

Our Mississippi



US Army Corps
of Engineers

PARTNERING TO KEEP
AMERICA'S RIVER GREAT

MISSISSIPPI VALLEY DIVISION • SUMMER 2024



A Sacred Mission

The Navigation and Ecosystem Sustainability Program is best known for its innovations in integrating navigation and ecosystem improvements on the Upper Mississippi River. It also protects cultural properties, starting with the nation's most important collection of prehistoric mounds.

AS A MEMBER OF THE BEAR CLAN of the Iowa Tribe of Kansas and Nebraska, Lance Foster has long felt a draw to the Effigy Mounds National Monument along the Mississippi River.

That site of more than 200 prehistoric mounds is most famously known for its marching bears—bear-shaped ceremonial mounds that follow the river as if in a drum line moving across the top of a scenic Iowa bluff. His tribe believes this is a place where members of his clan once, long ago, came together with other clans blessed with differing totems and gifts.

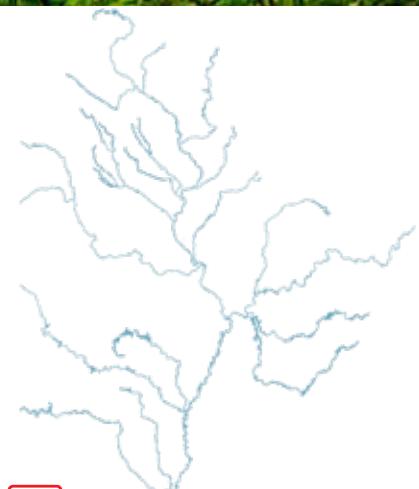
It's also a place where ancestors from this or any of 19 other tribes with a connection to the site were possibly buried, where ceremonies are held, and where the natural world was and still is experienced as sacred.

"To us, the land itself is the source of life," said Foster, who serves as the tribal historic preservation officer, who helped develop interpretive materials for Effigy Mounds and who runs a tribal national park with the first sister park relationship with a National Park Service site.

"Places like Effigy Mounds are essential," he said. "They are liminal places where you can contact the past, contact your ancestors. What we do is put down offerings to connect us to the place. There's a Lakota saying we all believe in that we're all related. They're all my relatives—the trees, water, animals and birds."

Foster's tribe is one with which the U.S. Army Corps of Engineers is collaborating to protect this landscape. Particularly, they're working to protect a set of mounds lying perilously close to the river from being permanently eroded and lost.

Through the ecosystem restoration portion of its massive Navigation and Ecosystem



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ABOVE: The Late Woodland Period along the Upper Mississippi River is associated with the culture today known as the Effigy Moundbuilders. These cultures built animal-shaped mounds, and along the Mississippi River in northeast Iowa and southwest Wisconsin, the prevailing animal shapes were bears and birds—shapes particularly visible from aerial views (FAR RIGHT). These mounds are preserved at Effigy Mounds National Monument. RIGHT: The National Park Service set up temporary erosion measures. The new project is seeking a more permanent solution.

Sustainability Program, the Corps is proposing a \$6 million project to protect the integrity of irreplaceable resources along the park's shoreline. This is one of several projects that will eventually protect cultural properties at risk of degradation. It's also part of the larger NESP program that's primarily focused on reducing backups at locks and dams and restoring natural ecosystem processes affected by the construction and use of the navigation system.

This project is relatively inexpensive as compared to the cost of seven new locks and hundreds of ecosystem restoration projects. But this NESP project has required a particularly high level of coordination with 19 affiliated tribal nations, many of which consider the site sacred, team members say. The project also lies within the boundaries of a park President Harry Truman declared a national monument on Oct. 25, 1949 because of its archeological significance. The park today still draws tribal elders and spiritual seekers as well as families, fishermen and hikers on a quest to see the stunning river view from the bluffs.

Planned for construction in 2026, the project will add shoreline protection in the park's Sny Magill unit. This mostly low-lying section is home to a concentration of 100 bird and bear-shaped as well as conical mounds adjacent to a slough that connects to the main channel six miles to the north. Extended recent high water events, compounded by wave action, have undercut the banks. That has damaged parts of several mounds but not yet completely destroyed any, according to park superintendent Susan Snow. But, she adds, there's no time to lose.

Staff at this National Park Service site first noticed erosion near the Sny Magill mounds in the 1980s, Snow said. In 1994, park crews placed small rocks held in place by beams as a make-shift protection measure. By the early 2000s, that system was failing, and teams further shored it up. While put on a waiting list for potential park service funding toward a



more permanent solution, the staff was approached by the NESP team with its project funding and serendipitous timing.

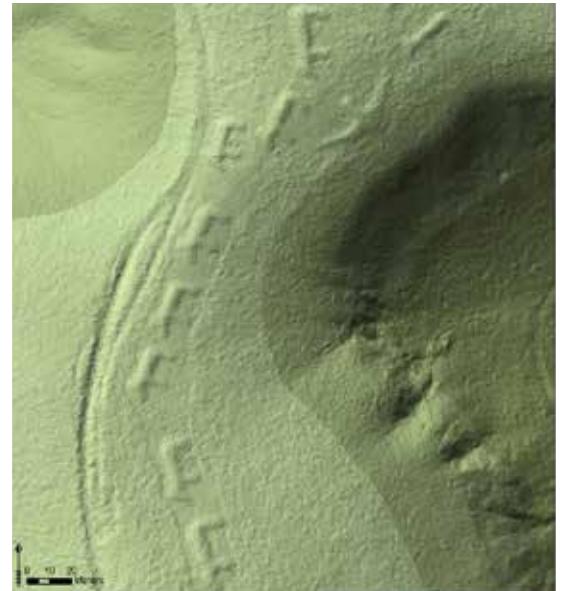
The mounds were likely created between between 800 and 2,500 years ago by hunter-gatherers who called the region home, and this precious resource escaped the fate of the many mounds plowed over for farmland in the fertile valley, Snow said. Road access to this site was limited and prone to flooding and the bluff terrain likely too perilous to farm. That left this treasure of a mound grouping virtually untouched.

"The really important thing to think about is this whole area was considered to be a sacred landscape by the native people that were here," she said. "We emphasize the mounds, but they're here because this area is so sacred to begin with."

This NESP project would include a rock berm, top-of-bank trail, and native vegetation planting. Efforts are being made as well to protect the rare mussel communities along the shoreline. Before construction begins, biologists will remove all the native mussels from within the project footprint. Concurrently, they'll work with the U.S. Fish and Wildlife Service's Genoa National Fish Hatchery which will propagate Higgins' eye mussel eggs and place them around the completed project site.

"We'll have a bank stabilization berm that we're backfilling to protect the mounds," said Jill Bathke, the project's planner, "and we're making sure we do so in a way that recognizes their importance. We'll have tribal and archeological monitors on site."

Beyond the scope of this one project, the Corps



has developed a programmatic agreement with 55 tribal nations connected to the Upper Mississippi River and the five border states for future NESP projects. It's an unprecedented coming together of the Corps and so many tribes, with efforts being kicked off through a fall workshop to which two representatives of each tribe has been invited.

"The broader coordination is how we incorporate the perspectives of the tribes beyond just what the minimum law requires," says Jesse Ray, NESP senior environmental specialist. "It's building better projects that reach more people. There are terms like tribal ecological knowledge. We have our science and tools, but their perspective is different. We can use that knowledge in our decision making"

The collaboration at Effigy also represents further healing from the distrust created when a former park superintendent was prosecuted for keeping human remains in his possession. The sister park relationship with the Ioway Tribal National Park is another step toward reconciliation, says Foster, who hopes the continued preservation of Effigy might keep it a place where many can experience the sacred past and present.

"The thing about the Mississippi is we called it Nitanga. That means the great river," he said. "We believed there were underwater beings that lived there. It had life in it, a huge system of living things. Not all life you can see; there's invisible life around you as well. When Sitting Bull as a boy had a vision question, a bird came to him and said, 'Be attentive.' That's all it said. It means pay attention. If you do, you will start seeing more and more." —K.S.

Corps program preserves the ancient

LARRY KINSELLA drapes a leather guard over his thigh and lays tools around him: a palm-sized hammerstone and smaller tools made of wood, bone and antler. He is visiting the St. Louis District of the U.S. Army Corps of Engineers, and it's not just for show and tell.

The experienced flintknapper from Fairview Heights, Ill., is working with the Corps' archaeology lab to showcase his method for reproducing stone tools used by the Native Americans who lived in the region for thousands of years.

His students? Participants in the Veterans Curation Program, one created by the St. Louis Archeology Center of Expertise in 2009 to accomplish a dual mission. The veterans get vocational training as they help to catalog and preserve



the Corps' archaeological collections. Basic flintknapping knowledge, Kinsella says, will assist the veterans in identifying lithic (stone) tools and flint scraps found in archaeological investigations.

"They can pick up a flake in the field and tell how it was struck and whether it was for a hoe or a little arrowhead," he said.

The program is based within the St. Louis District's Mandatory Center of Expertise for the Curation and Management of Archaeological Collections (MCX-CMAC). Dr. Michael (Sonny) Trimble, the program's founder and former director, returned from an archeological feat wanting to serve those who kept him safe as he worked in dangerous locations in Iraq. There, he led an infamous expedition: the excavation of mass graves in Iraq. In the desert, he was gathering evidence that would support genocide charges against Saddam Hussein.

The resulting program has a dual-purpose mission. Heroes help to preserve history, and the training helps them thrive once home. Some 90 percent of veterans trained in VCP go on to get further education in archaeology and find employment by government agencies, non-profit organizations and private corporations.

As veterans learn the intricacies of ancient tools, archaeologists within the lab at the center for expertise clean, categorize, photograph and catalog other valuable scraps of American past. They sort bits of broken glass, dishes, a square-cut nail, a shoe buckle, a handmade brick and a rusted sleigh bell in a room with panoramic east-facing windows.

The Corps of Engineers has designated this office as the Mandatory Center of Expertise for Curation and Management of Archaeological Collections. The district's archaeologists provide other Corps districts with program guidance and more.

Across the country, Corps archaeology offices participate in civil works projects, which usually involve moving dirt, to assure they are conducted in compliance with the National Historic Preservation Act of 1966. They also consult with tribal nations to ensure no damage is done to historic resources, said Mark A. Smith, supervisory archaeologist for the St. Louis District of the U.S. Army Corps of Engineers.

In addition, Corps archaeologists conduct surveys to determine whether historic resources are present under land that needs to be moved for civil works, such as repairing a levee or restoring a backwater. It's critical because history is everywhere in this home to world heritage sites like Cahokia Mounds.

The Mississippi River that attracted the early Native American settlers to the St. Louis area also brought the first Europeans to the middle of America, notes Meredith Hawkins-Trautt, a district archaeologist. "The French were first when Joliet came down the Mississippi in 1672."

Typical finds are stone tools and ceramics. In the 19th century, alcohol and medicine bottles begin to appear in the historic record. The center curates finds like dolls, toys, spoons, knives and forks broken or lost, as well as damaged jewelry—things that help them hone in on the time period in which they were used. Artifacts collected in the St. Louis district are stored at the Illinois State Museum in Springfield, a repository that meets federal standards for historic preservation.

"This area is so rich you can choose literally any part of history and find something significant," Hawkins-Trautt said. "The collections and our notes are all the information we have to determine what life was like in the past. There are a million different ways to think of why our history is important." R.S.

Restoration project offers wins for the environment—and locals

The public has weighed in and the feasibility report completed; now the U.S. Army Corps of Engineers through its Upper Mississippi River Restoration Program is moving forward with a restoration project that will affect a massive 900 acres along the Quincy, Illinois waterfront. One highlight is the way it'll offer improved options for people in a designed "food desert" to drop in a line and more effectively catch the night's dinner.

Environmental justice is one factor considered in the selection of Corps habitat restoration projects nationwide, and the Quincy Bay project, kicked off in October 2021, is immediately adjacent to a northwest part of the city that qualifies as a high poverty area by the U.S. Census Bureau Economic Development Administration. This project has such wide support that some 400 people showed up at a recent open house showcasing the project focused on restoration of the waters to restore plants key to migratory birds and habitat for fish and forests threatened by invasive species, said the Corps' Rachel Perrine, the Rock Island district plan formulation section chief.

When dredging is done, it will include spots central to the city and be located near publicly owned parks and handicap-accessible fishing sites. That will improve recreational—and food options—like fishing. The dredged material also will be used in beneficial ways.

"People are very excited about what's going to be brought to the area," she said. "They recognize the focus is environmental, and they're also excited about that. They've watched Quincy Bay degrade over time, and they are excited that habitat will be brought back. They're equally excited about the increased recreational and educational opportunities that could occur." —K.S.



Macroinvertebrate monitoring returns—and here's why it matters

Mayfly swarms on the river may be an annoyance for boaters, but they're a good omen for paddlers and fishermen. Mayflies thrive only in clean waters, so their hatches indicate good water quality and probably healthy populations of the fish that eat them.

"The macroinvertebrates we see in the water tell us about the health of the river. Mayflies are very sensitive to pollution," said Manisha Pant, an assistant research biologist at the Illinois River Biological Station. She is the lead macroinvertebrate scientist for the Long-Term Resource Monitoring element of the Upper Mississippi River Restoration Program led by the U.S. Army Corps of Engineers.

After a 19-year break due to funding shortfalls, macroinvertebrate monitoring returned to LTRM in 2023. Sampling is conducted along the Illinois and Upper Mississippi rivers by the five states comprising the Upper Mississippi River Basin Association: Wisconsin, Minnesota, Illinois, Iowa and Missouri.

Since 1986 LTRM scientists have continuously collected data on river ecosystem factors such as water quality, fish and aquatic vegetation populations, land cover along the rivers and river depths, levels and discharge rates. Scientists will be able to now determine how current macroinvertebrate populations compare to those found two decades ago and how those numbers reflect changes in water quality.

"A lot of bugs, like mayflies, have long aquatic larval stages so we find them in our samples. Where there is a wide variety and high number of invertebrates, there is a healthy river," Pant said. "When we find only bugs that are tolerant of pollution, that indicates the river is unhealthy."

Water that can't support pollution-intolerant macroinvertebrates is less likely to support higher orders of life, she notes. "They are a very important part of our ecosystem's food chain. They are a food source for fish, birds, amphibians and reptiles."

Numbers of bugs captured in sampling bags are extrapolated to estimate the concentrations of each per square meter of river bottom. Collected burrowing mayflies undergo laboratory testing that can indicate the risks that water pollution may pose to wild and human life. Mayfly tissue, for example, is analyzed to



quantify the concentration of polycyclic aromatic hydrocarbons that naturally occur in coal and crude oil, and of current-use pesticides and insecticides, Pant said. The U.S. Centers for Disease Control considers some of these chemicals to be cancer-causing and has found pesticides to be the tenth-leading-cause of poisoning exposures.

How many critters?

It is difficult to estimate the numbers of macroinvertebrate species in all the rivers' niches, Pant said. But that's the goal. While it's too early to compare current macroinvertebrate populations with those last recorded in 2004, she says it appears that the number of mayflies has increased, at least in some stretches of the river—a good sign.

Why bugs?

Careers studying macroinvertebrates do not attract a lot of people, Pant acknowledged, adding she sees these bugs as simply cool.

"When you put them under the microscope you can see all the features they have—their appendages and mouth parts. And there are so many types: many more than there are of larger animals. It is so fascinating."

More importantly, they're good water quality indicators. Scientists can identify three ranges of water quality by analyzing the types of macroinvertebrates that predominate in river samples. Caddisflies, mayflies and stoneflies need good water quality, she says. Dragonflies, damselflies and amphipods (crustaceans) can live in a wide range of water quality. And leeches, aquatic worms and midges don't tell you as much because they are pollution tolerant and survive in poor water conditions. —R.S.

Clearing up the water clarity issue

Why is the river water clearer over here and cloudy over there? Is murkiness determined by vegetation, sediment input or water flow—or is it rather something digging in the muck below?

A variety of factors affect the amount of suspended solids concentrations in the river, a recent research project has found, but "common carp abundance was the strongest predictor in nearly all study reaches."

Where the water is clear, fewer common carp are present. More carp suspend more dirt as these benthic feeders root along the river bottom slurping up plants, algae, aquatic insects and their larvae, small crustaceans and small fishes.

The findings were published recently in the journal *Ecosystems*, in "Intrinsic and Extrinsic Regulation of Water Clarity in a Large, Floodplain River Ecosystem." But the paper's lead author, Alicia M. Carhart, is a river vegetation specialist at the Wisconsin Department of Natural Resources

who conducted the research as part of the Long-Term Resource Monitoring Program (LTRM) of the Upper Mississippi River Restoration Program. Joining in the project were scientists from the U.S. Geological Survey and Minnesota Department of Natural Resources.

The team studied 24-year trends in total suspended solids in six reaches of the Upper Mississippi and the LaGrange Pool of the Illinois River. The LTRM data showed that common carp abundance has declined system-wide but remains relatively high in some pools. Ongoing changes to the river and its watershed as well as changing climate patterns have resulted in increased sediment as well, they found. Erosion of riverbanks and soil runoff from agricultural fields were the top sediment contributors.

One key finding was that increased water clarity perpetuates itself—increasing abundance of aquatic vegetation, something that creates its own clarity loop by further clearing the water. —R.S.

First NESP navigation improvement readies for use

There's a new cell going in downstream of Lock and Dam 14 near LeClaire, Iowa. This structure to which barges will tie up while waiting for a lock to be open is the first of what's known as small-scale measures to help navigation barges traverse the Mississippi River more efficiently. The goal is to save time and thus money for those producing and hauling goods from this fertile Midwestern farmland region—and money too for those who will eventually purchase these goods.

Small-scale measures are one key component of the Navigation and Ecosystem Sustainability Program. They denote projects and processes that can be implemented relatively quickly to help with river congestion as teams move through the design and construction of larger, more complicated new locks. There are nine of these mooring facilities in the works, one nearing completion and use by barges navigating the river. Eight others are in the planning stage.

Despite the name, the impact of mooring facilities isn't necessarily small, says Andrew Goodall, project manager for NESP. While early time estimates predict a savings of five to 10 minutes per each barge that "locks through," the time varies by how big the bottleneck is and how close barges are (or aren't) waiting for locks now.

"One is almost built, and we'll be able to see pretty quickly with that one what a difference these can make," Goodall said.

At the most extreme location, barges wait for the lock about four miles from the lock itself while the mooring facility proposed there would be just a quarter mile upstream. That, team members estimate, could save almost the 1½-hour time it takes for a waiting barge to enter the cleared lock. Benefits increase even more when multiple barges are waiting.

As soon as the first mooring facility is complete and in use, NESP teams will work with the U.S. Army



Engineer Research Center in Vicksburg, Miss., to track the exact time savings through monitors on individual barges and equate that to eventual savings. A time savings of just five minutes per lockage still translates to a significant annual savings to the economy, team members say.

Congress first authorized construction of the mooring facilities in the 2007 Water Resources Development Act. There, mooring facilities are described as structures to which a vessel might temporarily anchor. They'll vary between circular cells filled with earth and concrete and "dolphins" made up of steel pilings. Which is used depends on the structure of the river bottom at a given location.

Navigation industry leaders worked with the Corps to identify the locks that might most benefit from mooring facilities to reduce commercial traffic delays. The initial list of 20 locations was pared down and prioritized, in part through use of heat maps that show the unofficial mooring areas barges are using now.

In addition to saving time on each lockage, the mooring structures will help to reduce unintended consequences to the environment, notes team member Breann Popkin. Barge operators often ground their boats as they wait along a shoreline that's often significant in terms of endangered habitat or cultural resources.

NESP is the first Corps program in the nation to have a dual purpose, in this case one that mirrors Congress's declaration of the Mississippi River system as both a nationally significant ecosystem and nationally significant commercial navigation system. This system is used to transport more than 60 percent of America's corn and soybeans through these often congested locks; it's also a globally important flyway for some 300 bird species and is comprised of some 2.7 million acres of bottomland forest, islands, backwaters and side channels that are home to multiple mammal and fish species and some 50 types of mussels.

Having the waiting barges tied off in the water, along specifically designated spots, will reduce shoreline erosion and will protect trees to which they may anchor and shoreline mussel beds that often contain rare and endangered species.

"These will give barges a designated place to wait that will have no impacts to things like mussel species as far as prop wash," Popkin said. "They won't be bumping up against those natural resources causing degradation." —K.S.

PHOTOS: U.S. ARMY CORPS OF ENGINEERS.



Brad Eldridge,
owner of Parish Waterfowl Company,
Vicksburg, Mississippi

"I grew up 30 minutes west of Vicksburg in Delhi, Louisiana. I did spend a lot of time outdoors, duck hunting around the Mississippi River.

"The predominant amount of my hunting before my adolescence was in the Tensas National Wildlife Refuge south of Tallulah, Louisiana. Then as I got older, I started traveling out more and using some of the oxbows and backwater of the Mississippi River. It's a treasure out there.

"I've been an avid duck hunter since I was about 13. When I was about 30, I moved back to this area. I started hunting with a couple of younger guys that were into duck call collecting, which is something I had never been into.

"I ended up putting on a benefit for my friend's daughter to raise some money for a liver transplant. In doing that, we put on a two-day duck hunt. The initial reason for making the calls was just to be able to put together experiences for people, and then it kind of took off on me and turned into more of a full-time job.

"I wanted to display what I was doing with my custom duck-call making. When I found this Reconstruction Era-Freedman's Savings Bank, it was really a blank canvas. It had a lot of natural light. The vaults in the back and everything were really cool too. Just the history of that building.

"I think locally, people understand that there's a lot of habitat out there along the river. A lot of tourists that we get at least, are coming from Europe and sometimes the West coast, and they just really have no concept of what makes good hunting property or where we hunt." —C.E.



DID YOU KNOW?

The U.S. Army, established by the Continental Congress in June 14, 1775, is a year older than the Declaration of Independence and thirteen years older than the Constitution.

River Helpers

From campground hosts to river angels, **volunteers**



As families turn into Persimmon Hill campground at Northern Mississippi's Lake Enid each spring, Lisa Harlow zips around in a golf cart to welcome the newcomers with a smile.

In return for a campsite, she and her husband and volunteers at other U.S. Army Corps of Engineers campgrounds along the Mississippi River's 2,500-mile corridor of connected rivers and reservoirs, serve as campground hosts. They spend about 20 hours a week helping first-time visitors get oriented to their campsite, making sure bathrooms are well-stocked and keeping public areas such as beaches tidy.

"We do a lot of meet-and-greet," said Harlow, who has lived on-site for eight years at this popular reservoir off the Yocona River south of Memphis, Tenn., and north of Vicksburg, Miss.

The regular campers, whom they get to know well, may ask for the latest intel on fishing hot spots, especially if they dream of a world-record catch like the 5-pound 3-ounce white crappie once landed at Lake Enid.

"[Campground hosting is] not hard work at all, but you do need to be in good health," said Mickey Haus, volunteer coordinator at Granada Lake. "And you need to be a people person and be ready and willing to help however you can."

Volunteers extend activities

The Harlows are among legions of volunteers who help people connect with and take care of natural resources along America's largest watershed whether they're camping, paddling, boating, fishing, hiking, or sightseeing and learning about local history and heritage.

Nationwide, the Army Corps of Engineers hosts an estimated 250 million visits annually to its recreation areas and manages waters that provide 18 percent of all U.S. freshwater fishing. More than 45,100 volunteers pitch in across the country.

Those who are focused on the Mississippi River and its tributaries do everything from vital spring cleanups and tracking migratory birds to assisting long-distance paddlers or getting city kids onto the water for the first time. They fill the gaps and meet the needs where funding and staffing falls short.

Erika Van Krevelen, Volunteer-in-Parks coordinator with the National Park Service, estimated 2,000 people answered requests in 2023 to help out along the Mississippi National River and Recreation Area, a 72-mile stretch through the Twin Cities. Multiple agencies, including the National Park Service and Army Corps of Engineers, provide programs and tackle improvements within its 54,000 acres. Volunteers do everything from landscape restoration at historic Coldwater Spring to answering questions at the visitor center in downtown St. Paul.

"Volunteers are so important to not only our park operations, but to the experience of visitors," Van Krevelen said. "They bring different expertise and energy, and that helps anyone who visits the river corridor by enriching their experience."

Here's a look at some of the many ways people do good along or on the rivers so everyone can enjoy them more fully.

Assisting at visitor centers, museums

People who love learning and sharing what they know should check out the many museums closely tied to the Mississippi River, such as the National Eagle Center in Wabasha, Minn., the sprawling National Mississippi River and Aquarium in Dubuque, Iowa and the 12,000-square-foot National Great Rivers Museum in Alton, Ill.

The National Great Rivers Museum, a collaboration between the U.S. Army Corps of Engineers and the Meeting of the Rivers Foundation, opened in 2003 next to the colossal Melvin Price Locks and Dam. It operates where the Missouri River joins the Mississippi in St. Louis—a major meeting point for riverboats on the water and migrating birds in the sky.

Birders come for eagle watching and visits to the Audubon Center at Riverlands on the opposite shore, while museum visitors can watch river fish in aquariums and use a simulator to see whether they can virtually steer a barge into a lock. Outside, they watch the real action as barges up to 1,200 feet in length move up and down the river.

"What draws people to the museum the most seems to be the lock and dam tours," said Elise Ratcliff, volunteer coordinator. Three times a day, volunteers lead tours, as well as helping in the museum, but the staff always needs more people to help visitors learn about flood control, keeping the rivers safely navigable for shipping, protecting the ecosystems and the wildlife who use them.

"In the winter we see lots of bald eagles and flocks of trumpeter swans with the occasional tundra swan mixed in," Ratcliff said. "The dam is great for watching eagles since they are often flying above the river and people can see them up close."

keep Mississippi River natural areas and educational sites thriving and get plenty in return.



River angels help out thru-paddlers

Social media makes it easy to find like-minded people who feel close ties to the Mississippi River through boating, paddling and shared interests such as annual festivals, birding, and photography.

Mike Bohannon, who lives near Dyersberg, Tenn., about halfway between Cairo, Ill., and Memphis, Tenn., often took photos along the Mississippi River and then discovered a unique way to get involved by helping adventurers paddling the entire length from Minnesota to Louisiana.

He and many other “river angels” check the River Angels Facebook page for travelers heading toward their section of the river. They can reach out through messaging and ask if paddlers need anything. That person-to-person act of kindness can flip a rough day into a good one with the delivery of a meal or supplies or a place to pitch a tent or take shelter during rough weather.

“Water is the number one issue through this area,” said Bohannon, who lives along a remote stretch but can quickly deliver supplies to a public boat access a few miles from his house. Paddlers might need a solar panel for power, a food package they pre-shipped to him, or a few groceries. He may gift them with fresh fruit or a hot meal to break up the monotony of camp-stove meals.

His reward has been hearing the stories from travelers of all ages from across the country.

“I like meeting people from all walks of life,” he said, and their ages range from mid-20s into their 80s. “All have the free adventurous spirit.”

Caring for a stretch of river

Keeping the Mississippi and its nearby rivers and reservoirs healthy and safe for boaters, paddlers and anglers often requires a group effort, especially in the spring when meltdown, the debris of winter, and spring storms can leave a mess.

People can pitch in through the Army Corps, state departments of natural resources, or local non-profit organizations such as Friends of Pool Nine, which cares for the more than 31-mile stretch of the Mississippi between Lynxville and Genoa, Wis.

“It’s really amazing what winds up in the river,” said Blake Schoh, a volunteer with Friends of Pool Nine and owner of S&S Boat Rentals in Lansing, Iowa.

He and a core group of 100 to 150 active members fill multiple 8- to 20-yard dumpsters with trash collected from more than 35,000 acres, including buoys, barrels, docks, tires, propane tanks and even a few cows that get caught in floods. They also clean up river campsites and replace firepits.

Donations from the group’s membership of 880 people bolster bigger projects completed in partnership with state or federal agencies. They’ve installed a new canoe launch, added handicapped-accessible wheelchair ramps to Iowa’s state boat ramps, and rehabbed some of the beaches.

When the U.S. Army Corps and Fish and Wildlife Service dredged and built new islands, Friends of Pool Nine purchased about \$30,000 worth of mixed trees

to be planted on them, and on Mississippi River Education Day, volunteers help provide area school kids with experiences that can include paddling, fishing, birding and a chance to visit a fish hatchery.

Inspiring the next generation

Volunteer coordinators say people who help children understand the importance of rivers can be vital. In Minnesota, volunteer educators help more than 4,000 Twin Cities elementary school students get onto the water through the Mississippi National River and Recreation Area’s Big River Journey field trip.

From the railings of riverboats and through hands-on activities, they observe birds and natural habitats, learn about mussels, mushrooms, and plants, talk about geology and examine fossils, and see shoreline spots where otters made slides.

“You can see the connections being made, and it might shape a student’s life in some way,” said Van Krevelen, the Volunteer-in-Parks coordinator. “It’s one of those things that’s really exciting to see. It helps inspire the next generation of park lovers and stewards of the environment.”—L.M.M.

FIND WAYS TO PITCH IN

<p>Volunteer.gov Submit one volunteer application for positions at thousands of locations managed by the U.S. government.</p>	<p>Friends of Pool Nine, Friends of the Refuge—Mississippi River Pools 7 & 8, and more.</p>
<p>Facebook Search for “Mississippi River Angels” on Facebook to find ways to help long-distance paddlers. You can also find regional groups that support the river, such as regional Audubon chapters, Mississippi Park Connection,</p>	<p>Workamper.com This site helps match RV owners with campsites and nearby jobs. Featured employers include the U.S. Army Corps of Engineers which offers campsites for volunteer campground hosts, but also may offer part-time or full-time contract work in offices, welcome centers, or maintenance areas.</p>

PHOTOS: U.S. ARMY CORPS OF ENGINEERS; NATIONAL PARK SERVICE



This land is your land

Celebrating 100 years of a ‘Wild-Life’ refuge ahead of its time.

“Fish and game can’t vote,” declared a quote published in a November 1923 edition of *Outdoor America*. Fortunately, women could.

A couple looking to honor the legacy of their son launched the drive to forever preserve the 250,000 acres of river channels and forests that would become the Upper Mississippi River National Wildlife and Fish Refuge. But the emerging voices of the suffrage movement—women who wanted untouched lands on which to vacation with families—were key to the passage of the bill that would a century ago create the nation’s longest contiguous stretch of public lands.

The refuge that stretches from Wabasha, Minn. to Rock Island, Ill., celebrates its 100th anniversary this year with events designed to create awareness of its existence and importance. A secondary goal is to connect even more people with these wild lands—through stretches paddled, hikes taken, birds spotted, photos snapped or fish caught—and thus inspire protection into the next century.

In her dream, says Refuge Manager Sabrina Chandler, the efforts might give rise to a new generation of leaders who might perhaps solve issues related to climate change and whatever other challenges might lie ahead.

“Most people don’t realize this is part of a system of public lands across the country, of the 571 national wildlife refuges that make up the largest system of lands protected for wildlife first,” she said. “Those lands belong to the public. One mission of mine is to help people understand this is not just the river. I want them to understand what that means and what protection the refuge provides. It’s also helping people understand the value of conservation thinking into the future.”

The way women rallied behind the effort struck a chord with Chandler, the first woman to hold the refuge’s top leadership position. The General Federation of Women’s Clubs became a powerful voice within efforts focused around conservation and natural resources. The official mission was “the promotion of all movements toward the betterment of life,” and many writings mentioned family vacations, recreation, natural beauty and the desire that this treasure be protected from becoming all drainage districts and agricultural land.

“That stood out to me,” Chandler said. “The first time I saw this place it had a significant impact on me from the perspective of being awestruck.”

Today, as they were a century ago, refuge lands are bordered by steep wooded bluffs that rise 100 to 600 feet above the river valley, and they’re traversed across four states by showy birds including the tundra swan and bald eagle. The refuge is now designated both a Globally Important Bird Area and a Wetland of International Importance.

Will Dilg, the Izaak Walton League founder and man whose vision first envisioned a refuge on the lands, was no doubt driven by that same sense of awe—as well as a passion for certain hobbies. “Since boyhood,” the Chicago advertising executive and outdoor writer once said, “the call of black bass waters has been my chief weakness.”

But though he frequently visited the Upper Mississippi on vacation getaways from his Chicago home, his motivation went well beyond the desire for a

forever place to fish and hunt. A story by the league’s Jack Lorenz talks of how Dilg’s young son drowned when he fell off a rented houseboat. Dilg and his wife Marguerite set out to build a natural living monument to their boy, and more than 50 friends and fellow outdoor writers joined the cause. They named their advocacy group the Izaak Walton League after the father of fly fishing.

Dilg’s bill to create the “Upper Mississippi River Wild-Life and Fish Refuge,” with the help of women’s groups and other outdoor advocates, made it through Congress to signing by President Coolidge in just 11 months and with a caveat not seen in any other public land preservation of the time.

The 50 refuges already designated at that time were “involute sanctuaries” meant to preserve fish or wildlife or game, says river expert John Anfinson, a former historian for the U.S. Army Corps of Engineers and past National Park Service superintendent. “This was the first refuge to say, we’ll be multiple use and allow hunting, fishing, camping, boating, everything. It broke the mold forever.”

The opening of this new refuge, then, launched a century of work to balance the interests of nature, commercial shipping and the recreating public. But Chandler would argue the balance has been well maintained. There were none of the 29 locks that now create a navigable 9-foot channel on the Upper Mississippi at the time the refuge was created, she notes, but the War Department was already tasked with operating the river for navigation.

Beyond that, what’s now the U.S. Army Corps of Engineers remains a key partner with the U.S. Fish and Wildlife Service, and not just for the benefit of barges. For the past 38 years, the partnership between the U.S. Army Corps of Engineers (which leads the Upper Mississippi River Restoration program) and other federal and state partners has worked on issues from island construction to water quality monitoring. Of the many UMRR projects located within the refuge, the most notable might be the Pool 8 islands, Chandler says, where you can see 40,000 tundra swans on a given migration day.

“The reason the birds are there is that we were able to reestablish islands that protect vegetation beds from wind fetch and allow sediments to settle out so plants can get rooted outside the turbulence of the main channel,” she said. “That’s why those birds come there. It’s a direct tie.”

She can see the lightbulb go off—in some cases almost literally—as publicity about the 100th year celebration opens eyes to the refuge’s existence and difference.

“I was in line at a music concert recently and the guy next to me is looking out from the Trempealeau Hotel saying, ‘Did you know there’s a refuge here and they’re celebrating the 100th anniversary?!’” she said. “It felt really good to hear this in a public setting and see how excited the guy was. I was cheering inside for sure.” —K.S.



Take only photos ...

They say that a photo is worth a thousand words. In the case of these shots of the Upper Mississippi National Wildlife and Fish Refuge, that would be 100 years of protection.

As one part of the centennial celebration, the refuge launched a photo contest to see who might best capture the spirit of a series of themes: connecting with place, wildlife and scenic views. There was much to choose from as the refuge stretches 261 river miles and hosts 306 species of birds, more than 300 bald eagle nests, 50 percent of the world's canvasback ducks, 51 species of mammals—and much more.

The staff received 57 entries from 22 photographers. Winning photos (some displayed below) are part of an exhibit rotating among refuge districts, and best of show will be determined by public voting. For more about how to see the scenery (and winners) for yourself, go to: [FWS.GOV/REFUGE/UPPER-MISSISSIPPI-RIVER](https://www.fws.gov/refuge/upper-mississippi-river)



Amy Cooper



John Kenkel



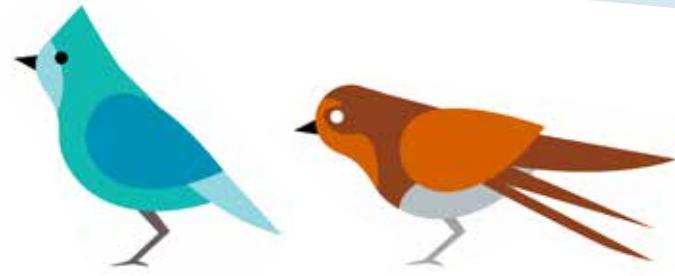
Deedee Nadeau



Bruce Bartel



Isabelle Katwa



Be a Buddy for Birds

Birds are all around us. They are one of the most common wildlife we encounter on a daily basis. From American Robins visiting our backyard bird feeders to American White Pelicans migrating along the Mississippi River to Bald Eagles constructing massive nests along the Great Rivers Confluence, birds are everywhere. Roughly 60% of North American songbirds and 40% of North American waterfowl use the Mississippi River as a vital bird superhighway.

Birds also tell us that they are in trouble. Since 1970, the population of birds in the United States and Canada has decreased by 2.9 billion breeding adult birds. These losses impact even our most common birds, including dark-eyed juncos, white-throated sparrows, and red-winged blackbirds. Birds are facing serious problems, and they need our support.

Here are some ways you can become an advocate for birds!



Make Your Yard A Bird Oasis. Create bird-friendly habitat in your own yard by planting native plants that provide food, shelter, and nesting opportunities for birds. Check-out Audubon's Native Plant Database and find the ideal native plants for your bird oasis!

Participate in Citizen Science. Some possible programs you can get involved in are Cornell's Nest Watch program, Cornell's Great Backyard Birdcount, Audubon's Christmas Bird Count, and many more.

Go Birding and Bring Friends! Join a local birding club or Audubon chapter and meet other bird advocates or just share your passion with others. The more people who care about birds, the greater the change we can make!

Keep Cats Indoors. It's estimated that outdoor cats kill a significant number of birds each year—up to 3.7 billion a year, according to a new report from the U.S. Fish and Wildlife Service and Smithsonian's Migratory Bird Center. By keeping your cats indoors, you're protecting your area's birds and your cats!

Turn Your Lights Out. Nearly a billion birds die due to window collisions every year with the highest periods of fatalities during migration. The Lights Out movement started to stop these huge mortality events with the simple premise of turning off your lights from midnight to dawn during peak migration season, September 1 to November 1.

Treat Your Windows. Minimize bird collisions at home by reducing reflective glass surfaces, such as windows. You can do this by creating patterns on your windows with decals, screens, UV liquid markers, or feather-friendly tape. —JONAH ECKELS, EDUCATION COORDINATOR WITH THE AUDUBON CENTER AT RIVERLANDS



How do birds get their names?

All birds have feathers, wings and a beak. But beyond that, they come in an amazing variety of colors, shapes and sizes. Many times, a bird's name tells you something about how it either looks—or behaves. A woodpecker, for example, pecks at wood to get its food; a red-headed woodpecker has, well, a particularly bright-colored head.

Look at these birds, write on the provided line how you think it got its name. And then invent, draw and name a bird of your own! (Note: make sure it has feathers, two wings, two feet and a beak. Beyond that, let your imagination rule).

SOURCE: AUDUBON.

Draw your own invented bird here, and give it a name!



RED-WINGED BLACKBIRD



BLACK-CAPPED CHICKADEE



GRAY FLYCATCHER



GREAT HORNED OWL



ROSEATE SPOONBILL



BLACK OYSTERCATCHER



Unparalleled Overnights

Spend the night in one of these storied river lodging spots.

Whether you're driving the Great River Road or exploring the beautiful outdoor spaces along the Mississippi River, you might be in the market for a cozy place to spend the night. Why not find one sure to leave you with an adventure story to tell.

Ensure that your overnight is just as interesting as your adventure along the Mississippi River with a night at one of these six places to stay within an old school house, historic jail or floating vintage towboat.



↪Maiden Rock Inn | Maiden Rock, WI

If you've ever dreamt of falling asleep in class, a stay at the Maiden Rock Inn in Maiden Rock, Wisconsin might be in order. This repurposed 1906 high school now serves as a fully functioning bed and breakfast with a one-of-a-kind event space attached. With thoughtful antique touches like restored pressed-tin ceilings, detailed woodworking and a show stopping spiral staircase, you'll feel like you're back in school alongside all of the comforts of home. The Maiden Rock Inn has four beautifully decorated suites that offer guests comfort and privacy during their riverside stay.

↪Covington Inn Bed & Breakfast | St. Paul, MN

There are plenty of places where you can wake up to a Mississippi River view. But there are only a handful of spots that let you sleep in the Mississippi River. The Covington Inn Bed & Breakfast in St. Paul, Minnesota gives visitors the chance to sleep aboard a 1946 towboat. While the Covington is permanently tethered with a view of the downtown St. Paul skyline, guests will still get a full nautical experience on the river when they retire to one of four cozy cabins for the night, each with private bathroom and deck access as well as a working fireplace and AC unit.

↪Jail Hill Inn | Galena, IL

This unusual accommodation puts new meaning to spending the night behind bars. Located on the bluffs of Galena, Illinois, the Jail Hill Inn offers a unique bed and breakfast experience in a circa 1878 building that served as the county jail until 1977. While the four-story brick building sat derelict for years, the passion and restoration efforts of a Galena local transformed it into the reimagined space you see today. With six spacious suites to choose from and plenty of luxury amenities, the Jail Hill Inn has everything travelers need for a relaxing getaway.

↪The Peabody Memphis | Memphis, TN

There are few classic hotels more iconic than The Peabody in Memphis, Tennessee. But one of the things that makes this legendary lodging so well-known is also one of its most unusual traditions. Every day at 11 a.m. and 5 p.m., the hotel's five resident Mallard ducks march through the lobby and into the Peabody's ornate central fountain. While the historic hotel is a beautiful place to stay while exploring Memphis and the Mississippi riverfront, hotel guests and tourists alike flock to the property daily to see the duck parade.

↪Captain's Quarters in the Old Mill Guest House | Le Claire, IA

Located on the banks of the Mississippi River in the charming town of Le Claire, the Captain's Quarters is the perfect spot for a romantic getaway. Originally built in 1851, this former mill house originally belonged to Captain John W. VanSant. Today, the top floor of this historic building pays tribute to its past with all sorts of cozy charm, just steps from the vibrant downtown district. Wake up with a view of the Mighty Mississippi before heading out for a day of exploring along the riverfront and beyond.

↪Watermark Baton Rouge, Autograph Collection | Baton Rouge, LA

Housed in an iconic skyscraper on the banks of the Mississippi River, the Watermark Baton Rouge is an Autograph Collection property with serious style. Originally the headquarters of Louisiana Trust & Savings Bank, this luxurious lodging option features hand-painted ceilings, carved marble staircases and bank vaults converted into unique dining and meeting spaces. —M.B.

Plan ahead for these Corps recreation site special events

AUG 17 Open Outdoor 3D Archery Tournament

Clarence Cannon Dam and Mark Twain Lake
Contact: Brian Falls, brian.a.falls@usace.army.mil, 573.406.2617

MOCHF.ORG/3D-ARCHERY-TOURNAMENT/

AUG 22-25 Wounded Warrior Camping Weekend

Cross Lake Dam & Recreation Area
This is a collaborative effort between the Corps, the Wounded Warrior Guide Service and the Paul Bunyan Scenic Byway Association to provide a camping and outdoor activities opportunity over a weekend for local Veterans.

Contact: Corrine Hodapp, corrine.k.hodapp@usace.army.mil, 651.290.5790

SEP 6 Barge Trip/50th Anniversary of Lock and Dam

Kaskaskia River Project
Contact: Chase Becker, chase.j.becker@usace.army.mil

SEP 21-22 33rd Annual Old Greenville Days,

Wappapello Lake
Contact: Andrew Jefferson, andrew.jefferson@usace.army.mil, 573.222.8562

OCT 24-27 Cross Lake—Camp Spooktacular

Cross Lake Dam & Recreation Area
Special Halloween camping weekend. Campers decorate their campsites and trick-or-treaters visit in a safe environment.

Contact: Aaron Springer, aaron.springer@usace.army.mil, 218.692.2025



DEC 7 Holiday at the Dam in Crosslake/ Light up the Dam

Cross Lake Dam & Recreation Area
Holiday lighting on the Cross Lake Dam and family fun day.

Contact: Ellen Tabako, ellen.j.tabako@usace.army.mil, 218.692.2025

ONGOING Volunteer Village Opening

Rend Lake
Contact: Meaghan Mason, meaghan.l.mason@usace.army.mil, 618.724.2493



US Army Corps
of Engineers

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

My MISSISSIPPI



Kirk Atwater, Structural Engineer, U.S. Army Corps of Engineers, Rock Island District and district Engineer of the Year

"In general, on the Upper Mississippi, all the dam gates are still original. They were built in the 1930s with an expected 50-year service life, but here we are at 90 years and all are still operating.

"They have issues and are in need of replacement, so in 2017 we designed new Tainter gates for Lock and Dam 22. Each gate weighs around 200,000 pounds, and back in the day, they didn't have cranes big enough to lift the gate in as a whole unit like we can today. They had to build them in place and rivet everything together. Since I was one of the designers of the replacement gate, I was most familiar with them and chosen to lead the replacement job. To date, we've received the first three replacements and successfully installed all of them.

"One of the biggest challenges was how to remove two 5,000-pound pins that support each gate. These haven't moved in 90 years and were heavily rusted into position. The idea we came up with was to break the pins loose using the self-weight of the gate, which put it in an extreme operating condition. I reached out to the USACE Engineer Research and Development Center—Structural Health Monitoring lab to see if we could put sensors on the gate and monitor its behavior when subjected to the extreme conditions. Additionally, since we were scrapping the original gates, we had the opportunity to perform full-scale destructive testing to learn as much as possible before the gates were removed from the dam. We could go crazy with the amount of induced damage as long as it remained safe for removal.

"These are steel structures that have been in water their whole lifetime, and we see more damage than you would expect; we also get a lot of floating debris—logs, ice, and we find cracks! With the destructive testing, we were able to simulate cracks where we expect to

find them, which allows us to see how the gate responds to known defects.

"We used torches to add cracks throughout the structure, and we'd operate the gate and check our sensors to see how the behavior was changing with every subsequent crack we added. This is where we had some surprises. We were seeing very little change in performance after putting these cracks in it. We even cut a structural framing member completely in half before continuing to operate it, and the gate continued to perform better than expected.

"Did we get a gate to fail? Not yet anyhow, but we have a total of six more gates to replace at LD22. We're going to perform more research along the way and push the gates harder as we go.

"I grew up in central Illinois along the Illinois River, but to be honest, I didn't realize all the work the Corps does until I started working for them. My Mississippi involves everything related to the lock and dam infrastructure that enables navigation and shipping on the river. It is incredibly satisfying to design, install, and perform maintenance on replacement structures that meet modern design requirements while maintaining compatibility with the original infrastructure that remains in place." —K.S.

We want to hear from you!

Have thoughts on our current issue? Story ideas you'd like to see us research? Email thoughts or letters to the editor to: editor@kimschneider.net

Questions or Comments:

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