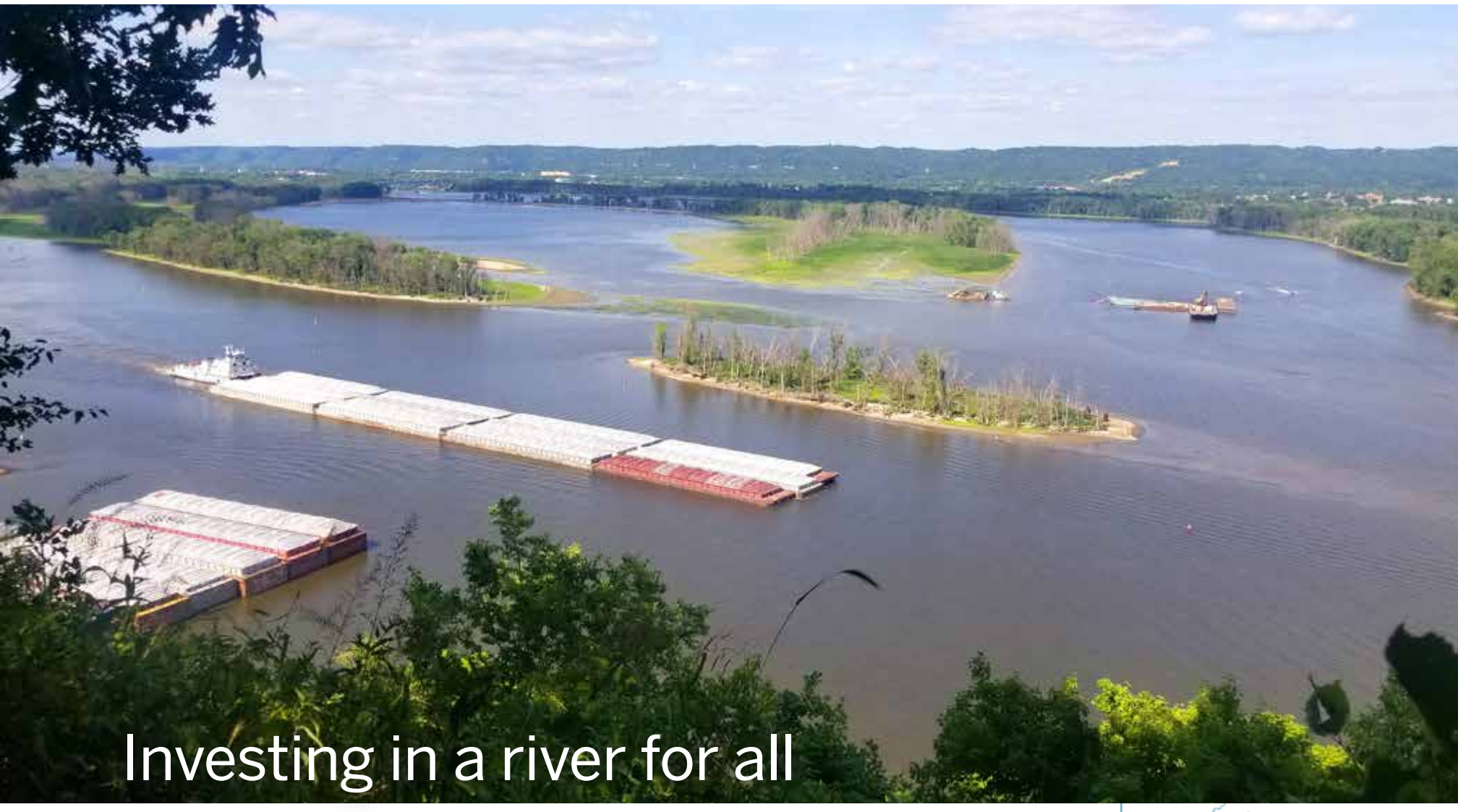
Our Mississippi

PARTNERING TO KEEP AMERICA'S RIVER GREAT

US Army Corps of Engineers

MISSISSIPPI VALLEY DIVISION · SPRING 2022



Investing in a river for all

Corps launches 'once in a century' opportunity on the Mississippi

ANDREW GOODALL GREW UP ON AN IOWA FARM near the Quad Cities, not even 15 minutes from the banks of the Mississippi River. More than most Midwestern middle schoolers, he was struck daily by what the river meant to his family and those around him.

"I saw towboats and barges on the river, and I knew that those gave us an outlet to get our corn and soybeans to market," he says. "And I spent half of my weekends in summer on the river and still do to this day with my family."

Goodall is now leading a team comprising individuals from the Corps' Rock Island, St. Louis, and St. Paul districts on a newly funded effort to ensure the river stays sustainable for both the ecosystem and industries like agriculture—for the next century and beyond. He's honored, he says, "to be part of history, of a once-in-a-hundred-year impact on the Upper Mississippi."

Congress passed the Infrastructure Investment and Jobs Act and through it authorized the first construction starts for the Navigation and Ecosystem Sustainability Program (NESP), 15 years after its initial authorization. The bill immediately provides $732 million for the U.S. Army Corps of Engineers to construct a new lock at Lock 25 in Winfield, Missouri; that represents a revolutionary step in a system that for the most part was constructed in the 1920s and 1930s.

Additionally, the act provides $97.1 million for the river's first-ever fish passage system, this one at Lock and Dam 22 in Saverton (See page 3). The March 12 omnibus appropriations package passed by Congress added another $45 million for additional ecosystem restoration and navigation improvement projects that include design of a new 1,200-foot lock on the Illinois

Continued on page 2 >>

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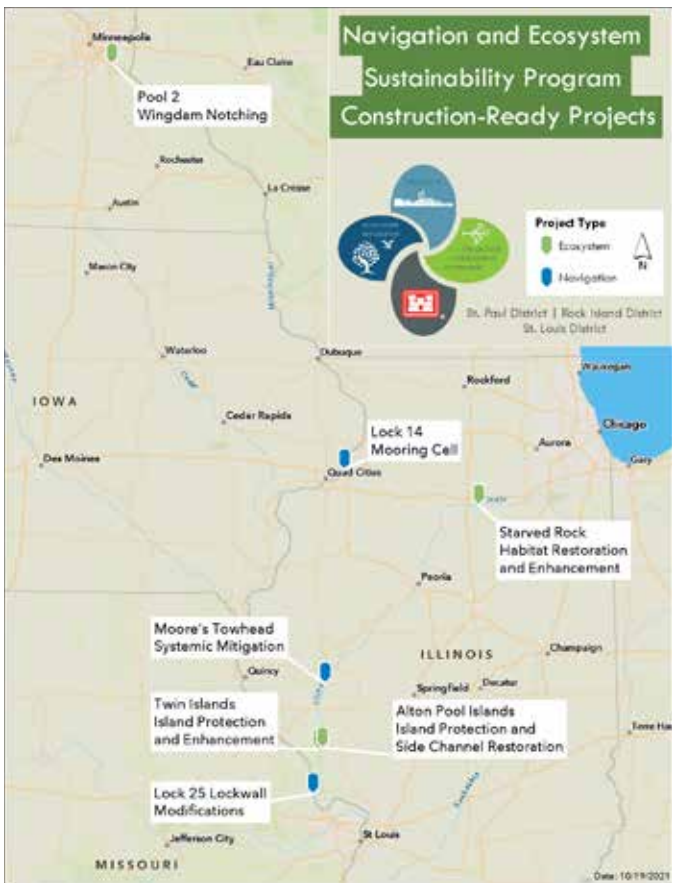
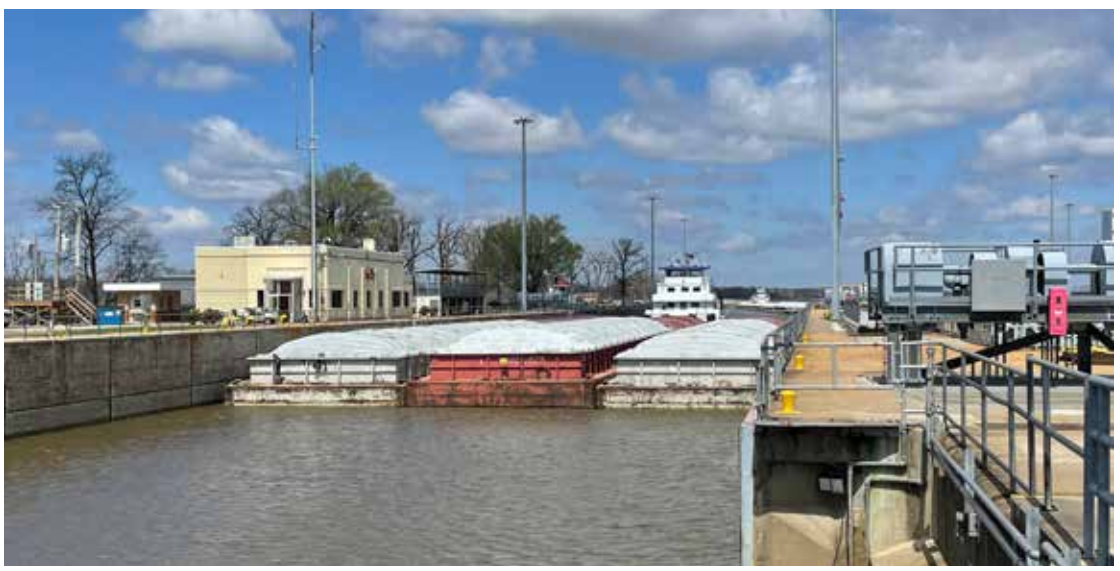
BELOW: This chart showcases some construction-ready Navigation and Ecosystem Sustainability Program projects including "small scale measures" for safer navigation and channel and island restoration for wildlife habitat and more. RIGHT: Crews disconnect and reconnect barges that have to be sent through a lock like 25 (PICTURED HERE) in two batches. Planned new locks will make the process safer and more efficient.





Learn more about the Navigation and Ecosystem Sustainability Program's history and funded projects: www.mvr.usace.army.mil/Missions/Navigation/NESP.

River. Beyond that, officials say the construction start paves the way for the future funding of six additional locks and the many environmental projects that have been prioritized through the dual-mission program.

"To date, this is the only Corps program with two different business lines under one umbrella, and it is a very innovative way of thinking," said Goodall, the NESP program manager. "The most important piece to me is that it had navigation industry and environmental stakeholders come together."

On the Upper Mississippi, the U.S. Army Corps of Engineers operates 29 locks and dams between Minneapolis and St. Louis, as a system serving to keep the river at a navigable depth and let barges carrying Midwestern grain (and more) travel the step system from one river pool to another.

Through those locks and dams and on the open river that flows south to the Port of New Orleans, barges transport more than 60 percent of America's corn and soybeans, sharing the river with 25 percent of North America's fish species and flyway with 40 percent of North America's migratory waterfowl and shorebirds. The river is widely considered the safest, cheapest and most environmentally friendly method for transporting bulk commodities; a 2019 USDA study also showed that rebuilding the NESP locks will inject $72 billion additional dollars into the nation's Gross Domestic Product.

"With new modern locks, we're going to help farmers get their products to market faster and more efficiently, lower costs and keep American agriculture globally competitive," President Joe Biden said in an April address.

To Andrew Schimpf, whose job is to oversee the locks—including Lock 25—within the Corps' St. Louis District, it's just time. It is testament to the skill of the Corps' maintenance staff, and perhaps a lot of good luck, that a lock hasn't broken down for long periods of time, potentially shutting the river down.

"One thing I like to ask is 'Can you picture or name a highway, any transportation system, even a railroad that was constructed in the 1920s—almost 100 years ago now—and is still in use exactly as it was?'"

The new lock will add both safety and efficiency, says Schimpf, operations manager for the Mississippi Rivers Project which includes missions like operating the locks, dredging, shoreline rehabilitation, and overseeing public lands and recreation on 300 miles on the Mississippi and 80 miles on the Illinois.

It will definitely add speed. Tow operators currently can move through the Mel Price Locks and Dam and Lock 27 (both 1,200 feet) in about 30 minutes each, Schimpf says. When they come to 600-foot lock 25, he says, "it takes 2½ hours on a good day with no wind, drift, outdraft or ice. A bad day can take 8 or 12 hours or longer."

Lock 25 carries through the most tonnage of all seven locks identified as priorities through NESP; it also has some of the strongest currents, making the locking process extra dangerous. But while a new lock there will add immediate efficiencies and safety, NESP is a systemic approach, he says. "We're trying to improve the system as a whole. This is the first step."

It will make the process immediately safer for towboat crews and Corps employees at the lock site, notes Paul Rohde, vice president of Waterways Council Inc., a strong supporter of NESP.

When going through a 600-foot lock with 1,200 feet of barges, deck crews have to break off the first nine barges from their 15-barge tow, lock the nine through, pull them out with a tow haulage unit and tie them up. "That requires a lot of momentum," he says. "Picture all 16,000 tons held in place with just a three-inch lock line. It's staggering when you think of the logistics.

"The lock chamber cycles back to prepare for the second cut. The crew climbs up the lock wall ladder, walks back to the other six barges and towboat, climbs down the lock wall, locks the six barges and vessel through then rejoins the two so it can depart the lock. This is an arduous process, even on a day of good weather. It's made more dangerous during snow, ice, night visibility, wind and other conditions."

Additionally, adding a second lock creates a two-way river, letting boats coming in the opposite direction use the current 600-foot chamber concurrently.

Improving a nationally significant ecosystem

But enlarging a system of locks too small for current industry standards is only one piece of a project that stems from Congressional recognition that the Mississippi River is both a nationally significant commercial navigation system and nationally significant ecosystem.

Kirk Hansen, the Mississippi River Habitat Coordinator at the Iowa Department of Natural Resources, is one member of a vast partnership charged with implementing the massive program he calls both exciting and terrifying in its scope. One of the initial projects will restore an Iowa lake that currently has poor water quality and fish habitat, but that's just the beginning. "The recognition the river has multiple uses and the formulating of a program that benefits all of those is what makes it so awesome," he said.

Notes project manager Goodall: "It truly will alter the future of the Upper Mississippi River System and ensure it remains vital for the transportation and ecosystem aspects for the next hundred-plus years. I don't say that lightly. I want to make sure I stress that this is very, very important." —K.S.

Restoring historic migrations to the Upper Mississippi River

Construction will soon begin on a rocky cascade designed to allow fish to pass Mississippi River Lock and Dam 22 and restore a migration path that once existed for thousands of years.

Paddlefish are among the migratory fish prevalent in this part of the Mississippi.

BEFORE THE DAMS WERE BUILT, fish roamed freely through the Mississippi River watershed for almost 12,000 years, since the last glacier retreated.

"North America's network of rivers and streams are used by fish for spawning, nursery areas, feeding and growth," said Mark Cornish, a biologist for the U.S. Army Corps of Engineers. "Industrial development changed everything in the late 1700s as mill dams, hydroelectric facilities and navigation dams were constructed, affecting how and when migratory fish could access the watershed. The biggest recorded change came in 1913 with the completion of the Keokuk-Hamilton Dam, now known as Lock and Dam 19."

This was and still is the largest dam on the Mississippi River, and it blocks all movement upstream save for that of the lucky fish that times the lockage well enough to move through with a boat.

Within weeks of the completion of the dam, local residents noticed extraordinary numbers of fish trying to swim upstream, only to be trapped below the dam. That barrier, and others that followed, thwarted fish migration on the river. It also affected other organisms like mussels that hitchhiked on fish when the larval mussels attached to the gills. Fewer fish migrating upstream meant fewer mussels in the headwaters. The Mississippi is believed to host 156 fish and 53 mussel species.

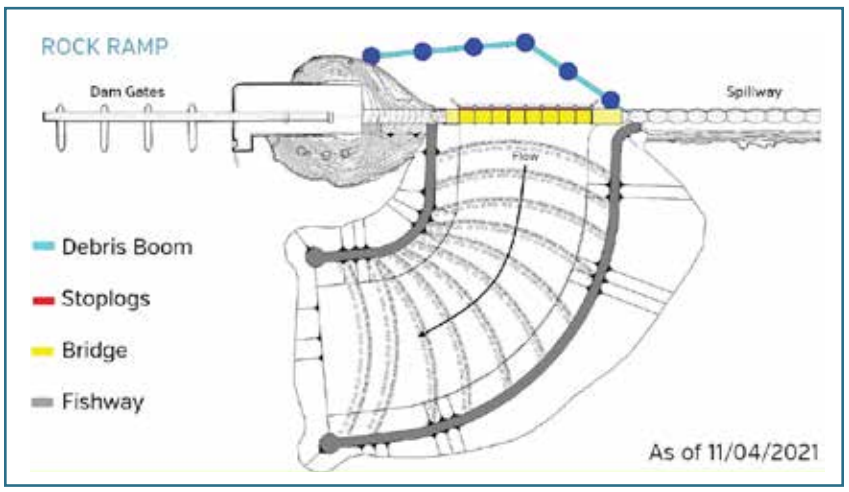
"In 1913 most fish in the Mississippi River were not considered migratory, but 100 years of fisheries science has changed how we understand fish movement and answered the question of why fish piled up at the Keokuk-Hamilton Dam," Cornish said. "Most river fish species make short migrations, often associated with seasonal movements to preferred environments for spawning, feeding and winter survival. Freedom of movement for both short and long fish migrations is needed for a healthy river"

The U.S. Infrastructure Investment and Jobs Act includes $97.1 million for the Army Corps of Engineers to complete design and start construction of the L&D 22 passage—a program that will restore that migration freedom. It is one of five upper Mississippi River fish passages authorized by the current 15-year federal Navigation and Ecosystem Sustainability Program (NESP).

Construction is expected to start in 2023 on the passage at Lock and Dam 22, which will be 200 feet wide and 560 feet long. The project is located near Saverton, Mo., approximately 10 miles south of Hannibal. The fishway will be built with rocks formed into a watery staircase that passes a series of placid resting pools as it descends gradually 11.5 feet into the river below. Since this is the first on the Mississippi River, the fish in and around the structure will be carefully monitored by state and federal natural resource agencies to glean answers to questions about fish migration.

Lock and Dam 22 was selected for the first passage by an interagency science team after comparing needs at 29 dams on the Mississippi and Kaskaskia Rivers and the Illinois Waterway, said Rachel K. Hawes, the project manager at the Corps of Engineers District office in Rock Island, Ill.

"The team believed that most scientific information could be collected at this location at the least cost," she said, and that "the risk of harming the environment by passing invasive fish was low because invasive carp were spawning above and below this area." —R.S.



New Golden Age of Water Infrastructure launched

The Upper Mississippi River 9-Foot Channel Project—29 locks extending for 669 miles of shipping channel that changes 400 feet in depth between Minneapolis and St. Louis—is among the largest and most ambitious river projects ever constructed in the United States.

Promoted as a way to help the country's heartland during the farm crisis of the time and address the disparities between rail and water freight rates, the project went on to transcend political boundaries. Though authorized in 1930 during the Herbert Hoover presidency, the actual construction of the locks—an undertaking so massive that the era became known as the golden age of the U.S. Army Corps of Engineers—was a centerpiece of Franklin Roosevelt's economic agenda when promoted as a massive New Deal employment program during the Great Depression.

Similar bipartisan support for infrastructure projects that will help Midwestern farmers and the ecosystem of the river, both, is ushering in what could be called the second golden age of water infrastructure investment, says Edward Belk, Director of Programs for the Mississippi Valley Division.

"We're talking unprecedented funding," he said, "and we're going to be able to get after a lot of really critical needs of this nation with that investment."

Among other things, the funding covers the first of six planned new locks on the Upper Mississippi River. This is critical because while existing locks continue to perform well beyond their intended service life, adding system resiliency and redundancy in case of a lock failure that could shut down river transportation is key, Belk says. Sixty percent of the nation's grain exports travel down the Mississippi River, and "we as a nation don't necessarily compete or win in global markets with the most favorable tax or regulatory climate. We compete and win with unmatched transportation efficiency. That's the secret sauce for our country, and these locks and dams are a vital part of that transportation network."

"We're talking unprecedented funding ... and we're going to be able to get after a lot of really critical needs of this nation with that investment."

—EDWARD BELK, DIRECTOR OF PROGRAMS FOR THE MISSISSIPPI VALLEY DIVISION

Concurrent investment on the Lower Mississippi River is amplifying the benefits and ability for the U.S. agribusiness to compete on a global scale, he says. A $238 million project led by the Corps, the state of Louisiana and Port of New Orleans is deepening the navigation channel along the lowest 258-mile reach of the Mississippi River from 45 feet to a new 50-foot standard to provide more efficient deep draft access for larger Panamax vessels traversing an expanded Panama Canal. Coupling the ongoing deep draft improvements at the lower end of the Mississippi River with an improved lock and dam system on the Upper Mississippi and Illinois Rivers will together strengthen the global economic competitiveness of U.S. grain exports from the Midwest's breadbasket.

"The important thing to know is that this is a generational opportunity to make a huge impact on critical infrastructure," Belk says. "This ushers in a new golden age nationally for the Corps of Engineers to make a big difference. These are historic and exciting times, and it's a tremendous privilege to be part of that." —K.S.

How much water's in that snow?

Snow tracking in the Upper Midwest key to spring flood forecasts

Just as many Midwesterners were doing in late February, Bill Odell and Jesse Scott of the U.S. Army Corps of Engineers were donning their tallest pairs of snow boots and warmest gloves and setting out for some time in the snow.

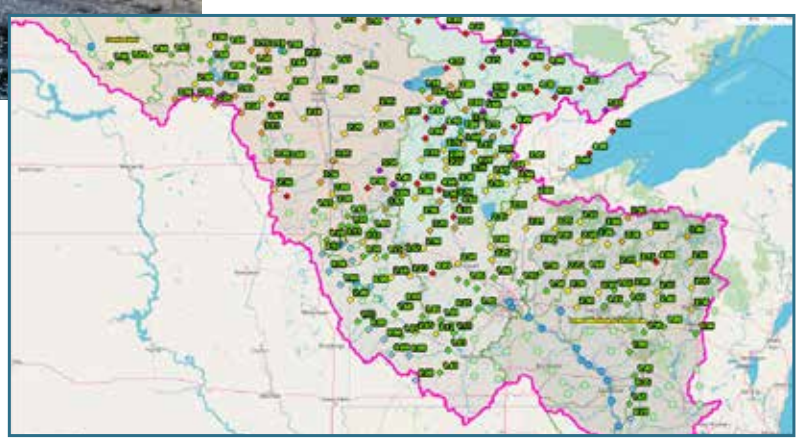
But as temperatures fell to as low as 40 below zero in the northernmost reaches they explored, the pair of hydrologic technicians from the St. Paul District were on a specific mission—one with ramifications along the entire 2,340 mile reach of the Mississippi River.

Armed with hollow tubes that could expand to reach the bottom of the deepest drifts and with portable scales for measuring weight of the melted snow, they set out to capture a "moment in time" look at how much water was being stored in those snowy drifts at the upper reaches of the Mississippi River watershed. That's key because the water melts as it makes its way downriver toward flood-prone towns further south.

By measuring depths over the same week at hundreds of locations across Minnesota, Wisconsin, North Dakota and sometimes Iowa, the pair and others at specific field stations gather data to plug into models used by flood forecasters to determine what the upcoming season might look like. It's also used by operators of Corps reservoirs charged with keeping the Mississippi River at a navigable depth, letting them know if this is a year to hold back more water than usual or if the snowpack is light, to let more go.

The process is a tricky one due to that Midwestern adage, "If you don't like the weather, wait a minute."

Says Odell: "When I was out on the road one time it snowed out there. That changes all those measurements. Other years have gone into 40-degree days with the snow melting as we're trying to catch samples."



FROM LEFT: Ice covers about half of the Mississippi River for some part of each river, and scientists are still learning more about the processes that happen beneath. The thickness—of ice and snowpack—is the subject of a Corps measurement study conducted across the upper river (see map) each winter.

Spreading the data over such a large geographic area—in this case, between 2,000 and 3,000 miles—helps to offset weather unpredictability, they say, and lead to data used both for the primary purpose of flood forecasting and other key uses too. It affects fisheries, for example, because there's a direct tie between snowpack and spawning seasons for walleye.

The data has not all been analyzed, but anecdotally shows that on some reaches there was slightly more snowpack than usual, at other reaches slightly less.

The process

The collections are done at predetermined sites used year after year for continuity, and each site is tested with multiple samples over a 30-mile radius and on spots that are representative of a particular area and not, for example, shaded by massive pines. Placing the snow tube from top of the snow to the ground (this year's deepest spot was 47.5 inches), they collect a single sample. That snow is emptied into a ziplock bag and weighed to calculate the Snow Water Equivalency or how much water is in the snowpack. One ounce of snow is equal to one inch of water.

The researchers also make notes on whether it was snowing or sunny, if the snow was wet from a recent rain or extra dry. The denser the snowpack, the more water content per inch, and the researchers uploaded findings directly to the district's water management team and river regulators through a new mobile application, Collector for GIS.

Since he started measuring in 2012, Odell says the work has been cancelled only a couple of times, only then because there was not enough snow.

Making this year's collection extra memorable was the "guest collectors" who came along on some of the measuring trips. Those included the hydraulics and hydrology chief from the Mississippi Valley Division, a forecaster with the National Weather Service and a liaison officer for the Brazilian Army currently based along the Mississippi. Scott says he put the guests to work and on short breaks taught them how to make snowballs and took them sledding.

Beyond the fun, he said, "they got a better sense of the methods used for collecting data and efficiency at which we were able to turn it around." —K.S.

Warming climate puts some river processes ON THIN ICE

Ice—sometimes chunky and thick, in some places thin—covers about half of the Mississippi River for at least part of each winter.

And as scientists learn more about what goes on beneath that ice cover, they're increasingly concerned about predictions of a warming trend.

"We used to assume that there wasn't much biological activity under the ice, but there actually can be a lot; nutrients are processed, and if light is available, there is plant and algal growth under the ice," says Kathi Jo Jankowski, a U.S. Geological Survey research ecologist at the Upper Midwest Environmental Sciences Center in LaCrosse, Wisconsin.

As the cover declines, additional sunlight and warmth will increase the "winter gross primary productivity" in rivers, providing more nutrients for river organisms as well as larger and potentially toxic algae blooms, she said.

Today, river ice cover can extend from the headwaters to as far south as St. Louis, she says. By 2100, under the highest climate air temperature scenario, that will only extend to approximately to Minneapolis and "a big part of the river will no longer be frozen,"

A 2.5-percent mean reduction in river ice coverage already occurred from 1984 to 2018, satellite images show. Average ice cover on the world's rivers is projected to decline a further 16.7 days per winter by 2100 with some rivers becoming completely ice-free year-round, according to a study cited in the January issue of *Nature Magazine*.

"We are realizing we need to pay attention," Jankowski says.

FROM TOP: The Two Rivers National Wildlife Refuge was established in 1958 to protect and enhance habitat for migratory birds. Now its 9,225 acres of river and floodplain habitat is a testing ground for a natural infrastructure partnership that reconnects land to river and reduces flood damage.

Partnering to restore nature, protect cities

GRAFTON, ILLINOIS embraces its status as a true river town—one that draws tourists for eagle spotting, for fishing its shoreline, boating its marina or sipping a "riverbend red" at a winery overlooking the Mississippi.

But a waterfront without levees, situated at the confluence of the Mississippi and Illinois Rivers, is vulnerable to floods, which explains the enthusiasm of Grafton Mayor Mike Morrow's enthusiasm for a new habitat restoration and enhancement project just upstream on the Two Rivers National Wildlife Refuge. The project will restore or enhance some 600 acres of wetlands and floodplain forest, an area that will be able to capture, hold, and then gradually released nearly 327 million gallons of floodwaters.

"Grafton relies heavily on tourism as our lifeblood, so our city is open to the river," Mayor Morrow continued.

"We need areas where that water can go naturally. We rely on natural storage areas for water, that can take the ponding away from the city and move it to areas where it can sit."

The new project will do just that.

Created by a partnership that includes a coalition of river mayors, the National Park Service, Ducks Unlimited Inc., and the U.S. Army Corps of Engineers–St. Louis District, it exemplifies an approach called natural infrastructure. It works by returning backwaters, sloughs, and floodplain forests to their traditional role. In the process of reconnecting these lands to the river, valuable wildlife habitat is created, biodiversity is enhanced, and flood damage and infrastructure maintenance costs are reduced.

"It's all just different ways of connecting these natural assets together in such a way that they can work to mitigate these disasters, provide habitat, clean the water, reduce climate impacts and sequester carbon," said Colin Wellenkamp, executive director of the Mississippi River Cities and Towns Initiative. MRCTI is an association of 101 riverbank city mayors like Morrow dedicated to restoring the ecology and economy of the Mississippi River corridor.

The project will have an immediate positive impact on the refuge's habitat management capability, according to Charlie Deutsch, manager of the Two Rivers refuge. The project will update pumps by July or August, perfect timing for fall migration along North America's most heavily used corridor for food and resting.

Each partner brings unique strengths to the project. Ducks Unlimited Inc. is partnering with the U.S. Army Corps of Engineers–St. Louis District to install the wells and pumps to move water around the site. The Corps will design and build the earthwork that enhances the wetland units, says Brandon Schneider, the Corps project manager. The Corps will finish off the project by reforesting upland portions of the site with flood-tolerant trees while the U.S. Fish and Wildlife Service will handle long-term operation and maintenance costs.

The project is just one of three pilots (with more in the planning) that have grown from a collaboration between MRCTI and Ducks Unlimited that looks at regionally specific solutions. It covers 33 cities in eight states with plans to add more, Wellenkamp says. The mayors in his group are interested in protecting their communities' homes, streets, businesses, and other infrastructure, and that complements Ducks Unlimited's history of successful wetland conservation at a landscape scale.

"We started to notice that we both wanted the same thing. Their waterfowl restoration areas were taking on floodwaters that would otherwise go into our downtowns," Wellenkamp said.

"It came together as a nice marriage, if you will."

Solutions that protect Mississippi River cities and towns are urgently needed in the face of climate change, he notes. Two Degrees Adapt, a consulting firm specializing in climate adaptation, helped the coalition identify the best natural infrastructure solutions for varied problems and landscapes along the Mississippi River corridor. That includes restoration of wetlands, regenerative agriculture, expanded floodplains, reforestation and more.

"We have had $210 billion worth of actual losses since 2005 along the [Mississippi River] corridor itself. That number is approaching $250 billion basin-wide," Wellenkamp said. "We need more diverse solutions that can operate on larger scales against multiple types of impacts." —D.D.

My MISSISSIPPI

**Austin LeRay,
Natural Resource Specialist/
Park Ranger, Bonne Carre Spillway,
Norco, Louisiana**

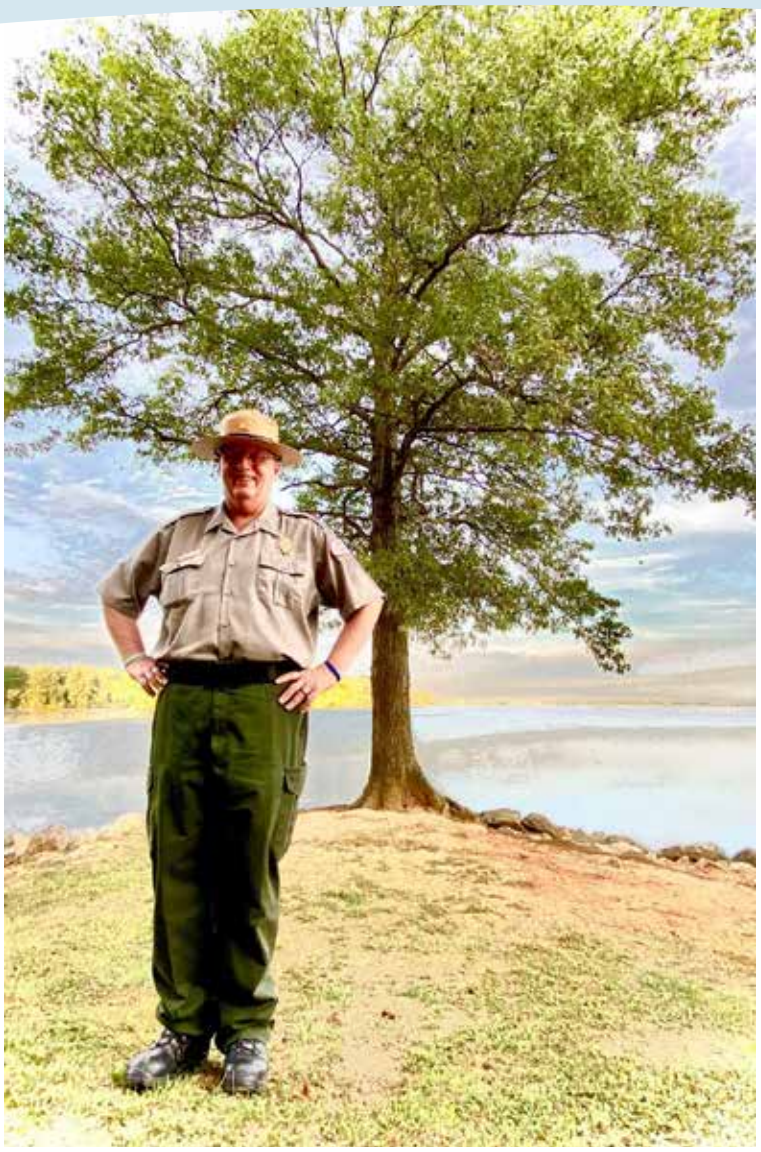
"I was born in Thibodaux, which is in southeast Louisiana, about an hour from the spillway. I grew up hunting, fishing, and my favorite thing to do is just be in the swamp, be outside.

"When I think of the swamp, the culture, that vibe, it makes me feel like it did when I was growing up. Being with all my family friends, everybody getting together cooking, fishing, hunting. I think that's why I'm so connected to it. It doesn't feel like I'm at work; it's like I'm where I'm supposed to be.

"The project's primary function is flood control to prevent the surounding areas from flooding and the levees overtopping. Within that, it's six miles long by a mile and a half wide. It's primarily bottomland hardwood. We've got cypress trees and tupelos. And there's a lot more than just woods; on one side of U.S. 61 is where the hunting and fishing takes place, and south of that is where we get ATV riders. We have horseback riding trails, and a lot of birdwatchers come to look at eagles and migrating birds.

"If the river is high, it might put a halt to planting sunflower seeds. But I can see 50 eagles a day because the river is up. That to me is what's so neat. It's dynamic in that it changes, but when it does, it attracts different users.

"I'm a big duck hunter, but I'm not going to go hunt something and waste it. If you shoot ducks, you have your friends over, and if you catch some fish, you're going to fry them. It's what connects you to the land. Without that, you wouldn't have as much conservation as you do now. It's why it's so important to me to get people to really see the wildlife the spillway has. It makes you appreciate it. Understanding why we try to protect and conserve a lot of these things is very important."



Meet the **'Can-Do' Ranger** of the Corps

Bischoff ... immersed himself in the role of George Drouillard, the expedition's half-French/half–American Indian expert hunter, territorial scout, and Native American sign language interpreter. Bischoff so absorbed Drouillard that he changed his accent, picked up French, learned to use Indian Sign Language and even felt ... the spirit of Drouillard.

Hiram H. Chittenden was legendary for his engineering feats, extensive scholarship and a rugged "can-do" spirit in overcoming some of the nation's fiercest natural and man-made challenges.

The same could be said for the first two-time winner of the award named after this former Brigadier General responsible for building much of the road system in America's first national park.

Timothy Bischoff, 55, a self-proclaimed cancer warrior, has let nothing—not a bleak survival prognosis, not a COVID-19 shut down of in-person interpretation—stop him from work inspired in part by a notable family legacy of Army service.

The award, given earlier this year, celebrated the way the full-time ranger at the Corps' Rend Lake Project in Illinois created the *USACEeducates Program of online lessons inspired by Corps interpretive programs. The program wasted no time in reaching 2,125 seasonal and full-time rangers as well as a network of schools that were early in the stay-at-home phase of the pandemic and hungry for online content with a special on-the-scene twist.

"We had 15 rangers that just dove in and figured it out by working in teams to satisfy the needs of each teaching theme with weekly field trips to virtual dams, the Smithsonian and other activities all made available via Facebook," Bischoff said.

But this was not his first recognition. The original award, 15 years ago, came for his participation in the Army's coast-to-coast reenactment of the Lewis and Clark Expedition. The humble 5-foot-8-inch living-history buff gained a coveted role in the three-year excursion after his hobby of reenacting a French Territorial Marine locally was revealed to the expedition's "Corps of Discovery Bicentennial Expedition" planning officer.

For the better part of three years, Bischoff then immersed himself in the role of George Drouillard, the expedition's half-French/half–American Indian expert hunter, territorial scout and Native American sign language interpreter. Bischoff so absorbed Drouillard, that he changed his accent, picked up French, learned to think and use art of Indian Sign Language and even felt, at times, the spirit of Drouillard along the 4,900-mile trail that extended from from Pittsburgh to the mouth of the Columbia River. There were first-time location visits, he said, where he oddly needed no explicit directions in finding historic or important locations proclaiming "it's as if I'd been there before... I didn't even need a map."

So complete was the transformation that he earned the respect of the East of the River Band of the Shawnee Tribe, which was Drouillard's mother's tribe, where members presented him with a medicine bundle, earth from their Great House, ash from their sacred fire, as well as wampum belt. There were many life lessons gained in the shadows of the Teton Mountains or along the sandy banks of the shallow Missouri River, said Bischoff, who spent parts of three years completing the 2003-to-2006 Corps of Discovery Expedition Bicentennial.

These experiences helped in providing the spirit, strength, and temerity to beat back what was a shocking 2015 cancer diagnosis which suggested he had only an 11% chance of survival. "I shouldn't be alive today," explained Bischoff who wishes to be fully transparent about his current fight and past cancer-related challenges.

"Cancer sped me along to make me reevaluate my life, and it's the Army ethos that impacted me. That's built in now ... into all of us [in the Corps], whether we know it or not,"

After three surgeries and approximately 140 chemotherapy treatments over six years, he's won back health throughout most of his body in returning to pre-cancerous levels. And the courageous Bischoff predicts he will overcome his remaining cancer where his last three cancerous polyps (down from hundreds just a year ago) have retreated from his colon and liver and are now in the lower part of his lungs.

"Whether it's a Ranger in a combat zone or fighting a flood, it is truly *Essayons* everyday ... let us try. And just like in the Corps, nobody said 'it's not my job' on the expedition ... they handled challenges just like today. We adjust, improvise, and overcome," he added.

He credits his Corps 'family' as enormously helpful in his return to health. They donated more than 900 hours of medical leave to allow him and his family the peace of mind to focus on healing and not miss a day of pay. His attitude hasn't hurt either.

He has humorously dubbed the invaders Larry, Moe and Curly after the Three Stooges comedians and calls the overall cancer he continues to successfully beat back "Smaug" after the antagonistic dragon featured in the 1937 novel *The Hobbit.*

Along these lines, Bischoff routinely dons a shaggy wig, a Hawaiian shirt and any number of instruments, songs or physical performances to roam the Siteman Cancer Center in Saint Louis as part of a spirit-raising troupe called the "Shenanigators." They encourage fellow cancer warriors by offering up a mixture of coping support wrapped around often boisterous comedy skits, practical jokes and lots of laughter. Bischoff says the Shenanigators is one of the most important things he's done "... as it brings excitement, happiness, giggles and joy to the cancer center." He explained the cancer, "has given me all kinds of gifts that I probably wouldn't have got without going through this journey. You can look at it with gratitude and a chance to grow knowing that I could get bitter, or I could get better."

Stories of his career epiphany are equally engaging. He was a boy "who always wanted to be a ranger," he said, since the day the typically well-behaved eight-year-old disappeared briefly on a family trip to Mesa Verde Park in Colorado. He was just chasing down the ranger!

"My family continued up the ladders, not realizing that I had stopped to talk to the Ranger at the bottom. My father then had to climb down the 'up' ladders to find me ... kind of like the only salmon heading downstream when all the rest were heading upstream to spawn," joked Bischoff.

"I wasn't lost. I knew exactly where I was. Needless to say, dad wasn't all that happy when he found me as this 'ranger talk' was one of only two times that I can remember ever being separated from my parents."

That episode in a way launched a 32-year Army career that put him on the 'Bischoff family tree' with other family members who saw Army service. The family legacy included General Patton's battlefield interpreter and another who served in "Operation Cowboy," the effort to repatriate the famous Lipizzaner Stallions to safety just ahead of the encroaching Red Army in the closing days of World War II.

In 1995, the Corps launched the Chittenden Award to acknowledge those who have risen above the basic Ranger expectations. Both the award's namesake and the latest winner were said to have demonstrated indefatigable, entrepreneurial and revolutionary spirit in tackling their particular challenges. Both demonstrated a passion for the Army, the American West and undeniable leadership during periods of significant tumult. Both weathered health concerns that sidelined them in various key points in their distinguished careers. Most importantly, however, is their shared intense dedication to public service. Chittenden, for instance, designed a Yellowstone arch that's inscribed "For the Benefit and Enjoyment of the People." It's this same spirit of service that has driven Bischoff to an award-winning standard while emphasizing that his Interpretive work is a gift.

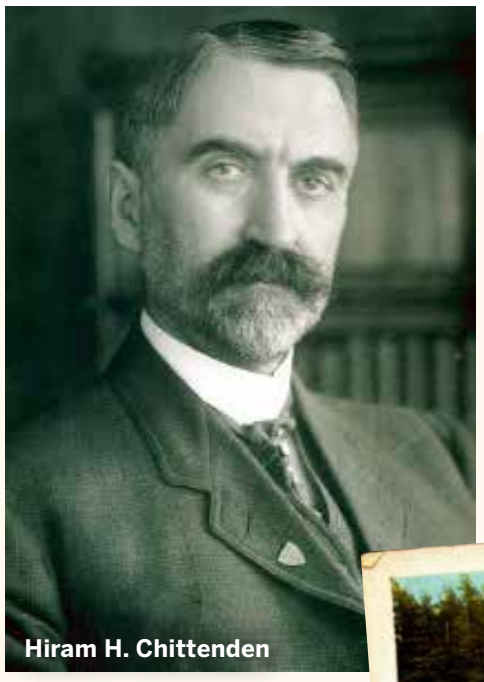
A career highlight that further draws the two together comes up this summer. Bischoff will travel with wife Beth to Yellowstone to be a ranger for a day (actually two), working one day at the boardwalk at Old Faithful, the next at Officers Row in Fort Yellowstone and park Headquarters at Mammoth. That he gets to live a lifelong dream to work there is just one thing; he'll also stay in the old house at the Old Faithful Inn, something so special to him that he wears a bracelet with the inn's coordinates. What he knows for sure is that visitors on those late July days will find the happiest ranger they have ever met.

"The reality of this dream actually coming true was momentous for me and probably the greatest gift that I could receive," he said. "Just picture that 8-year-old boy who wanted to be a park ranger and all his dreams coming true all at one time."

But he adds that his career overall has been something of a dream.

"Teaching is what I love to do; it is one of the things I'm most proud of. In looking back on my legacy it's hoping to make the next generation of Corps Interpreters better. We touch lives, and I love that I get to do that."

—M.B.



Hiram H. Chittenden

Building Yellowstone

THE U.S. ARMY had some early—and at first unplanned—involvement in Yellowstone National Park. Someone had to keep tourists under control when, shortly after it was established in 1872, they were found cooking in the hot springs, trampling geyser basins or grabbing petrified wood for souvenirs.

The army was sent in as part enforcement, part interpreters, and then in 1883, as road engineering experts. The U.S. Army Corps of Engineers laid out the system of roads that in many cases exists today. That it was young lieutenant Hiram Chittenden from the Corps St. Paul District who became a key bridge between park preservation and public enjoyment makes the annual award given in his name especially fitting.

Chittenden was already nationally well known as an author, advocate, engineer and historian when he arrived without budget or staff at Yellowstone in 1891, still recovering from typhoid. The St. Paul District had since 1883 been in charge of road construction, and his predecessor Captain Dan Kingman had already launched the layout of a road system that encouraged excellence (and kept dust away with a road sprinkling machine) and at the same time discouraged destruction of forest and native animals.

According to historic accounts, Chittenden laid out a road from Firehole River to the West Thumb of Yellowstone Lake with only two assistants, a hand level, and a five-foot stick prompting the superintendent of the time to call him: "zealous, untiring, and remarkably efficient."

He also led opposition to an electric railroad through the park—and he did so by illustrating what visitors wanted and didn't. In 1893, he conducted a public survey and sent 120 letters to former visitors across the country. He got 100 responses back, with comments overwhelmingly showing the main drawback to park enjoyment was the condition of the roads.

Later, using survey results and evidence of the growing importance of the park, he won a three -year appropriation equaling $750,000 back in 1902. According to a National Park Service history called "The Army Engineers and Yellowstone National Park," his legacy was a system both practical and aesthetically pleasing, one that avoided monotonous stretches in favor of roads that emphasized the natural terrain and key points of interest. Chittenden would later write: "the greatest service which official authority could render to posterity was to maintain and transmit this possession as it came from the hand of Nature."

Early Yellowstone construction

Early uniforms at Yellowstone influenced today's Army Corps ranger look.

The Trumpeter Swan

Their near disappearance was no permanent swan song; tens of thousands are trumpeting their comeback along the Upper Mississippi.

Their beauty has made for some of the world's most enduring fairy tales. (Remember the ugly duckling who turned beautiful swan?)

But the legendary grace and presence of the trumpeter swan also contributed to its near extinction as European hunters exploited the snow-white skin and soft features for powder puffs, Victorian hats, quill pens, and meat. Ironically, even famed ornithologist John Jay Audubon preferred the especially long feather of this, America's largest bird that flies, for his correspondence.

FROM TOP: Researcher David Wolfson holds a Trumpeter Swan, the largest waterfowl species native to North America. The swans can exceed 35 pounds, and that makes taking flight so tricky that they sound like horses galloping as they take off on a water runway of at least 100 meters.

Now, the comeback story is also one for the storybooks. And it's a tale told both by the tens of thousands of trumpeter swans you might spot along the Mississippi River flyway and the researchers looking to fill out the plot.

"They were extirpated in the Mississippi Flyway, and there were only a few in the lower 48 states, but the really cool part is they were never listed as endangered like the bald eagle. There was this grassroots effort to reestablish their population, people pulling together and working with agencies to find eggs, raise young and release them," says Charlie Deutsch, refuge manager at a now favorite swan overwintering grounds, the Two Rivers National Wildlife Refuge in Brussels, Illinois. "A lot of times recovery is driven by federal regulations or the Endangered Species Act. This was done in a way that didn't require that."

Migrating to an Army Corps natural area

Deutsch saw the recovery story first-hand while working as the supervisory wildlife biologist at the Army Corps of Engineers' Rivers Project Office in West Alton, Illinois. Some of those first swan pioneers, newly hatched in migration and U.S. nesting grounds in which they'd been completely eliminated, found their way to the Riverlands' Migratory Bird Sanctuary. Located at the confluence of the Mississippi and Missouri Rivers, and managed for hundreds of acres of wetland habitat, Riverlands appealed to the offspring of swans relocated from Alaska and the Pacific Northwest.

"The winter of 1991/92, my first winter at Riverlands, we had five swans show up," Deutsch said. "They swam right over to us and had neck collars on."

Deutsch and his colleagues tracked down the researcher who had banded the birds in Wisconsin, one as excited as they were to see they'd made their way that far south on their own. The swans returned the next winter with a few friends. From there, the winter swan population grew exponentially as flocks from Minnesota and Iowa joined the party.

Today's biggest threat to trumpeter swans is not hunting but lead poisoning and power lines. The Corps worked with a local power company that used helicopters to install diverters on power lines around the sanctuary. Over the years, the company has tracked mortality and installed more diverters as needed.

There's a lot to celebrate about a Midwestern swan population that went from zero to upwards of 30,000, says David Wolfson, a PhD student at the University of Minnesota who is leading a large study of swan migration patterns, genetics and more.

"There's a mission that's been accomplished to get the birds back onto the landscape," he said, "but we still have a lot to learn to better understand their behavior, habitat needs, and to be able to make the best planning decisions possible."

Wolfson, who started the project in 2019, has banded 50 swans in Minnesota, outfitting them with a light plastic neck collar unit with a GPS transmitter and testing their blood for DNA and lead (something found in trace amounts in every swan tested). Collaborating wildlife agencies in Wisconsin, Iowa, Michigan, Ohio, Arkansas, and Manitoba have also banded an additional 60 swans, expanding the study to cover the majority of the Midwestern breeding range.

Current technology allows the researchers to automatically download each swan's location data daily, then to follow the swans throughout their lives to see where they migrate—and if so, how far. As a species, they're partial migrants, some moving south during the winter, some (particularly in somewhat warmer states like Ohio and Iowa) staying put. Data may show that trends are tied to heredity, or maybe just to opportunity.

"What we didn't anticipate is there are a lot of ways they can find open water and still stay

up north," he said. "There are rivers that don't freeze downstream of dams and power plants, and a lot of gravel quarries keep open ponds. As long as they can get enough food, it's advantageous to not have to fly too far from their breeding territory."

MORE
Follow swan movements or help with the citizen science component of the study: trumpeterswan.netlify.app

Why is he (like legions of bird watchers) attracted to a species that today faces relatively few threats?

"They're an apex bird, being so large," he said. "They're also long living (the oldest known swan was 32), smart, they accumulate memory and they're very social. There's a lot more going on, more than people realize at times. I'm trying to bring together a lot of different information that can hopefully fill in a lot more of the story." —K.S

New Corps Tower helps in Migration Tracking

A major advancement in the tracking of migratory birds has come to the U.S. Army Corps of Engineers Rivers Project Office in the form of a new tower that sends information from transmitter tags back to a central database.

There are currently 1300 such Motus Wildlife Tracking System towers around the world, collecting data on tens of thousands of tagged birds, bats and even insects. Each tag transmits data on where the animal travels, how fast it moves between points, how long it stays in an area, and more.

The St. Louis District Rivers Project established its Motus tower, 25 feet tall with dual listening receiver and eight antennas, in December atop an office at the Riverlands Migratory Bird Sanctuary—an ideal location along the central flyway—in conjunction with the Audubon Center at Riverlands, Missouri Department of Conservation, and a St. Louis Audubon office grant.. **FOR MORE: MOTUS.ORG**

Rising chloride levels detected in Upper Mississippi River Basin

Look at any photo of a Minnesota winter roadway, and you won't be surprised at this. Chlorides, including de-icers such as rock salt (sodium chloride), are accumulating in Minnesota lakes and river tributaries. While concentrations have not reached toxic levels in the upper Mississippi River, they are rising, said Brooke Asleson, watershed project manager at the Minnesota Pollution Control Agency.

"We are seeing chlorides in more water bodies, in some cases already above what it should be for our freshwater fish, amphibians and insects," she said.

The Upper Mississippi River Basin Association this winter adopted a resolution calling on state and federal agencies to create more knowledge and public awareness of chloride pollution something easily introduced through runoff of road de-icers consisting of sodium chloride or calcium chloride. Softener treatments for hard water utilize calcium and magnesium chlorides, which leach into ground waters and streams. Agricultural fertilizers may carry chlorides of potassium, calcium, ammonium or magnesium. While some people may not taste a teaspoon of salt in five gallons of water, even this concentration is harmful to the plants and tiny organisms supporting the food chain as well as the eggs of fish and amphibians.

"Chlorides can kill the smallest macroinvertebrates at 230 mg/l, which we say is that one teaspoon in the bucket," Asleson said. "If those insects are no longer available, fish have to find new food and are not always successful. Chlorides also affect the ability of fish and amphibians to reproduce. Their eggs are soft and susceptible to absorbing chloride so fewer eggs will survive."

Plants that absorb chlorides "eventually will not be able to take in water and nutrients," she said. "Chloride is a permanent pollutant. It will remain with a water molecule forever."

In Minnesota's large rivers, including the Upper Mississippi, chloride levels have reached 50 to 80 mg/l, she said. That's led the Pollution Control Agency to develop a "Smart Salting" program to train winter maintenance professionals in efficient practices. The agency encourages adoption of efficient water softeners that may reduce salt use from three bags of salt a month to four or five per year.

Recognition of fertilizers as a source of chlorides "is fairly new," she said, adding, "We have just started conversations with the agricultural industry." —R.S.

My MISSISSIPPI

Charles Pendleton,
Owner and Curator, Vicksburg Civil War Museum,
Vicksburg, Mississippi

"Originally, I was a big car collector. I went from collecting antique cars like Camaros and Chevelles to collecting guns. My goal was to collect one of every gun used in the Civil War. I haven't achieved that yet, but I have one of the largest Civil War gun collections in this area. And then, about four years ago, I started collecting Civil War artifacts. My collection takes up quite a bit of space, and I didn't realize how much I was adding to it. It was in the living room, stacked on the pool table like you would not believe, and it got to the point where my wife, Betty—we've been married 31 years—just said enough is enough!

"But the thing that was really the driving force behind the museum was a letter that I purchased from a local antique shop. It was from a town about 30 miles from here called Fayette, and it talked about a Ella, a 7-year-old Negro girl. She was sold for $350, and I think it said she would be guaranteed to be a slave for life. It really caught my attention. I guess it was knowing that people were bought and sold. I mean, that's the practice of slavery, but coming face to face with this document, it was different. I felt connected to it and I wanted other people to feel the same feeling I did.

"We opened here in downtown Vicksburg on May 17, 2021. I don't know of any other private Black-owned Civil War museums, and doing something that's never been done before, that's a heavy burden to carry. The Civil War has always been a story that's been told from a white perspective, but we try to tell it from a black perspective, including slavery. The nice thing is, we're within walking distance from the docks, and I'd say 60 percent of our guests come from the river boats. I think that really helps spread word of our museum and message throughout the country, and the world."

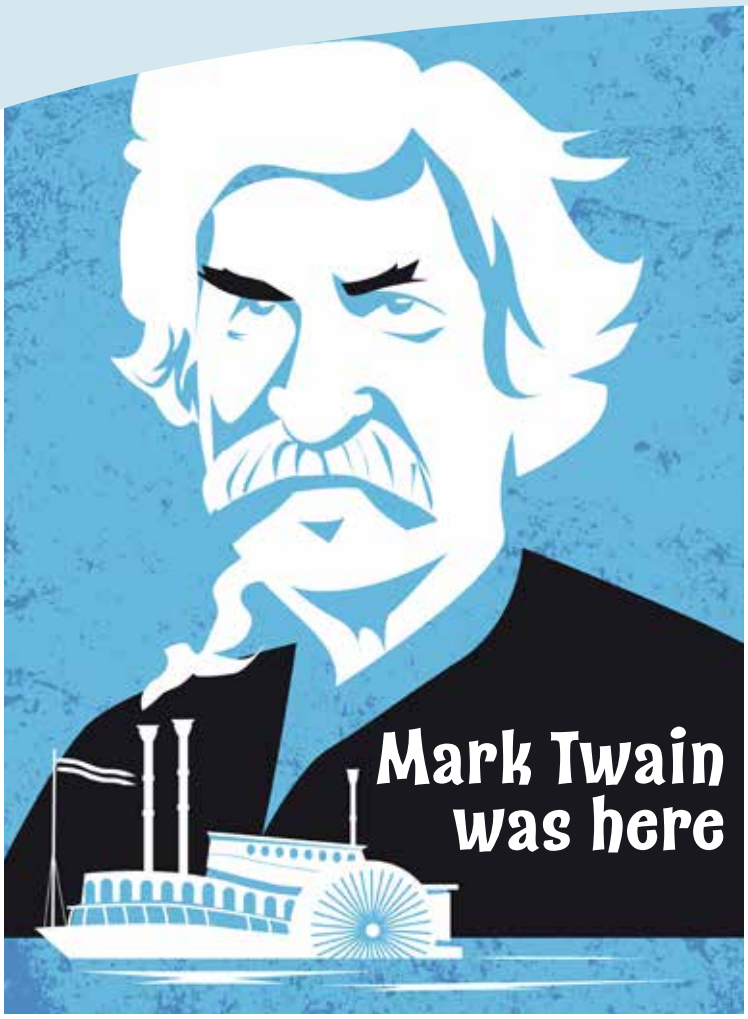
Visit the Vicksburg Civil War Museum

With thousands of artifacts on display, there's much to see at the Vicksburg Civil War Museum. Look for:

Secession Letters: At the beginning of the museum, look for letters drafted by 11 Southern states. The topic of slavery features heavily in them, as Pendleton notes, discrediting the idea that the Civil War wasn't primarily about slavery.

Enslaved Person's Cabin: Visitors can walk through a furnished wooden cabin, which was removed from a local farm and reassembled in the museum.

Enlistment Document: Many of the men who enlisted in the 52nd United States Colored Infantry were unable to read and write, and simply marked an "X" in place of their names. "They were so vulnerable, they couldn't even write their own name," says Pendleton, "but they were so powerful that they were willing to fight for their freedom." —J.G.



Hunt for author's signature brings new attention to Mark Twain's Cave.

CINDY LOVELL credits her fourth-grade teacher Mr. Ronald Riese for her life's career theme and a related obsession that led to an important recent discovery.

The teacher from her days at Newberry Elementary School in Etters, Pennsylvania, would read a chapter of a different book out loud every day. When he got to the famous fence whitewashing chapter of "The Adventures of Tom Sawyer," something struck close to home for the eldest girl of the family with younger siblings she never felt did their share of housework.

"I thought, 'I should be ashamed of myself!' but I was so impressed that Tom Sawyer figured out how to get his friends to do his work for him!"

That moment jump-started a passion for the author's works and life that led to jobs such as directing the Mark Twain Boyhood Home and Museum in Hannibal, Missouri, where Samuel Clemens (the author's real name) lived from ages 4 to 7 (1839–1853). She had come to love the author and the places immortalized in his books. Among those was a cave that inspired tales of hidden treasure.

While author Twain is best known for his connection to the Mississippi River, this cave near its shores "offered mystery and adventure," she says. "He had a big imagination and excellent memory."

In "Tom Sawyer," Twain wrote about a gang of pirates rumored to have left treasure in this cave, and he named landmarks, such as Aladdin's Palace after favorite books like "The Arabian Nights." For Lovell, as for generations of travelers, visiting the cave became as much an adventure quest as it was for Sam Clemens and his boyhood friends and fictional characters. She'd explore art on the walls and the signatures—some 250,000 of them throughout three miles of passageways. She found her own first name on the wall once, fortuitously just above the signature of "N. Rockwell" near the location artist Norman Rockwell made sketches for one of his paintings in 1935.

But for Lovell, the real treasure she sought was one signature in particular: that of the author himself.

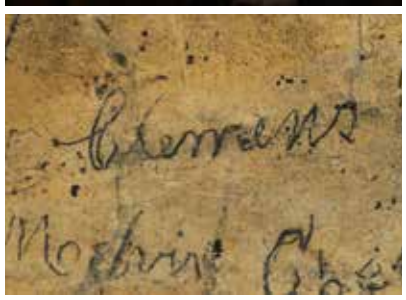
She and her friend Linda Coleberd, whose late husband's family owned the cave from 1923 until recently, frequently explored with flashlights. It was a widely known joke that any group she'd lead had to promise to hunt for the signature "Clemens." After searching the cave's walls on more than 100 occasions, Lovell said she'd almost come to believe that perhaps he had never signed his own name simply because his family was too poor. In Clemens' day, signing was typically done with candle smoke, and unlike many better-off friends, he couldn't squander candles needed for more practical use at home.

Then, on July 26, 2019, Lovell went on a cave tour with a group of scholars who had come to town for the quadrennial Clemens Conference. They had just passed a one-time hideout of robber Jesse James when she caught a glimpse of something as a flashlight beam passed across the walls. She called to Linda saying, "I think I see Clemens!" She didn't believe her eyes, but looked closer and saw the name in pencil—clear and recognizable as the signature she knew—distinct in the way other signatures appeared in smoke, pencil, paint or berry juice. (Pencils would have been easy to come by for a young boy who had to leave school when his father died to work as a typesetter to help support his family, she notes).

Experts later confirmed the authenticity of the signature and beyond that saw the initials S-A-M-L carved into the stone beneath. The news spread to so-called Twainiacs around the world, the cave set up a signature tour for those who had already explored but not yet seen the treasure, and Lovell focused on a continued quest: finding the signature of Tom Blankenship, the real child upon whom the character Huckleberry Finn was based. The cave, the boyhood home, and other places along the Mississippi that were frequented by the legendary author, remain Lovell's favorite sites to visit in Hannibal.

"To me, those places were already sacred ground," she said, "but the place where young Sam Clemens stood and signed his name in pencil on a cave wall was always the holy grail." —K.S.

BELOW: The labyrinth of 260 passageways that inspired Mark Twain's famous "The Adventures of Tom Sawyer," is open to the public, but there's a new holy grail inside thanks to a Twain historian and enthusiast who recently discovered the author's signature inside. Visitors can take a walking cave tour, watch a Mark Twain reenactor, take an adventure tour requiring crawling and headlamps, camp on site and more.



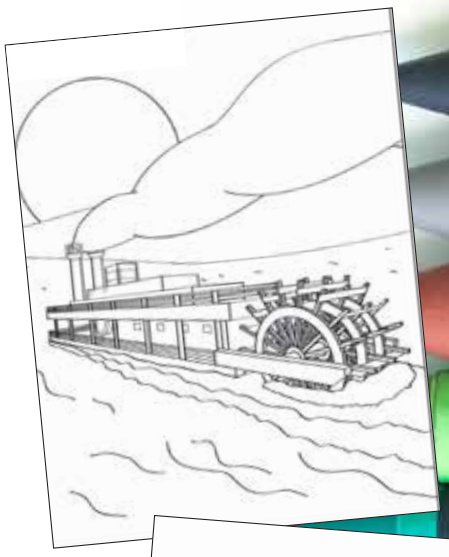
Book a cave tour: marktwaincave.com

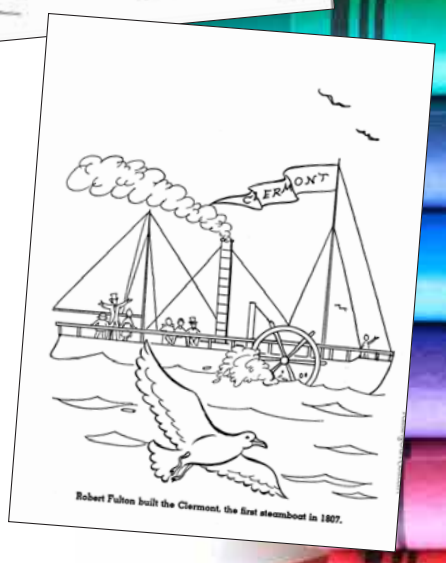
Mark the Twain

When Samuel Clemens (Mark Twain) was learning how to pilot a steamboat, there were no buoys to guide him or locks and dams to help him navigate the changes in depth. He needed to know a hundred landmarks for every mile of the journey so he could know the shape of the river at night. Every point, stump, limb, ridge, rock, or snag had told him something about the river. He had to steer for the slack water, staying close first to one bank and then the other. To find slack water, he had to know the shape of the river so well he did not actually need to see the landmarks. He also had to know the depth of the river in all places. This depth was measured by the pilot's leadsmen who constantly monitored the amount of water under the bow and stern of the boat.

To determine if water was deep enough to navigate, they'd "Mark the Twain." A leadman used a 30-foot-long weighted rope to measure distance to river bottom and would shout out what he'd measure. "Mark Twain" was the call made when the boat was in safe water of two fathoms or 12 feet. It's no coincidence then that this former steamboat pilot chose the name Mark Twain for his pen name. SOURCE: OUR MISSISSIPPI TEACHER'S GUIDE

Color these steamboat coloring pages, available for free download at **coloring-top.com/node/2078.** While you color, imagine being the pilot's leadsmen, measuring the water depth all along the journey.





Tours showcase 'risk v. reward'

"NOW, IMAGINE A 20-FOOT WALL OF WATER," says Barbara Johnson, founder of The Great Delta Tour Company, as she looks out across seawater that is barely higher than the land she's standing upon. Her words conjure up a sense of vulnerability.

Nothing nearby is twenty feet tall, perhaps a couple of stilt houses in the distance. A memorial to the St. Bernard parish victims of Hurricane Katrina stands nearby. But that infamous storm surge is but one player in a larger story showcased on a most unusual tour that's so popular that a new cruise line even offers it as a New Orleans day trip option.

Thanks to various factors, environmental and human, one million acres (25%) of the Delta's wetlands, forests, and barrier islands have been lost since 1932. That's a football field every 100 minutes. Yet residents and visitors persist—and for many important reasons.

Johnson's mission with the new tours is to champion the efforts to rebuild and protect the land, and also emphasize the sense of fun and pride that's made living here worth the risk to generations from a melting pot of cultures and lifestyles.

The work of the U.S. Army Corps of Engineers is evidenced as tourgoers pass through massive gates in a U.S. Army Corps of Engineers floodwall, which connects further on with the "Great Wall of Louisiana," a 1.8-mile concrete-and-steel wall. The barrier stands 26 feet above sea level to combat future storm surge coming in from the Gulf. Completed in 2013 at a cost of $1.3 billion, it is the largest civil-works, design-construction project in the history of the Corps. That "fortress," as she calls it, protects those tourgoers will later meet.

At lunch, far from Bourbon Street, Johnson's tour participants line up with locals at a roadside restaurant for fried local seafood po'boys or crawfish on platters in large scoopfuls. The next stop, along a canal in the fishing village of Yscloskey, finds a pod of pelicans gathered on shore to watch workers haul oysters, shrimp, and crab off the boats. They work under metal-roofed pavilions still showing storm scars they can name like temperamental neighbors. "That was Zeta. This was Ida."

Don Robin, an oyster harvester here for 50 years, is part of the fifth generation of the Isleños culture, descended, as 40% of residents in the parish are, from Canary Islanders who settled here in 1778–1783. Robin thrusts a cane pole into the water to demonstrate how to find oysters, chats about the challenges of his work and the delta environment, and grills some of his tasty harvest for his guests.

Travelers also learn about land restoration efforts: the National Guard using Black Hawk helicopters to airdrop old Christmas trees into Bayou Sauvage to trap silt and create habitat. Mud from the bottom of Lake Borgne is pumped up to build back coastline.

While history here is fascinating, there's no substitute for meeting the folks who accept the risks and challenges of living in an environment susceptible to hurricanes and flooding. In Sandy Beach, new buildings stand on 20-foot stilts, the minimum height since Katrina. Johnson calls life here an interesting dance.

"There's the tension between risk and reward or risk and resources," she says. "This is too good, the richness of this nature and what it offers, 'I'm willing to take a risk to invest and live here. It doesn't get any better.'"

The wildlife refuges and abundant birdlife are draws in themselves, but it's a love for perpetuating that "dance" that Johnson hopes to pass along. Raising awareness gets more people engaged in projects like coastal plantings, and the tourism dollars supplement incomes.

"I really think New Orleans can be a global destination where we celebrate nature, ecotourism, and stewardship of our environment," she says. But don't just take her word for it; let the locals convince you. —K.R.


Crawfish boils let tour-goers taste the culture.

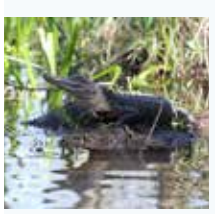

The bayou


Mississippi Meanders, a 70-foot glass bridge

TOURS SHOWCASE DELTA CULTURE

Cajun Cooking Lessons with Spuddy Facheaux are all about the fun—and Spuddy's stories of life and food spun in his authentic accent—that you'll want to volunteer to stir the roux, and to taste all. CAJUNCOOKINGEXPERIENCE.COM

Go with **Cajun Man's Swamp Tours and Adventures** (Captailn Billy), and you'll float to cajun tunes and swamp tales through cyprus swamps and bayous, past graceful birds and ancient-looking gators.



Cruise to the sounds of New Orleans jazz with dinner options on the Steamboat *Natchez* or newer *City of New Orleans*—and be so glad you did. CAJUNMANADVENTURES.COM

Even cocktails come with colorful tales, as you'll learn at the **Sazarac House: Museum of the Cocktail** in New Orleans with its interactive exhibits, virtual reality and real tastings; this spirit is credited to a Creole apothecary who emigrated from the West Indies and set up shop in the early 19th century. SAZARACHOUSE.COM

And a tour of the **1811 Kid Ory Historic House** shares two noteworthy history chapters: the 1811 rebellion of enslaved people and the dawn of jazz. 1811KIDORYHISTORYHOUSE.COM

Book a Delta Discovery tour or private birding trip: thegreatdeltatours.com

New scan-and-pay system debuts at some Corps rec areas

Want to camp at certain U.S. Army Corps of Engineers campgrounds or use a boating ramp? You may need your smart phone.

In partnership with Recreation.gov, a few U.S. Army Corps of Engineers recreation sites including some in the Rock Island and Vicksburg districts are testing a new scan and pay method.

The Vicksburg District launched a pilot at Lake Ouachita and Lake Greeson in 2020 as a way to minimize contact between guests and rangers during the height of the COVID-19 pandemic. The district is continuing to use the QR code-based feature of the Recreation.gov mobile app as the way visitors need to pay for sites at the Bear Creek, Arrowhead Point and Star of the West recreation areas.

In the Rock Island District, Bulger's Hollow, Cattail Slough, Clark's Ferry and Shady Creek recreation areas are using the self-registration process.

Lake Ouachita has discontinued the use, temporarily, after a pilot project found that while

it was for the most part successful, it was troublesome for customers with outdated smart phones and for those who didn't realize they needed to download the Recreation.gov app before attempting to use the new pay system.

Note: Scan and pay does not allow reservations, and visitors must be physically present. The QR code and confirmation number serves as proof of purchase during the stay.

Our Mississippi
PARTNERING TO KEEP AMERICA'S RIVER GREAT

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US Army Corps of Engineers, St. Paul
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Happy Birthday, St. Louis District!

The "heart" of the Mississippi Valley Division—the St. Louis District—is celebrating 150 years of helping navigation and the environment at the crossroads of three major river systems: the Illinois, Mississippi and Missouri. The roots of the 28,000 square mile district date back to 1937, when a young lieutenant was sent to study navigation-related harbor problems. The mission grew when Congress recognized the relationship between navigation and flood control. Today, the district focuses on navigation, flood control, environmental restoration, hydropower and recreation with its network of locks and dams, channel improvement structures, wetland improvement projetcs and diversity of wildlife habitat. It even operates the National Great Rivers Museum in Alton, Ill. Fun facts:

- More than 6,700 acres of habitat are being improved in current district construction projects
- The district monitors and protects more than 2,800 historic property sites
- The District's Mandatory Center of Expertise for the Curation and Management of Archaeological Collections provides expertise in curating collections, mass graves investigations, forensic support to government agencies and more.
- Lt. Robert E. Lee arrived to restore and protect the harbor in 1837; construction began on Lock and Dam 26 in 1934.

Through 1886, the primary mission of the St. Louis Engineer Office was to improve navigation on the Mississippi by maintaining an eight-foot channel on the Middle Mississippi through permanent improvements – dams to close chutes, dikes and jetties to contract the channel, hurdles to build up the banks, and revetment to protect the banks. From 1875 to 1881, the district protected banks with woven willow or cottonwood mattresses.

More than 100 million tons of commodities annually pass through the Port of St. Louis, saving more than $1 billion in transportation shipping costs.

Commission trip a success

The Mississippi River Commission traveled on board the Motor Vessel *MISSISSIPPI* throughout early April on the annual spring high-water tour, holding public meetings in Caruthersville, Missouri, Memphis, Tennessee, Greenville, Mississippi and Baton Rouge, Louisiana.

They gathered public testimony and answered questions but also toured sites initiating cleanups, unveiling floodwalls, planning new lock construction and more. Gen. Diana Holland, the Mississippi Valley Division Commanding General and Mississippi River Commission President, chaired the meetings.

"The Commission has the opportunity to see the condition of the river, from the same vantage point as the people who live and work in this watershed," she said. "Likewise, those citizens who depend on the river and who are protected from flooding by the Mississippi River and Tributaries project can express their concerns directly to the federal government, unfiltered, through the Commission. It is democracy in action."

Our Mississippi

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