

Our Mississippi

PARTNERING TO KEEP
AMERICA'S RIVER GREAT

SUMMER '12



Panama Promise

Will expanded canal flow riches into Mississippi River states? Jury's still out.

AS HE WINDS HIS TRACTOR through a lush field of soybeans near St. Louis, Dean Campbell's mind is on the Panama Canal.

The Coulterville, Ill., farmer has made two trips there in the past two years. And he wasn't taking a cruise. Instead, he was getting an update on a project that has everything to do with a farm field in the Midwest—the massive canal expansion project.

The Panama Canal Commission is constructing a new set of locks that will widen and deepen the existing navigation channel. By late 2014, the project is expected to double canal capacity, allowing larger ships to transit and potentially shift the balance of world trade.

For the Midwestern corn and soybean farmer, it's simple math. Ninety percent of the soybeans Campbell and his neighbors will harvest head off to export markets via barges on the Mississippi River.

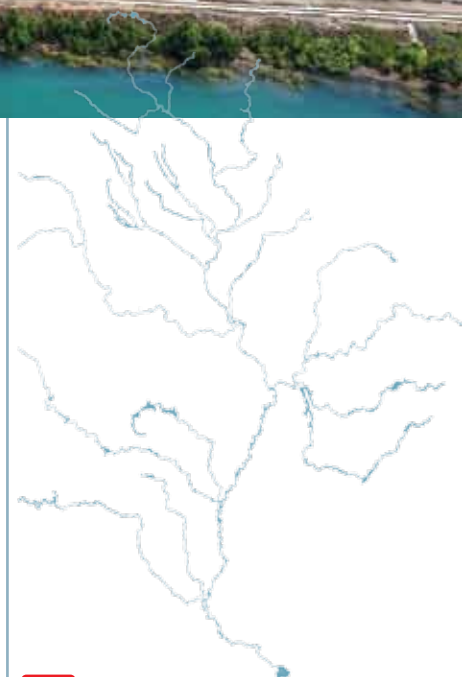
Commodities reach ocean-going vessels in New Orleans ports and head to the East. A burgeoning Chinese middle class, for example, is demanding more protein—protein that could come via Illinois soybean meal fed to Chinese chickens and hogs.


Corn exports to China have recently tripled, also signaling demand for feeding a growing population, says Iowa's Debi Durham, director of the Iowa Economic Development Authority.

When the canal doubles in size come late 2014, bigger, so-called post-Panamax ships will make transporting that food more efficient and therefore more profitable. That's because they'll be filled with bigger (and more economical) loads of soybeans harvested by Campbell and many others across the Midwest. If efficiencies add just 10 cents a bushel onto Campbell's beans and he nets that times 45 bushels an acre, that's \$4,500 for the 1,000 acres of soybeans he farms each year. In fact, a study funded by the soybean industry last year concluded that the expansion could result in a 35-cent-a-bushel savings and increase the total volume of U.S. soybeans and grain moving through the canal to export markets by 30 percent.

ABOVE: Once completed, the new locks will allow ships to traverse the isthmus with 12,000 containers of consumer goods at once. A collaboration of many nations under Panamanian direction, the Expansion Program will increase the region's connectivity and thus aide in global networking.

COURTESY PANAMA CANAL AUTHORITY.

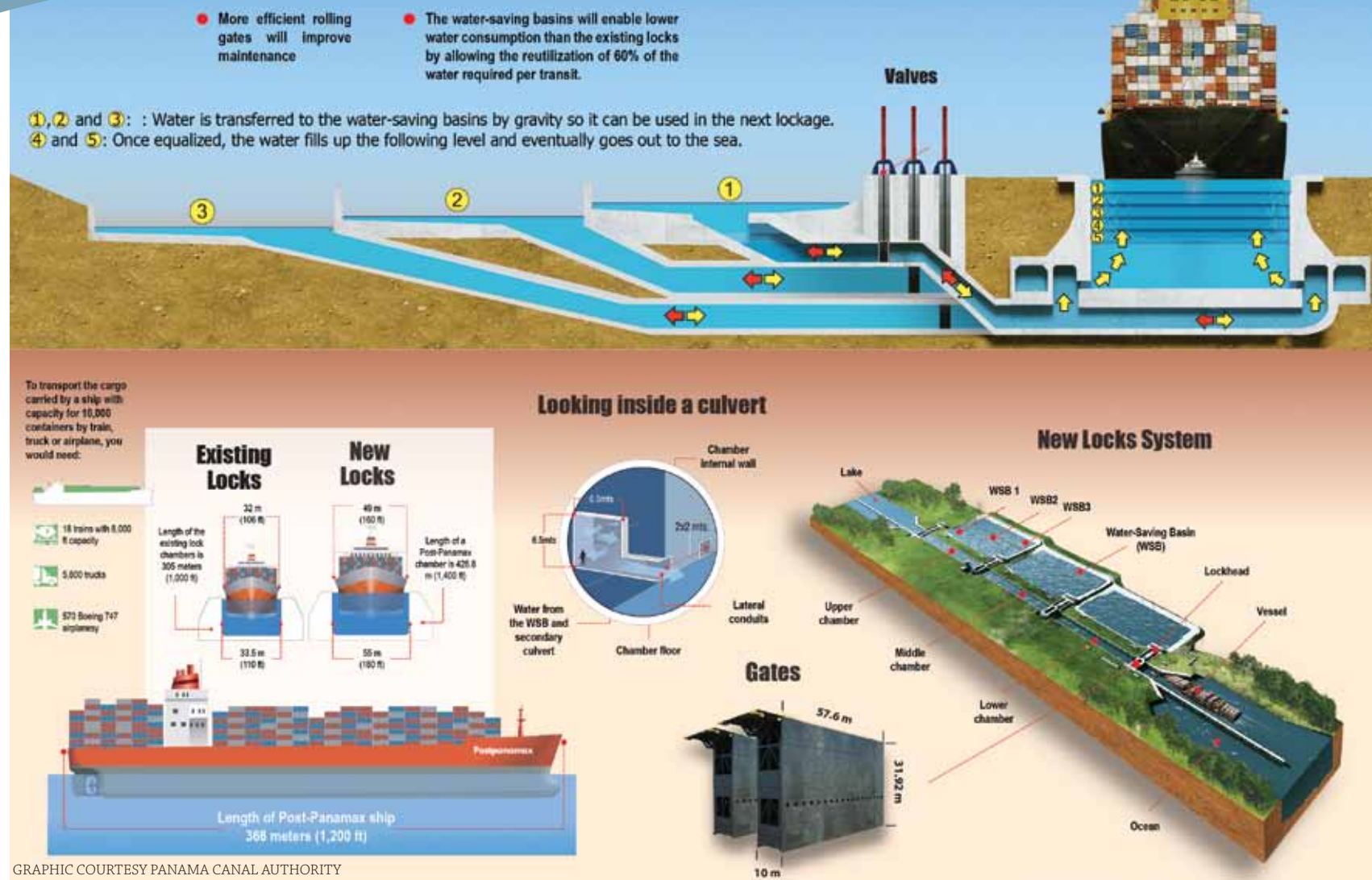


 **Our Mississippi** is a quarterly newsletter of the U.S. Army Corps of Engineers about its work in the Mississippi River Basin. It is published in cooperation with other state and federal agencies and other river interests with whom the Corps collaborates and partners toward long-term sustainability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

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Then & Now: Historic & Modern Photos of River Sites, PAGE 6

Panama Canal Expansion



Middle America will only reap benefits, he and others believe, if the United States invests in its infrastructure—in this case, the aging locks and dams of the Mississippi River.

“If I make a little more money, I spend a little more money locally,” says Campbell, a board member of the Soy Transportation Coalition, “and it goes back through the system.”

But middle America will only reap benefits, he and others believe, if the United States invests in its infrastructure—in this case, the aging locks and dams of the Mississippi River. The study also noted that benefits are only reaped if river port areas are dredged to the authorized depth of 45 feet and aging locks and dams properly maintained to prevent catastrophic failure—both sometimes limited by federal funding constraints.

More infrastructure attention needed in the U.S.

“One of our concerns in the industry is, will the river system be able to keep up or even stay operational with current maintenance and funding,” Campbell says.

The concern is shared by everyone from governors of Mississippi River states to leaders in Washington, D.C. Congress last year assigned the Corps of Engineers’ Institute for Water Resources to conduct a quick-turnaround study on what the country should do to prepare for the deep-draft, post-Panamax vessels that could soon be calling on the country’s perhaps too-shallow ports. While the Panama Canal currently limits ships to a draft of 39½ feet, the expansion brings the capacity to 50—deeper than the 45 feet to which the mouth of the Mississippi River is currently dredged. Will traffic move then to coastal ports—or to South American countries that are investing heavily in infrastructure?

Today, some 14,000 vessels use the canal each year, representing about five percent of all world trade. When the third set of locks is completed between Gatun Lake and the Caribbean, a single ship will have the capacity of hauling up to 12,000 containers of consumer goods at once, according to the Panama Canal Authority.

Who will reap the economic benefit—or how much benefit there will be—remains unclear, says Kevin Knight, an Institute for Water Resources economist who helped pen the report.

“One thing we don’t want people to think is that once they do the ribbon cutting and open the canal, all these ships will appear,” he said. “As they were building it, the economy slowed down so much that businesses will test the water for awhile, won’t use the larger ships until the economy is moving and

they’re sure they can fill up the boats and there’s enough demand.”

While there’s a lot of uncertainty in what will happen—something Knight says the report emphasizes “a lot”—they do conclude that our inland navigation system is aging, with less and less money being put toward maintenance of those locks. Resulting delays are already beginning to cost the country.

“The opportunity is presented more in the negative (in the report), of the dangers of not acting,” said Knight. “We may really miss out. Countries like Brazil and Columbia are investing in deepwater ports, and they also have coal and other resources. The Chinese are investing in Colombia and other countries in South America. We could lose big industries like coal and soybeans because other countries are jumping ahead of us. I took the report as a warning we have to act quicker.”

The U.S. builds a canal

Intense interest in the Panama Canal is not unusual for the United States. President Teddy Roosevelt was barely in office, the canal under construction by the French, when he declared before Congress: “No single great material work which remains to be undertaken on this continent is of such consequence to the American people.”

In 1902, the United States bought the canal property and equipment from the French for some \$40 million, and the U.S. War Department directed excavation—eventually overcoming yellow fever epidemics, bad press and inexperience with a project of that magnitude. Army engineers would oversee the work.

“The Corps used its standard engineering techniques on the Panama Canal, but increased by a scale of 10—or 100,” said John Lonquest, chief of the Corps’ D.C.-based Office of History. “There wasn’t anything new in the Panama Canal, though it was orders of magnitude larger than anything we’d done before.”

Even after the canal was complete and eventually turned back to Panama, U.S. engineer officers periodically helped in studies of other canal routes across Central America. In the 1960s, they were involved in studies on an alternate Panamanian route that would accommodate larger vessels.

Today, many states and private port operations are simply vying for a piece of the expansion pie. New Orleans has invested \$233 million in ports across the state, according to a recent statement by Gov. Bobby Jindal, who recently dedicated the \$36 million improvements in the container terminal at the Port of New Orleans. New larger cranes, for example, were designed to handle the



ABOVE: A barge makes a turn near New Orleans, en route to the Gulf of Mexico. More large ships are expected once the Panama Canal expansion is complete.

larger container ships plying the Gulf, ships expected to grow when the new set of canal locks open in 2014.

Iowa is working on a strategy to boost investment in river infrastructure as part of its agenda of creating 200,000 new jobs for Iowans. As part of that, Gov. Terry E. Branstad wants to increase exports by 20 percent.

“The expansion of the Panama Canal will have far-reaching impacts and will allow Iowa to more easily export products—including chemicals, corn, equipment and soybeans—to destinations around the world,” he said. “We look forward to continuing to work with the Mississippi River Basin stakeholders to ensure we capitalize on opportunities to reduce transportation costs of our exports.”

Much work is needed, at least according to testimony given recently at a hearing of the House Subcommittee on Water Resources and Environment. World trade is a logistics chain, said Mike Steenhoek, executive director of the Soy Transportation coalition. If one is strong and robust and the other links don’t match, you’re just shifting the bottlenecks form one part of the journey to the other.

The U.S. has a huge advantage in the Mississippi River, Maj. Gen. John Peabody, Commander of the Corps Mississippi Valley Division added. We have one of the world’s largest contiguous areas of farmland and mineral wealth next to the world’s longest inland navigation system, he pointed out. But we also have challenges with aging infrastructure.

“Our locks have an average age of 60 years,” he said. “They’ve performed well but many are showing obvious signs of wear and tear. Prior success has taught Americans to expect this infrastructure has always been and will always be there for us. But like everything built by men, it has limits.” —K.S.

Luck with Locks—and Army Doctors

Army Engineers key to initial Panama Canal construction success

In the early morning of May 4, 1904, a young lieutenant from the U.S. Army Corps of Engineers walked briskly into the old French Hotel in Panama City. He exchanged brief greetings with officials of the new French Panama Canal Company.

The French had been trying to build the canal since 1880. The new company, which had succeeded Ferdinand de Lesseps’ bankrupt enterprise in 1894, had been no more successful than its predecessor in the effort to build a canal across the Isthmus of Panama connecting the Pacific and Atlantic Oceans. Its workers ravaged by yellow fever, malaria and equipment in disrepair, the company was ready to sell all of its assets to the U.S. government for \$40 million. Following the directions of the U.S. Secretary of War, the lieutenant signed his name to the receipt: “Mark Brooke, 2nd Lieutenant, Corps of Engineers.” The long years the French had spent attempting to construct an isthmian canal were over. The American attempt was about to begin.

Building the Panama Canal required the assistance of the foremost engineers of the day. But two resigned after just a short time on the job, the first after several high-ranking officials succumbed to yellow fever. Frustrated by his inability to find a civilian willing to see the project through to completion, President Theodore Roosevelt turned to the U.S. Army Corps of Engineers for help.

RIGHT: The most taxing daily labor was the excavation of the Culebra Cut. Each day workers moved miles of construction track and filled the spoil trains that ran in and out of the Cut. Landslides often buried workers and equipment.



“We can’t build the canal with a new chief engineer every year,” he said. “Now I’m going to give it to the Army and to someone who can’t quit.” President Roosevelt requested the Panama Canal Commission appoint engineer officer Lieutenant Colonel George W. Goethals as Chief Engineer and commission chairman. Engineer officers Major William L. Sibert and Major David D. Gaillard, West Point graduates, also served on the commission.

In the 1880s, the French learned after several years of effort that a sea-level canal across Panama was impossible. Locks were absolutely necessary. Benefiting from French experience, the Americans decided on a canal using locks (something they’d perfected on the Great Lakes, though at dramatically smaller scale). So, they developed a plan to erect a monumental dam across the Chagres River, thereby creating Lake Gatun. At each end of the lake, the engineers constructed locks. The Gatun Locks lead to the Atlantic. The Pedro Miguel Locks lead to Miraflores Lake and, farther on, Miraflores Locks. From these locks, ships travel on to the Pacific.

Major Gaillard directed the huge engineering task of completing the Culebra Cut through the continental divide, which required the excavation of 96 million cubic yards of rock and dirt. Spectacular landslides at the cut were the greatest engineering difficulty. The amount of earth that had to be removed was nearly double the original estimate. More than 100 steam shovels removed most of the soil, and flat-cars hauled it out. Trains departed every 13 minutes to keep pace with the shovels.

Going beyond mere construction, the Army officers and in particular Col. William Gorgas helped eradicate disease and vastly improved sanitation in the areas adjoining the canal. He knew that 22,000 workers had died and one-third of the work force was sick at any given time during the French attempt to build the canal. He brought his experience with tropical medicine during military occupations like that of Cuba, screening patients and killing mosquitoes as if at war with the insects.

The Panama Canal opened ahead of schedule on August 15, 1914. The organization, administration and implementation of this massive building effort remain a model for subsequent large-scale construction projects today. —K.S.

SOURCE: THE U.S. ARMY CORPS OF ENGINEERS: A HISTORY, U.S. ARMY CORPS OF ENGINEERS, HEADQUARTERS, OFFICE OF HISTORY



Gator-Aid

Unusual management program is helping the American Alligator thrive

A MAN AIRBOATS into a Louisiana swamp then trudges quietly to a mounded nest of alligator eggs. Nearby, the mother postures fiercely to protect her brood. But this is no vandal or looter. He's one of the state's estimated 60 licensed Louisiana alligator ranchers who will place the eggs in an incubator then raise the alligator babies until they're large enough to survive in the wild. Each June through August Louisiana alligator ranchers collect wild eggs, paying landowners for the privilege. They tend the hatchlings until they're about four feet long, then return 12 percent back to the marshes. This is roughly the same percentage that would have survived, in ideal circumstances, if left on their own to fend off predators and tropical storms. The remaining adolescent alligators may be kept and sold for their hides or for their meat, which is popular in Cajun cuisine.

The wildlife management program is now considered a successful model, bringing alligators back from threatened to plentiful. It has helped to support landowners and ranchers as well as protect vanishing coastal wetlands, says Lance Campbell, biologist and manager with the Louisiana Alligator Management Program. Profit has proved a powerful motive for humans to protect the gator—and their rare and important marsh habitat.

"Eighty percent of our coastal marshes are privately owned. The only way we can effectively manage alligators is to do something that helps these private landowners," Campbell said. "It offers them financial gain, and it gives them an incentive to keep their wetlands wet."

Today there are more alligators in Louisiana than in any other state, an estimated 1.5 to 2 million in the wild, with another 400,000 on ranches. Florida has the next highest population at about 1 to 1.5 million.

Every summer an estimated 100 gators make their way into the Bonnet Carré Spillway, a Corps-run floodway that doubles as a large recreation area. Chris Brantley, spillway manager, biologist and one-time alligator researcher, says there are only a few conflicts between the dinosaur-like creatures and visitors. Nuisance animals small enough to transport are relocated within the spillway. Larger gators are targeted for harvest by state permittees during the month-long fall trapping season. And there's never been a death in Louisiana from an alligator bite.

What the smaller gators prefer to bite are things like crawfish, crabs and small fish, he says, though in the course of his research he's also found fishing lures, rocks and pieces of Styrofoam in their bellies. Larger gators prefer birds, turtles and mammals.

Gators face more risks from man and nature than we face from them, he and other experts say. The state's hunting season closed from 1962 to 1972 after unregulated harvests caused a massive population drop. The population at one time was down to five percent or less from today's numbers. The management program, implemented in the 1970s, brought about the comeback. Alligators are estimated to be a \$20-\$50 million industry, according to the Louisiana Department of Wildlife and Fisheries, which includes tourism, egg ranching and an annual wild harvest each fall.

Fascination with the creatures seems to have exploded even faster than the population—evident by a quick scan of the latest "Animal Planet" lineup, many starring the gator. Researchers, too, are fascinated that the alligator still thrives after 200 million years despite the extinction of its ancestor, the dinosaur. Based on alligators' demonstration of strong parental care, researchers believe dinosaurs may have behaved similarly, Brantley said.

It's also an iconic species. "When you think Louisiana, what do you think about?" said Campbell of the management program. "People think crawfish, alligators, swamp."

"I guess it's like how we're fascinated with grizzly bears in Montana or wolves in Alaska. But there's also something about an animal you can't see, that's underwater. It's mysterious." —K.S.

Gaze at some Gators
Play with baby alligators, even watch as one hatches in your hand, at Insta-Gator Ranch and Hatchery, the only state 'ranch' open to the public (INSTA-GATOR RANCH.COM). The albino alligator is just one draw to The Audubon Zoo in New Orleans (AUDUBON INSTITUTE.ORG), and you'll get Cajun culture with your gator sightings at Cajun Pride Swamp Tours (CAJUNPRIDESWAMPTOURS.COM) and Bayou Pierre Alligator Park (ALLIGATORPARK.NET). The park's alligator bites refer to a snack—not your experience.

GATOR FACTS

- Alligators were first harvested in the early 1800s; their skins were used to make shoes and saddles for Confederate troops during the Civil War.
- A translucent second eyelid covers the gator's eyes when it submerges, much like a diver's mask.
- Gator lifespan averages 70 years but they can live to 100.
- The name alligator comes from early Spanish explorers who called them "el legarto for "big lizard."
- A typical male can reach 13-14 feet long and can weigh more than 600 pounds.
- When its body temperature drops below 76 degrees, the cold-blooded alligator will stop eating. It burrows into a hole to wait out the winter.

MY MISSISSIPPI

Lynne Brach, 49, co-leader and chef for WomanTour's Meandering Mississippi 2,000-mile bike trip

"For 39 days this spring, my life was about being on a bicycle on various roads following the Mississippi. From all the museums and sites along the way, we really got a sense of the river and the ways it has fed us over the centuries, figuratively and literally. We went over so many locks and dams, took five ferry rides and crossed numerous bridges. In the south, our route was flat, but we suffered from the heat. Only when we got to Missouri and Iowa did it get hilly and more difficult. Coming into Hannibal was a challenging day for us!

"The Iowa bluffs were gorgeous. Bicycling with the river on one side and the bluffs on the other, and feeling blasts of frigid air from the old limestone mines was amazing. One moment I'll remember forever is biking into St. Louis, biking right to the Arch, such a symbol for Americans' westward journey. It was very emotional for many of us, in part because we felt we were halfway through our trip, and it was downhill from there—even though that didn't prove to be true. The aromas were interesting too, from the oil refineries in the south to a town in Minnesota where grain is loaded onto barges. It smelled like oatmeal!" —S.A.



Rebecca Gearhart

The Prairie Rivers Network, an Illinois-based advocate for clean water and healthy rivers, joined with the 1 Mississippi campaign to sponsor an essay contest centered on the Mississippi River and the theme "connection, inspiration and transportation." This winning essay was penned by Rebecca Gearhart, an anthropology professor at Illinois Wesleyan University who specializes in the music and dance performance traditions of East Africa but found much life inspiration in river traditions close to home.

MISSISSIPPI MEMORIES

BY REBECCA GEARHART

My Life in Anoka, Minnesota

The gentle way that the Mississippi River flowed past my childhood home did not change much during the 1970s and '80s when I lived there, and its presence was a source of stability when everything else seemed to move too fast.

The river figures prominently in my earliest memories, and "fofoo," the name I called it, was one of the first words in the unique vocabulary that I spoke. Having the river in my life was a privilege that I can honestly say my younger sister and I were aware of while growing up. This is because our parents consciously positioned our activities indoors and outdoors so that we could not only see the river but watch it. My mother's favorite place in the house was the bay window in our living room, where she perched each morning while she sipped her coffee. My father's morning spot was the hot tub he built on our deck overlooking the river, in which he read the daily paper—even in the winter.

When the weather was nice, my family gathered on the patio or on our porch, where the river was the backdrop to all of our serious conversations about school, work and the future. When it was a particularly beautiful evening we all went for a boat ride, which meant a floating

Though people say that youth is wasted on the young, we could not have fully tapped our romantic sense of adventure at any other time.

cocktail party for my parents and a chance to get out on the water for my sister and me, albeit at trolling-speed. From our position on the river, my parents critiqued new landscaping and other exterior improvement—or dislevelment, as the case may be—of our neighbors' places. We always spoke in hushed voices during these excursions; we knew from experience that water carries sound and the people sitting on their patios could hear us the same way we heard the critics who passed by our own house.

At least once a summer, we joined another family or two and organized a float-trip, which entailed inflating large inner tubes and rafts and driving 10 miles up the Rum River to a place near a bridge where we could leave our car parked for the day. We loaded a cooler of snacks, pop and beer into one of the rafts, and stopped at a sandy stretch of beach for lunch about half-way down the route. The Rum flows much slower than the Mississippi, and there were several places where we had to paddle to keep moving. Our flotilla picked up speed as we neared the confluence of the two rivers, the place that signifies "Anoka," or "where two rivers meet," in the Lakota Indian language.

When I was a teenager, the river played an even more significant role in my life, particularly in the summer. My girlfriends and I spent many Saturdays tanning in our boat and flirting with the guys who regularly sped by to show off their talents on water skis and boogie boards. If I had to pick a favorite combination of sensations, it would be the feel of a cotton towel against a warm vinyl seat; the combined smell of baby oil, river water and Fresca; the polyphony of Steve Perry and a distant Mercury engine; and the vision of sunlight dancing on the water. Though people say that youth is wasted on the young, we could not have fully tapped our romantic sense of adventure at any other time. We looked good in swimwear, our bodies were pliable enough to perform dazzling feats while hanging on to a ski rope, and our minds did not keep us from reckless stunts like barefoot skiing by moonlight.

Though I now live in the middle of Illinois and quite far from a natural body of water, I recall those sensations whenever I need to. Even if "living in the present" is the mantra of my generation, I often take time to close my eyes and remember the happiest moments of my past. I do this weekly at the end of my workout, when I belt out the words to REM's "Night Swimming" and imagine the scene from my old bedroom window. I see the huge oak trees and the carpet of green grass, the pitched roof of the boat house, the patch of orange tiger lilies, the large rock along the bank and the patterns of ripples on the water beyond. A group of ducks paddle by; I hear a fisherman cast a line just off shore. And now I'm running barefoot, though the yard and down the railway tie steps. I sit down on the edge of the dock and dip my feet in. The cool, brown water laps at my ankles and the warmth of the sunshine washes over me.

Whenever I return "home" for a visit, I try to sneak a peek at the stretch of the Mississippi River that meanders by my old house and the houses where many of my friends once lived. For those of us who grew up there, the river holds some of our favorite stories, and runs through our memories like the blood through our veins.

GATOR: SANDRA VORNSTEIN; GATOR ILLUSTRATION: DIANE KOLAK

Educators invited to inaugural "Our Mississippi" curriculum training—on river

The U.S. Army Corps of Engineers has teamed up with Living Lands and Waters to bring the group's floating classroom to several river towns for free teacher workshops on the newly-completed "Our Mississippi" river curriculum. It's just one of several hands-on ways in which the Corps is working to help educators most effectively use the content.



The floating classroom of Living Lands and Waters will be one of many training locations for teachers on a new "Our Mississippi" river curriculum.

The goal of the "Our Mississippi" guide is to help teachers inform future decision-makers about the importance of the Mississippi River and its key tributaries. The guide follows a multi-disciplinary approach mixing science, technology and math with social science, language and arts to help educators introduce the river's complex resource management issues.

Living Lands and Waters Workshops are still open in La Crosse, Wisc. (JULY 23), Dubuque, Iowa (JULY 30), Davenport, Iowa (AUG. 6-7), St. Louis, Mo. (SEP. 17) and Channahon, Ill. (OCT. 12). More than 40 facilitators completed training in the spring and will be bringing workshops to a river town near you.

Each participating educator will receive a free copy of the "Our Mississippi" educator's guide, specially aligned to state and national standards. The curriculum guide covers the river watershed, ecosystem, history and culture, navigation connection and many uses as a shared resource. Each lesson includes suggested hands-on activities. Through this unique set of training sessions educators will witness the varied dynamics of the river systems firsthand onboard Living Lands and Waters work boats, which have been instrumental in river clean-ups spearheaded by organization president Chad Pregracke. Since its founding in 1998 in East Moline, Ill., the group has removed more than seven million pounds of debris from America's rivers with the help of 60,000 volunteers.

Special opportunity for students

High school students can come aboard the floating classroom for additional free workshops that forge real-world connections to the curriculum. The classroom ship will make several stops in river towns this fall, starting with an Aug. 20-31 stop in the Twin Cities, to teach the value of clean water, waste reduction and recycling. Instructors will also cater a portion of the workshop to match individual teachers' specific curriculum needs.

See livinglandsandwater.org for the complete schedule (some dates filled) of educator and student workshops, or call Jaymie Schudt, 309-236-6279.

For a peek at the educator curriculum, go to OurMississippi.org and click on the Education and Outreach link. —K.S.

Search for "Our Mississippi" on Facebook and like our page for the latest on teacher training workshops.



Cutter Dredge



Hopper Dredge



Dustpan Dredge



Capt. Ed Morehouse

Dredges keep aquatic superhighway safe

CAPTAIN ED MOREHOUSE likens his job to steering a giant Hoover down the middle of the Mississippi River. But instead of vacuuming up the dust, he's sucking channel bottom slurry—all to clear a navigable path for ships hauling grain and other commodities to and from export markets around the world.

"It's like a wet vac that sucks whatever's in its way and uses the flow of water as an inductor," he explained.

Morehouse captains the largest hopper dredge owned by the U.S. Army Corps of Engineers, the New Orleans District's dredge Wheeler. Like a dump truck, a hopper holds dredge material in its hull until filled, then carries the load to a remote disposal site. Dustpan dredges similarly "vacuum" up a mixture but use a pipe to move it out of the main channel toward the sides. Cutterhead suction dredges like the St. Paul District's Goetz are the most versatile since they can pump dredged materials a longer distance.

Last year, the six districts within the Mississippi Valley Division moved 93 million cubic yards of sediment with its various dredge types. That's 41 percent of all sediment moved by the Corps nationwide, says Steve Jones, the division's navigation manager. That's not surprising given the hydraulics of a river versus a coastal system, he said. The Mississippi is occasionally nicknamed "Big Muddy" for a reason—the millions of fine suspended grains of sediment.

Engineering projects to create a navigable depth have for the most part done their job, keeping 98 percent of the river as deep as intended, Jones said. When the velocity or energy falls, sediment drops and shoals or sandbars develop.

On the Mississippi, the Corps does both deep-draft and shallow-draft dredging. From New Orleans to the Gulf of Mexico, deep-draft generally means 45 feet, able to accommodate deep ocean-going tankers. "Shallow" refers to the nine-foot navigation depth maintained north of Baton Rouge. Survey boats routinely check for trouble spots, and dredges are dispatched to keep vessels from running aground. A hopper can move 8,000 cubic yards of slurry at a time—equal to 700 dump trucks full.

Dredged material is increasingly being used for environmental restoration projects. In the Delta National Wildlife Refuge, the Corps has used dredge material to create 1,600 acres of new marsh at just one site. In St. Louis, islands have been created as nesting grounds for endangered birds. Further north to Rock Island and St. Paul, dredge material is used for island creation, shoreline protection and is stockpiled for public use, sometimes even used by road crews to sand icy streets, Jones says.

In other areas of the Gulf and the East and West Coasts, dredging operations use deflection devices to protect endangered sea life such as sea turtles and sturgeon.

Captaining a vessel or being the one making the tough calls on where to dredge isn't always easy. Federal funding dictates whether or not authorized depths can always be maintained, and the Mississippi River is never predictable.

"Mankind has been trying to control the river for generations, and it still pretty much does what it wants," Capt. Morehouse says. "It's fascinating to see how it adapts, deposits material and flows. All I can say is, 'Never underestimate it.'" —K.S.

FROM THE PROJECT MANAGER

Lance Engle

Dredging Project Manager,
St. Louis District,
U.S. Army Corps of Engineers

Talk a bit about the dredging program you oversee. How big is the area, and how many dredge boats do you operate?

Within the St. Louis District we perform dredging on 300 miles of the Mississippi River, from Cairo up to just below Lock 22 near Hannibal, Mo. We have 80 miles of the Illinois River and 36 miles of the Kaskaskia. We also have a small harbor project just below Cape Girardeau, Mo. On the main stem Mississippi River, we use the dustpan dredge Potter. For other projects, we use our contract cutterhead dredge America.

How do you decide what type of dredge to use?

Dustpan dredges are very efficient on the main stem of the Mississippi River. They can move easily in and out of traffic and were specifically designed to move the sand that's in the Mississippi River. Cutterhead dredges are better suited for harbors or smaller river systems where you might need to do more selective placement with dredge material to avoid mussel beds or other threatened species. My main concern is mussel beds. You can't bury them.

What do you do with the dredge material?

Most of our dredge material within the St. Louis District is outside the channel toward the shoreline. We have purchased flexible pipeline to allow us to use the material to create islands. We did a demonstration last year on the open river, and we hope to do more to create habitat for the least tern, which is a bird that likes to nest on exposed sand bars that are disconnected from the shore. Their concern is other predatory birds. They don't like to have trees on their island, so the island height is critical. Too high, and you might grow trees, and too low, the island may not be available due to river levels.

How do you identify spots you need to dredge?

Our least preferred method is waiting for a towboat to go aground. To prevent that from happening, we have the MV *Pathfinder*, a 1,200-horsepower towboat that has a buoy barge and sounders that let us know if an area is getting too shallow. If a buoy needs to be moved to prevent a grounding, it can do that as well. We also use contract surveyors available and currently are ramping up surveying efforts because the river looks like it'll start falling this summer. We're forecasting a drought situation, so we could have to do more dredging than usual, especially between St. Louis and Cairo, which is an open free-flowing river system.

Your dredge Potter has the honor of being the oldest piece of property owned by the U.S. Army. Is that a blessing or a curse?

Built in 1932, it was originally steam powered. From October 1999 to October 2001, we converted it from steam power to diesel electric to make it a more modern dredge. When I first saw it in 1999, it was still steam-powered and quite amazing. I'd never seen anything like it, all dials and levers. The pilot talked into a sounding tube that went to the engine room, and the engine room controlled how fast the engines were going.

What qualities does a dredging manager need?

I think you have to have a thick skin and remain calm. You're generally not making everybody happy. We are maintaining a water highway for those towboats that go up and down the river. We do the best we can to keep the channel open, but there are challenges. It is a dynamic and changing river system.

Sometimes you get surprised, too. Your dredge once uncovered a mastodon skull. Is that the strangest find?

On the Ohio River, we once found an unexploded cannonball. It got everybody excited. In the dustpan of the dredge, where water first enters the pipeline, there's a trash rack to prevent any large objects from entering the pump. That's where we found the cannonball. I'm not sure who volunteered to actually pick it up. Fortunately, we have unexploded ordinance experts in the District, and they were able to safely take it off the dredge. —K.S.

NOT WANTED, DEAD OR ALIVE

IF AN ASIAN CARP has accidentally vaulted onto the deck of your recreational boat or barge as you head up the Illinois River toward Lake Michigan, don't kick it overboard—even if it's dead. That's the newest request from the U.S. Army Corps of Engineers, which implemented a special protocol in early June at the Dresden Island and Brandon Road Lock and Dams.

Boat captains are asked to bag fish, dead or alive, and turn them over to lock personnel. The goal is both to further halt the spread of live fish across electric barriers and to prevent dead fish from skewing the results of tests designed to detect the presence of live ones.

The new protocol is being implemented as scientists study how to perfect the science and accuracy of eDNA sampling. The term eDNA or environmental DNA refers to a genetic marker unique to a species that is extracted from water samples. In this case, scientists aim to detect the presence of invasive bighead and silver carp. The fish escaped from southern sewage lagoons and fish farms decades ago and have infested parts of the Mississippi and its tributaries. The goal of a massive federal effort is to prevent the further spread of Asian carp into Lake Michigan, with new concerns also focused on the prize fisheries of the Upper Mississippi.

So far, eDNA samples have been found north of an electric barrier system designed to halt the march of carp up the Illinois River and potentially into Lake Michigan. But what does that mean exactly? That's what the so-called eDNA Calibration Study is seeking to find out.

"The Monitoring and Rapid Response Work Group views eDNA positive results conservatively, like they may represent the physical presence of a bighead or silver carp, even though we don't yet know if the DNA is from a live fish or fish at all," said Kelly Baerwaldt, Program Manager for the Asian carp Regional Coordinating Committee's eDNA program. "All DNA results are considered equal—and according to our Monitoring and Rapid Response Plan, they serve as a trigger for some kind of response. Response events can range from more survey boats conducting electrofishing or netting and doing a full-scale rotenone event—that's a chemical we put in the water that kills all the fish."

Because responses are so extreme and yet necessary, resource managers want to be more confident about what a positive eDNA finding actually signifies, Baerwaldt says. A positive sample could be detecting the presence of one or several live carp. But what if the DNA source is from a carp that was digested and discarded, even years ago, by a pelican that enjoyed one for lunch?

To view sampling results at the Corps' ERDC laboratory, go to: lrc.usace.army.mil/AsianCarp/eDNA.htm. For general study info: asiancarp.us/ecals.htm.

Seven laboratories around the country, including the USACE Engineer Research and Development Center, are participating in some aspect of the study. One project that researchers are repeating focuses on Chicago storm drains. Last summer, a research team tested the hypothesis that fishmongers legally selling Asian carp as a prepared delicacy in Chinatown might be contributing to positive results. They tested to see if the ice, used to keep the carp fresh, contained eDNA and tracked the disposal of it into storm drains that lead to the Chicago River.

Last November and again this month, federal scientists from the U.S. Geological Survey, U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers sampled for eDNA in Chicago storm sewers, flushed them out, and then tried an experiment. They put small pieces of filleted Asian carp on ice, dumped the ice into storm sewers and repeated the test—one way to see if eDNA findings always detect the presence of live Asian carp or could on occasion be picking up the DNA of a fish being prepared for a Chinatown lunch.

Last November, eDNA samples were detectable both before and after the experiment. This summer's repeat is designed to better pinpoint the exact eDNA source.

Other projects are targeting the potential spread of Asian carp DNA via the many fish-eating birds found frequently around the electric barrier, in particular pelicans, eagles and cormorant rookeries. One test, undertaken at the Brookfield Zoo, involves feeding Asian carp to pelicans and then testing for eDNA in their regurgitation and excrement. Research has determined, Baerwaldt said, that in penguins DNA does survive digestion.

The carp study is not expected to remove all uncertainty surrounding eDNA, but researchers hope it will at least move the science forward. Although it has been used for years in forensic crime scene investigations, Baerwaldt says, studying DNA in water involves many unknowns, including how far it carries and how quickly it degrades. She hopes the study will improve sampling efficiency and has already reduced processing time by two days, decreasing the cost by \$4,000 per batch of 120 samples. The study may also help managers better assess the source of collected eDNA—whether it is from a live fish, for example, or one that was once a pelican's lunch. —K.S.



Scientists dump ice mixed with small pieces of Asian carp fillets into a Chicago storm sewer as part of an eDNA experiment.

Mayors unite to form influential river voice

There's trouble in river cities. But it may be nothing that a coalition of Mississippi River mayors can't solve.

A new group is combining the political muster of the mayors of as many as 124 main stem river cities and towns to bring attention to the challenges and needs of America's greatest river.

"Mayor is one of the hardest jobs in the United States," says Colin Wellenkamp, who directs the initiative through a Walton Family Foundation Grant and the Washington, D.C.-based Northeast-Midwest Institute. "Wherever there is a pothole or a light out, the mayor is the one who gets the call. You have to approach things very practically and very efficiently, and that's what the river needs."

There's been a benign neglect of the waterway over the last decade or so, as national attention seems to have shifted more to the Great Lakes, the Gulf and the Everglades, he says. Issues relating to clean water, floodplain development, jobs, recreation and even river history and culture are expected to be part of a formal river priority agenda that will be developed this year. The effort culminates with a public release on Capitol Hill next spring.

While it's tough for a single mayor to get the attention of federal stakeholders, Wellenkamp says, an assembly of 15 or 30 or 50 is harder to ignore. The river's issues should command attention, member mayors say.

"Today I can watch 60 percent of all grain exported from the United States pass right by my office in City Hall on its way to markets around the world," says Mayor Kip Holden of Baton Rouge, La. "Our city depends on a healthy river, as do all of the cities, towns and villages along the 2,350 miles that the Mississippi River meanders

through in the heart of America. More than 50 cities depend on it for their daily supply of clean drinking water, and our nation depends on it for jobs. We must find ways to keep all of these activities sustainable and make sure the river works for all of us."

More than three million people live in the 124 Mississippi River cities and towns, spread across 10 states. Wellenkamp believes their common interest in waterfront development, green infrastructure, clean drinking water, working ports and smart floodplain management helps overcome the diversity of history, politics and culture that has often hindered efforts in the past. Integration of transportation, farming, industrial, municipal and environmental interests is the plan, to launch lasting river management solutions.

Mayors have a vested interest in bringing a new focus to river needs and solutions, says Mayor Dave Hemmer of Prairie du Chien, Wis. They'll hold their first meeting Sept. 12-14 in St. Louis, Mo.

"If we look at our city as a corporate body, the most valuable stock we have is the ecological stock of the waterway," he says. "Sport fishing along the Mississippi brings in over \$100 million a year. That's economic development worth investing in. That's why our waterfront development plan calls for highlighting the natural beauty and draw of our frontage. Making the natural beauty of the Mississippi a priority for all 2,500 miles is something mayors can take to the national level." Questions? Contact Wellenkamp at cwellenkamp@nemw.org. —K.S.



Mayor Dave Hemmer or Prairie Du Chien, Wis. (LEFT) and Mayor Kip Holden of Baton Rouge, La.



Documenting more than a century of change, one frame at a time

How have 130 years changed the Mississippi's landscape?

A ST. PAUL PHOTOGRAPHER has launched an intriguing project to answer that question by re-shooting a Twain-era river album by 19th century photographer Henry Bosse.

Photographer Christopher Faust is photographing the same spots, from the same angles, but getting sometimes very different results.

Bosse captured the early taming of the Mississippi River. He was fascinated by the creation of new locks and wing dams that would make the river safer for steamboats. The Army Corps cartographer and draughtsman shot photographs of natural river landmarks, of boats caught in snags and of railroad bridges under construction. He did so after positioning colleagues on bluffs, gazing at a river bank or otherwise appearing as specks amid the river's vastness. The results were so powerful that the auction house Sotheby's recently valued one album of his blue-tinted cyanotypes at \$4.5 million, marking them as some of the most valuable photographs of all time.

Photographer Faust is setting out to document today's river landscape by re-shooting that long-forgotten album, discovered by a Corps historian in the pilot house of a working dredge.

Bosse shot the large, oval blue photos at low exposures, with an oversized 11-by-14 camera that he would lug up and down the river to document the Corps' work in the Upper Mississippi from 1883 to 1891. That and his other albums, one owned by the Mayo Clinic and still another by the Corps' Rock Island District, also recorded the river's transformation from the wild frontier to a busy commercial highway.

More than a century later, Faust is uniquely qualified to take on the massive re-shooting task. Best known for his panoramas that show how landscapes evolve over time, he was hired by the St. Paul District to digitize the album discovered in the dredge. The district's goal was to better preserve and to share the photos kept locked in a local bank vault.

While closely examining the images, Faust says, he saw value in the way the stunning shots captured the river at a distinct moment in time. Recreating them now—and through another photographer, perhaps, another 100 years from now—could show how humans affect a landscape over time.

"I thought, 'These are spaces that can be identified. Let's go back and re-do it,'" he recalls. "I've found it's not quite that clear. Rising water hasn't just changed the shoreline; it has inundated certain things that were there. There were locks on the Des Moines River. I can't find them. There's Mechanic's Rock. I don't know where the heck it is."

Bosse himself is providing some help via levation maps he drew more than a century ago. Faust's friends are also offering boat rides to reach the most difficult shooting locations. Faust considered posing people in shots the way Bosse did but decided against it. The landscapes aren't as romantic today as they were when Bosse memorialized them in shots Faust calls "Rembrant-ian" in their effect. That doesn't mean some aren't still beautiful. One spot called Reeds Landing, shot from a bluff atop where the Chippewa River meets the Mississippi, is basically unchanged, Faust says, unless the Corps Dredge Goetz happens to be there clearing a path for modern barge traffic.

What does he expect his project might in the end show?

He responds: "Nature will take care of itself just fine, no matter what we do. Nature will provide. It will come back and do whatever it needs to do." —K.S.



TOP: Henry Bosse shot the photo at left in 1890, looking back at Red Wing toward what's called Barn Bluff, Christopher Faust from the same vantage point in 2012. ABOVE: A similar then-and-now shot of Franklin Bridge, looking upriver toward St. Anthony Falls.

Who's Bosse?

Henry Bosse began his career with the U.S. Army Corps of Engineers in 1874 and at the time of his death in 1903 was the Rock Island District's chief draughtsman. He was one of many employed to create maps, navigational charts and plans for harbor, levee and channel improvements. In 1883, he started a photographic record to supplement his maps.

The thought that he'd spin a photographic record of channel improvements into art is best explained by his early upbringing, believes John Anfinson, a U.S. Park Service historian who discovered the St. Paul album when he worked for the Corps.

Bosse was born in Prussia on the estate of his grandfather, a German general often credited for leading Prussian troops to defeat Napoleon at the Battle of Waterloo. At his grandfather's estate, he studied both engineering and art before immigrating to the United States at age 21.

Anfinson has given more than 40 public lectures on the photographer, fascinated both by the history he captured and his meteoric rise to fame as one of the best 19th-century American photographers. A Getty book portrayed him as one of 38 photographers of genius, Anfinson notes, due in part to the clear geometry in his images. One of his great gifts to history is that he captured most every community along the river, just as the frontier towns were starting to develop.

Anfinson says: "He captures this transition from steamboats to railroads and he shows you this transition from a natural river to one the Corps is increasingly managing through channel construction work. The photos are not static images. They're an essay of transformation of the Upper Mississippi Valley at the end of the 19th century." —K.S.

Stumble upon an artifact? Look, but don't touch.

BY SARAH KOEPEL

The Mississippi Valley has a long, rich cultural history. From the great prehistoric mound builders and vast American Indian trade networks to the Spanish and French explorers and missions, steamboat driven commerce, fighting Ironclads of the Civil War, and population expansion westward, people have thrived along the river for thousands of years.

Evidence still exists of prehistoric residents when mounds, projectile points, arrowheads and pottery are observed. Pieces of whiteware ceramics, bottle glass, brick and metal may indicate a historic farmstead once presided. Remnants of the Civil War are visible in trenches and embankments or in the occasional bullet, cannon ball, or button. Steamboat and other watercraft wrecks are scattered along the banks. And thousands of undisturbed cemeteries and burial sites overlook the River and its tributaries.

With all of this great history around, it is no wonder the Corps receives so many visitors each year on its 33 lakes within the Mississippi Valley Division. Within the division, the Corps operates 9,526 camp sites, 44 recreation areas, 278 boat ramps and 14 visitor centers.

An estimated 50 million visitors enjoy Corps recreation sites in the Mississippi Valley each year. The Corps encourages the public to visit all our interpretive centers to learn about local history. Each district has several archaeologists and historians who love to talk about their favorite subject: the past. They are available to talk to school groups, professional associations and other groups about a variety of topics and time periods.

But we ask that while enjoying our natural resources you remember to respect our shared cultural resources and heritage. Once an artifact has been removed, the information it could provide has been lost. If you are interested in what you have discovered, please take a picture, draw your location on a map and send that information to us. No artifacts should be removed from any federal lands. States also have antiquities laws that require permits to remove human remains from non-federal property and misdemeanor penalties for removing artifacts from state, county or city property.

Should you encounter any human remains, we ask that they not be disturbed. Contacting your local law enforcement officials and Corps District as soon as

possible will ensure these items are handled with respect and care and in accordance to the law. Federally-recognized Tribes ascribe great importance to the areas of their ancestors, especially those containing human remains.

If you enjoy metal detecting, please keep in mind that several laws prevent the damage, theft, removal and/or transportation of any item from federal lands. Additional historic preservation laws are in place to further protect historic properties, sacred sites and traditional cultural properties. Penalties for violating these laws can be stiff and may include fines, seizure of equipment used and imprisonment. When in doubt, contact your local Corps District or the Mississippi Valley Division, who can direct you to the right individual.

The word Mississippi, as perceived by the French, comes from the Algonquian word for "Great River," Misi-zibi. The natural and cultural resources present within the River Valley attest to that greatness. And the Corps takes pride in assuring that this greatness continues.

Sarah Koepfel has served as the Vicksburg District Regulatory and Operations Archaeologist since 2009. She enjoys speaking to groups about the prehistory of the United States, teaching children about the importance of protecting and preserving our cultural heritage and ensuring compliance to historic preservation laws in her role as a public servant. She can be reached at Sarah.Y.Koepfel@usace.army.mil.

DID YOU KNOW?

The U.S. Army Corps of Engineers considers potential effects to cultural resources prior to any engineering, dredging or other work. Corps archaeologists and historians work with state historic preservation offices, federally-recognized tribes and federal and state agencies and the public to comply with preservation laws and Corps regulations.

MY MISSISSIPPI

Garrett Gnade, 36, general contractor, Rapid City, Ill.



"Last summer, friends and I were on Ladybird Lake in Austin, Texas, renting paddleboards, and I said, 'Hey, we oughtta paddleboard a river in Texas!' But because of the drought the rivers were pretty much rock beds. Then I thought, 'I just finished a job and have some cash saved. What do you say we do the biggest river in America?'"

"Only one guy actually agreed to do it with me. My dad dropped us off at Lake Itasca, Minn., at the source of the Mississippi River on Aug. 28 last year. It's this tiny stream.

"I had 85 pounds of gear on the nose of my board. We were way overloaded, not really prepared, didn't plan it out like we should have, yet decided to continue on. We were in paddle shorts and barefoot when we landed in the Quad Cities and met Chad Pegracke, who's famous for cleaning up the river. He bought us wet suits. We figured we'd be way further south by winter, but we had weeks and weeks when the high temperature was 19 or 20 degrees, where we kept ourselves warm with campfires. My friend, having health issues and struggling to keep up, only made it 800 miles and he was done.

"It took me nine months, but I did make it all the way, 2,552 miles to the Gulf of Mexico. I actually paddled 2,800 miles altogether, exploring different bayous and stopping in all kinds of cool towns and taking time to explore. I tried not to pass up any points of interest, everything from the grave of Norma Jean, the elephant, in Oquawka, Ill., to the world's largest six-pack, which is in LaCrosse, Wis., and holds 500,000 gallons of beer.

"It's really cool how every town has its own river lore. I can't tell you how many times I went through the strongest current on the Mississippi, or the only place the river goes east and west, or the only spot it goes north. Everybody is proud of their section of the Mississippi. I

never told anybody they might be wrong. I kinda knew the facts but said, 'You know, you're right! This is the greatest part!'"

"I met the greatest people, too. I hung out with everybody from bums to bankers. Everybody had something to offer, even poor people fishing along the river. I ate lots of fish the whole way down, mostly given to us by generous fishermen, eager to share their catch of the day. That was a nice option for protein, as opposed to canned tuna or peanut butter.

"And once I got into Louisiana, I started meeting lots of barge captains and pilots and developed a huge fan base! I had barges stop in the middle of the river and wave me over so they could give me cold drinks, food and cash. The Coast Guard wanted to shut me down in Baton Rouge because my vessel was too small and didn't have a motor, but a lot of the barge pilots heard the radio talk and yielded me the right of way.

"The Mississippi's a learning river. It starts out three feet wide and ends up a mile wide. It slowly builds in volume, speed and power, and your skills build with it. And you learn the current. Ever since the internal combustion engine, navigating a river has become a forgotten art. I can look at the river and see where it's rough, where it's calm, where it's deep, where it's shallow, where I need to be. I can tell all this now, just by looking at that river. My eyes and my ears were my greatest assets, because I could tell obstacles were coming up by listening for turbulence.

"I'm much more relaxed now, about everything. I learned you can't always be in control. To be able to complete a task everybody says is impossible really builds your self-esteem. You learn that anything is possible if you bear down and stick with it.

"My next adventure: paddleboarding from the Mississippi to Key West, Fla., sticking close to shore. I'm going to paint big eyeballs on the bottom of my board to keep the sharks away." —S.A.



MY MISSISSIPPI

Kids' Voices

Josie Manar, 11
 "I like the Mississippi River because so many birds come by the Mississippi River, and I like seeing them. The most unusual thing I spotted on the river is a baby eagle. I have never seen one before. If I could take a trip to the Mississippi I would take a boat because I would like to see all the fish jump out of the water and all the birds."

Travis Hilligoss, 10
 "I like to kayak on the Mississippi because me and my mom have fun kayaking. My mom and dad work on the Mississippi. My dad works on towboats and my mom is a park ranger. [My first connection to the river was when] I took a ferry ride near the landing in St. Louis. I wondered how it floated. [And the most unusual thing I saw] was a big chunk of Styrofoam that had plants growing out of it."

OUR MISSISSIPPI KIDS Bird Match!

Catching a glimpse of a wild animal or bird is even more exciting when you see a whole bunch at once—a group, a flock, a bevy. Also fun is impressing your friends by knowing some of the quirky names for animals not traveling solo. "Did you see that storytelling of ravens?" you might ask, or that "mob of emus?" Test your knowledge by matching these collective nouns with the bird, as illustrated by winners of the "Bonkers for Birds" contest at the National Great Rivers Museum in Alton, Ill.

Circle the collective noun and draw a line to the bird it represents in a group. (Answers at right.)



Canvasback Ducks
by Kennedy Ruyle



Trumpeter Swan
by Lydia Lansaw



Horned Lark
by Courtney Conrad



Eurasian Tree Sparrow
by Lizzie Fields



Ruby-throated Hummingbird
by Kennedy Carter

Flight

Brace, Raft, or Paddling

Charm

Sord

Herd or Bevy

Aerie

Hedge

Ascension

Parliament

Host



Green Heron
by Mackenzie Hutchinson



Mallard
by Kaleigh Becoat



Barn Swallow
by Cara Foster



Barred Owl
by Leigh Ann Nottke



Bald Eagle
by Manuela Barrera

ANSWERS: Brace, Raft, or Paddling of Ducks; Herd or Bevy of Swans; Ascension of Larks; Host of Sparrows; Charm of Hummingbirds; Hedge of Herons; Sord of Mallards; Flight of Swallows; Parliament of Owls; Aerie of Eagles.

GO ON A Wildlife Watch



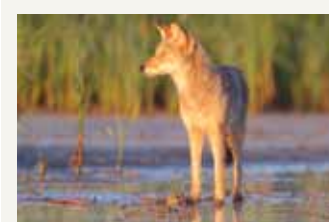
Where should you look? Check out the map and viewing tips at watchablewildlife.org

Take a stroll at Crosby Farm Park near downtown St. Paul, and you'll likely be accompanied by deer, raccoon and other inhabitants of its woods, marsh and river environment.

The Bald Eagle Center on the river in Wabasha, Minn., nearly guarantees sighting of the impressive bird from its observation deck jutting out toward the river. Further south, the confluence of the Missouri River with the Mississippi at Jones Confluence Point State Park is a natural landmark for viewing migrating waterfowl; nearly 40 percent migrate along the Mississippi. Also nearby is the new Audubon Center at Riverlands, just north of St. Louis, at the Corps' 3,700-acre restored prairie marsh and forested Migratory Bird Sanctuary.

While birds offer the widest variety of possible sightings, mammals, reptiles and amphibians also can be observed all along the river and its adjacent lowlands. Whitetail deer, raccoon, beaver and river otter are the most common creatures. Wildlife viewing at Meeman-Shelby Forest State Park in Millington, Tenn., might even win you a glimpse of a bobcat.

Black bear and alligators top the celebrity "A list" in Louisiana's Red River State Wildlife Management Area. As in several prime viewing areas along the upper portions of the river, the bayou country wildlife is best viewed by watercraft. Viewing for many bird species is best during the overwintering period when wading birds and waterfowl by the thousands populate this habitat.



Gaze at **Danny Brown's** portfolio of wildlife images, and it seems he must use sorcery to capture a pelican only half done with an Asian carp lunch, or a fox hungrily eying a baby woodchuck, or two great egrets dancing in the sky. The truth, however, is far less mysterious. Here, the Missouri-based nature photographer shares some tips for capturing shots suitable for framing.

1. Be a student of animal behavior. It's good to know what time of year a given animal leaves the nest with its babies or when they're collecting food for their winter cache, Brown says, tips he finds in the Missouri Department of Conservation's \$7 natural events calendar (mdcnaatureshop.com).
2. Rise early enough that you'll be in position to shoot when the sun comes up. Then blend in. "I make sure I'm in the woods, swamp or mudflat before the animals get active," he said. "Then I keep a camouflaged cover. I plan ahead, then I wait for the animal to swim or walk by."
3. Shoot a critter from eye level, not from above. Kayaks and low beach chairs are good perches.
4. Enlist others' eyes in your quest. Brown's "cooperators" give him a heads up when a barred owl is nesting outside their kitchen windows, for example, or if a fox just had babies down the road. If you're traveling someplace new, check with park staff, he suggests. Don't just ask where you'll find pretty scenery; ask what's been seen on which trails lately. Then head off with a lens and tripod you can tote easily.
5. Invest in the best SLR camera you can afford. A telephoto lens of at least 300 mm is necessary, he says, to keep images sharp. Then keep the ISO at around 200 for rich, buttery images.
6. Expect the unexpected. Even if you've set out to photograph ducks, be ready to shift focus to pelicans, for example. That's what

Brown did when some pelicans started herding Asian carp in front of his eyes, fish so big they ended up hanging out of their predators' bills. The same day, an otter jumped out of the river onto a rocky point, almost landing in Brown's lap. "He let out a blow and then did a back flip into the water." —K.S.

Find Brown's portfolio at dannybrownphotography.com. Subscribe to his Nature Frames blog for a regular behind-the-scenes look at how he got his shots.



PHOTOS: DANNY BROWN.



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

Summer of Paddling: St. Louis Adventure (the Lewis and Clark way). Aug. 17 (youth day) and 18 (all ages). Free. Pre-register at NationalGreatRiversMuseum.org. 618-462-6979.

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NEWS BRIEFS

Online guide shares tips to paddling the Lower Mississippi



The first paddling guide to the Lower Mississippi River went online June 1 full of insights about the 1,100 miles of river between St. Louis and the Gulf of Mexico.

Called River-Gator, the guide capitalizes on the wisdom of long-time river guide John Ruskey, who has paddled, photographed and documented islands and channels of these stretches since 1982. It was funded in part by a grant from the Walton Family Foundation, which Ruskey says focuses on “conservation-omics” for a sustainable environment and economy.

The owner of Quapaw Canoe Company says he hopes the guide will dispel myths about the lower river, though he also shares secrets for safe paddling on the often confusing and mysterious waterway.

The guide focuses on 100-mile sections, with more gradually added until the guide is complete. Already published are several stretches, including “Muddy Water Wilderness,” the colloquial name for a stretch between the Quapaw Landings, down the Arkansas to Vicksburg, Miss.

“Here there are more bears than humans,” Ruskey writes. “There is little evidence of civilization. The paddler enjoys wild open places, deep forests, hidden back channels, rich wildlife and spectacular camping throughout.”

FIND THE GUIDE AND ITS STRIKING PHOTOGRAPHS AT RIVERGATOR.ORG.

New web site focuses on river management

It takes everyone at the table to come up with solutions that speak to our diverse interests, as well as the most common one—the long-term health of freshwater systems. In this spirit, The Nature Conservancy’s Great Rivers Partnership recently launched a web site to feature the different ways that partners such as the U.S. Army Corps of Engineers are collaborating to protect and restore the Mississippi River and other rivers globally. The Great Rivers Partnership brings together scientists and academics with business leaders, agencies and others to work toward sustainable management of large rivers. The site will also serve as a space for partners to exchange science and industry information that can be applied worldwide.

FOR MORE: VISIT GREATRIVERSPARTNERSHIP.ORG.

Regional trails get federal designation

Some 54 trails, five of them managed by the U.S. Army Corps of Engineers, were recently designated as “national recreation trails” by the U.S. Department of the Interior. They join some 1,150 previously designated trails, encompassing some 13,650 miles, all so-designated for the way they link communities to public lands and local parks. Two of the new national Corps trails are in the Mississippi River Watershed. The Carlyle Lake (Carlyle, Ill.) Multi-Use Trail is a 10-mile multi-use trail connecting the city of Carlyle to Carlyle Lake in a partnership between the city and the Corps. It passes through numerous recreation areas, a diverse and scenic habitat and includes a dam and historic suspension bridge. The other, Veterans Trail at Coralville Lake in Iowa City, Iowa, is a quarter-mile, barrier-free trail that meanders among mature oak, hickory and maple trees and includes memorials and monuments honoring Johnson County veterans from Civil War to present.

Questions or comments:

U.S.A.C.E. REGIONAL OUTREACH SPECIALISTS

- Kevin Bluhm, St. Paul, 651-290-5247
- Angela Freyermuth, Rock Island, 309-794-5341
- Hilary Markin, Rock Island, 309-794-5730
- Laurie Farmer, St. Louis, 314-331-8479
- Kimberly Rea, West Alton, 636-899-0050
- Bret Walters, Memphis, 901-544-0777
- Gloria Piazza, Vicksburg, 601-631-7691
- Ben Robinson, Vicksburg, 601-631-5682
- Rachel Rodi, New Orleans, 504-862-2587

Mailing list changes:

Marsha Dolan, Marsha.G.Dolan@usace.army.mil

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Contributors this issue:

EDITOR/LEAD WRITER

Kim Schneider

DESIGNER

Diane Kolak

CONTRIBUTING WRITERS

Susan Ager

Rebecca Gearhart

Sarah Koeppel

Tom Watson

