Volume 25, Issue 2
Spring 2024

The Corps Environment

10

Water Power:

USACE hydroelectric plants provide renewable energy for a sustainable future

Environmental Operating Principle #4

Continue to meet our corporate responsibility and accountability under the law for activities undertaken by USACE, which may impact human and natural environments.

Going with the Flow: Sustainable Rivers Program controls water flow to improve environmental conditions **14**

CONTENTS

The Corps
Environment

Lt. Gen. Scott A. Spellmon
Commanding General, Publisher

Chris Augsburger
Director of Public Affairs

Lara Beasley
Executive Editor

Jenn Miller
Managing Editor

Kristen Bergeson
Editor

The Corps Environment is an online quarterly news magazine published by the U.S. Army Corps of Engineers under the provisions of AR 360-1 to provide information about USACE and U.S. Army environmental initiatives, policies and technologies.

Opinions expressed herein are not necessarily those of the U.S. Army Corps of Engineers, the U.S. Army or the Department of Defense.

The Corps Environment's editorial staff welcomes submissions with an environmental, sustainability or energy focus from USACE and Army units worldwide.

Send articles, photos, events, letters or questions to the editor at Corps-Environment-Magazine@usace.army.mil.

Submission deadlines are indicated in red:

December 15	Winter
March 15	Spring
June 15	Summer
September 15	Fall

U.S. ARMY

US Army Corps of Engineers®

Earth Day 2024

Highlighting Our Environmental Professionals

On April 22, we joined our global community in the celebration of Earth Day. During this time, we often focus on the actions being taken to shape a sustainable future, but this year I want to focus on the people behind these actions.

As Environmental Division chief for the U.S. Army Corps of Engineers, not only do I oversee the annual execution of around $2.5 billion of environmental compliance and cleanup work across the enterprise, but I also serve as the Environmental Community of Practice chief. In this position, I champion our more than 4,000 environmental professionals who specialize in diverse environmental disciplines within USACE.

Lara E. Beasley
Chief, Environmental Division

These are our teammates who work across our military, civil works and research and development programs in jobs that are uniquely focused on our environment. These are our health physicists, environmental engineers, biologists, ecologists, physical scientists, geologists and so many others who make up over 10% of our USACE workforce.

But our strength in supporting our environmental mission extends far beyond this 10%. This is just a small number compared to how many different disciplines support our diverse and enduring environmental mission — which overlaps all that we do. Every project delivery team member is supporting efforts that have a direct impact on our environment. All our engineers, scientists, specialists, technicians, attorneys, assistants — everyone within USACE plays a role in delivering engineering solutions that shape our environment, our nation and our planet.

The environment is everywhere and so is our team of more than 38,000 dedicated professionals who are putting in the work each and every day to secure a sustainable future for current and upcoming generations.

- In honor of Earth Day, we prepared an infographic that provides a snapshot of the diverse environmental disciplines within USACE. You can view and download the infographic here.
- We also prepared an Earth Day StrongPoint that connects the work we do across USACE to our environmental mission. You can view the StrongPoint here.

Environmental stewardship is ingrained in our culture here at the U.S. Army Corps of Engineers. It is indoctrinated through our Environmental Operating Principles and illustrated through the many actions being taken across the enterprise. Through our collective efforts, and alongside our partners, we will continue to protect and preserve our environment and shape a sustainable future for not just ourselves, but for every species that inhabits our planet.

USACE Environmental Operating Principles

1. Foster sustainability as a way of life throughout the organization.
2. Proactively consider environmental consequences of all USACE activities and act accordingly.
3. Create mutually supporting economic and environmentally sustainable solutions.
4. Continue to meet our corporate responsibility and accountability under the law for activities undertaken by USACE, which may impact human and natural environments.
5. Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.
6. Leverage scientific, economic and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner.
7. Employ an open, transparent process that respects views of individuals and groups interested in USACE activities.

Learn more about the EOPs at:
www.usace.army.mil/Environmental-Operating-Principles

Building a Bridge Between Readiness & Resiliency

'Old-timer' discusses USACE's efforts to mitigate environmental impacts of military training lands

By Thomas Milligan
U.S. Army Environmental Command

As a self-described "old-timer" in natural resources with more than 20 years of experience, Heidi Howard has had a birds-eye view of the changes that have shaped the Army's approach to training-land management.

"When it started in the late 1980s, Integrated Training Area Management (ITAM) was a research program with the objective to identify military impacts from training and to understand fundamental processes and what could be done to mitigate impacts. The idea of how to ensure that this didn't happen in the future though wasn't really a part of that thinking initially," she said.

"I think one of the things that has changed is that there's a better understanding of what sustainability means and what it takes. We definitely have a better understanding of the needs of the land."

Howard, who works at the Construction Engineering Research Laboratory under the U.S. Army Engineer Research and Development Center, is part of a more than 300-person team of engineers, scientists, technicians and support staff dedicated to developing technologies to provide high-quality facilities and realistic training lands for the Department of Defense.

Howard said the laboratory team's work has helped the Army make great strides in not only protecting and sustaining land for training, but also protecting Army land and the animal and plant species that live on this land.

"Without realistic training lands, there's no way we can have Soldiers ready. That's always the goal, that they have that training capability. Our work, specifically ITAM work, is to provide the support to the installations to ensure sustained training capabilities are maintained and even improved. By creating the right conditions, we can preserve and protect plant and animal species as a part of meeting our overall mission," she said.

"As far as installations and the Army, I am gladdened to see that there is continuing interest and accountability on how the lands are managed and sustained. The Army is really invested in sustainment and land management. Stewardship is important."

Howard said, contrary to what some might believe, training activities and the land disruption that comes with them can, in fact, provide critical habitat and breeding ground opportunities that would not be possible without the disruption.

"Training installations are reservoirs of a large number of species and a wide range of biodiversity, and one reason is the impact of training activities," she said, noting that training activities change the habitats regularly, which in many ways is critically important to the life cycles of some species.

"A wide range of micro-ecosystems pop up in different areas of the installation, and that allows for a broader diversity of habitats. It's just good. It mimics the natural processes that used to occur."

Howard also said that close working relationships with federal and state regulators — to keep them aware, informed and engaged in the land management strategies and tactics — are a big part of a successful program.

"I think we do a good job of communicating to the regulators, and that's important," she said. "I don't know if the general public knows or understands the benefits of training or military land management, or how Army training enhances natural areas."

Howard points to her work in helping share information, research findings and best practices with installations around the country, to continue to build on an Army-wide culture of support for effective land management.

"I am most proud that I have worked for the Army for more than 25 years, and I have worked on more than 100 installations," she said. "There's a great sense of pride for what I do and how it can fundamentally help so many front-line managers be ready to meet the mission."

Heidi Howard studies long-term vehicle impacts/land management plots and conducts field investigations to identify soil strength and vegetation responses, as well as compaction levels post-ground disturbances. Collecting this data helps the Army better understand the needs of the land. The Construction Engineering Research Laboratory's work has helped the Army make great strides in not only protecting and sustaining land for training, but also protecting Army land and the animal and plant species that live on this land. (Photo by Thomas Milligan)

Major Milestone

for Missouri River navigation restoration efforts

By Christine E. Paul
USACE Kansas City District

This year will mark five years since the historic flood of 2019 in the Kansas City metropolitan area and surrounding region. Water levels on the Missouri River reached heights not seen for decades and caused an estimated $2.9 billion in damages across the Midwest.

While the historic flooding impacted many in the area in ways they will likely not soon forget, it might be hard to believe that just a couple of years after the historic flooding, the region entered a period of historic drought. With water levels now at historic lows, repairing the river's navigation channel to its pre-flood condition has not been an easy feat.

Despite these challenges, the U.S. Army Corps of Engineers Kansas City District closed out 2023 by hitting a major milestone in efforts to restore the navigation channel on the Missouri River. The project reached 52% completion heading into the new year — right on track, according to Dane Morris, Kansas City District Missouri River navigation and restoration program manager.

After the flooding, Congress gave the Kansas City and Omaha districts a combined $484 million in additional funding, with $316 million coming from the Bipartisan Infrastructure Law, for repairs to the navigation channel. The additional funds allowed teams from both districts to begin the arduous process of repairing and restoring the navigation channel.

"Those funds have allowed us to go do a detailed inspection of all the repairs that need to be made and then go out and make it happen," said Morris.

To date, USACE has awarded $275 million in repair contracts, he said.

Widespread Damage

There are roughly 7,000 river structures along the 735 miles of the Missouri River. Nearly all the structures needed repair of varying degrees after the flood waters receded in 2019. According to Morris, in a typical year the Kansas City District places between 100,000 to 150,000 tons of rock as part of standard maintenance of its portion of the navigation channel.

The district has contracted about 5.3 million tons of rock to be placed. Last year alone, the district placed 1.2 million tons of rock as part of the repair project.

"Our inspections after the 2019 flood revealed that there was hardly a structure to be found that wasn't damaged as a result of that flood," said Morris. "So much larger magnitude of damage than we typically see and really than we've ever seen because of the duration of that high water."

Due to the magnitude of repairs needed, the Kansas City District opened a satellite construction office in Lexington, Missouri, solely to oversee the repair efforts. Together with the Missouri River Area Office, located in Napoleon, Missouri, the district has been making significant strides in the repairs needed to keep the navigation channel operational.

"We prioritized which structures were going to be repaired first to make sure we were getting the highest priority in the areas that were having the biggest problems," said Morris. "Since we've started repairs, the navigation channel has remained open, which I think has been a huge success."

Newt Marine, a contractor, places rock on a damaged river structure on the Missouri River April 7, 2022. Flooding in the region caused an estimated $2.9 billion in damages across the Midwest in 2019. (Photo by Dane Morris)

In addition to keeping the navigation channel open, Morris and his team have had other successes since starting the project. These include engaging and collaborating with the commercial navigation industry as part of the repair process and researching and developing innovative ways to operate and maintain the navigation channel.

"I think that's been one of the silver linings of this whole catastrophe — we've been able to go back, do some very detailed inspections, take some time and rethink how and why we are doing things," said Morris.

Navigation Study

In conjunction with the navigation channel repairs, the Kansas City District is also part of a navigation study that hopes to shed light on future operations of the river.

"Climate is changing, the river is changing, so that is part of our challenge," said Morris. "Looking into the future and understanding what the state of the river is going to be in 50 years, what do we want it to be, what does the region need it to be, and how can we best make that happen."

For more information about the status of the Missouri River navigation restoration project, visit nwk.usace.army.mil/Missions/Civil-Works/

Water Power

USACE hydroelectric power plants provide renewable energy for a sustainable future

By Pat Adelmann
USACE Fort Worth District

When the gates leading from Sam Rayburn Lake in Texas open, the water rushes towards the Kaplan turbines some 100 feet below. The river begins to rise and swell below the dam as the ground vibrates with the power of the water's flow. Within minutes, the force of the water produces 50 megawatts of electricity to power homes near and far.

"Hydroelectric generators are unique in the expedient way they can start and be producing power to the grid," said Thomas Webb, Piney Woods regional hydropower manager for the U.S. Army Corps of Engineers (USACE) Fort Worth District. "A hydroelectric generator can start and be producing electric power in a matter of five to 10 minutes, unlike fossil fuel or nuclear power plants."

According to the USACE Hydropower Center of Excellence, hydropower is the largest single renewable source of electricity, generating more than all other renewable technologies combined: 27% of all renewable electricity; 6% of all electricity and 1% of all primary energy.

The waters of the Angelina River below the Sam Rayburn Hydroelectric Power Plant and dam are calm and still before the turbines are engaged to produce electricity (left) but swell and flow rapidly increase after the turbines are engaged (right). The Sam Rayburn Hydroelectric Power Plant was commissioned in September 1965. Even after a period of 59 years of operations, it still meets the electrical demands of Southeast Texas communities and the regional area daily. (Photo by Pat Adelmann)

Hydropower is the process of converting the energy of flowing or falling water into electricity. It is a versatile and flexible energy source that can be harnessed in various ways, including dams, run-of-river systems and tidal power. The most common method involves building dams across rivers to create reservoirs that store water. When the water is released, it flows through turbines, which spin generators to produce electricity.

The Fort Worth District manages three hydroelectric power plants that can provide up to 90 megawatts of power per hour to support the Texas power grid. This is enough electricity to power more than 100,000 homes.

The amount of electricity the Fort Worth District produces is based on an agreement with the Southwestern Power Administration and the amount of water in each reservoir.

While USACE built and maintains the dams, they control only the flood pool behind the dam. Everything below that level is controlled by organizations like the Brazos River Authority, who develops and distributes water supplies, provides water and wastewater treatment, monitors water quality and pursues water conservation though public education programs.

"While in flood pool, we tell them to generate full time," said Timothy Helms, a hydraulic engineer in training for the district. "There are different zones that define how much we can release from each. So, in zone one they can generate a good amount, and as you move lower into the pool, we start to limit how much they can generate for water supply purposes and concerns of droughts."

One of the key advantages of hydropower is its flexibility. Many hydropower dams, including those in the Texas region, do not have consistent water flows and are not utilized for baseload power. These plants are oriented toward load following or peak operations. Additionally, hydropower plants can be quickly adjusted to meet fluctuations

The topside of the two Westinghouse generators inside of the Sam Rayburn Hydroelectric Power Plant in Texas are capable of generating up to 50 combined megawatts of electricity to the power grid. (Photo by Pat Adelmann)

in demand, making it a flexible energy source that can adapt to changing needs.

"Hydroelectric generators can also provide condensing services, a means in which the generator acts as a motor, not producing electric power, but rather utilizing electric power from the grid, to help stabilize voltages or system frequencies on a power grid," Webb said. "During emergency and unscheduled power grid blackouts, certain hydroelectric generators are generally the ones who perform system 'black starts' as part of a power grid system restoration plan. This means that a hydroelectric generator would start and provide electric power to the grid and provide the necessary amount of electricity to other large base-load generators, such as fossil fuel and nuclear power plants, so they can start up and restore the power grid."

Another significant advantage of hydropower is its environmental benefits. It is a clean and renewable energy source that produces no

See WATER on p. 12

greenhouse gas emissions during operation. By replacing fossil-fuel-based power plants, hydropower can significantly reduce carbon dioxide emissions and help mitigate climate change.

Furthermore, hydropower plants have a long lifespan, often exceeding 50 years, and require relatively moderate maintenance.

While moderate, maintaining a plant is still a full-time job. The Sam Rayburn Hydroelectric Power Plant, which was commissioned in September 1965, continues to meet the electrical demands of Southeast Texas communities and the regional area daily thanks to the plant staff, Webb said.

"At the power plant, we're basically working on the hydropower units, so we're maintaining the turbines and any auxiliary equipment," said Michael Rogers, senior mechanic for more than 10 years at the Sam Rayburn Hydroelectric Power Plant. "This includes the mechanical seals, hydraulic pumps, air compressors and air systems, as well as the generators themselves."

Michael Rogers, senior mechanic

Hydropower also offers numerous social and economic benefits. It creates job opportunities in construction, operation and maintenance, contributing to local economies.

"If I could have found a job like this when I was a lot younger, I would have really sought after it. I didn't know jobs like this existed when I graduated high school," said Gary Justice, civil engineering technician at Sam Rayburn Lake. "I grew up about 30 minutes from here and started going to Mill Creek Park when I was 5 years old. To be able to work at a place I've always dreamed about living, just down the road, has just been a blessing to me. It's an awesome job and a great place to work."

Additionally, hydropower projects can provide irrigation for agriculture, improve water supply and control flooding, benefiting communities and enhancing their resilience to climate-related challenges. The USACE Institute for Water Resources (IWR) determined that hydropower is better for the environment than other major sources of electrical power, which use fossil fuels. Hydropower plants do not emit the waste heat and gases — common with fossil fuel-driven facilities — that are major contributors to air pollution, global warming and acid rain.

However, hydropower is not without its challenges and potential drawbacks. Dams and reservoirs change the landscape and rivers they are built on, and there is often a price to pay for these changes. USACE works closely with natural resource agencies to minimize the negative environmental impact of its hydropower projects.

"One might say a negative is that hydroelectric power plants use water, which can change reservoir levels that can impact recreational areas and boat ramp availability, especially during dry summers and drought years," said Webb. "The positive side to that same scenario is that during hot and dry summers, usually power grids see more of a demand for electricity usage that is caused by air conditioning needs and other electric power consumption needs. Having available water as a constant resource for this needed electric power generation can play a significant role in assuring electric power is available to meet the power needs and demands of our local communities. There are many more pros than cons. Hydroelectric power is renewable, reliable, ready and relevant."

In the quest for sustainable and renewable sources, hydropower has emerged as a leader in green energy. Harnessing the power of water, this clean and reliable energy source has been utilized for centuries, and its potential for the future is immense. With the world's growing energy demands and the urgent need to combat climate change, hydropower offers a promising solution that can help us transition to a greener and more sustainable future.

For more information on hydropower and USACE hydropower plants, visit https://www.iwr.usace.army.mil/Missions/Value-to-the-Nation/Hydropower/.

Earth Day Tree Planting

The U.S. Army Corps of Engineers St. Paul District and agency partners celebrated Earth Day with a tree planting at McGregor Lake Habitat Rehabilitation and Enhancement Project near Prairie du Chien, Wisconsin. (Clockwise from top) Members of USACE, the Wisconsin and Iowa departments of natural resources, and the U.S. Fish and Wildlife Service Upper Mississippi River National Wildlife and Fish Refuge gather April 22 on one of the islands that was built as part of the McGregor Lake restoration project to plant over 250 swamp white oak bareroot seedlings. Sara Rother, St. Paul District forester, teaches USACE employees and partner agency representatives how to plant a tree. Angela Deen, Upper Mississippi Restoration program manager, covers the roots of a seedling she planted.

Going with the Flow

Sustainable Rivers Program controls water flow to improve environmental conditions

By John Hickey
Hydrologic Engineering Center
and Jim Howe
The Nature Conservancy

This article is the third in a series of articles on the Sustainable Rivers Program published in The Corps Environment. The first article, which spotlighted the program's 2023 National Meeting, ran in the August 2023 issue. The second one, which provided an overview of the program following its 20th anniversary, ran in the Winter 2024 issue.

The Sustainable Rivers Program (SRP) is a formal partnership between the U.S. Army Corps of Engineers (USACE) and The Nature Conservancy (TNC). The mission of SRP is to improve the health and life of rivers by changing dam and infrastructure operations to restore and protect ecosystems, while maintaining or enhancing authorized uses like navigation, hydropower or flood risk management.

Flow is the master variable in river systems. By design, dams often change the natural variability of river flow, which can prevent water from reaching floodplains, inhibit fish passage, and alter sediment and temperature regimes. The premise of SRP is that, if flow is the most important factor in the health of aquatic ecosystems; and if science and stakeholder input can help devise new flow patterns that improve environmental conditions and maintain other benefits; then management of dams and reservoirs can be used as a tool to help reestablish ecosystems.

SRP began in the 1990s when the USACE Louisville District and TNC's Kentucky Chapter collaborated on a new management plan for the Green River Dam. The Green River is a trove of biodiversity, with more than 150 species of fish, 70 species of mussels and 42 endemic species found nowhere else in the world. Based on input from stakeholders, USACE determined that it could adjust outflows from the dam in ways that improve flow and temperature regimes for fish and mussels, while retaining downstream flood risk management benefits. The new flow plan also delays autumn drawdown of the reservoir, extending the fishing and boating season.

Success at the Green River Dam led to a nationwide Sustainable Rivers partnership that has grown to 45 rivers and more than 90 USACE reservoirs. Each of these sites is unique, of course, but at each site USACE districts and partners apply a similar approach to engaging stakeholders, evaluating opportunities, and testing and incorporating environmental strategies.

SRP's Three-Step Process

SRP has developed a three-step process for sites to follow as they progress through the program. The first step, "Advance," involves engaging in a science-based process to define potentially beneficial environmental strategies. USACE districts convene in-person meetings where USACE staff and other experts from state, federal and local groups discuss historic conditions and evaluate environmental opportunities such as enhancing fish and mussel habitat, restoring wetlands and improving water quality. Scientists and other stakeholders play important roles in helping teams understand flow components needed by certain species or natural communities.

USACE's Hydrologic Engineering Center has developed a suite of tools and software that can help location-based SRP teams understand both how flow patterns have changed and how to graphically depict opportunities. These tools include the HEC-Regime Prescription Tool and HEC-Ecosystem Functions Model, among others.

Using this information, USACE facilitators brainstorm ways that infrastructure operations might be changed, while still accounting for a dam's congressionally authorized purposes. One of the hallmarks of SRP in the Advance phase is its ability to bring together USACE functions from across a district — Operations, Water Management, Engineering, Planning, etc. — to jointly evaluate proposals for new flow patterns.

See SRP on p. 16

Advance Phase Case Study: Cossatot River

A great example of how a site progressed through the Advance phase is the Cossatot River in the Little Rock District. The Great Flood of 1927 on the Mississippi River prompted a wave of dam building by the U.S. government, including several dams on rivers draining the Ouachita Mountains in Arkansas and Oklahoma. These dams allow USACE to hold back water in the event of potential flooding on the Lower Mississippi. While these dams have helped reduce flooding on cities and farmland, they also have had unintended impacts on the region's aquatic systems.

The Cossatot is home to one of these dams, Gillham Dam. The Cossatot once harbored abundant populations of darters. Small, colorful fish species about the size of your finger, darters are highly sensitive to water pollution. To spawn, they need clean, cool, flowing water and gravel substrate.

The Cossatot completed its Advance phase SRP e-flows workshop in June 2022, with participation from a diverse group of USACE staff, TNC, the Arkansas Game and Fish Commission, Arkansas Natural Heritage Commission and the U.S. Fish and Wildlife Service. Stakeholders broke out into three groups — fish, mussels and floodplains — and identified species of concern, as well as their flow and habitat needs.

Shortly after the workshop, USACE released a full report documenting the results. That report is the basis for testing new flow regimes at the Cossatot.

"We know we can't replicate the flashiness of this system because a narrow tunnel constrains how much water can be released," said Rheannon Hart, who oversees the Cossatot SRP project for the Little Rock District. "But we hope we can manage the flow differently during lower flows in a way that restores some of these species and doesn't jeopardize flood risk management benefits."

Through the SRP, the USACE Little Rock District engaged stakeholders from the Arkansas Game and Fish Commission, U.S. Fish and Wildlife Service, and other agencies to help understand environmental flow components needed by certain species and natural communities. (Photo by Jim Howe)

The second step in the SRP process is "Implement." Armed with the ideas generated from the Advance phase, SRP teams comprising USACE staff from Operations, Engineering, Environmental and Water Management, together with stakeholders, test the effectiveness of the most promising strategies. For example, a spring pulse might be released from a dam if ample water supplies exist in the system. Designed to mimic a spring high-water event, such a pulse can serve as a cue for fish migration, provide an influx of water to riparian floodplains, or improve spawning conditions by flushing sediment from gravel bars.

A key to the Implement phase is monitoring the effectiveness and feasibility of the new flows. USACE biologists often team up with academic institutions, state fish and wildlife agencies, and The Nature Conservancy to evaluate environmental performance. USACE also monitors effects on other users of the watershed so that teams can understand the tradeoffs, if any, in a new flow pattern.

Implement Phase Case Study: Kaskaskia River

An example of a river in the Implement phase is the Kaskaskia, one of Illinois' major tributaries to the Mississippi. It begins near Champaign and flows south and west to the Mississippi, joining the river downstream of St. Louis. This is farm country, but the Kaskaskia watershed still has some of the most intact forests remaining in Illinois.

There are two USACE reservoirs on the lower Kaskaskia, or Kasky as it's commonly called: one in Shelbyville and the other in Carlyle. They provide drinking water and are also used to hold back flows to the Mississippi during periods of flood risk. The reservoirs have become highly popular recreation areas for boating, water skiing, hunting and fishing.

In 2021, SRP support enabled the USACE St. Louis District team to host public meetings and solicit ideas about management options on the Kasky. A hunting group proposed a summer drawdown of the reservoir to improve habitat for waterfowl. After determining that water control manuals allowed flexibility for lowering the level of the pool, USACE experimented with a 6-inch drawdown of both the Carlyle Reservoir and Kaskaskia Lock and Dam.

The 30-day 6-inch drawdown in early summer 2021 exposed mudflats that were quickly colonized by wetland vegetation.

"It was a dense carpet of green," said Lane Richter, a wildlife biologist with USACE St. Louis District.

Later in the summer when USACE raised the water level, the response was immediate. The carpet of vegetation buffered wave action, which lessened erosion and improved water clarity throughout the reservoir. Based on GIS assessments, USACE estimates that the drawdown helped enhance 1,482 acres of wetlands.

The wetland vegetation also provided habitat and structure for fish and wildlife. Ducks are one of the chief beneficiaries. At one of the drawdown sites, wetland plants valued as food sources by waterfowl — sedges and grasses, for example — produced more than 900 pounds of seed per acre, enough to feed 3,450 ducks for a single day. Importantly, the drawdown also was accomplished with little impact to other users.

The final phase of SRP is "Incorporate." In this step, USACE adopts strategies tested in the Implement phase as part of the official policies that guide USACE infrastructure operations.

In early August, USACE and TNC will release a Request for Proposals for USACE districts interested in enrolling a project in SRP. For more information about the program, email John Hickey at john.hickey@usace.army.mil.

Incorporate Phase Case Study: Des Moines River

USACE operates two dams on the Des Moines River: Saylorville Dam and Reservoir is located directly upstream from the city of Des Moines, while Lake Red Rock Dam and Reservoir is approximately 60 miles downstream. Both dams are managed in tandem for flood risk management, as well as for recreation and fish and wildlife. Saylorville also provides drinking water for the city of Des Moines, Iowa.

In 2016, USACE Rock Island District enrolled the Des Moines River in SRP. The flow regime of the river had been altered by increased summer flows, lower spring flows and reduced peak flows, which had substantially reduced floodplain inundation. Altered flows to the river had impacted fish, mussels and other wildlife that depend on the river's aquatic, riparian and floodplain habitats.

During the Advance phase of SRP, USACE and The Nature Conservancy collaborated with scientific and environmental experts to identify environmental flow and lake pool requirements for the Des Moines River and Lake Red Rock. Some of the key stakeholders included the city of Des Moines, U.S. Fish & Wildlife Service, academic institutions and Iowa Department of Natural Resources.

Restoring aspects of the natural flow regime is expected to benefit numerous species, including freshwater mussels and ancient river fishes like paddlefish and shovelnose sturgeon. Spring pulses are being implemented to benefit fish reproduction and migration, as sturgeon and other fishes rely on spring flows to signal the advent of spawning and oxygenate eggs.

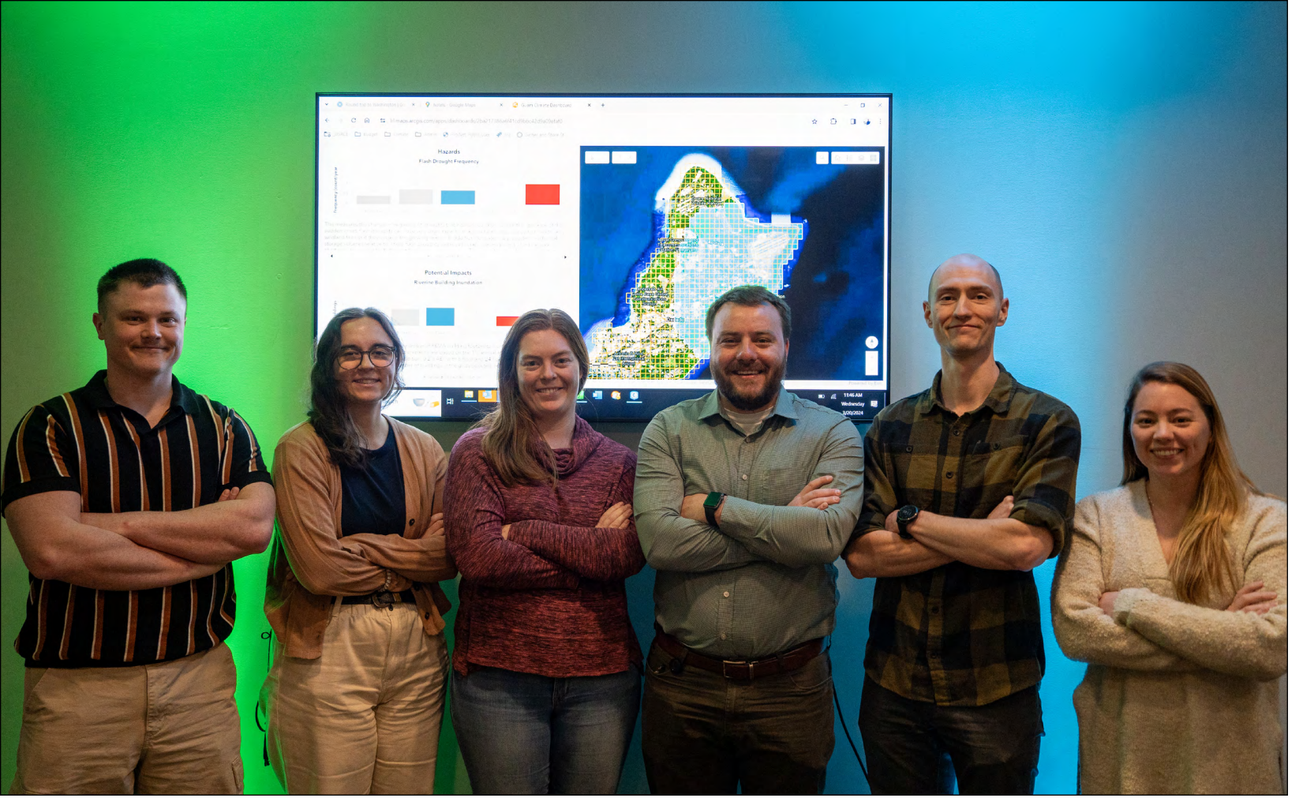
For the last five years, USACE has also implemented a gradual 6-inch summer drawdown of Red Rock Reservoir, which has created hundreds of acres of delta habitat that provide feeding areas for migratory shorebirds like sandpipers, dowitchers and plovers.

"Shorebirds just love it," said Perry Thostenson, who serves on the Operations team at USACE Rock Island District. "They're resting and feeding — fueling up — in this refuge that we're creating."

Recent SRP funding has helped the USACE team with Iowa State University to use satellite tracking to understand the daily movements and migration patterns of shorebirds, some of whom migrate as far as South America each winter.

In 2019, USACE updated the water control manual for the Des Moines River Basin, and the Rock Island District added new guidance that includes several of the considerations that emerged from the SRP process.

"Flood risk management prevails," said Thostenson, "but when we're not operating in flood risk management mode, we can operate the dams for multiple benefits that weren't thought about when the dam was built."



Members of the Climate Production Team from the U.S. Army Corps of Engineers Louisville District Hydrology & Hydraulics Branch pose for a portrait at the district office in Louisville, Kentucky, Mar. 20. (Photo by Kelsie Hall)

Leading the Way

New USACE Louisville District climate team has unique mission focused on resiliency worldwide

By Kelsie Hall
USACE Louisville District

The U.S. Army Corps of Engineers Louisville District has established a Climate Production Team — the first of its kind at a USACE district — and already, the team's work is having far-reaching impacts across the globe.

The team's mission is to meet the ever-growing need to incorporate climate resilience into USACE Civil Works and Military Program missions through the Louisville District's expertise in hydrology and hydraulics (H&H), engineering and climate resilience. They lead climate preparedness and resilience H&H activities for the USACE Great Lakes and Ohio River Division while also supporting the USACE Headquarters Climate Preparedness and Resiliency Community of Practice, U.S. Army and the Department of Defense nationally and internationally.

The team primarily comprises employees from the Engineering Division's H&H Branch, with co-op students and Department of the Army interns being added to support heavy production times. They also utilize district employees in geographic information systems, planning and master planning, as well as employees from other USACE districts who work in climate areas.

"Climate has many connotations in today's political realm," said Nicholas Hudson, civil engineer. "Although important, our group is not as involved in the climate mitigation to reduce greenhouse gases or sustainability portions like with the efforts of big timber and electrification. Our team is working for the betterment of infrastructure to appropriately design for anticipated conditions in the next 20 to 50 years."

Lauren Alexander, chief of the Hydraulics and Hydrology Modeling Section, described assessing climate vulnerability as an equation, where exposure to the climate hazard, how sensitive you are to that climate hazard and whether you can adapt to that climate hazard are all added together.

"It takes knowing those three components and trying to separate all the different climate data, and other data out there, into those three areas so that people can apply it to project-specific information and assess how vulnerable infrastructure is to climate," she said.

With the USACE Climate Preparedness and Resiliency Community of Practice, the team is leading modernization efforts of the Civil Works Vulnerability Assessment Tool, a tool originally launched in 2014 that is used in all feasibility planning projects as part of the qualitative climate assessment. The team is also assisting with the development of the USACE 2024 Climate Adaptation Plan, projected riverine mapping, installation-specific climate resilience plans and an interactive GIS viewer.

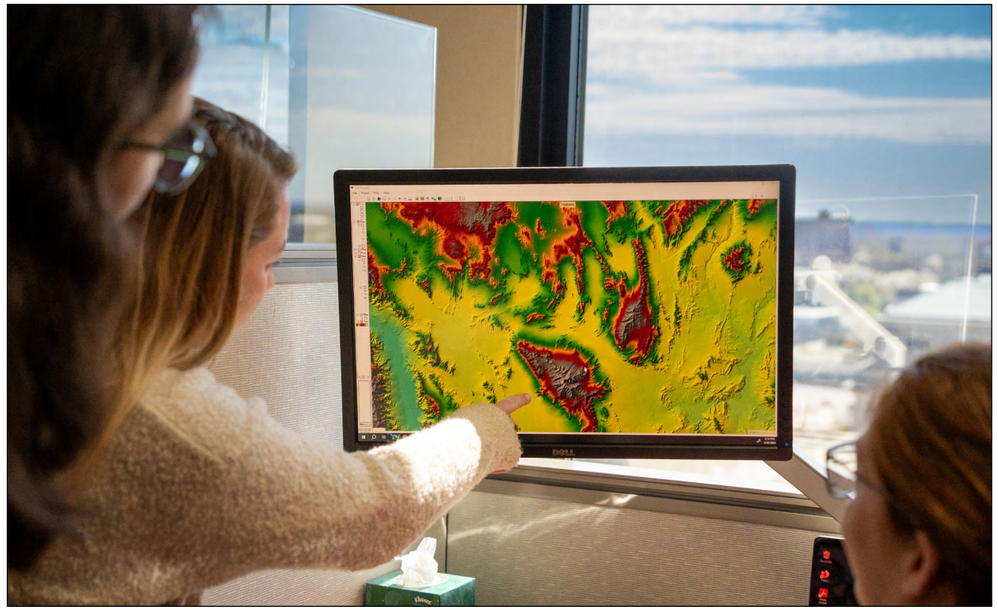
> "I have found the best part of being on the team is brainstorming with colleagues and other experts to develop useful tools and solutions. I hope the long-term results of our efforts will be growing the available tools and references that can be used to prepare communities for climate change."
>
> **— Marissa Conn Minister, hydraulic engineer**

The team conducts qualitative climate assessments to support local planning projects that protect communities such as the Johnson County (Kentucky) flood risk management project and the investigation of solutions to flooding in the Kentucky River basin. Their impacts are far-reaching as the team has worked to develop climate assessment tools for six partner nations, including Australia, Germany, Italy, Japan, South Korea and the United Kingdom.

"I enjoy the work because the projects are constantly changing due to the evolving nature of research being conducted related to climate. The work is very thought-provoking, involves collaboration with a team, and focuses on the best ways to help communities given hazards we are predicting will arise," said Marissa Conn Minister, hydraulic engineer. "I have found the best part of being on the team is brainstorming with colleagues and other experts to develop useful tools and solutions. I hope the long-term results of our efforts will be growing the available tools and references that can be used to prepare communities for climate change."

Because traditional flood-mapping tools cannot adequately support extremely large

See TEAM on p. 20



Members of the Climate Team from USACE Louisville District Hydrology & Hydraulics Branch discuss calculations utilizing the Hydrologic Engineering Center River Analysis System (HEC-RAS) at the district office March 20 (Photo by Kelsie Hall)

areas — like entire countries — the team has been working closely with USACE's Engineer Research and Development Center, which has developed a different process for estimating flood mapping.

These climate assessment tools allow countries to import the critical infrastructure that is most important to them and overlay it with the climate data the team provides to complete similar risk assessments for their own infrastructure regarding climate change.

"A lot of what our group is doing to support that is H&H modeling for the entire world for a variety of recurrence intervals, like 100-year, 500-year, 1,000-year floods and also for different greenhouse gas emission scenarios," said Lauren Alexander, H&H Modeling section chief. "We can estimate the worst-case scenario flood for a specific recurrence interval, or the most likely scenario flood with how greenhouse gas emissions are going now, to provide to our customers so they can determine what is most realistic for them or how much uncertainty they want to capture in their modeling."

But like anything, the work doesn't come without its own unique challenges.

"A challenge we face is the amount of uncertainty that is involved in climate change data," said Conn Minister. "The Climate Team overcomes this challenge by using engineering judgement, reliable data, and the most current predictions available."

Alexander noted while the tools are outputting pretty good estimates for flood mapping scenarios, they aren't perfect. "It does still take the eye of an engineer to go over it and do quality assessments," she said.

As for long-term goals, Hudson said, "I hope that we can move the dial with incorporating climate resilience into policy, programming, planning, design and construction for USACE, the Army and the DOD."

"We're working right now to get it more engrained in people's minds that it goes beyond just being a checkbox exercise," added Alexander. "As we are designing things with very long lifespans, whether civil works or military infrastructure, everyone needs to be thinking about climate change every step of the planning process and every step of the design process. It's something that will literally affect everything the Corps does and everything we do as engineers."

The Picker, the Ranger, and the Regulator

USACE Charleston District welcomes new regulatory chief

By Francisco Hamm
USACE Charleston District

Not everyone gets cool job titles like "the bug picker," "the identifier," and "park ranger," but for Charleston District's new Regulatory Division chief, Mindy Hogan-Charles, it's all part of her interesting career and early fascination with water that started in the glorious mountains of her home state of West Virginia.

Mindy Hogan-Charles

Hogan-Charles started out as a business major at Beckley College, now called Mountain State University, but the value and importance of water got her attention early and she changed to an environmental biology major at Marshall University in Huntington, West Virginia, where she eventually landed a job as a student aide at the Huntington District Engineering Division's Water Quality Lab in 1992.

With 32 years of working for the U.S. Army Corps of Engineers, her "origin story" started much like something out of a Marvel movie. As a student intern, she was a bug picker, where she helped pick bugs out of the water samples collected in the field.

She then elevated to a co-op student and was "the identifier" where she would take the bugs from the bug picker and start identifying the bugs.

This early work for USACE helped seal her fate for choosing her career.

"I have always had a passion for streams and the importance of water quality and ensuring the fishes' overall equilibrium of water sources," said Hogan-Charles.

Upon graduation, she continued to serve USACE as a park ranger from 1995 until 1999 for the Dillon Lake Flood Control Recreation Facility in Zanesville, Ohio, part of the Huntington District's Operations Division.

She later moved to the Jacksonville District's Fort Myers Regulatory Office where she worked as a project manager. In 2003, she relocated to the Tampa Regulatory Office, eventually becoming the mining subject matter expert.

In August 2019, Hogan-Charles accepted a new position as the regulatory section chief at the Tampa Bay Regulatory Field Office.

"[Regulatory is] the public face of the Corps," she said. "We start the dialogue and are always educating and informing the public, especially as the laws change."

To demonstrate USACE's dedication to serving the public, Hogan-Charles pointed to the new Regulatory Request System (RRS). This new system was designed to make the review of permit requests a transparent and efficient process for the public, provide general information on the Regulatory Program, and allow the public to submit pre-applications meeting requests and jurisdictional determination requests. Users can now electronically submit individual and general permit applications and other necessary information, saving time and reducing the need for paper-based submissions.

"This new system will help streamline the permit application process and underscores USACE's commitment to modernizing our application process, meeting user expectations and providing a transparent, straightforward process for the timely review of permit requests," Hogan-Charles said.

One of her career highlights was being assigned to the Office of the Assistant Secretary of the Army for Civil Works in Washington, D.C., in 2016.

"It was a great experience to see the leadership within our agency at such a high level," she said.

With her new position in the Charleston District, Hogan-Charles can add another cool title — Chief Regulator — to her collection. Regulators, assemble!

Sunken Treasure

Fish Attractor Program at Pomme de Terre Lake benefits environment and recreators alike

By Christine E. Paul
USACE Kansas City District

On an unseasonably warm day in February, the sun was shining and hardly a cloud could be found in the sky. Staff at Pomme de Terre Lake, along with staff from the Missouri Department of Conservation (MDC), were hard at work. The task? Sinking piles of cedar trees into the lake to create fish habitat.

Attracting anglers from across the state and region, Pomme de Terre Lake's partnership with MDC is vital to maintaining a healthy fish population. For the last 32 years, the U.S. Army Corps of Engineers Kansas City District and MDC have been working together to provide habitats for fish at Pomme de Terre Lake through the collaborative Fish Attractor Program.

Missouri Department of Conservation employees drive cedar trees to an identified location in Pomme de Terre Lake Feb. 13 in Hermitage, Missouri. The trees will be used to create fish habitats as part of the Fish Attractor Program. (Photo by Christine E. Paul)

Every year in January or February, USACE and MDC team up to cut down cedar trees, anchor them with concrete blocks and sink them into the water to create fish habitats. There are about 400 cedar tree brush piles that have been sunk in Pomme de Terre Lake.

According to MDC, each brush pile lasts about 10 to 12 years, so every eight to 10 years, the team will add new brush to existing brush piles, which are mapped via GPS, in addition to creating about 40 to 50 new piles each year. All of this takes about a week, but the program has long-lasting benefits for the environment and recreators alike.

Small But Mighty

Located in southwestern Missouri, Pomme de Terre Lake is not as sprawling as some of its neighboring lakes like Harry S. Truman Lake, Stockton Lake and Lake of the Ozarks. But what it lacks in size, it makes up for in popularity. The lake might be relatively small as far as Missouri's lakes go, but it boasts over 1 million visitors annually. Many of these visitors are avid anglers, enjoying the plentiful fish that can be found in the waters of Pomme de Terre Lake.

"We are small compared to surrounding lakes in the area in land, but we get over a million visitors a year," said Shannon Henry, natural resource manager at Pomme de Terre Lake. "The whole goal (of the Fish Attractor Program) is to provide habitat for fish … so they can grow and sustain the fish populations that MDC manages here."

USACE owns and operates Pomme de Terre Lake, while MDC manages the fish population through sampling, stocking and implementing fishing regulations. Sinking cedar trees into the water to create fish habitat might sound strange or unorthodox, but there is strategy behind the method.

"The benefit of these brush piles is twofold," said Craig Fuller, fisheries biologist with MDC. "One, it concentrates fish and gives a place for anglers to target and go fishing, and two, the habitat that we are placing is fairly shallow, and that gives a place for fish to get in and hide from predators, but it also provides a food source for young fish."

According to Fuller, the cedar tree piles attract small fish, which attract large fish, which attract the anglers who travel near and far to fish at Pomme de Terre Lake.

Growing Appreciation

Using cedar trees to create the fish habitats has benefits above the water, too. According to Henry, cedar trees, while plentiful in southwestern Missouri, are an invasive species.

"Cedar trees can be invasive," said Henry. "They can kill out native species, and if you are trying to reestablish a glade or an open area for resource management, they will come in and take over."

Every year, USACE staff at Pomme de Terre Lake identify natural resource areas around the lake that have been taken over by the invasive cedar trees. They cut down the trees to clear the area so that native plants can thrive once again. The cedar trees are then used for brush piles for the Fish Attractor Program. For the park rangers at the lake, this is an important part of the USACE natural resource mission.

"MDC provides options for the public to be able to get out and use their natural resources and to grow an appreciation for that," said Henry. "That's what we do with our natural resource program here at (USACE), so marrying that with MDC and what opportunities they provide to the public is important."

Interagency Partnership

The Fish Attractor Program at Pomme de Terre Lake is an example of the impact that interagency partnership can have, benefiting the land, wildlife and public for the last 32 years, and for many more years to come.

"It's just a way to give back to the taxpayers," said Henry. "We are the stewards of their money and lands (so we are) giving them options to fish, hunt and recreate in a very beautiful part of Missouri."

Missouri Department of Conservation employees assemble concrete blocks, which will be used to sink cedar trees to create fish habitats in Pomme de Terre Lake as part of the Fish Attractor Program Feb. 13 in Hermitage, Missouri. (Photo by Christine E. Paul)

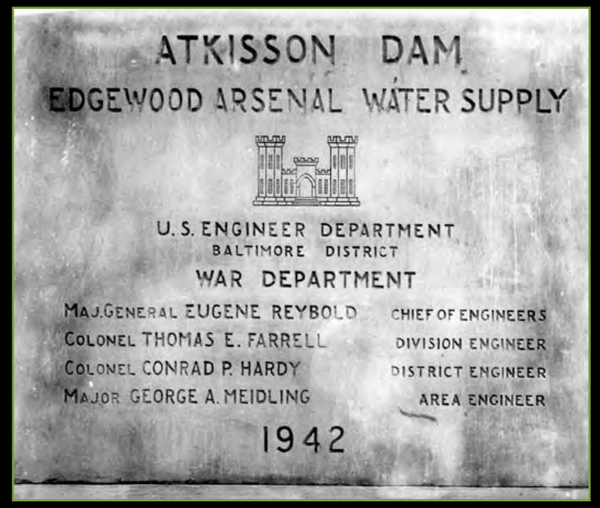
A park ranger with USACE Kansas City District picks up cedar trees to load onto a barge, which will drop the trees in Pomme de Terre Lake to create fish habitats as part of the Fish Attractor Program in Hermitage, Missouri, Feb. 13. (Photo by Christine E. Paul)

Atkisson Dam

removal project shining example of incorporating systems thinking, risk management early in planning

By Amy Guise
Chief, Planning Division
USACE Baltimore District

Atkisson Dam in Harford County, Maryland, was constructed in 1942 to provide water supply to Edgewood Arsenal, now known as Aberdeen Proving Ground. It was named after Army Col. E.J. Atkisson, commander of the First Gas Regiment during World War I and commander of Edgewood Arsenal from 1920 to 1923. Even in the development of the project in the 1940s, the environment, risk management and a systems approach were at the forefront of the planning, design and construction. The site was chosen due to the unique geologic setting and small area of farmland that would be lost to production. In addition, formulation of the dam balanced evaluations of water supply, drought and flooding.



While originally built to provide water supply, the dam eventually stopped being used for this purpose, and sediment accumulation was degrading aquatic habitat. Due to these sediment concerns, along with identified safety concerns and potential hazards associated with dam failure, the Army began looking to divest itself of Atkisson Dam. Aberdeen Proving Ground consulted the U.S. Army Corps of Engineers Baltimore District to evaluate the potential environmental impacts of the full or partial removal of Atkisson Dam.

During the project initiation and planning phases, USACE officials identified an opportunity to restore free-flowing streams and rivers and provide significant improvements to water quality and fish passage. Implementing an environmentally compatible solution in a risk-informed and systems context would also bring the dam into compliance with Army regulations and Chesapeake Bay restoration goals.

Through physical stream assessments, wetland surveys, forest stand delineations, bog turtle surveys, and fish, benthic and water quality sampling, environmental restoration opportunities were incorporated into an evaluation of a range of dam-removal alternatives. Ultimately, these analyses will support decision-making for the preferred solution to benefit the site and the surrounding ecosystem.

This image from April 28, 1943, shows Atkisson Dam soon after construction was completed in 1942. The U.S. Army Corps of Engineers constructed the dam to provide water supply to Edgewood Arsenal, now known as Aberdeen Proving Ground. (Courtesy Photo)

In 1984, the Maryland General Assembly enacted the Critical Area Act to address the increasing pressures placed on Chesapeake Bay resources from an expanding population. While Atkisson Dam does not fall within the critical area, the surrounding study area did meet the critical area definition. Therefore, a systems perspective was warranted. The Nature Conservancy, in coordination with the Chesapeake Bay Program's Fish Passage Workgroup — made up of federal, state and local partners — developed a geographic information system model to help identify barriers to fish passage. The Freshwater Network of the Chesapeake Bay Region GIS model ranks barrier data from Tier 1-20 with Tier 1 indicating the "highest priority" and "most potential from a passage restoration project." Four species of diadromous fish were found downstream of Atkisson Dam, and the dam was given a Bay-wide Anadromous Tier 3 designation, indicating the prioritization of potential for anadromous fish with the dam removal.

Pursuant to Section 106 of the National Historic Preservation Act, tribal consultation was an important part of the project and decision-making process. The Eastern Shawnee Tribe of Oklahoma and the Stockbridge-Munsee Community Band of Mohican Indians responded that there were no known sites at this location that were of interest to the tribes. In addition, ongoing coordination with several federal and state government agencies, as well as non-governmental organizations, will ensure diverse perspectives are included in the design process, especially related to impacts to submerged aquatic vegetation.

Comprehensive and life-cycle planning facilitated a design and construction approach to be developed to maximize environmental and cultural benefits on-site and downstream, reduce costs and increase safety. Incorporating environmental principles, risk management and systems thinking in the earliest stages of the project life cycle enabled the proper surveys, outreach and design disciplines to be part of the formulation and implementation process. It is through such examples that the Army can demonstrate its commitment to shared environmental goals and results.

Coastal Restoration

project gives threatened plant another chance

Above, seabeach amaranth grows on Monmouth Beach, New Jersey, July 31, 2000. (Photo by Mark Burlas) Below, the federally threatened piping plover is monitored at Monmouth Beach. (Photo courtesy of USFWS)

By JoAnne Castagna
USACE New York District

In 2000, Dag Madara, a geographer with the U.S. Army Corps of Engineers (USACE) New York District was walking on Monmouth Beach, New Jersey, the location of the district's Atlantic Coast of New Jersey Sandy Hook to Barnegat Inlet Beach Erosion Control Project.

He was monitoring the federally threatened piping plover, a small migratory shorebird, as one of several environmental conservation measures performed by the agency on all coastal restoration projects to ensure wildlife is not harmed.

While doing this, he spotted what looked like spinach sprouting out of the sand by his foot.

"My colleagues taught me how to search for and identify various endangered wildlife in the area, but I wasn't expecting to find this," he said.

Madara had discovered a federally threatened coastal plant, the seabeach amaranth, that hadn't been seen in the region for almost a century.

Since his discovery, the plant's population has grown tremendously in the region, and its success is attributed to this erosion-control project and the environmental conservation measures performed on it to protect the endangered wildlife that play a vital role in coastal resiliency and ecosystem health.

The seabeach amaranth does its part. Its branches grow low along the ground, holding the sand in place, which strengthens beaches from erosion caused by coastal storms that have become stronger and more frequent due to sea level rise.

This annual flowering plant has red stems and thick, waxy, greenish-red leaves that are somewhat reminiscent of spinach.

The plant is native to the beaches along the Atlantic coast of the United States from South Carolina to Massachusetts.

However, over the years, the species has vanished in most of these states, including New Jersey.

Prior to 2000, when Madara spotted the plant, the last time it had been seen in the area was in 1913.

Its population decline has been attributed to several factors including coastal development, beach driving and foot traffic, competition with other plant species, beach stabilization projects without best management practices, sea level rise and natural disasters such as tropical storms and nor'easters that can inundate or wash away plants from beaches before they can set seeds.

The plant's return in this region of New Jersey is being attributed to the successful Atlantic Coast of New Jersey Sandy Hook to Barnegat Inlet Beach Erosion Control Project that began in 1994.

The project increased the size of the habitat for the plant, as well as performed environmental conservation measures to protect it.

The project encompasses 21 miles of the Monmouth County, New Jersey, shoreline that extends from the township of Sea Bright down the shore to the Manasquan Inlet.

The highly populated stretch of coast has experienced extensive erosion or sand loss due to old, hard structures including a seawall, and frequent storms including most recently Superstorm Sandy in 2012.

An eroded coast puts the shoreline community at risk for flooding from storms, so USACE has been replenishing the eroded sand and increasing the size of the beach to help protect the community.

USACE is working on this project in cooperation with its non-federal sponsor, the New Jersey Department of Environmental Protection, and the U.S. Fish and Wildlife Service (USFWS) since the plant is protected under the Federal Endangered Species Act.

To replenish the lost sand and increase the height and width of the beach berm, sand was dredged from the ocean, pumped onto the shore and distributed around. A berm is the flat area of the beach between the landward shore and the ocean where beachgoers typically sunbathe.

Dag Madara holds the once endangered bald eagle while working for the North Jersey District Water Supply Commission in the early 2000s. (Courtesy Photo)

An enlarged beach acts as a buffer, protecting the structures and infrastructure behind the beach from storm surges and flood damages.

In 2012, 18 miles of the 21-mile project was completed. It was at this time that Superstorm Sandy devastated the region, removing 5 million cubic yards of sand from the shore, enough sand to fill New Jersey's MetLife Stadium.

The following year, USACE received funding from the Hurricane Sandy Disaster Relief Appropriation Act of 2013, or what's referred to as the "Sandy Bill," to not only replenish the sand this project lost during the hurricane, but to restore it to its original design profile.

With this funding, USACE replenished 8 million cubic yards of sand to 18 miles of the project and completed the remaining three miles.

Since then, the agency has been performing periodic sand replenishment to ensure that the beach provides continued protection from storms and hurricanes. In terms of sand volume, it is the world's biggest beach-fill project.

Sand is dredged and pumped onto the Atlantic coast of New Jersey as part of a USACE beach erosion control project. (Photo courtesy of NJ Spotlight)

"This continued renourishment will help protect local communities, prevent damages from hurricanes and nor'easters, and benefit the economy," said Jason Shea, project manager, New York District.

See COAST on p. 28

The project also included the notching of several existing groins. These are structures that extend out perpendicular from the shore into the water, interrupting water flow and limiting the movement of sand to prevent beach erosion. Notching the groins helps to facilitate the movement of the sand and water.

In addition, 10 existing stormwater outfall pipe extensions were lengthened. These pipes carry stormwater from the land to the ocean.

Recently, USACE started a study to re-assess the project and see if additional measures could be done to make the project even stronger and more resilient.

On this project, as well as with all USACE coastal restoration projects, the agency performs environmental conservation measures to protect and minimize impacts to rare, threatened and endangered species that play an important role in coastal resiliency and ecosystem health.

Measures on this project are helping to protect not only the seabeach amaranth, but also migratory birds such as the piping plover and the least tern.

Measures on this project are helping to protect not just the seabeach amaranth, but also migratory birds including the piping plover, the state-endangered least tern, and the state Species of Special Concern (SSC) American oystercatcher.

The Kemp's ridley sea turtle is one of the many marine species protected (Photo courtesy of the Environmental Protection Agency)

Offshore measures are being used to help protect marine species that include the loggerhead sea turtle, the Kemp's ridley sea turtle, the green sea turtle, the leatherback sea turtle, the Atlantic sturgeon, the North Atlantic right whale and the fin whale.

Environmental conservation measures used to help protect these species include monitoring, educating the public, following environmental windows and constructing symbolic (post and string) beach fencing.

If Madara wasn't monitoring the beach in 2000, the seabeach amaranth wouldn't have been discovered.

Surveying a beach to identify rare, threatened and endangered wildlife is one of several tasks monitors perform. In the beginning of a project, they create a monitoring plan in cooperation with the project team, and during the project they monitor and document wildlife behavior, movement and potential threats on and near the project site.

Besides this plant, monitors on this project have also observed the return of the American oystercatcher.

Monitoring also occurs offshore. This project has a successful sea turtle monitoring program where trained, certified monitors accompany the project team on hopper dredges to make sure endangered sea turtles, as well as whales, dolphins and seals, are not harmed during the offshore sand dredging and placement process. This is done with the help of turtle excluder devices that are placed at the drag head of the dredge to prevent turtles and other wildlife from being entrained in the hopper dredges.

Using beach signs to educate the public on how they can avoid or minimize potential impacts to wildlife and ecological communities on the project site is good for the plants and animals.

It's also good for the project. For example, an educated beach visitor may be more tolerant of any inconveniences, such as temporary beach closings, that are associated with protected beach areas.

A tolerant on-site crew is also desirable, which can also be done through education. Several years ago, when the project was experiencing the successful return of the American oystercatcher, a monitor at the time attributed this in part to an educated crew.

Educating the crew sparked their interest in the bird, which helped to contribute to the bird's return to the area. The crew purchased binoculars and bird books and made notes about their bird observations that they provided to the monitors.

Environmental windows are months out of the year where construction on a project is halted to protect endangered species.

For example, on this project, sand is not placed on the shore between March 15 and August 15 because this is the time of the year that the piping plover nests on the shore. During this time, sand placement may still occur only in portions of the project where piping plovers were determined not to be nesting.

Symbolic beach fencing, also known as post and string fencing, delineates areas used by wildlife and alerts the public to the presence of a protected area, said Katherine Pijanowski, USACE New York District.

"In the case with plants, placing fencing around protected species also prevents the project crew from inadvertently running over or burying it," she said. "If the project is unable to avoid impacting the species, the Army Corps works with the USFWS to either move the plant, stockpile the seedbank or other recommended action."

Fencing can provide multiple benefits, added Peter Weppler, chief of the New York District's Environmental Analysis Branch.

"For example, when you fence off an area for breeding migratory birds, this also provides a protected habitat for seabeach amaranth and other rare coastal plants they co-habitat with. It's a win-win for multiple species," said Weppler.

According to the USFWS, fencing can create successful results. For example, fencing installed on a beach in Long Beach Township, New Jersey, resulted in a 300% increase in the seabeach amaranth plant.

Symbolic fencing consists of string with orange flagging stretched between poles. (Photo courtesy of the National Park Service)

Continued use of environmental protection measures and a successful coastal restoration project helped the seabeach amaranth flourish, allowing it to perform its natural abilities that contribute to coastal resiliency and ecosystem health.

So that other coastal restoration projects can experience the same success as this project, Pijanowski offered a few tips. She suggests that biologists and engineers work together to integrate their expertise in vegetation, wildlife, geomorphology and coastal engineering to design a project that restores coastal processes and provides habitats for listed species.

Before construction work begins, she added, a baseline survey should be carried out to note the species present and she suggests that dredging pipes and equipment be placed in minimally invasive locations.

And finally, she recommended ongoing beach monitoring for new plant and wildlife growth to provide weekly presence or absence assessment of the species throughout the duration of the project.

If it wasn't for Madara monitoring the beach in 2000, the threatened seabeach amaranth would not have been discovered, showing the important role environmental conservation measures play on coastal restoration projects.

Continued use of these measures and a successful coastal restoration project helped the plant to flourish again so that it can perform its natural abilities that contribute to coastal resiliency and ecosystem health.

If Madara took a walk on the beach today, he would be sure to find the plant again by his feet, its branches firmly gripping the sand, strengthening the coast from today's stronger and more frequent storms caused by sea level rise.

For more information about the seabeach amaranth, visit the U.S. Fish and Wildlife Service website at fws.gov/species/seabeach-amaranth-amaranthus-pumilus.

St. Louis District completes remediation at Army firing site in Iowa

By Mike Kessler
USACE St. Louis District

After several years of work, U.S. Army Corps of Engineers (USACE) St. Louis District recently completed remediation of soil contaminated with depleted uranium at the Iowa Army Ammunition Plant (IAAAP) Firing Site (FS)-12 Area under USACE's Formerly Utilized Sites Remedial Action Program (FUSRAP).

FS-12 is one of several locations in the Firing Sites Area, collectively associated with Operable Unit (OU)-8.

As outlined in the 2011 Record of Decision, the selected remedy for OU-8 included excavation, physical treatment and off-site disposal of soil contaminated with depleted uranium (DU). The remedial action at FS-12 was a multi-faceted project spanning several years.

ISO-Pacific employees watch the Soil Sorting System (S3) divert soil that is below the remediation goal Oct. 20. The inset shows a sample screenshot of the waterfall display, which captures the instant that the S3 detects soil above the remediation goal. (Photo by Mike Kessler)

Work began at FS-12 in 2013 with remediation contractor North Wind Services LLC. In 2019, a joint venture of Region 8 International, a Native Hawaiian-owned business, and Cabrera Services Inc. became the remediation contractor at IAAAP's FS-12. Now known as Ohana-Cabrera Remediation and Construction (OCRC), this partnership has been the contractor to complete remediation and restoration of FS-12.

At the commencement of the project, FS-12 was divided into 49 individual survey units (SUs) measuring approximately 2,000 square meters each. With support and expertise from Leidos LLC, the FUSRAP team conducted gamma walkover surveys (GWS) in the SUs outside the original designated excavation area.

The FUSRAP team used GWS to determine the overall extent of the contamination and to establish which of the SUs could be most efficiently remediated using mechanical excavation and soil processing with an automated radiological soil-sorting system.

Eventually, FS-12 expanded to 125 Class 1 SUs, which amounted to more than 61 acres. In a Class 1 SU, GWS is performed on the entire SU and samples are collected on a systematic grid.

In 50 of the 125 SUs, the surface soil was mechanically excavated and stockpiled for radiological screening (i.e., physical treatment) to reduce the amount of contaminated soil that required shipment off-site.

The soil-processing technology most recently employed at FS-12 was the ISO-Pacific Soil Sorting System (S3). The S3 is a patented conveyor-based system that uses custom radiation detectors, proprietary spectroscopy and reporting software as well as rapid mechanical sorting to accurately survey and segregate scanned material that is greater than the remediation goal (RG) from material that is less than the RG.

Automated radiological sorting of soil on-site at FS-12 greatly reduced the amount of soil requiring shipment off-site. An automated sorting system such as the S3 is capable of segregating soil with DU concentrations greater than the RG from soil with DU concentrations less than the RG. Soil with DU concentrations less than the RG could remain on-site and be reused as backfill material, substantially reducing the overall project cost.

After contaminated soil was excavated and processed at each SU, three additional steps were necessary to complete remedial action. First, Leidos provided third-party verification to confirm that the SU was ready for restoration. Third-party verification included conducting GWS of the excavation surface, collecting systematic soil samples and analyzing the soil samples at the St. Louis District's Leidos-operated FUSRAP Laboratory. Second, the remediation contractor completed restoration of the SU by backfilling, grading and reseeding the area. Finally, the contaminated soil was shipped to a licensed, off-site disposal facility.

A locomotive from the Iowa Army Ammunition Plant pulls the final four railcars out of M-Yard to begin their journey to a licensed, out-of-state disposal facility Jan. 30. (Courtesy Photo)

One of the more challenging areas at FS-12 was the former test-fire pit. OCRC was tasked with performing pre-design investigation -- consisting of borehole drilling, downhole gamma logging, and sample collection and analysis -- to determine the extent of the DU contamination. The FUSRAP team found that contamination extended to 18 feet below ground surface. OCRC developed a Remedial Design/Remedial Action Work Plan to guide the excavation. OCRC sloped the excavation walls around the former test-fire pit to allow safe entry for GWS and soil sampling of the floor and sidewalls. Following GWS and verification sampling by Leidos to confirm that the excavation met the RG, OCRC backfilled and restored the areas to match the surrounding contours.

The first transportation and disposal (T&D) campaign to dispose of contaminated material off-site was completed in 2015. Additional T&D campaigns occurred each field season through 2023. OCRC conducted the final campaign Jan. 30 when a total of four covered gondola railcars loaded with 308 cubic yards of contaminated soil was shipped to EnergySolutions, a licensed disposal facility in Clive, Utah.

Throughout the life of the FUSRAP project at FS-12 from 2013 to 2023, the FUSRAP team excavated and processed 133,627 cubic yards of contaminated soil. As a result of the soil processing, only 15,898 cubic yards of soil greater than the RG required shipment off-site, comprising an overall 88% reduction in waste volume requiring off-site disposal during the project.

FUSRAP still has some additional remediation work at the Firing Sites Area, but completing the remediation at FS-12 is a significant achievement for the program and IAAAP.

Sustainable Art

USACE challenge champions creative use of materials

By Jenn Miller
USACE Headquarters

In commemoration of Earth Day, the Environmental Division within U.S. Army Corps of Engineers Headquarters hosted its third annual sustainable art challenge to promote the creative reuse of materials. The challenge, which originally started within Environmental Division in 2022, extended beyond Headquarters this year and was open USACE-wide.

"I'm overwhelmed by the level of effort and creativity that went into these submissions," said Ms. Lara Beasley, USACE Environmental Division chief. "We received 48 submissions in total, each of which illustrated the diverse ways we can reuse materials."

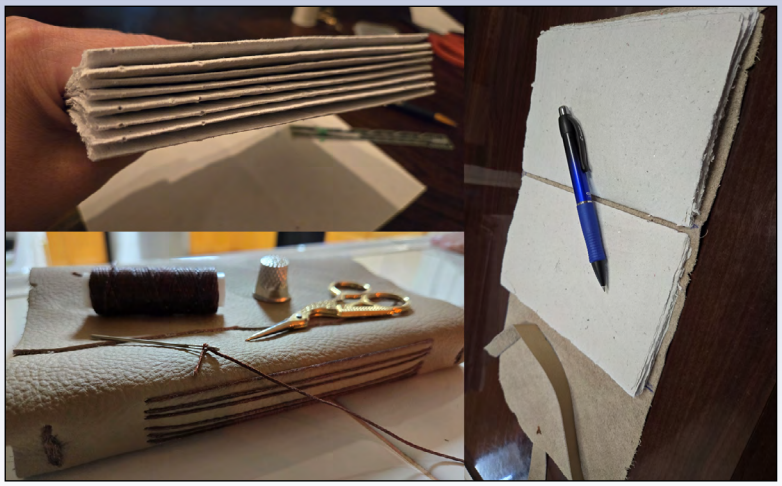
Submissions had to include at least 70% reclaimed, reused or recycled materials and had to be created by a USACE employee and/or their families. Two entries were chosen as the "Grand Champion," one within the child category and the other within the adult category.

The Grand Champion for the child category was awarded to Clara Mae Salfiti, daughter of Raymond Salfiti with the Kansas City District, and her piece, "There is No Home Like Earth." Using recycled and sustainable materials, Salfiti recreated figures from The Wizard of Oz. Each figure includes a quote that relates to the character within the story and relates to the importance of sustainability.

The Grand Champion for the adult category was awarded to Shawna Polen with the Sacramento District, and her piece, "Handmade Leather Book." Polen made the pages for the book with pulp made from shredded paper from her office and a mold and deckle she made using an old pair of picture frames and an old unused paint strainer. After the pages of the book were made, Polen hand-sewed them into scrap leather, resulting in a fully homemade leather-bound book.

The USACE Sustainable Art Challenge was developed to provide an interactive activity among USACE teammates in support of Earth Day. Any type of art or craft could be submitted for the challenge, including woodworking, metalwork, sewing, paper crafts, or any other type of creative endeavor.

"There Is No Home Like Earth," a collection of figures from The Wizard of Oz created by Clara Mae Salfiti, won the Grand Champion award in the child category. Salfiti is the daughter of Raymond Salfiti, Kansas City District.



Shawna Polen, Sacramento District, was awarded Grand Champion for the adult category for her piece, "Handmade Leather Book."