Our Mississippi

PARTNERING TO KEEP
AMERICA'S RIVER GREAT

SUMMER 2020

Creating connections

FROM ITS HEADWATERS near Lake Itasca in Minnesota to its meeting with the Gulf of Mexico in Louisiana, the Mississippi River flows, bringing sustenance, commerce and recreation opportunities. Sometimes welcoming, sometimes destructive and always ever-present in the lives of the people who live along its banks, the river has sparked artists' imaginations since the Native American tribes living on its banks incorporated river motifs into their clothing, blankets, robes and drums.

But as the centuries passed and nearly 130 cities sprang up along the Mississippi, in many places something happened to the relationship between the people and the river. With floodwalls, levees and heavy industrial builds at river's edge, in recent times "there has been a huge disconnection over the years," according to Baton Rouge artist and landscape designer Taylor Jacobsen.

ABOVE: The reflective *Sing the River* sculpture in Baton Rouge draws visitors who can see themselves inside with the river as backdrop or listen to sounds that change as the river moves.

PHOTO: ATHENS SILABAN.

On a road trip that Jacobsen took to survey the length of the Mississippi, he found places all along the way that are changing that reality, by using art installations to help give residents and tourists a renewed sense of the power, grandeur and beauty of the river.

Artists hearing the call of the river muse are changing the way we see America's greatest waterway

"There are some cities that are intentionally changing their river culture, with urban revitalization combined with art, designed to revitalize the water's edge and to start the conversation of getting people back there and closer to connecting to the river through art," he said.

"A big revitalization project can take ten years, at a great cost. But what I always tell people is that art is so quick, it's so cheap, and it has such an impact to the visual space, often virtually overnight. Art is just very natural for human beings to understand. It's something that's been around for 30,000 years. Creativity, art. It's human nature."

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Our Mississippi River Basin

CLOCKWISE FROM TOP LEFT: In the Mississippi River Sculpture Park in Prairie du Chien, Wisconsin, artist Florence Bird's works honor historic contributors to the river including a Sauk warrior and a voyageur; Baton Rouge artist Taylor Jacobsen's work focuses on connecting people with rivers through art; the *Red Stick* sculpture at Southern University honoring the city's name; and below: another view of *Sing the River* and a close-up of a Vicksburg waterfront mural.

Art + The River = Emotional Health

Studies have proved that getting in touch with nature is essential for human beings to relieve stress, anxiety and negative feelings and to bring a sense of overall wellbeing. art often evokes a similar response, adding emotion and knowledge to those feelings. Those realities are things that renowned Minneapolis artist Alyssa Baguss brings to her work, work that has always been closely tied to nature and the big river that flows nearby. She recently received a $10,000 grant from Forecast to create art directly on the Mississippi River, in a program she calls Open Water.

"I'm a superfan of the Mississippi River," she admits with a laugh. "I've always lived close to the Mississippi River and there's just something about it that is intriguing. It's so culturally important to the Midwest, and particularly in the Twin Cities and the history of the cities, but for me, it's kind of this central natural feature. It's always there, you can count on it, you know where it's going. And there aren't that many things in life that you can count on in that way."

Open Water is "a series of experimental buoyant happenings aboard the Minneapolis Water Taxi," Baguss explains. "It is a one-hour experience on the river. It's for an artist to get on a little boat with six or less guests, and do whatever they want for an hour, in some relationship with the river. And it's an opportunity for them to play and fail and experiment and relax, which is something we don't get to do a whole lot when it's an opportunity to create work."

That innovative project puts the artist right into the river, while most other cities (including Minneapolis) are going a more traditional route to helping people relate to both the natural wonders of the river and the creative benefits of being exposed to all kinds of artworks.

From Minneapolis to Baton Rouge: creating connections

In Minneapolis, near where the Mississippi River begins, different art projects along the river have been a part of the city's DNA since 1994. That's when the Adopt-a-River Trash Sculptures program began, pairing river cleanup volunteers with artists. In place until 2015, the program challenged artists to create "trash sculptures" from garbage collected from the river, with the resulting creations shown at the Minnesota State Fair. While that program is no more, seven sculptures are permanently installed around the city, including "The Industrious, Cooperative Ant" in place on the river trail in South Saint Paul and the riverside "Dragon Fly" at Lock & Dam #2 in Hastings.

These days in Minneapolis, John Hock spearheads the River First Gateway Sculpture Trail, an ambitious project in the Northeast Minneapolis Arts District. With "about 15 sculptures in place" right now, Hock and his cohorts at the NE Sculpture | Gallery Factory are planning many more installations, including works in parks along the riverbank. "Over the next five years, we should have sculptures all over the district," Hock says.

In Prairie du Chien, Wisconsin, visitors enjoy the Mississippi River Sculpture Park, where artist Florence Bird is creating bronze sculptures that reflect the people who have made important contributions to the history of the area. Six sculptures are currently on display, including "Black Hawk," the Sauk war chief; "Voyageur," her homage to the river paddlers of the 19th century; and "Emma Big Bear," for a well-known Winnebago tribe artist whose work was influenced by her river experiences.

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>
> —Taylor Jacobsen

Further downriver in Dubuque, Iowa, lies the Mississippi Riverwalk, a gorgeous riverside walkway that boasts an ambitious annual sculpture exhibit celebrating the relationship between art and the river. Since 2006, the city has commissioned ten sculptures for placement along the riverwalk; this year's installation "focuses on artists and artwork that draw inspiration from the people, culture, beauty and magnitude of the mighty Mississippi River."

In Cape Girardeau, Missouri, more than 18.000 square feet of the downtown floodwall is covered in "Mississippi River Tales" murals created by Thomas Melvin in 2005, including 24 panels that tell the history of the city and the river region surrounding it. It's a city that loves murals, with a massive "Welcome to Cape Girardeau" mural welcoming river traffic also painted on the river wall, as well as more floodwall murals that honor the Missouri Hall of Fame.

Along Levee Street in Vicksburg, Mississippi, a collection of 32 murals by Robert Dafford draw visitors to the floodwall along the river. Unveiled beginning in 2002, the popular murals tell the story of the city's commercial and cultural life, dating back to the founding of the city.

And in Baton Rouge, where Taylor Jacobsen has created a "HeART Trail" walking path for locals and tourists alike to enjoy, he's put the start at the river's edge, where one of the Mississippi's most impressive sculptures resides. That's the "Sing the River" stainless-steel work created by artist Po Shu Wang and placed in late 2019. Designed to be integrally connected to the river via sensors, they allow the sculpture to actually play music that reflects the rise and fall of the water.

That beautiful piece regularly draws crowds of hikers and bicyclists who pose before its fun house-like mirrored effects, capturing their own likenesses coupled with reflected images of the river. It might also be the most evocative of all the artwork that calls the Mississippi River banks home, singing out a suggestive tune that just might spark the muse in yet another budding artist who hears the siren song of the mighty Mississippi, a river that's called to artists since time immemorial. —J.P.

The Veterans Curation Program helps preserve cultural artifacts while also bridging a gap into civilian life.

Heroes Preserving History

Since Combat Veteran Dustin Wood can remember, he's been intrigued by archaeology. Dinosaurs piqued his childhood curiosities, and then he became fascinated by ancient civilizations.

So, after five years of service in the U.S. Marine Corps, Wood began to think about how he would define this next chapter of his life as a civilian. An internet search—"archaeology for veterans"—led him to the Veterans Curation Program, and, in 2019 he moved from Wisconsin to Missouri to take part in the five-month paid program that aligned with his passions. In a St. Louis laboratory, stocked with high-tech equipment and ancient artifacts, Wood learned how to clean, photograph, and catalogue precious archaeological collections belonging to the U.S. Army Corps of Engineers.

"The chips fell into place, and I knew this was where I was meant to be," says Wood, who joins a cadre of 646 veterans who have been trained and employed by the Veterans Curation Program since its inception 11 years ago.

The St. Louis District's Mandatory Center of Expertise for the Curation and Management of Archaeological Collections (MCX-CMAC) developed the Veterans Curation Program back in 2009. Previously, Dr. Michael (Sonny) Trimble, the program's founder and former director, was performing an archaeological feat: the Iraq mass graves excavation. In the desert, he was gathering evidence that would support genocide charges against Saddam Hussein. Trimble, a Corps archaeologist, came back to the states, wanting to serve those who had served him over in Iraq, keeping him safe as he worked in dangerous locations.

Artifacts that come into the labs include historic flood photos; remnants of ancient Native American tribes, like effigies portraying animals important to the Mississippi River region; historic military garb from the Civil War Era; and ammunition from early wars.

FROM LEFT: U.S. Marine Corps combat veteran Dustin Wood, pictured top right under a photo of a rare Civil War-era dog tag, was able to transition back to civilian life in a way that incorporated his childhood love of anything ancient through the U.S. Army Corps of Engineers' Mandatory Center of Expertise for the Curation and Management of Archaeological Collections. Also pictured: the 2019 graduation class and the group in cleaning and mending training.

The idea behind the program? Heroes are helping to preserve history.

A primary goal of the program, says Jennifer Riordan, MCX-CMAC and Veterans Curation Program director, is to provide a stepping stone for veterans as they transition from military careers to the public sector. Ninety-one percent of the graduates land jobs or enroll in college at the completion of the program.

Not only do veterans bring an attention to detail to the lab, but they are also eager to learn new skills, Riordan says. "This is all new to them, but they dive in with energy and enthusiasm, and the environment in the lab is very positive," she says.

Kim Blanke, a Marine veteran who went through the VCP, is now an assistant lab manager in the St. Louis facility.

"I get to experience the same brotherhood in the lab that I did in the Marines," says Blanke, who enjoys mentoring fellow veterans who are transitioning from the military into new careers.

American Recovery and Reinvestment Act funds were used to establish the first three main VCP laboratories in Augusta, Georgia; Alexandria, Virginia; and St. Louis, Missouri. Over the years, the VCP has opened another main laboratory in San Mateo, California, as well as opening up smaller satellites, including ones at Washington State University in Pullman, Texas State University in San Marcos, and the University of Arkansas in Fayetteville.

Artifacts that come into the labs include historic flood photos; remnants of ancient Native American tribes, like effigies portraying animals important to the Mississippi River region; historic military garb from the Civil War Era; and ammunition from early wars.

Recently, technicians in the St. Louis lab processed a Civil War–era dog tag (PICTURED, TOP) that was discovered during excavations at Fort Ellsworth, Kansas, Blanke says. Made of brass, the tag is stamped with the initials LPW and the number 7, which possibly refers to the 7th Iowa Cavalry (1863–1866), which established the fort. The team looked at muster rolls and believe the tag belonged to Lewis P. Wall, a sergeant with those initials. While it's impossible to definitively link the artifact to Sgt. Wall, it demonstrates the human connection that makes archaeology so fascinating.

"As veterans, it's really nice to be able to preserve that history," Blanke says.

The skills veterans learn in the lab are valuable in a variety of fields, and graduates have gone on to take jobs as managers, photographers, working in the culinary arts, or pursuing careers with federal agencies like the Transportation Security Administration or the U.S. Census Bureau.

For Wood, though, the time in the lab helped him better hone his skills in the field of archaeology, further fueling his interest. While in the program, he was receiving encouraging feedback about the quality of his photographs. Now, he's working as an image specialist for a Hawaii-based company Na Ali'i, digitizing casualty records from World War II and the Korean War.

He credits the Veterans Curation Program for giving him the skills to do this important preservation work. Not only does the work he's doing fit his interest, it's meaningful to Wood, who was stationed in Iraq.

"I feel as though I'm doing my small part by helping soldiers' families find peace, and maybe some answers," Wood says. "Every record I go through is another person's life. I lost friends when I went to combat, so I understand that every file I go through is someone who didn't make it home to their family. I want to help them find their way home." —B.A.

The wilderness within

Sharing a special view of the Lower Mississippi with tomorrow's paddlers and stewards

THE LOWER MISSISSIPPI RIVER captured John Ruskey's heart almost four decades ago. When he began exploring its back channels and islands as a 18-year-old from Colorado, he had never owned a canoe. But the beauty and power of the river hooked him.

"Without reading too much into it," he said, "it felt like the river called my name."

That experience opened a path he had never considered, creating a canoe company to help others get out and enjoy the wild places of the river. In 1998, he founded the Quapaw Canoe Company, the longest standing canoe outfitter and guide service between St. Louis and St. Francis, Louisiana. Ruskey and his guides lead more than 100 trips each year, connecting people with the unexpected wildness of the Lower Mississippi River.

Ruskey describes the Lower Mississippi as one of the most natural landscapes he's ever experienced. Despite being a major corridor for towboats, towns and industry sit far back from the main river channel behind levees. The backwater channels, floodplain forests, sandbars, and islands create a constantly changing wilderness, home to white-tailed deer, Louisiana black bear, and abundant waterfowl, fish and bird life.

A foundation of Ruskey's mission for Quapaw Canoe Company has been creating the next generation of river fans. Last year, his trips included 960 students in school, after-school, and summer programs. Most were middle schoolers and high schoolers from Mississippi, Tennessee, and Arkansas. But some come from as far away as Colorado Springs, San Francisco, Seattle, Milwaukee, and Andover, New Hampshire.

The Jackson Academy of Jackson, Mississippi, has become a Quapaw regular, ensuring each of its fifth graders can participate in an overnight trip. Students learn to paddle, camp, set up a tent, and use a sleeping bag. Some cook over a fire for the very first time in their lives. "A day trip or an overnight trip will turn some kids' lives around," Ruskey said. "They like the feel of being in a peaceful place and feeling protected and inspired by the nature around them."

This year marks the third season of a new outreach venture, the Youth Leadership summer camp, created in conjunction with the Lower Mississippi River Foundation. Quapaw Canoe Company also sponsors the Mighty Quapaws, an ongoing, on-demand apprenticeship program for youth from Clarksdale neighborhoods. Here, they learn to build a canoe and safely paddle it on the big river.

"Once the apprentice is at that level, they become a guide for Quapaw or go elsewhere," Ruskey said. "They all take a life-long connection to the river as they go into the wider world."

Ruskey stays in touch with a core group of the apprentices. One young man now in the Marine Corps recently shared in an email, "Man, I miss that river." Ruskey sees that sentiment as hopeful.

"When our youth start feeling strongly for the river, they can't wait to get back to that river," he said. "They are becoming the future stewards of the Mississippi. We're recognizing the formula for helping Mother Earth survive is pretty important, trying to create a better world in harmony with our youth." —D.D.

Get the River Guide

Ruskey calls it the "wilderness within," the thin strip of wild lands where the Mississippi River flows through the heart of the continent. He's carefully mapped and documented more than 1,000 miles of the river's wildest stretches in his Rivergator guide. RIVERGATOR.ORG

Recommended Trips

On these trips, dramatic bluffs rise above the swampy floodplain. Listed from shortest to longest, these reaches are also notable for their dramatic sunsets and sunrises.

- Chickasaw Bluffs (Osceola to Memphis): 48 miles, from San Souci Boat Ramp, just below Osceola, Ark., to Mud Island Harbor.
- Mississippi Hills (Natchez to St. Francisville): 98 miles, from Natchez-Under-The-Hill to the St. Francisville ferry landing.
- Missouri Hills (St. Louis to Cairo): Approximately 200 miles, depending on put-in and take-out. Consult Rivergator for options, and use caution through the Port of St. Louis!

View from the wheelhouse

Adam DeSimone, relief captain for the Marquette Transportation barge, the M/V Christopher Myskowski, has a view from the wheelhouse few get to see, especially when he's running from 11 p.m. to 5 a.m. He says, "You get an interesting perspective like the Eads bridge when it's foggy, hazy, raining. It's the oldest steel bridge across the Mississippi. James Eads was the designer, and Andrew Carnegie supplied the steel. It had the deepest caissons, over 100 feet and it's still some of the deepest to this day. And wildlife. I never knew eagles would swim. They pick up fish they can't carry and flap wings on the water like they're swimming. And the meteor showers out here are especially cool." His most powerful subject turns out to be the barges themselves—the 1,000 to 1,400 feet of grain, corn, wheat and soybean he pushes up and down the Mississippi River and Illinois Waterway. Here's what he sees as he catches the rainbow and bridge above Lock 15, the barges almost as richly colored as the sunset south of Dubuque, Iowa, and more.

Follow the captain: facebook.com/Through-River-Bears-eyes-101032468341334/

Helping the bugs we want in the river

FROM LEFT: Audrey Harrison examines a sample of river bottom sand collected on a recent research outing in search of clinging invertebrates. Harrison of the Corps' Engineer, Research and Development Center has been fascinated with the river's tiniest creatures since studying insects on which river sturgeon feed. She's now setting out to increase species abundance through a Corps Memphis District project that's adding wood to the river as a place for insects to cling.

"But this thing has knocked the romance out of piloting, to a large extent ... the peril of snags is not what it once was. The government's snag-boats go patrolling up and down, in these matter-of-fact days, pulling the river's teeth. They have rooted out all the old clusters which made many localities so formidable; and they allow no new ones to collect."

—Mark Twain on the U.S. Army Corps of Engineers

Mark Twain might be the lone Mississippi River pilot wanting more snags for the challenge and romance of it all. But he would have some surprising company in a group of microscopic critters key to the rivers' ecosystem and the biologists trying to give them a boost.

In a pilot project, the Memphis District of the U.S. Army Corps of Engineers is working with the U.S. Army Engineer Research and Development Center (ERDC) in Vicksburg to add woody debris back to the river. The goal is to provide places for the bugs key to the river ecosystem to "cling" and complete their life cycles. A companion study is looking at exactly what river substrate materials the tiny critters most prefer.

"Because we've lost that wood and we've engineered the river to move as much material out of the system as quickly as possible, we just don't have that structural complexity within the river channel we once had and that the river needs to maintain diversity levels," said Audrey Harrison, the ERDC biologist spearheading the project. "We think that's really had the biggest impact on clinging invertebrates, those that hold on to a structure for either shelter or feeding, whatever they need to be doing to complete their life history. The loss of wood has led to what we think has been a big decline."

With the help of grant funding, the Memphis District has stockpiled woody debris to place strategically in the secondary channel when river stages permit to colonize the micro-invertebrates and create more fish habitat.

Why this is needed

The need arises from that original mission of the U.S. Army Corps of Engineers—to remove trees and snags to make the river safer for the steamboats.

"Wood jams would cause wreckages and would delay navigation, and so that was the very first navigation improvement on the river, and that was in the early 1800s" Harrison said. "Then we did all the other things to the river. We straightened it, we built levees and we channelized the tributaries, and all the while the whole basin was being converted to agriculture. Our estimate is there's been about a 90 percent decrease in forest. So not only have we lost the wood that was already in the river, we've lost the forests that feed wood into the river. And wood is a really, really important feature of any flowing river system. It provides habitat and food for a multitude of organisms."

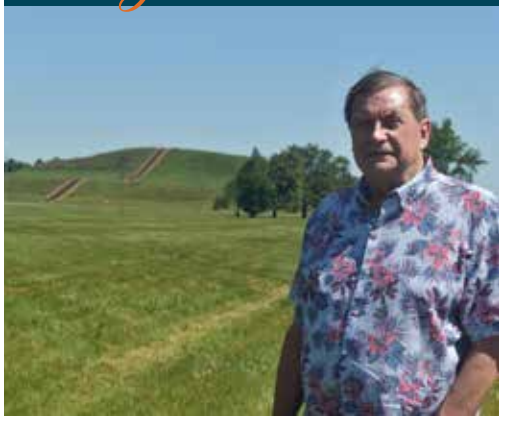
Mayflies, stoneflies and caddisflies or "clinging invertebrates" are the focus of Harrison's work. These smallest of the river's are indicators of good water quality—sensitive to environmental changes and pollution and used as indicators of ecosystem health. But while their presence or absence can be used as a benchmark for river health, they're also key contributors to nutrient cycles.

A grant from the U.S. Fish and Wildlife Service is funding the construction of the pilot wood trap. It'll be placed in a V-shape open to the flow of the river, connected with wire cables, fed initially with trees cleared from banks during river engineering work. The traps will continue to collect the wood that flows downstream.

A companion three-year colonization study funded by the Mississippi Valley Division's Lower Mississippi River Environmental Studies Program is looking at which of seven types of substrate materials—among them leaf packs, clay, gravel and rip-rap used to stabilize river banks—attracts the most clinging invertebrates by attaching cages containing each to a floating buoy. So far, natural substrates support the largest numbers and most individual invertebrates, Harrison says.

"Insects are the most abundant group of organisms on the planet, occurring in large numbers in aquatic environments," she says. "They have the ability to perform all these outstanding services for us—cleaning up the river, taking all the energy and taking it back into he terrestrial environment before it reaches our oceans and seas and estuaries and serving as food themselves for shorebirds and bats. The goal is, because we have suffered these losses, to try to (without affecting flood control or navigation) find ways to increase the structural complexity that used to be there." —K.S.

My MISSISSIPPI



Bill Iseminger, Archaeologist for 49 years at the Cahokia Mounds State Historic Site

"Since I moved to this area in 1971, the river has been part of my subculture. To be associated with that connection is important, but also to see the dynamics of the river as it rises and floods and drops, how it affects the ecology of the area, how it affects the people who live here. It is a massive force of nature.

"Cahokia Mounds preserves a portion of the archaeological site which originally covered almost six square miles and had about 120 mounds, and 80 remain. They were built by people of the Mississippian Culture. That is a term archaeologists use; we don't know what they called themselves or this place.

"The majority of mounds are temple mounds that had buildings on them—places where leaders lived, temples or other ritual and public buildings. The peak period of occupation was from about 900 to the mid-1300s, when up to 20,000 people lived here. It was very influential. Perhaps a new religion was starting here. There could have been a charismatic leader. It could have been the location itself.

"Cahokia is near the confluence of the Mississippi, Missouri and Illinois rivers. The rivers were important for transportation, communications and trade. The Mississippians relied on the fertile floodplain soils for their crops. The aquatic resources provided all kinds of fish and waterfowl. The whole ecosystem was essential to the people who lived here. In many ways it still is today."

Managing the Mississippi in changing times

Group looks at ways to manage more frequent floods and the sediment left behind

THE MISSISSIPPI RIVER and its tributaries are carrying more sediment away from their banks than even a few years ago. Floods occur more frequently, picking up more sediment that fills side channels and wetlands, leaving less capacity to absorb the next flood.

What can and must be done about that is the focus of a unifying plan created by the states of the Upper Mississippi River.

"Since about 2016 the states have been asking for a planning effort that addresses together water movement and sediment movement and how we manage the Upper Mississippi River to maintain the goals and purposes we set together, which include navigation, a healthy ecosystem and clean water," said Kirsten Wallace, executive director of the Upper Mississippi River Basin Association (UMBRA).

The UMBRA is an interstate organization formed by the governors of Illinois, Iowa, Minnesota, Missouri and Wisconsin to coordinate river-related policies and programs. It is preparing a report, "Keys to the River 2020," that will guide state and federal agencies in cooperative efforts to enhance the resilience of the economies, communities and ecologies with the river corridor of the Upper Mississippi River System.

"We are in a new paradigm," Wallace said. "For the last 10 years or so we have seen the watershed behaving differently. We have more flooding and more resulting damage. Communities that live along the river are struggling. They need to be there because we still need the river to work for us. We are trying to understand how our management structure should be set up to deal with how the river is acting now and we think it will act in the future."

Water and sediment have historically defined river policies, but they are creating ever bigger challenges—starting with water. That's true whether "that is a lot of water or not enough water and then how much sediment is coming in, where that sediment is going and how we get rid of it," she said.

First, the water

So far, 2019 has the honor of being the wettest year on record for the Upper Mississippi River. There's not only more water, there's flooding well beyond the spring flood pulse. When it doesn't drop in July, as it typically has, the floodplain forests sustain significant damage, and communities remain longer at risk.

On the other hand, Wallace says, "We are closer to drought than most people realize." Significant droughts affected portions of the Upper Mississippi watershed in 2012, 2014, 2017 and 2018. "People in the floodplain are more affected by flooding. That causes more damage to infrastructure than drought does, but drought has significant economic and ecological implications, too."

Then the sediment

Both the high volume and velocity of water moving from the watershed are causing greater rates of sedimentation to the river, Wallace notes. As the river's backwaters fill with sediment, its capacity to convey floods is limited, adding to the extent of flooding in the river. Flooding also causes erosion of the islands and river banks, further adding to the sediment problems down river.

It's also hard for districts to keep up with the dredging needed to keep the channel open for barge traffic. In the past five years, dredging totals are up 10 to 20 percent over previous years, says Paul Machajewski, the St. Paul district's dredge material manager. Each year, that district alone dredges 1 million cubic yards of sand. That's "if you're a football fan, something that can fill Lambeau field to the top."

Enhancing resilience

A suite of management techniques may be enlisted to enhance the resilience of the Upper Mississippi, Wallace said, including "new infrastructure, maintaining existing infrastructure, floodplain connectivity and restoration, dredging backwaters and wetland restoration of side channel connections."

The long-term planning will be complex and sometimes contentious, involving multiple agencies and communities in each of UMBRA's five states, three districts of the U.S. Army Corps of Engineers, multiple levee districts and other federal agencies such as the Fish and Wildlife Service and Environmental Protection Agency. Resulting program proposals will compete for federal funding with programs proposed by other regions.

More importantly, communities with sometimes competing needs will be asked to reach agreement on plans that maximize benefits for the entire region.

"We are hearing from our levee communities that, without a system plan, it is a zero-sum game," Wallace said. "Pointing fingers will not be productive. We need to convene all the affected parties to get the right clarity of the issues and really think through the implications of various actions so that we ultimately create the right approaches to river management." —R.S.

ABOVE: The Corps' St. Paul District is disposing of excess dredged sand by using it to enhance aquatic ecosystems. It's constructing peninsulas and islands in Lake Pepin in Mississippi River's Pool 4 and in Pigs Eye lake in Pool 2.

KEY FACTS

- Heavy precipitation events have increased in intensity and frequency since 1901.
- Six of the 10 highest crests on the Mississippi at St. Louis have occurred since 1993, four of them since 2013.
- The frequency and intensity of heavy precipitation events are projected to increase over the 21st Century. Of forecasters' predictions, the "Lower Scenario" calls for a 10–20 percent increase in heavy precipitation events, the "Higher Scenario" as much as a 40 percent increase.
- Annual precipitation in the Upper Mississippi River has been below the previous long-term average only five times since 1990.
- More flooding is occurring in the fall. Historically, high fall flows occurred only periodically. In the past 40 years, wet fall seasons have been more common. In 2010 the Mississippi River at St. Paul rose above flood stage during the fall for the first time since the river gage was installed in the 1870s.

Crafting wildlife havens out of unwanted fill

In a making lemonade with lemons–type approach, the Corps is solving one problem—too much river sediment—by solving another: the need for river islands to solve a host of environmental issues.

WHEN THERE'S TOO MUCH SEDIMENT in one part of the river but it can be used to improve the river elsewhere, that's a fortuitous coincidence—especially when you've been granted special funding to make it happen.

The U.S. Army Corps of Engineers will use sediment dredged to keep the navigation channel open (its navigation mission) to create two island habitats on upper stretches of the Mississippi River to help with another Corps mission—to restore the ecosystem.

When construction starts next year, crews will use excess river sediment to create islands, in one case where the river once created them naturally. The islands will in turn block wind and wave action, reduce erosion and boost growth of aquatic plants favored by wildlife.

During dredging, that excess river dirt is deposited at holding sites purchased by the Corps, generally close to the river's edge, and available for use by local governments, for instance, for sanding icy roads. But these two projects offer unusual opportunities to use that sediment for the benefit of in one case, in another a popular recreation lake that sediment has been filling in, says Nathan Campbell, the civil works program manager.

In both of the new project areas—one just south of St. Paul, Minnesota, the other in Wisconsin's Lake Pepin—the way the locks and dams have impounded the river has left large open lakes without small spits of land and vegetation to block the wind and wave action. As a result, shorelines are eroding, and sediment-muddied waters blocking growth of plants that could be food sources for birds, fish and other life.

The Corps' Upper Mississippi River Restoration Program, now in its 30th year, was the pioneer of using islands to restore the ecosystem, creating 110 as part of 27 projects. At spots like Harpers Slough and Capoli Slough, both in Wisconsin, island building has improved habitat, increased water clarity, decreased erosion and brought back a wildlife haven. While a typical day count used to track an impressive 300,000 canvasback ducks in one survey area, that's risen to 700,000-plus where new islands were built.

The new projects (one out for bid, the other moving to the design phase) are funded by a different authority that allows for sediment to be beneficially used for aquatic ecosystem restoration, but they'll draw on lessons learned as well as extensive community input, Campbell says.

Pig's Eye and Pepin

In Pig's Eye Lake, named for a notorious early settler in the St. Paul region, the Corps found a project sponsor in the Ramsey County Parks. The county owns 500 acres of parkland surrounding the they've called an aquatic desert. Very little grows in the spot bordering a former Superfund dump site. But the vision is for a future wildlife preserve, one filled with frogs, fish and birds.

ABOVE: A work boat forms an island from dredged river material as part of a program that uses excess material to restore river features lost during impoundment for locks and dams.

The $15 million project would create a more natural habitat by moving dredged material from the lower pool to create six islands. The project still in the design phase would start next year and take four years to complete.

The Lake Pepin project was requested originally by the Lake Pepin Legacy Alliance and is one of only 10 in the nation to get pilot study funding and the only on the Mississippi River. For this, the sediment will be moved from Reed's Landing near Wabasha, a sediment storage site that is at capacity and needs room to hold additional river sand.

READ MORE
https://tinyurl.com/y75eza55

Here, the plan calls for the sediment to be crafted into four peninsulas. Sand would be deposited strategically in the river, capped with fine material, planted with topsoil and stabilized with rock veins. The plan additionally calls for dredging and shoreline protection. The dredging portion will provide water deep enough for fish to overwinter, and the dredged material will be used as topsoil to offer benefits for the floodplain forest and other plantings. —K.S.

The River Otter

Those who come to play on the Mississippi River share it with a resident who also seems to delight in frolicking on the water: the North American river otter.

An attentive paddler can spot otters swimming near shore in early morning or evening with their squarish heads and whiskered faces just emerging from the water. A raucous churring and snorting reveal the presence of a mother and her pups as they wrestle and splash in the pursuit of fish or each other. Even riverbanks and snow become slides for playful otters.

"Otters are one of my absolute favorites. You can't watch a river otter without thinking they have a fun time," said Kirsten Bartlow, Watchable Wildlife program coordinator with the Arkansas Fish and Game Commission. She regularly encounters otters in her work developing water trails on Arkansas rivers.

Historically, otters are one of the more widely distributed mammals in North America, said Tom Serfass, Frostburg State University professor and North American coordinator of the International Union for Conservation of Nature's otter specialist group. Otters are aquatic specialists, and their habitat is tied closely to inland rivers and lakes, though they are found in coastal waters and estuaries as well.

The extent of otters' presence along the Mississippi River is reflected in historical place names, from Ottertail Point on Leech Lake at the headwaters to Louisiana's Bayou la Loutre (French for otter) on the Gulf of Mexico. While the Mississippi River now hosts a stable otter population, that has not always been the case. Habitat destruction and extensive trapping caused middle Mississippi River states to lose their otters completely in the 19th and early 20th centuries. The otter's thick, dark brown fur was prized by trappers as a warm, water-resistant pelt.

"River otter population recovery has been substantial, and reintroduction has been successful," Serfass said. In the United States, 22 states have conducted reintroduction efforts. Most of the several thousand otters used in Mississippi River basin reintroductions came from Louisiana.

Some early reintroductions raised concern that otters would decimate game fish populations. But recent research shows river otters prefer slower moving fish that live nearer the bottom, such as suckers, over the species that human anglers pursue.

The renewed presence of otters is a hopeful sign for people as otters only thrive in clean water. They are carnivores, eating fish, crayfish, frogs, and turtles. Any pollutants found in its prey are concentrated in its body. "If you see otters, it is usually an indicator of a healthy and thriving ecosystem," said Abby Urban, curator of Living Collections at the National Mississippi River Museum and Aquarium in Dubuque Iowa.

The National Mississippi River Museum currently houses two young otters who came to the museum from Iowa wildlife rehabilitators. Because these pups became separated from their mothers too early, they did not learn the skills needed to return to the wild. They did learn to play though and seem to love chasing young visitors from one length of the exhibit to the other.

Otter keepers quickly become aware of their charges' inquisitive nature. Serfass tells the story of the day his otters flooded the third floor of the biology building. An enterprising otter escaped its pen, dragged all his bedding into the sink, and turned on the water. "They taught us to lock everything down and take off any knobs. They are very handy at manipulating things," he said.

Keeping such inquisitive creatures active is vital to their physical and mental health, Urban said. Keepers work with the otters so they will step on a scale for weighing and open their mouths on cue for a dental check. Every day, her otters must search for their food, sometimes hidden, sometimes buried, and sometimes frozen in ice.

Urban sees the otters in her care as ambassadors for their wild cousins and the conservation of all species that depend on water and wetlands. She encourages anyone interested in helping river otters to take simple steps to preserve water quality, such as participating in waterway cleanups, using pesticides and fertilizer sparingly, and keeping litter out of storm drains.

The return of the smart and lively river otter marks a success story for the Mississippi River and all who find joy there—and all want to keep it that way. —D.D.

Fun Facts about North American River Otter *(Lontra canadensis)*

- Second-largest member of the weasel family
- Swift and agile swimmers with long bodies, short legs, and webbed feet; propelled by feet or by tail
- Travel well on land, move best on snow by sliding from a running start
- Can close ears and nostrils underwater
- Size: up to 50 inches long with 18-inch tail; rarely more than 30 pounds.
- Age: Live 8–9 years in wild; more than 20 years in captivity.
- Range: Found from the tundra in Alaska and south over most of continental North America. Populations are sparse in the arid Southwest.
- Habitat: Lives in rivers and lakes but also in brackish and coastal areas, even found at higher elevations. Builds dens with underwater entrances in other abandoned dens or natural hollows.
- Life Cycle: Male and female are only together during mating season. Pups are born in March and April. Average litter is 2–3 pups but can be as many as 4–5. Pups remain with the mother for up to a year, learning hunting and swimming skills. Reaches maturity at 2–3 years old.
- For a live webcam of otters at the National Mississippi River and Aquarium (8 a.m.-5 p.m.), see rivermuseum.com/webcams

DID YOU KNOW?

The U.S. Army Corps of Engineers turns 245 this year. George Washington appointed the first engineer officers of the Army on June 16, 1775, during the American Revolution, and engineers have served in combat in all subsequent American wars.

Washington in His Uniform, John Trumbull, Yale University Art Gallery

My MISSISSIPPI

Jeffrey Farmer, navigational electrical engineer, Dredge Hurley, U.S. Army Corps of Engineers (and volunteer medical mask maker)

"We were already making some ear saver things and trying to figure out where I could donate them when my wife saw a post on Facebook, and we started making masks. I do the plastic frame you slide on your head, and Midsouth Makers (artists who give back) packages them with a clear plastic shield. I downloaded the software and started (3D) printing and making an average of 50 a week. If I have the time, I'll join them and help to package.

"The masks go to the Memphis Medical Society; a lot of nurses and doctors are wearing them in hospitals as extra protection. There was a shortage of the ones they could buy commercially, so us tinkerers, we started making them.

"Since 2008, I've worked at the Corps, the design branch for five years and the rest of the time with operations at the river. I do contracts and electrical upgrades and troubleshooting. I always like the water, I like going on the dredge, watching them operate. When I first started in navigation, I didn't realize how much commerce goes down the river, but you see those big cargo and oil ships offloading or getting loaded, and when the bigger ships come, the dredge has to get to the side of the river.

"I guess you would call me a tinkerer. Every year I have my lights connected to a local radio station, and they blink to the music. But this makes me feel good because I'm doing something for the community."

DOUBLE TROUBLE

Pandemic and Hurricanes

If you think you had it rough during the COVID-19 pandemic, know that Helena, Ark., Mayor Keven Smith just might have had it rougher. He was dealing with a flood, tornadoes, a compromised levee—and a pandemic. And he offered this advice to his fellow mayors and members of the Mississippi River Cities and Towns Initiative: be prepared.

"It's very difficult. We're better prepared now in the sense that we know what it's like. We also know how unprepared we were."

The coalition of Mississippi River mayors held a press conference on June's hurricane season opening day to discuss actions they're taking to keep river town residents and visitors safe from the virus while also protecting them from high water and hurricanes, potentially at the same time.

When his community was hit simultaneously by two storms and the first death from COVID-19, Smith says, it was exceptionally hard to "keep everybody mindful of the COVID issue and protection while helping people out of ditches and out of homes."

As hurricane season builds, he says he's reaching out to establish hotel contracts so that evacuees could be moved to hotel rooms if needed. Getting a stockpile of personal protective equipment like masks is key too, not just for first responders and public works employees but for those who work in food banks and other personnel.

"In America's small towns, it doesn't take much to have an impact," he said. "We have to prepare now. We can't wait until the event occurs."

The MRCTI itself has worked to help mayors better prepare. It purchased and distributed personal protective equipment (PPEs) to river cities for use by staff and volunteers dealing with hurricanes, floods or other natural disasters. Baton Rouge, La. Mayor Sharon Weston Broome, the Co-Chair of the MRCTI said she was appreciative of the organization's help. Her city is also preparing for the high probability of a major hurricane by applying lessons learned from other storm events, she said. During last year's Hurricane Barry, inundation mapping provided by the U.S. Geological Survey through a new Mississippi River disaster prediction portal enabled the city to make plans in case the storm had stalled and caused catastrophic impacts. Additionally, they'll apply procedures put into place during the H1N1 outbreak of 2019, a disaster that also overlapped with that year's hurricane season.

Cities can't be too prepared, according to forecasters at the National Oceanic and Atmospheric Administration (NOAA). They predict a 60% chance of above-normal hurricane activity in the Atlantic with a likely range of 13 to 19 named storms of which three to six could be major hurricanes with winds of 111 mph or higher this season.

New Orleans is one city taking no chances. Mayor LaToya Cantrell says the city has tweaked its city evacuation plan to incorporate pandemic-related distancing needs, securing more PPEs and doing additional outreach needed to allay potential fears should mandatory evacuation be needed.

"We had to make sure we have enough buses on hand and also solidified a partnership with Amtrak to get people out of the city should a mandatory evacuation be called," she said. "We're pushing back on complacency and getting people to understand that in the midst of this pandemic, you have to leave. Fears and anxieties are real in the community so people may feel it's safer to stay, and it's not. So we're doubling down on efforts." —K.S.

Tell your own *river story*

Like the classic stories of the Mississippi River, the best works of fiction have memorable characters and settings and a problem for your characters to solve. Three times, roll a die or pick a number between one and six. Based on the associated numbers, tell your own river tale to your family and friends.

FIRST ROLL Character	SECOND ROLL Setting	THIRD ROLL Problem
a two-headed river monster	on a paddlewheeler	found an ancient, unlucky coin
a fire-breathing sturgeon	at a riverside horse farm	chased by a flood
a young explorer	by a lake	fell off a raft
a lost, lone baby wolf	inside a lock and dam	separated from a friend
a riverboat captain	on an ancient burial ground	ate a poisonous fish
a grumpy bear	on a magical river island	lost his/her memory

Little House brought to life

Laura Ingalls Wilder was one of many authors who lets us all grow up along the banks of the Mississippi River. That's true if Pa is catching a "fish as big as Laura" out of Lake Pepin or the family is heading west in their wagon across the frozen Mississippi River into Minnesota to move to the property on Plum Creek.

In Pepin, Wisconsin, where Laura was born and her book *Little House in the Big Woods* took place, the Wilder museum helps your imagination come to life. You'll find a covered wagon just like the one Laura's family used to travel west. Go to Laura Ingalls Wilder Days, held most Septembers, to hear great fiddlers, watch the Laura look-alike contest, play pioneer games and take bus tours to the spot where Laura Ingalls Wilder was born. Just be sure to bring your bonnet!

Illustrator Cheryl Harness offers a variety of printable Little House coloring pages at her website: cherylharness.com/coloringpages.htm or buy the coloring book at ingallshomestead.com/shop

Mississippi River books for kids

Most people have heard of Tom, Huck and Becky, those best friends who had many adventures on the Mississippi River a long time ago, before our grandparents were born. Mark Twain's classic novels, *The Adventures of Tom Sawyer* and *The Adventures of Huckleberry Finn*, are two of the best stories ever written about life on the river. But don't stop there! Check out some other terrific Mississippi books.

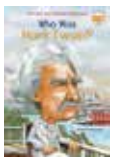
Many of these recommendations came from The Red Balloon book store in St. Paul, Minnesota.

The Mighty Mississippi, by Marion Dane Bauer. Learn about the river and its role in U.S. history in this level 1 ready-to-read book. AGES 4-6

Discover America State by State series. Find out interesting things about states that border the Mississippi through pictures and the alphabet. Includes B is for Badger (Wisconsin) and P is for Pelican (Louisiana), and many more from Sleeping Bear Press. AGES 6-8

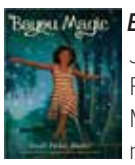
The Haunted Cabin Mystery (Boxcar Children #20), by Gertrude Chandler Warner. The mystery-solving Alden siblings visit Cap Lambert near Hannibal, Missouri. AGES 7-10

Where is the Mississippi River, by Dina Anastasio, Ted Hammond (illustrations). Part of the best-selling Where Is... series, this book tells about all kinds of people who have lived on the river and used it as a highway. It also has a cool fold-out map! AGES 8-12



Who was Mark Twain, by April Jones Prince, Nancy Harrison (illustrator), John O'Brien (illustrator). The creator of Tom, Huck and Becky had great adventures of his own. Read about him in this biography from the *Who Was/Is...?* series. AGES 8-12

Houseboat Girl, by Lois Lenski. The last thing 9-year-old Patsy wants to do is move to a houseboat on the Mississippi, but she and her brother and sisters learn to love the river. Written in the 1950s and based on real experiences. AGES 8-12



Bayou Magic, by Jewell Parker Rhodes. City girl Maddy finds magic in her surroundings when she visits her Louisiana grandmère. AGES 8-12

Minn of the Mississippi, by Holling Clancy Holling. This is the story of Minn, a snapping turtle who travels all the way down the Mississippi, from Minnesota to the Gulf. A Newberry Medal honoree, it tells the history of the river in text and pictures. AGES 10-12

Swift Rivers, by Cornelia Meigs. Back in the pioneer days, 18-year-old Chris needs to earn some money to take care of his grandfather, so he decides to float some logs down the Mississippi from Minnesota to the lumber mills in St. Louis. AGES 10 AND UP

Can You Canoe: A Mississippi River Adventure Album, by the Okee Dokee Brothers. Not a book, but terrific storytelling in song form for the whole family. Audio CD or digital streaming.

3 River Towns to Try

1


2


3


4


5


6


7

Go road tripping to these iconic charmers filled with river traditions, active adventures, biscuits and pie.

THE ROAD TRIP'S MAKING A COMEBACK, and there's no stretch more iconic than the Mississippi River's Great River Road. In 36 hours of straight driving, it's said you could make it from the road's beginning on a stretch of northern boreal forest at Lake Itasca, Minnesota to its end in Louisiana's Delta National Wildlife Refuge. But rushing is not what was intended when the route was created in 1938 as a combination of existing roads now identified by a green pilot's wheel with a steamboat in the middle.

On this route past storied cliffs, across ancient bridges, you can explore parks and overlooks, wineries and microbreweries, towns and cities alike. Here are three iconic river towns where you'll want to stop and play awhile.

Stockholm, Wisconsin

In this river hamlet (1), population 97, you'll find a thriving gallery scene, charming pie shops and cafes, festivals of art and film, and scenic Lake Pepin (2). Try your hand at yarn spinning—or just visit the sheep—at Black Cat Farmstead. Toast your good fortune at Maiden Rock Winery and Distillery, situated on one of the town's many scenic bluffs. In a normal year (check for cancellations this summer), the town's a draw for the WideSpot Performing Arts Center's performers in drama, music, comedy and storytelling; the Flyway Film Festival: and a popular art fair. Any year is a good time to stop by the Stockholm Pie and General store for a slice; *USA Today* called it one of the 18 legendary pie shops in America. Also a must is a sail on long, breezy Lake Pepin, which also became the birthplace of American water skiing when in 1922 a teen named Ralph Samuelson decided that "if you could ski on snow, you could ski on water!"

Alton, Illinois

The Corps' National Great Rivers Museum and the on-site Audubon Center at Riverlands are your access points to the natural world. Many species of bird, including the showy white pelican, stop off at this confluence of the Mississippi and Missouri rivers (3&4). At your stop, wander more than eight miles of bird-spotting trails or catch the Mississippi River Water Trail being developed by the U.S. Army Corps of Engineers and partnering organizations. If you don't have your own kayak or canoe, Big Muddy Adventures offers rentals and guides, and more. Book a full moon float or their Rivertime Supper Club trip on which you can paddle the 29-foot voyageur canoe, then search an island for arrowheads and eagle sightings before your gourmet campfire dinner.

Natchez, Mississippi

For southern culture, food and gracious architecture (5), it doesn't get better than you'll find among the antebellum mansions, historic attractions and modern microbreweries and coffee roasteries. But the must stops are for food. "Biscuit Queen" Regina Charboneau (6&7) teaches her secrets perfected in Paris in brunch cooking classes at her Regina's Kitchen Cooking School, or go for her burgers and bourbon pairing. New Natchez Heritage School of Cooking takes authenticity a step further with three generations of women teaching African heritage through cooking—and tales. —K.S.

The River of Barbecue

When it's time to fire up the backyard grill, why not turn to Mississippi River towns for inspiration. Like its people, the barbecue styles along the Mississippi are multi-layered, varied and fun.

The process of barbecue requires steady low and slow cooking that allows the meat to tenderize, connective tissue to gelatinize, and smoke and the Maillard reaction to flavorize. Change the meat, the wood in the smoker, or the style of sauce or rub, and you've got a totally different BBQ experience.

The best smoker woods are hardwoods that have been "seasoned," dried until all moisture and sap are gone from them. But that's just the beginning.

Memphis

Wet or dry? In Memphis that debate plays out at competing BBQ joints or even on a single menu. Pork ribs and pulled pork are the norm here, either smothered in sauce (typically tomato and vinegar-based) or seasoned with garlic, paprika, onions, cumin, and other spices, and served "dry" (though you still get sauce on the side for dipping.)

St. Louis and Missouri

St. Louis-style barbecue is known for its specially-trimmed spare ribs, but baby back ribs are also favored here. Meats are typically grilled, rather than set in a slow smoker, and smothered in a sweet, mildly tangy tomato-based sauce. Diners in St. Louis consume more barbecue sauce per capita than any other BBQ destination.

Kentucky

While pulled and chopped pork shoulder set in masonry pits for up to a day or more is popular, Kentucky also serves a lot of mutton (sheep) smoked and basted over hickory wood. The order comes with a "dip" and that varies by county: some prefer something with Worcestershire-sauce and spices, while others lean toward vinegar and cayenne.

Arkansas

Caught between Memphis and Texas, you can expect a little influence from each in the barbecue pit. Texas uses a red "mop" sauce, so-called for the way it is applied to the meat. Key ingredients are beef stock, vinegar, Worcestershire sauce, garlic and other seasonings, and it tends to be thinner in consistency. Brisket is king in Texas; pork reigns supreme in Tennessee. Here you can have the best of both.

New Orleans

This is the outlier. BBQ Shrimp NOLA-style is magnificent, but it isn't slow cooked in a smoker. Created in the 1950s at an Uptown restaurant called Pascal's Manale, the shell-on shrimp baked in a mouth-watering sauce came out looking a bit red, like barbecue sauce. The ingredients include a blend of butter, cream, Worcestershire sauce, white wine, garlic, cayenne, black pepper, Creole seasoning, and hot sauce, and while the folks upriver might thumb their noses at the name, this is not a dish to miss. —K.R.

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Designing protection inspired by nature

Fisheries biologists at the are working with engineers at the U.S. Army Corps of Engineers Research and Design Center to see if they can develop for humans something modeled after the unusually powerful and resilient snout of the paddlefish.

The paddlefish lives 30 years on average, and yet even the oldest caught among them had suffered very little damage to their rostrum. "They live in hydrologically and physically complex environments with rocks, pilings and trees. They make migrations of hundreds, even thousands of miles and yet the rostrum stays intact," says Jan Hoover, an ERDC biologist based in Vicksburg, Miss. "We were interested in that. What makes it so durable?"

Hoover has teamed with engineers to study both what makes it so durable and if that durability could be mimicked as protection for humans. There is tremendous military application, Hoover notes, in protecting infrastructure or the development of armor or protective shields.

Past studies have examined the swimming prowess of the fish to "bio-inspire" the design of underwater vessels. The current group is examining how force is disbursed along a skeleton that resembles mesh but is actually made up of star-shaped bones. Like a snowflake, each is a different shape and size. The fish survives decades of hydrologic forces and at high speeds and bumps into rocks. Says Hoover, "It's also extremely lightweight. If you could replicate a material like that, it would be readily transportable but highly protective." —K.S.

Division welcomes its new commander

Maj. Gen. R. Mark Toy transferred command of the Mississippi Valley Division of the U.S. Army Corps of Engineers to Maj. Gen. Diana M. Holland in a formal change of command ceremony that was live streamed from the division headquarters in Vicksburg.

Toy, division commander and president of the Mississippi River Commission (MRC), is moving to a new post after having been assigned as the Chief of Staff, United Nations Command, Republic of Korea.

Holland comes to Vicksburg from Atlanta, Ga., where she served as commander of South Atlantic Division. As MVD's 41st commander, Holland will be responsible for the Corps' water resources programs in a 370,000-square-mile area that includes portions of 12 states; its boundary extends from Canada to the Gulf of Mexico. District offices are headquartered in St. Paul, Minn.; Rock Island, Ill.; St. Louis, Mo.; Memphis, Tenn.; Vicksburg, Miss.; and New Orleans, La.

Send story ideas to editor@ourmississippi.net

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Our Mississippi

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