette

Help eagles conserve energy they need to withstand the cold by not approaching them, not slamming doors or otherwise startling them, and staying close to or near your car as you watch, using binoculars for a close-up view.

Get closer

The National Eagle Center in Wabasha, Minn. lets you get a beak-to-nose experience with its five resident education eagles. Observation decks with spotting scopes also provide great viewing over the adjoining Mississippi River and backwaters. Visit nationaleaglecenter.net or call 877-332-4537.

