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Can table scraps save a sinking coast?

LOUISIANA OYSTERS are arguably some of the finest in the country, which is why thousands are eaten every year in New Orleans restaurants. But who knew enjoying Big Easy bivalves would help protect and restore Louisiana's disappearing coastline?

The Coalition to Restore Coastal Louisiana (CRCL) has developed a program that collects used oyster shells from participating restaurants and uses the shells to build reefs along the coastline. To date, the program run by volunteers has created five coastal reefs and returned several million pounds of oyster shells to their original habitats.

A Coastline In Peril

It's not breaking news that Louisiana's coastline is disappearing—more than one million acres of wetlands and barrier shoreline lost since 1900. The wetlands and marshes that line Louisiana's border with the Gulf of Mexico make up prime habitat for fish and wildlife, plus the coast buffers inland cities from destructive hurricane winds and storm surge. Without human intervention going forward, the state, it's estimated, could lose a section of coast the size of Rhode Island by 2050.

Enter the Coalition to Restore Coastal Louisiana and its innovative Oyster Shell Recycling Program. The advocacy group started in 1988 to address Louisiana's land loss through legislation has evolved to include education and hands-on volunteer programs like this which collects



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FUN FACT

Louisiana is the top harvester of oysters in the United States, with 1.68 million acres of public oyster grounds and 400,000 acres in private oyster leases. Every day, 1.3 million Louisiana-produced oysters are consumed somewhere in the U.S. SOURCE: LOUISIANA WILDLIFE AND FISHERIES

CLOCKWISE FROM TOP LEFT: Volunteers working through the Coalition to Restore Coastal Louisiana place recycled oyster shells along an area chosen because it's culturally important or at high risk of coastal erosion. Recycling companies collect shells donated by New Orleans restaurants (after the oysters are consumed by customers), and 100 percent of the shells are returned to Louisiana waters. The program with the motto "Once you shuck them, don't just chuck them," has restored some 8,000 feet of oyster reef living shoreline with the recycled shells.

used oyster shells from New Orleans restaurants. Volunteers then plant bags of used oyster shells off the coast to create new oyster reefs.

"CRCL's still an advocacy group, but it's a way to engage people to take advantage in helping protect the coast," said Darrah Fox Bach, Oyster Shell Recycling program manager.

CRCL has been planting native grasses and trees along coastal waters since 2000, but the organization longed for a fisheries component, Bach said. In 2014, they began the shell recycling program, enlisting help from the seafood industry, primarily restaurants serving oysters in New Orleans. And there are many.

CRCL provides bins for restaurant oyster shell collection, and R&R Recycling Company in New Orleans retrieves the bins three to five times a week.

"It's really important that it's part of the restaurant's daily routine," Bach said. "We provide that resource loop."

Recyclers deposit the shells on nearby St. Bernard Parish land arranged through the Mereaux Foundation. This "engagement site" allows for volunteers to assemble 30-pound sacks of oyster shells. CRCL then works with indigenous tribes along the coast to find locations for the manmade oyster reefs, choosing either cultural sites important to the tribe or areas experiencing a high rate of coastal erosion.

Now in the program's sixth year, CRCL has worked with the Pointe-au-Chien Indian Tribe, the Grand Bayou Indian Village and Grand Caillou-Dulac Band of Biloxi-Chitimacha-Choctaw. Tribes hire boat captains from their membership, volunteers load the sacks onto the boats and then place the reef's "building blocks" within the water.

The newly created reefs—sanctuary reefs, not ones for harvesting oysters allow free-floating oyster eggs to attach to something to grow into new oysters. Oyster shells provide that ideal home, Bach said, and provide a seed ground for oysters to grow.

Since the program's inception, CRCL has developed five thriving reefs and recycled 14 million pounds of oyster shells. About 228 tons of shells were bagged in 2023 alone.

Currently, 30 New Orleans restaurants participate in the project. For Ryan Prewitt, executive chef and partner of the city's Peche Seafood Grill, the program filled one of the restaurant's challenges since in the beginning they threw away barrels of oyster shells.

"We started looking around and saw a problem with throwing the oyster shells in the trash. I was naïve to think you could just throw them in the bayou," Prewitt said with a laugh. "But you can't do that."

Peche uses two smaller recycling bins, due to the weight of the shells, which are picked up three times a week. CRCL charges a nominal fee for the service.

"It's astonishing," the James Beard Foundation winner said of the program. "These types of things are a no-brainer. The oysters grow on the shells. The oysters help clean the waters. It's amazing."

Another benefit for restaurants—one that Peche takes advantage of—is the state tax credit signed into law this year. Louisiana restaurants that recycle

their oyster shells may receive a tax credit worth \$1 per 50 pounds of shells recycled, not to exceed \$2,000 annually.

Giving Back

Mary Julia Klug wanted to help her home state so she signed up for the oyster recycling program. An email from CRCL explained the job, what to wear and, most importantly, what to expect.

"Volunteering for the first time can be nerve wracking, but I felt really prepared," she said.

The annual giving strategist for the LSU Foundation drove from Baton Rouge to Violet, a small town east of New Orleans, where a "CRCL super volunteer" gave a presentation on how important the wetlands are to Louisiana and how fast they are disappearing.

"It was really interesting and eye opening," she said of the program. "The photos he showed us made it real."

Along with around 30 other volunteers, Klug was part of the first round of oyster recycling. She perched on plastic tubes with oyster sacks at one end and with a hand-held rake slid oysters into the sack until it reached 30 pounds. After lunch, the volunteers stacked the sacks in a pile for other volunteers to load on to boats to be placed in the water. Klug has plans to be part of the reef-building trip, which is scheduled for this fall.

"It's one of the our most popular volunteer engagement projects," Bach said. "It's really fun. People can say, 'I helped build a living coastline." Bottom line for Klug was helping to fight Louisiana's coastal erosion.

"The more I can do to make the state better, I will," she said. "Whatever I can do to help, I will."

Not Too Late

There's data to prove that the recycling program is working, Bach said. CRCL monitors the reefs and charts oyster growth. They also look for other species that use the reefs as habitat.

"We've seen satisfactory monitoring results," Bach said, adding that reefs also provide a barrier that has helped protect more than 8,000 feet of coastal shoreline. "We can positively say that the reefs are protecting the marshes."

The additional benefit of the program—like the several run by state and federal partners including the U.S. Army Corps

of Engineers—is that it gives volunteers personal connections to nature, instilling a desire to both take action and to see not only Louisiana's coastal problems but the possibilities.

"It's a small-scale activity to show how it can be a solution," Bach said. "We hope that it will give hope that it's not too late, to see that there's a reason to engage in coastal restoration because there are tangible solutions out there."—C.C. CRCL is now looking to expand into the Baton Rouge restaurant scene, and later throughout the state. Restaurants looking to join the program need only sign up on the CRCL website: CRCL.ORG/ OYSTER-SHELL-RECYCLING.

Positioning the Mississippi for the next century and beyond



Brigadier General (BG) Kimberly Peeples

started her military career building bridges, and she still does that to this day—only today's bridges are often between people, organizations, and a mighty river system. BG Peeples is the newest commander of the Mississippi Valley Division (MVD) of the U.S. Army Corps of Engineers and president of the prestigious Mississippi River Commission. As the commander, she serves as the senior military officer in a division responsible for engineering solutions for water resources in a 370,000 square mile area, which encompasses a portion of 12 states and extends from the border of Canada to the Gulf of Mexico.

BG Peeples brings experience in both the Army's civilian and military realms to team MVD, having led civil works missions in the Corps' Great Lakes and Ohio River Division and overseas deployments that supported Operation Iraqi Freedom and Operation Joint Endeavor (Bosnia). She holds master's degrees in construction management from the University of Washington and Strategic Studies from the U.S. Army War College and has been the recipient of many awards and decorations including the General Douglas MacArthur Army Leadership Award.

Q: What drew you into a military career and eventually led you to the Mississippi Valley Division?

A: Mentors, friends, and a challenge drew me into a military career; relationships and people have kept me in. I grew up as part of a big and loving family from Akron, Ohio. By luck, my friend's advice led me to West Point, and I have loved every minute of my experience as a cadet and commissioned officer. As I branched Engineers, I thought I would go to Panama to build schools and help partner nations improve their infrastructure. However, after graduation, the Army's needs shifted, and I began my military career at Ford Hood (now Fort Cavazos), Texas, as a floating bridge platoon leader. Water bridges and teamwork are consistent themes throughout my 30-year career in supporting both military programs and civil works. It is an honor to lead this historic division that executes our Nation's work, and continues to be a winning team.

Q: In river time, your two-year command in this division will be relatively short. How do you tackle figuring out a system so complex and the opportunities, needs and goals?

A: Fortunately, I am surrounded by experts, stakeholders, and partners who understand the basin in ways I never will—I get a PhD-level education every single day! The mission and impact of the Mississippi River Commission is another powerful force in this basin, executing missions and responsibilities that date back to 1879. Anchor projects like the Mississippi River and Tributaries project

(MR&T), and Navigation & Ecosystem Restoration Project (NESP), provide frameworks that deliver results. Also, Major General Holland was my predecessor and was a tremendous leader who left a lasting legacy. I hope to do the same. Continued teamwork is paramount in the days ahead.

Q: Has anything stood out in your first six months in command as a particularly exciting opportunity – or daunting challenge (or both)?

A: Thanks to the trust and confidence of Congress, the Corps of Engineers and the Mississippi Valley Division have been granted a generational opportunity to reinvest in our civil works projects and to plan for the future. There is much work ahead, but this Division, USACE, and our Partners are ready to tackle any and all challenges that lie within our path – together. I'm excited for what the future holds.

Q. You've served previously in the Lakes and Rivers Division. What overlap do you see in what MVD faces? What are similar issues you dealt with there?

Both USACE Divisions are storied, dedicated, and professional units who take their mission seriously. Both face similar challenges of sedimentation, fluctuating water levels, aging infrastructure, and extreme weather conditions. With that being said, I am inspired by the collective drive, tenacity, and professionalism to tackle these challenges head-on through aggressive research, development, and partnering.

Q: Do you have a set goal or mission for your time at MVD?

A: My goal is to understand the pressing issues that our partners and our communities face. As an Engineer Officer, I have always been taught to reduce obstacles and to tackle challenges in a systematic way. My vision and goal while I am the commander at MVD is to solve these problems, but to also create a lasting team and community along the way. Fortunately, I already have a strong team and have the privilege to learn about all the opportunities and needs of this valley from those with first-hand knowledge and years of experience.

Q: Previous generals have spoken of need to find a balance in this job. How have you explored the river or its historic towns outside of work?

A: My husband, John, is my rock. He carries a heavy load for our family, and I am forever grateful. We love to explore America, and as an Army family, that's what we do. We've particularly enjoyed getting to know new communities in and around the valley and along the river. Our son, Van, is loving the area and enjoying the warm weather in Vicksburg! Everyone has been so welcoming, and we look forward to more exploration ahead.

Q: How would you complete the sentence, "My Mississippi is ... "?

A: My Mississippi is powerful. Water is life. I have great respect for the Mississippi River and this bountiful valley. I approach each day with humility and gratitude for every blessing. $-\kappa$.S.

BELOW, FROM LEFT: Brig. Gen. Kimberly Peeples and Rock Island District's Captain Ryan Sexauer review a bridge project that's part of the Corps' Cedar Rapids flood control system; the general joins other members of the Mississippi River Commission at a meeting with the Mekong River Commission.



Managing the *Unmanageable*





The Mississippi River and Tributary Project (MR&T) has worked as designed for nearly a century, saving countless lives and preventing hundreds of billions of dollars in damages in each flood.

But the project known for innovations in "making room for the river" is getting another look as the Corps of Engineers—led by its New Orleans District—embraces a generational opportunity to look at the comprehensive management of the Lower Mississippi River and perhaps wrap new missions into the plan.

"We have looked at the MR&T a few times over the last 100 years, but it's been about 60 years since we've had a new master plan," says senior project manager Ann Hijuelos. "We were due for one."

Congress authorized the \$25 million Lower Mississippi River Comprehensive Management Study in the 2020 Water Resources Development Act. The allocation was prompted in part, Hijuelos says, by wild swings between flood and drought, related concerns about navigation impacts, a public desire for additional recreational opportunities and concerns by groups like a coastal seafood industry negatively impacted by the consecutive openings of spillways for flood control.

The study is slated to run through 2027. Through it, the Corps will develop a series of potential alternative plans for comprehensively managing the river between Cape Girardeau, Missouri, and the Gulf of Mexico.

No topic is off the table, according to a study team looking at issues like: hurricane and storm damage reduction, flood risk management, structural and nonstructural flood control, floodplain management strategies, navigation, ecosystem and environmental restoration, water supply, hydropower production, recreation, and more.

In the project's first stage—scoping—the project team has been reaching out to the public. Through some 30 meetings in 15 locations and additional meetings with private or civic groups, they've gathered input on what the public would like to see changed or embraced. The study team heard from nearly 500 people through the meetings, and comments are still being accepted at: HTTPS://WWW.MVN.USACE.ARMY.MIL/ ABOUT/LMRCOMP/

We recognize the area is massive," Hijuelos said. "Hearing what the public wants us to look

at helps us refine what we tackle."

What the study team has heard so far was for the most part expected, she said. At meetings along the Gulf Coast, where meeting turnout was the largest, residents brought concerns about repeated openings of the Bonnet Carré Spillway. The Corps built the spillway in response to the Great Flood of 1927 with the purpose of diverting potential floodwaters from the city of New Orleans. When activated, the spillway sends the river water into Lake Ponchartrain, and that fresh water eventually flows into the brackish Mississippi Sound. Flooding in 2019 necessitated two openings in the same year for the first time in some 90 years, resulting in an influx of 123 days (the longest on record) and impacting the seafood industry and marine life.

On the flip side, at meetings further up the Mississippi River, Hijuelos said, "we heard the way the levee systems work is fine, and they don't want to see any changes."

Alternatives could be developed that change the system in one area, leave it the same in others and perhaps add ecosystem restoration or recreation ideas that don't yet exist, she noted.

As a starting point, the study team developed a list of "early alternatives." Among those:

- Maximize the beneficial use of dredge material and sediment in the water column that might protect the navigation channel, enhance coastal wetland restoration, and contribute to delta building.
- Evaluate tradeoffs between Flood Risk Management, Navigation, and Ecosystem Restoration priorities.
- Modify existing infrastructure to re-introduce hydrologic connectivity to floodplain areas

So far, Hijuelos says she's heard plenty of enthusiasm.

"People recognize the historic opportunity the study provides to look at multiple purposes, to look at the system holistically," she said. "Across the variety of stakeholders and participants, there's a lot of excitement that we're taking a step back to look at 975 miles of the Mississippi River." $-\kappa$.S.



Saundi McClain-Kloeckener, 64, River Keeper of Cherokee descent/ retired first grade teacher, St. Louis, Missouri

"We meet at Lincoln-Shields Recreation Area (a Corps site on the Mississippi River) at 9 a.m. Sundays to bless the water. We collect water from the river and pray with it, saying, 'Water, we love you. Water, we thank you. Water, we respect you.'

"The Native Women's Care Circle has been doing this for more than a decade. Anyone who comes to be thankful for our waters is welcome. Sometimes it's just one person, sometimes 100. Other Indigenous groups up and down the rivers are blessing the water simultaneously.

"After the river blessing this morning, I sent video messages to three classrooms of children in Australia, Mexico and at a Lakota reservation school in North Dakota, asking them to join in caring for the water. I told them that what I love about the confluence of the Mississippi and Missouri rivers is that I can put a foot in each river at the same time. They're the longest and biggest rivers in North America, which flow into the Gulf of Mexico and from there mingle with the waters of the world.

"The purpose of the care circle is to help our community. Our goal is to provide a way for families to gather and remember our Native American ways. We support the students at the Kathryn Buder Center for American Indian Studies at Washington University. We do social and medical navigation for the Native community. We take prayers to our folks in the hospital and at their homes.

"You don't see a lot of people of color on the river, although there are a bunch of new young ones out there. They want to get more involved with our waters and in some of our traditions. Such as, I was taught to sprinkle tobacco in the water before paddling on the river, as a prayer for safety for myself and the group, as my ancestors did. And I do more than pray. I always pick up trash. We are all responsible for care of the rivers. Water is life, *Mni Wachoni* in Lakota." –B.O.

Lifting a community in the path of future flood



WHEN HURRICANE LAURA BARRELED THROUGH the broad,

flat landscapes of southwest Louisiana in 2020, work was already underway to manage the risk of the next devastating storm. The previous year, Louisiana's Coastal Protection and Restoration Authority and the U.S. Army Corps of Engineers launched the pre-construction and design portion of a large-scale joint effort to protect homes and other structures in Calcasieu, Cameron, and Vermillion parishes from the ravages of storm surge and flooding.

This summer, that planning becomes reality. Twenty-one homes will be raised out of harm's way under this continuing partnership called the Southwest Coastal Louisiana Storm Risk Management and Ecosystem Restoration Project.

"These first structures are in the low- to moderate-income neighborhoods and have the lowest first-floor elevation," said Darrel Broussard, project manager for the Corps' New Orleans District. "When the structure is lifted up and put on piers, the floodwaters are allowed to come in and then go out. You have minimal damage to the structure with this approach."

The qualifying residential structures will be raised three to five feet on average, but no higher than 13 feet, which puts them above the projected 2075 100-year flood level. In all, the Southwest Coastal Louisiana Project plans to elevate 800 to 1,000 structures over the next three to five years, Broussard said, properties selected from a pool of some 4,000 structures identified in the feasibility study.

"The project, as a whole, is a cost reduction project, where we are looking at reducing the damage that's caused by coastal flooding," he said. "Instead of using levees, we're now just going to raise the structures." He noted that the benefit-cost ratio of elevating structures was \$5.6 of benefit for every \$1 of cost, an extremely high ratio in the competitive world of infrastructure projects.

In 2023, the Corps secured \$296 million for the project through the Infrastructure Investment and Jobs Act of 2022. The CPRA will contribute an additional \$159 million towards this first phase.

"We're really excited that we're the first non-federal sponsor for a project of this magnitude with the Corps," said Michelle Felterman, senior scientist for CPRA. "We have the resources and the brainpower to really help get these types of programs off the ground and successful going forward.

"The nonstructural work, which this Southwest Coastal project is about, is really a new and exciting project type for us. These home elevation projects are that new wave of the future that is going to allow us to take communities where they are currently and make them really resilient. This is the largest-scale nonstructural effort that Louisiana has had so far."

Local residents have been positive about the project, according to Jennifer Cobian, grants director for Calcasieu Parish. "For our communities, the significance will be that residents have a reduced flood risk. If homes are elevated, they can remain where they are instead of having to relocate, and it prevents a drop in value of their homes."

Program participation is entirely voluntary. Many homeowners are drawn by the program's cost. For the Southwest Coastal Project, homeowners bear no responsibility for the design and construction cost of raising their homes. But they do have to make any repairs needed to bring their homes up to code so necessary utility work can be completed and they are responsible for their own living arrangements for the time they must be out of the house during construction, Broussard said.

"We have a really great tool online that allows participants to sign up and to show their interest," said Micki Meier, project manager for the Corps' Rock Island District, which is working cooperatively with Broussard and New Orleans District staff to expedite this large project.

Meier and her team expect to award the first contract before June 1. She anticipates the start of actual construction work will spark more interest. Public information meetings are being scheduled throughout the Calcasieu, Cameron, and Vermilion parishes this spring and summer. The first are scheduled for the second week of June.–D.D.

The application is available at HTTPS:// WWW.MVR.USACE.ARMY. MIL/SWCOASTAL/. The parishes and the Corps call center at 877-814-2539 can help landowners fill out the application.



Pete Manzo, 51, owner and lead guide for EAT St. Louis Food Tours

"I grew up about a mile south of The Hill [neighborhood] and 20 to 25 minutes from the Mississippi River. Our Taste of the Hill walking food tour features five to six tastings over approximately three hours.

"We taste some iconic items that originated here and have become synonymous with the city, such as St. Louis-style thin crust pizza and the ever-popular toasted ravioli. The food itself is a story. When we talk about the origins of St. Louis-style pizza and its star ingredient—Provel[™] cheese—we talk about who originated it and why. And some stories can be more about human nature. When you eat a toasted ravioli, would you ever think it was invented by accident?



"I love immigrant stories too and helping [tour participants] envision what life might have been like for them. New Orleans was a significant entry port for immigrants. From there, they journeyed up the Mississippi via steamboat, to interior and more western areas, such as Illinois, Missouri, and beyond. For some mostly German, Irish, and Italian—St. Louis became their new home. Many Italians worked as laborers in the clay mines and as brick factory operators. Others began neighborhood businesses such as barber shops, saloons, grocery stores, and fruit sellers.

"When my dad arrived in 1955, he [worked] a well-paying welding job with steady income, and saved money for passage to America, for my mother. They started wholesaling and delivering ingredients to their restaurants. My siblings and I worked there from an early age, until we received degrees and got professional jobs.

"My Mississippi is a city of immigrants who shaped St. Louis with their heritage and habits. Many had to figure out how to support their families while shaping their dishes based on available ingredients. We're a melting pot and I can see the differences. This is a delicious place, crafted by immigrants." –L.W.G.

First of its kind

Mississippi River Fish Passage—the largest ecosystem project of a Navigation and Ecosystem Sustainability Program—moves toward construction.

THE IDEA: Provide a fish passage in a lock and dam that currently blocks the historic movement of migratory fish like the ancient shovelnose sturgeon, the iconic river catfish, and the shark-like paddlefish to offer more access to feeding and spawning grounds.

A bonus: The creation of a state-of-the-art fisheries database to strengthen native fish populations and provide opportunities to capture invasive species. Findings and strategies will be copied elsewhere on the river and also shared with scientists around the world.



The project moving toward a summer 2024 construction contract is one of 31 ongoing projects in planning, construction, or design within the massive Navigation and Ecosystem Sustainability Program of the Upper Mississippi River System. Those include two new locks and mooring cells to improve navigation efficiency as well as a variety of ecosystem restoration projects.

The dual-purpose mega program represents an innovative approach and model for Corps infrastructure projects, notes program manager Andrew Goodall. But innovations are similarly woven throughout the design and structure of the Fish Passage system being located just 10 miles south of Hannibal, Missouri —Mark Twain's hometown.

Fish heading into the passage will be greeted by a series of rock riffle structures made of granite since the use of natural stone will be most beneficial for fish. The passage opening was precisely placed where fish have been found to congregate below the dam.

"What fish will do, depending on the species, is swim upstream through the fast-flowing water in the gaps of the rock riffles and rest along the way in the slow flowing pools in between," Goodall said. "The riffles act like steps that the fish use to navigate through the dam. They'll swim to the next one, to the next one, and so on. There's also a bridge that provides access for people and vehicles to cross the fishway. The bridge has eight openings that allow fish to pass beneath."

Fish movements will be monitored with receivers that collect information from tags that biologists have surgically placed inside of special fish, allowing researchers to track tagged fish that approach and use the fishway. The electronic data will be collected and used by researchers to better understand the movements of fish. The passage system itself can then be adjusted so that passage widths can be changed to fish preferences in the future.

"We're planning not just for the science we have today," Goodall notes. "If we can come up with new ideas, plans for carp capture or new monitoring techniques, we want to have the flexibility to continue to adjust, learn and grow. It's an exciting project not just because it's the first of its kind on the Mississippi River, but for all the things we can learn."

Lessons also will be applied to three subsequent fish passage projects, also authorized through NESP, that have the goal of providing fish even fuller access to new river stretches.

Teams are finalizing the design and don't want to leave anything to chance, says senior project biologist Mark Cornish. Construction needs to ensure that data from the sensors gets to the equipment center—the fishway's nerve





CLOCKWISE FROM TOP LEFT: This schematic depicts the design for the first-ever Fish Passage system on the Mississippi River. Highlights include a rock ramp fishway that helps to protect approaching fish from the flows, mooring cells at which research boats can dock and a bridge to a sheltered equipment center. Paddlefish and sturgeon, both ancient migratory species on the Mississippi, are among the species expected to most benefit from the fish passage. They're also among the some 600 fish that have been caught and tagged so that their future behavior might be captured by equipment built into the system and studied.



center—and that it's built high enough to never flood. The equipment center also serves as an emergency shelter for research scientists who may be present in all weather conditions. Especially key is finding the ideal location for sensors to maximize the data they might collect.

"Think about security cameras you might have in a convenience store," he said. "It would be important to have one pointed at the cashier and one at the entrance. It's the same idea for the fish. Monitoring equipment must be located where it provides the best information."

The new system includes an upstream boom to block ice and debris. Anyone familiar with the area has seen large chunks of ice flow past or large trees carried by spring floods, said Kara Mitvalsky, project design lead. The project also includes mooring cells, she said, that can be used to safely dock research boats or work barges near the site.

The location was carefully chosen in part because invasive carp have reproducing populations both above and below the dam and the new passage wouldn't exacerbate the spread. Perhaps it can help prevent such.

"At the fishway we have a dedicated area where we can start testing some of the different technologies or techniques to deter invasive carp and lead to new solutions," Cornish said. "We may be able to put out speakers and new sound deterrents. We may be able to test pheromones to attract or deter them there.

"Knowing exactly what we will learn from the first fishway on the Mississippi River is still an evolving part of the project. That is the wonder of science. We just know that if we don't do it now, we will not know it in the future. A primary purpose of this fishway is to learn new things." -K.S.



Hey fish? Where do you want to go?

The installation of the Locks and Dams in the 1920s disrupted the ability for fish to travel to their native spawning locations. Understanding historic native fish movement is a mission of the team designing the first-ever Fish Passage on the Mississippi River.

The team was determined to find a fish passage design that fish would use. So at first, engineers and biologists consulted with subject matter experts from the U.S. Army Engineer Research and Development Center.

They turned to fish behaviorists from a cognitive hydrology team that helps to better understand why animals including fish make the decisions they do. The group that helped develop salmon passage in the Pacific Northwest looked at behavioral differences in migratory Mississippi River fish—the way they tend to leap over hazards and change swimming paths based on flows, sediment, and seasonal obstacles.

Since 2021, Lock and Dam 22 Science Team members have been tagging fish at Lock and Dam 22—the site for the first of five planned fish passage systems. The team has followed along the tagged fishes on their often surprising journeys.

In collaboration with U.S. Geological Survey and U.S. Fish and Wildlife Service, the team has tagged more than 600 fish, among them 62 blue catfish (including one they named NESP after the Navigation Ecosystem and Sustainability Program that'll build the migratory fish an easy route through by 2027), 78 paddlefish, 65 smallmouth buffalo and 77 lake sturgeon.

"We've been able to get some idea of where they're going, when they're going and we suspect why they're going—if it's during spawning or winter is approaching," said senior project biologist Mark Cornish. "We're able to utilize a large tracking network to the advantage of all the project, including fish passage. It's showing us that fish are moving not just up the Mississippi River but also into major tributaries. We're learning how integrated the system is and how fish don't know geographic boundaries. They go where they want to!"

One of the most exciting "developing stories" from the tagging process was that of a female American eel, Cornish says.

American eel females make large migrations, he said, while the males stay in brackish waters along the coast. The eel tagged was heading south on the Mississippi River this April, perhaps toward the ocean. The Lock and Dam 22 Fish Passage science team will partner with the Ocean Tracking Network to follow her, perhaps to the Atlantic's Sargasso Sea, where American eels are known to spawn.

"It's a dream now," Cornish said. "It's possible that one of the fish we tagged at Lock and Dam 22 will be the first ever tracked that kind of distance."

Historically, fish such as the American eels and the river's many other traditionally migratory species could have migrated from the ocean into northern Minnesota waters, he said.

"Some still manage to navigate through, but they get rarer and rarer as they get higher in the system because they can't navigate through dams. And they try. They can go across a small amount of water going over a spillway, but to do that at a lock and dam is too big a challenge for many."

Lock and Dam 22 was chosen as it's just south of Lock and Dam 19. Lock and Dam 19 is the hardest lock to pass for fish, tracking has shown. This lock never goes into what the Corps calls "open river condition."

"There was one paddlefish that made it up, probably going through the lock (with a barge)," he said. "It's not a complete barrier, but it's a really tough one."

The paddlefish, one of the most fascinating species being tracked as part of the Lock and Dam 22 Fish Passage System, is unique to large river systems of North America; you won't find them anywhere else. A distant relative once found in China is now extinct due to impacts of the Three Gorges Dam on the Yangtze.

What makes the paddlefish so unique is its paddle shaped nose and migration patterns. It's been tracked from the Mississippi River all the way to Waterloo, Iowa. Paddlefish are also more closely related to sharks than any other freshwater fish.

"You know how they say a shark can smell blood a mile away?" Cornish said. "Paddlefish have a similar sensory mechanism; there are receptors that can detect plankton, which is what they eat.

We're the guardians of the last paddlefish in the world. Projects like Lock and Dam 22 are going to help maintain that population and maybe make it even larger." $-\kappa$.s.

Port grouping serves the "Corn Belt"

Four regional port authorities in the Upper Mississippi River Basin did not exist five years ago, but two are now ranked among the busiest in the country. The others are expected to follow.

The authorities have become known as Corn Belt Ports since about 50 counties in five states on the Illinois and Upper Mississippi rivers began forming the groups in 2019. The regional authorities then petitioned the U.S. Army Corps of Engineers for federal recognition by the U.S. Waterborne Commerce Statistics Center.

The Corn Belt Ports work within the Corps' lock and dam system above Lock and Dam 26 at Alton, Illinois.

Two of the new statistical areas immediately arrived in the top 50 ports in the country, said Robert Sinkler, executive coordinating director of the Corn Belt Ports collective.

"There were no recognized ports between St. Louis and St. Paul, Minnesota, and none between St. Louis and Chicago,"



he said. "These ports handle 100 million tons of freight a year. Roughly 50 percent of that is agricultural products."

The ports group chose the corn belt name because the Upper Mississippi basin has long been known as the source of most of the country's crop, Sinkler said. "The Corn Belt Ports are simply the regional ports within the corn belt's lock and dam system.

"About 60 percent of the nation's grain is exported on the Mississippi River system through Louisiana, and we account for a significant portion of that. We are an important part of national and global supply chains. Having the federal port designation reinforces that."

The new authorities "didn't build any new infrastructure," he said. "They consist of existing ports and terminals, the majority of them privately-owned. We grouped them in a way that made sense geographically. Creating regional port identities is the most important benefit. We represent riverfront communities and voters who become constituents when we submit community funding requests through our Congressional representatives."

The Corn Belt Ports have attracted \$2 billion in transportation and infrastructure investments from federal and state governments, non-profit organizations and private businesses.

The current federal budget includes \$120 million for infrastructure projects on rivers in the Corn Belt Ports region. The work will be handled through the Navigation and Ecosystem Sustainability Program that is administered by the Corps.

The improvements, to docks and intermodal connections such as roads, will make the region's farmers and businesses more competitive, Sinkler said. The federal designations also give the ports more clout as customers and supporters of Corps lock-and dam initiatives.

"Drought and flood resilience is part of the Corn Belt Ports mission and interest," he said. "The lock and dam system is one of the most effective climate resiliency systems, from a man-made infrastructure standpoint, in the interior of the U.S."

The ports have set a goal of increasing annual freight shipments so that all four port districts rank in the country's 50 busiest. "We are on track to see that kind of growth. We anticipate a 5 percent increase on average over the next 10 years," he said. -R.S.



Half-century of effort brings cleaner waters to Upper Mississippi River

The waters of the Upper Mississippi River Basin are generally cleaner than they were three decades ago, but some quality issues remain and new problems are emerging, A new report, "How Clean is the River?" was released by the Upper Mississippi River Basin Association (UMRBA) to update its previous 1989 report.

The positive findings: Rivers are carrying fewer nutrients, sediments and heavy metals while dissolved oxygen levels are higher. The negatives: Road salt and related chloride contamination, as well as problems from septic leaks remain too high, and emerging contaminants such as microplastics should be closely monitored.

UMRBA, an interstate organization representing Illinois, Iowa, Minnesota, Missouri and Wisconsin, uses the plan to assess the river's suitability for aquatic life, recreation, drinking and fish consumption.

"Cleaner water has the potential to support healthier aquatic plants and animals in the Upper Mississippi River. Improved aesthetics from cleaner water draw more people to recreate on the river, which increase opportunities for local tourism and supporting cities and towns bordering the Upper Mississippi River," said Lauren Salvato, UMRBA's policy and programs director.

The new analysis finds that water quality between 1989 and 2018 has "generally improved, while there are pollutants of concern that have varying trends."

The new study analyzing water quality between 1989 and 2018 indicates regulations and infrastructure investments facilitated by the 1972 U.S. Clean Water Act "have really worked" in river reaches such as Minneapolis, Minnesota, and St. Louis, Missouri, spots with concerning sewage and industrial discharges in prior reports.

The act empowered states to monitor and regulate "point sources" such as sewage treatment and manufacturing plants. The river continues to be harmed by some pollutants, particularly road salts and septic system leaks, she notes, with chlorides increasing an average of 35 percent across the system. Saltier water harms organisms that are accustomed to low-salt environments.

Public and private investments have positively impacted the river's quality, though, the report concluded. For example, reductions in discharges of nutrients and sediments have been achieved through improved agricultural and wastewater treatment practices, she said.

"The phosphorous decline is likely attributed to changes in land use management. We have made significant progress. We also can conclude that we need to do a lot more work."

The study calls for expanded and uniform monitoring of important water quality parameters, including metals and recently-recognized emerging contaminants such as microplastics, "Good monitoring information gives us confidence that we can make improvements in water quality when we make commitments to science, policy and action," Salvato said.

The Upper Mississippi River Basin includes about 1,200 miles of the Mississippi and Illinois rivers and other tributaries. The complexity of its many pools, side channels and backwaters means that water quality conditions may differ widely by location, and pollution concentrations can also change as the amount of water in the river changes, the report explained. -R.S.

Upper Mississippi River Basin Water Quality: Positive and Negative Trends, 1989–2018

The Mississippi as muse



Riverside boyhood inspired author whose call for a 'land ethic' resonates 75 years after his iconic book's release

Aldo Leopold had made a name for himself as a young man. The visionary naturalist, one of the 20th century's most revered champions of conserving land, water and wildlife, was working for the U.S. Forest Service in the Southwest, where he'd crafted the agency's inaugural fish and game handbook and a Grand Canyon management plan.

So, one might have expected him to bask in such accomplishments when visiting his hometown of Burlington, Iowa, in 1918. But in a local newspaper article, Leopold focused not on desert landscapes of Arizona and New Mexico, but the natural wonder on Burlington's doorstep: the Mississippi River.

A new bridge had been completed, and he urged the city to buy riverbank property on the opposite side in Illinois for a public park.

"It is a peculiarity of river towns that they despise the river which made them," Leopold mused, lamenting the degraded Rio Grande in his adopted city of Albuquerque. "Burlington, I believe, passed the stage of despising its river 10 years ago. It is the more to be wondered, therefore, that she has not seized this opportunity for establishing a river park."

The commentary hinted at the Mississippi's crucial role in developing Leopold's thought on the relationship between people and nature, says Steve Brower, president of the Leopold Landscape Alliance. The nonprofit owns the family's Burlington homestead on a bluff overlooking the river.

"The Leopolds were river rats. They spent a lot of time on the river," Brower said. "Before we had cars, the river was a corridor of transportation to get into wilder landscapes."

Aldo Leopold is best known for *A Sand County Almanac*, a collection of essays published in 1949, shortly after his death at age 61. A blend of memories, scientific observations and philosophical arguments, the book makes the case for a "land ethic" that regards people as part of nature instead of its master.

"The land ethic simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land," Leopold writes. People sometimes must leave a footprint in nature, yet fellow creatures have a "right to continued existence and, at least in spots, their continued existence in a natural state."

He adds, "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."

The 75th anniversary of the book's release is renewing appreciation for Leopold's prophetic voice and interest in his work. He transferred from the west to the U.S. Forest Products Laboratory in Madison in 1924 and became the University of Wisconsin's first wildlife management professor. He led efforts to restore damaged landscapes, including a patch with a wooden shack in rural Sauk County that helped inspire *A Sand County Almanac*.

But some scholars believe Leopold's formative years by the Mississippi have been overlooked. Although he didn't devote a particular article or essay to the river, they contend it profoundly influenced him.

"All you have to do is visit Burlington to understand Leopold's local environment as a young person ... being on the river, in backwaters on the Illinois side, having his most important impressions from exploring the river and the river bottoms," said biographer Curt Meine, senior fellow with the Aldo Leopold Foundation and the Center for Humans and Nature.

Leopold's family picnicked weekly by the Mississippi and had memberships in boating and sporting clubs, which introduced Aldo to waterfowl hunting and the importance of healthy watersheds.

"The Mississippi River taught Leopold to become a systems thinker," Meine said, "to think holistically and in an integrated way about how natural systems maintain themselves and renew themselves."

Years later, Leopold concluded that saving endangered wildlife in the Upper Midwest would require more than tougher game laws, predator controls or refuges. Lands and waters exhausted by forest clear-cutting, overgrazing and overplowing needed restoration. That meant cooperation between government agencies, landowners and conservation groups.

Prodded by Leopold and others, President Franklin D. Roosevelt in 1934 sent





CLOCKWISE FROM TOP LEFT: Aldo Leopold, known as one of the nation's most influential conservationists, grew up in this home in Burlington, Iowa. The Leopold Landscape Alliance has purchased this as a hub for future conservation projects. A younger Leopold is pictured with wife Estella and dog Flick in a boat at Les Cheneaux, Michigan, another natural area which—like the Mississippi River—inspired his land ethic. His whole family, historians say, were "river rats," who would boat on the Mighty Mississippi. The U.S. Army Corps of Engineers partners with the Sand County Foundation to apply Leopold's conservation principles to potential ecosystem projects.

the Civilian Conservation Corps to Coon Valley in western Wisconsin, where a creek flows to the nearby Mississippi.

Coon Valley became the first demonstration project for farming techniques, including contour plowing and terraced landscaping, that reduced erosion and gully formation. About 10,000 pasture acres were returned to forest, enlarging habitat and clearing the creek. The successful measures have been replicated elsewhere.

Yet erosion and nutrient runoff still damage soil quality and pollute the Mississippi. Modern conservationists often quote Leopold when calling for watershed-scale improvements.

The U.S. Army Corps of Engineers' Mississippi Valley Division in 2005 signed an agreement with the Sand County Foundation, which promotes Leopold's land and water ethic. They pledged to help protect biological communities along the Mississippi, its delta and key tributaries. Through one such collaboration, the St. Paul District studied innovations in flood protection that would protect an area in which the Aldo Leopold Memorial Preserve (a science and research center) is located.

"The Mississippi being the iconic river of the continent, it becomes a proving ground for whether we can live on this land, as Leopold put it, without spoiling it," Meine said.

In Burlington, the Leopold Landscape Alliance is working to make the family homestead—two adjacent houses on the Mississippi where young Aldo and relatives lived—a center for studying and advancing his legacy.

The nonprofit also hopes to acquire land for protection along Iowa and Illinois sections of the Mississippi.

Brower contends that much of A Sand County Almanac references the naturalist's childhood in Burlington. At one point, Leopold poignantly writes: "Man always kills the thing he loves, and so we pioneers have killed our wilderness. Some say we had to. Be that as it may, I am glad that I shall never be young without wild country to be young in."

That's an obvious reference to his boyhood along the Mississippi, he says.

"He's going back in his mind ... thinking about all the places he's been where there's been water. All the experiences you have with nature end up having an impact that you carry with you."-J.F.

OUR MISSISSIPPI KIDS

Do you know the

saying, "Busy as a bee"? Well, it's true! Female worker honey bees take on many jobs to keep a hive buzzing. Cut out these bees—with an adult's help—and color them in as you learn more!

 Thank you **Texas Roadhouse** for sponsoring this activity.





THE BUMBLEBEE



The surest sign of spring is the blooming of sweet, fragrant flowers. But don't just look and sniff. Listen, and chances are you'll hear the buzz of a bumblebee.

Pollinators like the plump and fuzzy American bumblebee move from bloom to bloom, and this bee is especially useful. Many things we eat are pollinated by bumblebees, including cucumbers, peppers, tomatoes, strawberries,

blueberries, raspberries, melons, and squash. Worldwide, bees help more than 75 percent of all the flowering plants and 80 percent of farm crops.

But bees are at risk and with them, the plants and even lives that depend on them. Loss and fragmentation of native habitat, such as prairies, in the Midwest region due to agriculture and development has directly resulted in the decline of pollinators. Pollinators like the bumblebee also continue to face increasing threats such as pesticides, climate change, invasive species, diseases, and continued habitat destruction and degradation.

At the Riverlands Migratory Bird Sanctuary, the U.S. Army Corps of Engineers Rivers Project Environmental Stewardship team manages 1,200 acres of prairies and wetland habitat to support wildlife such as the Southern Plains Bumblebee and American Bumblebee. Biologists with the Rivers Project have started to monitor bee populations to better understand what species are utilizing restored prairies and how management actions such as prescribed burns and seeding impact these species.

This monitoring feeds into national monitoring programs such as the Bumblebee Atlas, which is a citizen science program to gather bumblebee data across the U.S. Biologists are also conducting netting protocols to collect a wider sample on the pollinators in habitats across Riverlands. The bees are captured, identified, and pinned to preserve for future analysis and education. Biologists also conduct monarch butterfly monitoring throughout the summer as this iconic and imperiled species migrated across North America. The data gathered will help biologists to adapt actions to better manage for threatened and endangered species. Monitoring also is useful for education and outreach so visitors can learn about the different native pollinators that are present at Riverlands and their importance in our ecosystem. —INSIYAA AHMED, FORESTER, U.S. ARMY CORPS OF ENGINEERS

THE AMERICAN BUMBLEBEE



- **They're friendly-ish.** The bumblebee is peaceful, and they only attack people when threatened. When a bee is buzzing near, it's best to stay calm and still and let it fly away in its own time.
- **They're big (for a bee).** The queen measures about 1 inch long, the worker bees about half that size.
- You only need two crayons to capture their likeness. The queen is mostly black, but the back portion is yellow, especially in the middle. Males have a yellow abdomen, black head and stripes in the lower thorax.
- **They have flower preferences.** The American bumblebee, which nests on the surface and forages in large open fields, looks for things like clovers, goldenrods and St. John's wort, but it's also fun to see them upside down, foraging on trout lilies or columbines.
- **They're sneaky.** Some bumblebees "cheat" by swiping nectar from a flower without pollinating it—a shady scheme called "nectar robbing."
- **Their feet are stinky.** Whenever their feet touch a surface, they leave traces of an invisible, oily substance that other bees can smell.

You can help. Plant native plants in your own yard. Consult with a local flower shop or a spot like the Rivers Project (which runs the Riverlands Native Plant Festival) to find good planting ideas. Even one plant can support a variety of native pollinators and other wildlife such as birds!

Trek a River Trail

Hike or bike these best-of outdoor spaces along the Mississippi River

OUR MISSISSIPPI TRAVEL

FOR AS LONG AS PEOPLE HAVE BEEN SETTLING along the banks of the Mississippi River, communities have turned to the majestic waterway for resources, transportation and recreation. In many ways, no river in America has been as culturally, historically or economically significant as the Mighty Mississippi.

While many cities' relationship to the river have changed over the years,

there's been a resurgence of communities turning to the waterway for redevelopment and reinvigoration in recent years. From the headwaters to the gulf, cities across the country are bringing their vibrant cultures and local attractions to the banks of the river so visitors can be inspired and engaged by the important ecology.

Discover the ways that five communities along the Mississippi River have created river walks and waterfront parks to get travelers and locals alike outdoors and enjoying the natural landscape.



St. Paul, Minnesota

St. Paul has more shoreline than any other city along the Mississippi River, and this Minnesota community has embraced its waterfront resources to the fullest. The city's last remaining island, Raspberry Island, is home to the oldest athletic club in the state and still offers classes for visitors wanting to get out on the water. Just off the Mighty Mississippi, Hidden Falls Park is home to a picturesque spring-fed waterfall and plenty of paddling outfitters to assist in riverfront explorations. For walkers and cyclists, the nine-mile, paved Samuel H. Morgan Regional Trail is the perfect setting to experience stunning views of the river, St. Paul skyline and more.

Dubuque, Iowa

In Dubuque, visitors and Iowans alike can explore the beautiful Mississippi Riverwalk. Wander from the Port of Dubuque through the city's Art on the River public art installation. Then end the exploration at the historic Star Brewery and Shot Tower. For visitors interested in the river's complex ecology, a stop at the National Mississippi River Museum and Aquarium is a must. This museum with a 10-acre campus helps bring the history of the river to life through dozens of exhibits highlighting water quality, wildlife and more. This paved river walk is also part of the 26-mile Heritage Trail that connects the Mississippi River to the famous Field of Dreams in Dyersville.

St. Louis, Missouri

Experience quintessential pieces of local history with a walk or ride along the St. Louis Riverfront Trail. This 12-mile paved trail is the perfect place for walkers or cyclists looking to explore iconic sites along the Mississippi River. Starting at the Gateway Arch and ending at the Old Chain of the Rocks Bridge on historic Route 66, this trail has plenty of public art, informational signage and rest areas to stop at along the way. Visitors will also get an up-close view of the action along the river as tugboats push barges full of cargo and levees keep neighboring communities safe.

Memphis, Tennessee

While the riverfront in Memphis has long held a prominent place in the city, a new \$61 million renovation recently brought new life to Tom Lee Park. Opened in late 2023, the new outdoor space features a 20,000-square-foot Sunset Canopy for sports and events, river-themed playground and outdoor fitness zone. The city's connection to nature remains front and center with outdoor classroom spaces and a riverfront pollinator lab. While exploring the riverfront in Memphis, don't miss Big River Crossing at the historic Harahan Bridge. At nearly a mile long, this is the longest public pedestrian bridge across the Mississippi River. Visitors can lace up their walking shoes or hop on a bike to enjoy breathtaking views from Big River Crossing, which connects downtown Memphis to Arkansas.

Baton Rouge, Louisiana

Steps from the hustle and bustle of downtown Baton Rouge, the Riverfront Plaza and City Dock is a peaceful respite on the banks of the Mississippi River. The 5.4-acre greenspace includes a riverfront walking and biking trail, open-air amphitheater and ample public art with breathtaking scenic views of the river. History lovers will be intrigued by the riverfront, castle-like Old Louisiana State Capitol building, which was home to the state legislature from the 1850s to 1930s. Cyclists can follow the 4.3mile Levee Bike Path along the river's levee. –M.B.



Steve Spracklen, 73, ragtime piano player and Riverlorian for American Voyages Cruise Line

"Growing up in Joplin, I always wanted to be a musician. A great fan of fellow Missourian Mark Twain, I also thought it would be fun to be out on the river. I am lucky that I have gotten to do both. In 1979, I was playing ragtime piano at the Red Slipper Club in Denver when someone saw me and recommended me for the *Mississippi Queen* (PICTURED BELOW). I was 28 years old when I started on the *Mississippi Queen*.

"Now I've been the Riverlorian on the *American Duchess*. As Riverlorian, I get to share the history of the river and the riverboats traveling on it. The mighty



Mississippi has spawned music for about as long as folks have been traveling on it. Known as America's Music Corridor, the watery highway connects three of our nation's greatest river cities and their huge contributions to the world of music: St. Louis with its blues and ragtime, Memphis with its blues and rock 'n' roll, and New Orleans with its jazz.

"Steamboats have been working their way through America's waterways since 1811—the year the first grand paddlewheeler left Pittsburgh and traveled down to New Orleans. That was the beginning of the Great Steamboat Era.

"Loaded with cotton and sugar cane, steamboats carried the pioneers, the traders, the planters, the businessmen, the gentlemen and ladies. At one time, more than 11,000 paddlewheelers worked these great rivers. Competition was fierce, so fierce that steamboats virtually became floating palaces, each one trying to outdo the other with more music, better food, more comfortable staterooms. Today, people like to cruise on riverboats to visit the cities and hear the music. Old Man River just keeps rolling along."—J.S.F.







U.S. Army Corps of Engineers, Rock Island PM-Acuff Clock Tower Building, P.O. Box 2004 Rock Island, IL 61204-2004

River Exchange keeps building

As two of the world's largest river systems, the powerful Mississippi and Mekong rivers have much in common. Those who drink their waters or farm along each deal with issues like saltwater intrusion from the oceans or seas to which they flow. They face floods and droughts and increasing unpredictability from climate.

The common challenges, as well as distinct ways each system is managed, form the basis for an equally powerful partnership between the river commissions tasked with various degrees of river management.

"It's really neat how the water and the river brings you back to basic human nature and respect for one another. It's the equalizer," said Brig. Gen. Kimberly Peeples, the president of the Mississippi River Commission and commanding general of the Mississippi Valley Division of the U.S. Army Corps of Engineers. "The river is life for the Mekong region, just as it is for us, and we both have the same mandate for our people and nations, to be the best stewards. To have a willing and able partner is a gift."

Peeples was part of a U.S. science delegation that traveled to the Mekong earlier this year. As part of a partnership funded by the U.S. State Department and reinforced by a memorandum of agreement between the two commissions, the group of officers and technical experts from the from the Mississippi River Commission, U.S. Army Corps of Engineers and other agencies visited both Thailand and Vietnam. The group toured a Mekong Delta fishery that produces and exports much of some 150,000 tons of commercially-caught basa (a type of catfish) a year and also the Bong Bot Sluice Gate. That infrastructure lets Vietnam mitigate saltwater intrusion that has damaged local farmland and threatened livelihoods. The groups also met formally and informally as river commissions, scientists and friends, with a bond deepened through each exchange.

Though the Mekong deals with multiple languages and distinct issues, their system shares with the Mississippi both the challenge of complexity and need for readiness and resiliency, Peeples said.

The two have been official "sister rivers" since 2010 with the first annual exchange taking place in 2011. A U.S.–hosted exchange in 2023 focused on trends affecting both basins—flow concerns, sediment, salinity, pollution and climate impacts, says delegation member Andy Ashley, the director of the Mississippi River Science and Technology office of the Corps' Mississippi Valley Division. The January exchange focused on methods for tracking trends through monitoring and data.

One thing that struck Ashley was the population density along the Mekong and related challenges.

"Even though it was a rural area, there was not a patch of grass that didn't have someone living on it, didn't have a family run business that or any given stretch of the river—and it was the same everywhere you went."

Some industries were distinct Southeast Asia river system, such as the way you won't find coconuts farmed along the Mississippi, he said, but the systems faced many similar challenges. The sluice gate visited by the team helps in controlling salinity for rice production along thousands of miles of canals.

Louisiana also has salinity control structures that facilitate navigation and fresh water supply, Ashley notes, adding, "There were many ties like that." –K.S.

materials, visit https://www.mvd.usace.army.mil/Library/Publications/Our-Mississippi/

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