The Corps
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USACE partnering to protect pollinators

U.S. Army Corps of Engineers
Natural Resources Management Community of Practice

Entering the visitor center at Rend Lake near Benton, Illinois, a visitor will notice a buzz in the air. The sounds come from a real life functioning honey bee hive that educates visitors on the importance of honey bees and pollinators.

Many people do not realize that commercial honey bees are responsible for one of every three bites of food we eat and annually contribute to the agricultural value of $15 billion. Native pollinators contribute to natural plant communities and other ecosystem functions. However, loss of habitat, improper use of insecticides and conditions such as Colony Collapse Disorder (CCD) have resulted in sharp reductions in honey bees and native pollinators during the past three decades.

A honey bee, with pollen attached to its hind leg, pollinating a watermelon flower. (Photo by Stephen Ausmus, U.S. Department of Agriculture)

The significance of this decline has not been lost by the current administration. In June 2014 President Barack Obama issued Presidential Memorandum, "Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators." As a federal land management agency, the U.S. Army Corps of Engineers was specifically called out in the memorandum to "incorporate conservation practices for pollinator habitat improvement on the 12 million acres of lands and waters at resource development projects across the country, as appropriate."

More importantly the language invited the Corps of Engineers to participate in the White House Pollinator Task Force, which developed the April 2015 National Strategy to Promote the Health of Honey Bees and Other Pollinators, including agency specific pollinator plans and actions. Staff from Corps of Engineers Headquarters Natural Resources Management, the Institute for Water Resources and field representatives developed the Corps Pollinator Protection Plan to assist in the national effort. This plan includes several initiatives to better track pollinator work on the ground, improve visibility of pollinator work packages in budget submittals, increase awareness and education of pollinators and utilize best management practices to improve pollinator health on Corps of Engineers lands.

Significant progress has already been made on several action items. On July 8, Mary Coulombe, chief of Natural Resources Management, announced a new Pollinator Website (http://corpslakes.usace.army.mil/employees/pollinator/pollinator.cfm) and identified the significant content such as best management practices for federal agencies, the National Strategy and the Corps Pollinator Plan, which emphasize the role the Corps of Engineers can serve to protect and enhance pollinators.

Preliminary tracking data shows the Corps of Engineers maintains more than 293 flower gardens that benefit pollinators, manages more than 14,000 acres of habitat specifically for pollinator health and works with at least 21 different beekeepers managing 1,336 hives on Corps of Engineers property. Additionally, the data show the Corps of Engineers provided 154 interpretive pollinator programs in 2015, reaching nearly 7,000 contacts.

"The locations of Corps of Engineers lands and waters many times make them very important in the overall fabric of pollinator habitat," Coulombe said. "The undeveloped nature of many places are islands of habitat that are essential for breeding and migration. We take our responsibilities to protect and manage these lands very seriously."

One specific pollinator species that is gaining attention is the Monarch Butterfly, which the Corps of Engineers is well positioned to assist in the recovery of this iconic species. The U.S. Fish and Wildlife Service, state agencies and experts in the field have identified the Interstate 35 corridor, which extends from the Texas-Mexico border to Duluth, Minnesota, as a key pathway for Monarch migrations. Within 50 miles of this corridor, the Corps of Engineers manages 45 water resources projects and more than 1 million acres. On the southern end of the corridor the Fort Worth District personnel

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A crew from the Fort Drum Public Works' Carpentry and Electrical Shop cover the high-performance insulation panels with sheet metal siding on the exterior of a building in the 400 area.

Fort Drum participates in testing high-performance insulation technology

Story and photos by Mike Strasser
Fort Drum, New York

Energy loss — specifically wall-related heat loss — is estimated to annually cost the Department of Defense about $200 million and accounts for 5 percent of total energy cost in military facilities. Fort Drum, New York, is the site of a U.S. Army Corps of Engineers project that will test high-performance insulation technology designed to keep heat indoors more effectively and with greater cost savings to the government.

The Fort Drum Energy Branch is working with the Construction Engineering Research Laboratory (CERL) in Champaign, Illinois, to conduct an energy-efficiency project using two military buildings in the 400 area.

Tapan Patel, CERL project manager, traveled to Fort Drum to observe and assist with installing a new type of insulation. He said the objective of this research is to demonstrate and validate the energy and cost performance of a high-performance insulation technology called Modified Atmosphere Insulation, or MAI.

"MAI represents a new generation of advanced thermal insulation with the performance of silica-based vacuum insulation panels and significantly reduced cost," Patel said. "This technology has great potential benefit for the Army and the DOD."

CERL, a research lab within the U.S. Army Corps of Engineers' Engineer Research and Development Center, is working with Oak

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The U.S. Army Corps of Engineers Buffalo District awarded a $1.39 million contract in September to Tidewater Inc. of Elkridge, Maryland, in support of the Unity Island Aquatic and Riparian Invasive Species Management and Habitat Restoration Project for the removal of aquatic invasive species (AIS) from Unity Island in Buffalo, New York. As part of the Great Lakes Restoration Initiative, the demonstration project will be conducted in coordination with the city of Buffalo and the Engineer Research and Development Center. Methods used to control AIS will be monitored for a period of three years before potentially being employed throughout the Great Lakes in coastal wetland environments similar to Unity Island. The project includes implementing AIS control and management, introducing container-grown woody, shrub and herbaceous native plant species, planting in-water submerged aquatic vegetation (SAV), installing in-water fish attraction structures, planting in-channel SAV and installing fish attraction structures, and expanding riparian and wetland buffers. The goal of this demonstration is to evaluate the efficacy of a number of invasive species removal methodologies. (Photo by Andrew Kornacki)

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Whenever possible, please enjoy *The Corps Environment* **without using paper.**

Providing solutions to tomorrow's environmental challenges

By Beth Fleming
U.S. Army Corps of Engineers
Engineer Research and Development Center (ERDC)
Director of the Environmental Laboratory and Civil Works Business Area Lead

The impact science and technology have on our lives is visible every day — from cell phones to smart cars, to stronger concrete, to new fabrics and better foods.

Science and technology also impact our natural environment. The U.S. Army Corps of Engineers' environmental research and development program inculcates a culture of considering the environment throughout the lifecycle of new scientific and technological developments. The fact that USACE is a steward of the environment is evident on a daily basis in all of its projects. Thinking about environmental consequences at the beginning of projects affords the opportunity to accomplish more diverse outcomes with multiple benefits.

At the U.S. Army Engineer Research and Development Center's Environmental Laboratory, we have dedicated our careers to developing the latest science that integrates physical, chemical and biological components and applies them in solutions to environmental challenges facing the Corps, Army and nation. The key to our success is maintaining strong relationships with our customers and partners, developing and maintaining a talented workforce and delivering on commitments in ways that impact the world.

Our people

Our team of more than 240 federal employees embrace demanding opportunities and thrive in situations that challenge commonly held theory. We strive to be our people's first choice as a quality workplace at every level of their careers. We provide them access to other high-caliber engineers and scientists for collaboration and partnerships. We give our team cutting-edge facilities and equipment to use in their work.

Our culture is one of learning, discovery and innovation that we weave into the solutions delivered to our customers. Our staff includes more than 200 engineers and scientists with 80 percent holding advanced degrees, including 50 percent at the doctoral level. We emphasize advanced education and training, providing long-term training opportunities that grow our employees' skills in their areas of expertise.

Our customers

We learn from our customers' experiences and strive to delight them in every way possible: in how well we understand the challenges they face, how well we carry out our work, how well we deliver results and solutions to them and in how well we stand by them. Our customers include Corps districts and divisions, the Department of Defense and other federal, state, academic and non-government organization partners.


Beth Fleming

Greater than 80 percent of our research and development is for repeat customers who come to us for solutions year after year. Our customer-researcher relationships span decades. Recently, researchers revisited habitat projects constructed decades ago for threatened and endangered species that revealed sustained outcomes we predicted during project planning — yielding environmental goods and services for future generations. We know our customers, listen to their needs and requirements and help them succeed.

Tough challenges

We enjoy the thrill of complex problems and being a part of teams that find solutions to difficult challenges. We immerse ourselves in tough projects. Our energy levels increase where others might view potential projects as contentious or daunting. We bring science to the table to help with decisions that our customers face, informing policy and outcomes.

Our challenges span the globe and cover the breadth and life cycle of environmental needs. Our experts apply their knowledge across such diverse areas as ecosystem restoration, contaminant management, threatened and endangered species protection, water quality assessment and improvement, environmental sensing and characterization, natural resources stewardship, invasive species eradication, environmental networks studies, toxicogenomic analyses and wetlands conservation.

For example, our fisheries experts predict threatened and endangered fish behavior to enhance threatened populations and inform system-operation strategies to minimize impacts.

We use cutting-edge genetics methods to detect the presence of Asian carp environmental DNA to predict the locations of carp populations. We analyze contaminant levels in fish to determine whether new military materials have environmental effects. Our toxicogenomics research helps us understand whether new materials proposed by the military will have effects on respiration, endocrine or nervous systems in animals. Our research teams evaluate contaminant fate and transport and fish toxicity and work with our customers to design sediment management strategies for dredging.

We work across missions to creatively imbed environmental benefits in our customers' projects. We answer the questions, "What is the condition now? What will it be? What will we do about it?" To answer these questions and augment traditional infrastructure, we've identified creative ways to combine nature-based features into new and novel infrastructure solutions.

We provide results founded in cutting-edge science, seamlessly blending the natural and unnatural environment. Our robust solutions incorporate every aspect of environmental systems.

Unique facilities

We have more than 100,000 square feet of laboratory space dedicated to environmental research and development. The latest in facilities and equipment includes the conceptualization, design and construction of a unique environmentally controlled fish flume housed in our Cognitive Ecology Research Facility.

The 8-foot-wide, 4-foot-deep, 36-foot-long system can move water at speeds of 6 feet per second with a temperature range of 50 to 80 degrees Fahrenheit. The facility has a three-dimensional acoustic tracking system, Doppler velocimeter, acoustic profiler and high definition video cameras allowing us to analyze fish behavior with greater accuracy, resulting in better predictive capabilities.

Our partners

Our unique portfolio is 50 percent military and 50 percent civil works, affording us the uncommon opportunity to adeptly move between both worlds in the same way our environmental mission does. The Cognitive Ecology Research Facility has already been used to solve diverse problem sets that involve invasive species and threatened and endangered species for military and civil works customers with a variety of partners, including the U.S. Bureau of Reclamation, tribes and the Strategic Environmental Research and Development Program.

How can you work with our team? We have streamlined processes for developing work with our customers, including the Corps, Army and the other services, other federal agencies, non-federal agencies, organizations and academia.

To learn more about ERDC's Environmental Laboratory and how engineers and scientists can join the team at the leading edge of environmental research and development, visit www.erdc.usace.army.mil/el.

ENVIROPOINTS

USACE research biologist leads effort to assess military site contamination

By Patrice Creel
U.S. Army Corps of Engineers
Engineer Research and Development Center

A light bulb moment sparked a research idea for Dr. Guilherme Lotufo while attending a November 2011 conference as part of the Society of Environmental Toxicology and Chemistry North America's 32nd annual meeting.

For the U.S. Army Engineer Research and Development Center's Environmental Laboratory (ERDC-EL) research biologist, that idea led to insight about the potential novel use of the polar organic chemical integrative samplers (POCIS) for monitoring munitions constituents (MC), which is now his current research project in his laboratory on the Waterways Experiment Station campus in Vicksburg, Mississippi.

In 2001, Lotufo joined with Gunther Rosen from the Space and Naval Warfare Systems Command, Systems Center Pacific to investigate the fate and effects of MC in underwater environments. Since that time Lotufo, Rosen and other scientists from ERDC and SSC Pacific participating in this collaboration have published more than 40 papers detailing their research.

"The Environmental Security Technology Certification Program (ESTCP, project 14E-ER1-016), has funded us since 2013 to optimize the use of a commercially available POCIS for the detection of MC in aquatic environments. The POCIS is a high-sorption sampler 4 inches in diameter, which is used to detect polar contaminants including pesticides, pharmaceuticals and household products," Lotufo said.

Leading experiments and field studies

In addition to conducting experiments at the ERDC-EL Ecotoxicology Laboratory, Lotufo also participated in the field demonstration of the POCIS in 2014, adjacent to the U.S. Environmental Protection Agency's Gulf Ecology Division at Santa Rosa Sound, Florida.

"Fragments of composition B (CB) were added to metal canisters with mesh-like sides and suspended from a research dock just above the sea floor. POCIS samplers were placed inside canisters and deployed at varying distances, directions, and depths, from the 'source' canister containing CB. A concentric circle sampling design was employed to examine uptake by the POCIS at increasing distances from the source. After 13 days, all samplers were removed and sent for analysis. Concentrations of contaminants TNT and RDX were highest within 0.3 meters from the source, with rapid reduction to non-detectable levels only several meters away," he said.

"The laboratory experiments provided calibration and optimization of POCIS for use with MC in preparation for field deployments. Some of the calibration experiments were the first research project conducted in collaboration with Dr. David Smith at ERDC-EL's newly opened flume facility. The most recent experiments addressed the effects of biofouling (gradual accumulation of microorganisms, algae, and animals such as barnacles on wetted surfaces) on the uptake rate of MC by POCIS," Lotufo said.

Lotufo noted the laboratory and field experiments showed that MC presence, at concentrations of concern in aquatic environments, are expected to be localized, intermittent and influenced by the level of projectile corrosion and site conditions, such as temperatures and currents.

"Because many of the Army's and Navy's firing ranges are, or were, located near coastal environments, such as the former naval training range in Vieques, Puerto Rico, concerns exist regarding the potential for unexploded ordnance (UXO) to cause blast-related risks to humans or ecological damage to the environment. Discarded military munitions (DMM), which have been purposefully and improperly disposed of in underwater environments, present similar concerns at Department of Defense sites such as the Ordnance Reef in O'ahu, Hawaii. POCIS simplifies the sampling process by eliminating the time and effort involved to conduct multiple grab sampling events and multiple analyses," Lotufo said.

He noted the POCIS detect MC in the water at ultra-low levels and preserve the contaminants of concern once they come into contact with the sorbent, making it a superior method compared to directly sampling numerous liters of water.

Advantages to military sites

"Identifying leaking underwater munitions and measuring MC at low concentrations is highly challenging, in part because introduction of the constituents to the water column may be episodic in nature and sporadic water sampling is unlikely to accurately characterize water concentrations over time.

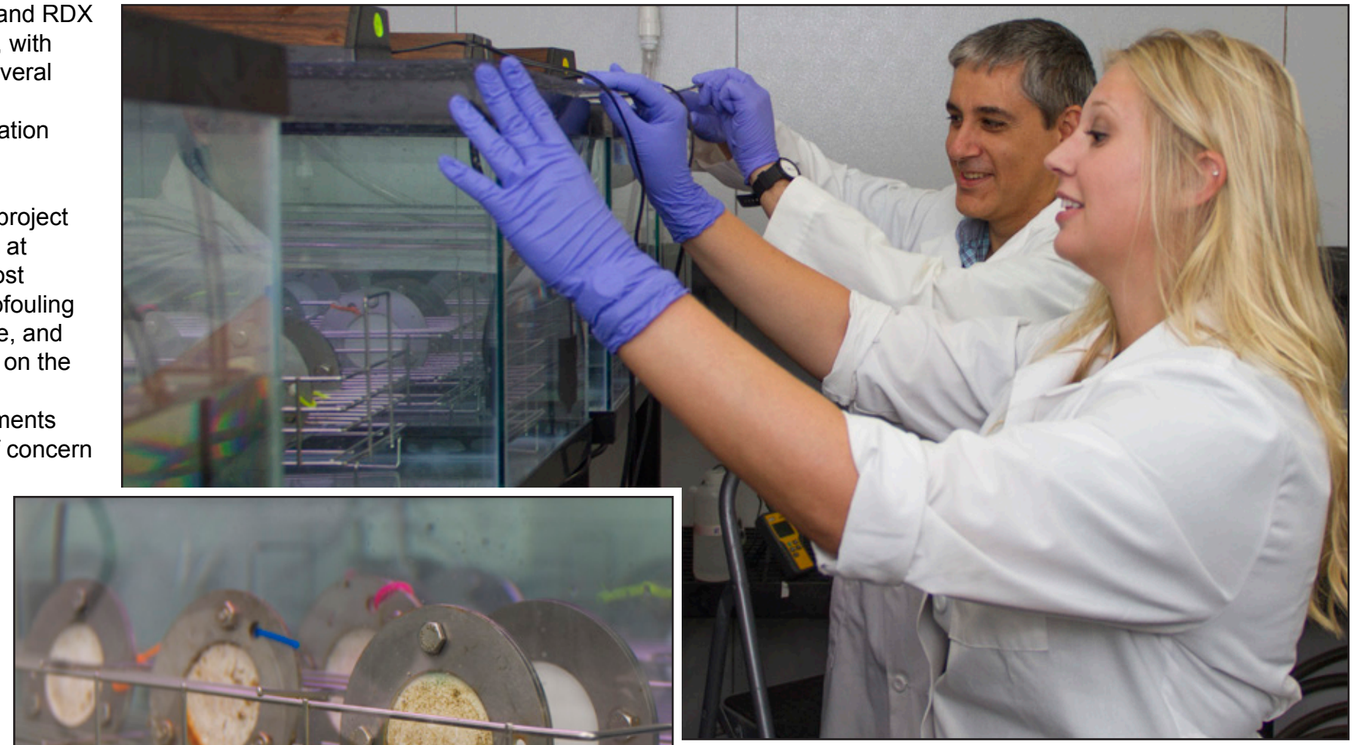
"Without the ability to accurately assess the risks posed by UXO and DMM, DOD sites are faced with increasing regulatory scrutiny which may result in costly assessment and cleanup that can jeopardize routine operations," Lotufo said.

Lotufo's research suggests the release of MC from underwater munitions into the aquatic environment is associated with low ecological risk under most exposure scenarios in the marine environment, substantiated by the development of a large body of data illustrating that these chemicals typically undergo extensive dilution and degradation processes, especially upon contact with sediment.

"High concentrations of these chemicals would be required to produce toxic effects. Additionally, these chemicals have virtually no potential for trophic transfer from invertebrates to fish and very low likelihood of exposure to humans via the food chain."

Lotufo joined Navy collaborators this month for the final phase of the project, the implementation of the POCIS at a former naval training range in Puerto Rico.

"Placement of samplers in the area will provide critical information regarding the magnitude and spatial extent of the release of MC into the underwater environment, to accurately assess risk and determine whether removal is warranted," Lotufo said.



ERDC-EL Research Biologists Dr. Guilherme Lotufo and Lauren Rabalais set up a replicate aquaria experiment in an Environmental Risk Assessment Branch laboratory. They are investigating how increasing degrees of biofouling impacts the uptake rate of munitions constituents using polar organic chemical integrative samplers (POCIS) in coastal environments. Left is a close-up showing POCIS with increasing degrees of biofouling. (Photos by Oscar Reihsmann)

The Department of Defense and U.S. Fish and Wildlife Service collaborated to produce the fall 2015 Wildlife Stewardship and National Defense issue of the *Endangered Species Bulletin*. This issue focuses on DOD projects that sustain the military mission while protecting and managing endangered, threatened and candidate species. Read the bulletin to learn about how:

— The Pacific Missile Range Facility modified exterior lighting to create a dark sky philosophy to protect Newell's shearwater. These lighting changes helped maintain Newell's shearwater's orientation and drastically reduced fallout numbers.

— Vandenberg Air Force Base removed invasive species and contoured dunes to create a beach habitat to help the western snowy plover recovery take off.

— The Navy captured, measured and released more than 56 Atlantic sturgeon, tracking them to determine their habitat use and seasonal movement patterns within rivers of the Chesapeake Bay watershed.

— Camp Blanding used prescribed burns to enhance red-cockaded woodpecker habitat, create nest cavities and facilitate population growth. Prescribed burns helped maintain training areas and also provided habitat for relocated gopher tortoises.

— Fort A.P. Hill used local spatial data and existing stream system habitats to find swamp pink and small whorled pogonia and protect these plants from predators such as white-tailed deer and American beavers.

www.fws.gov/endangered/news/bulletin.html

Promoting resilient workforce, installations for future operations

By Candice Walters
Headquarters, U.S. Army Corps of Engineers

Don't let Eugene Collins fool you. He may say he doesn't have an advanced or doctoral academic degree in environment, safety or occupational health, but the new Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (DASA-ESOH) will admit that after more than 30 years, both as an Air Force logistics officer and senior civilian, his job assignments directly challenged his practical, hands-on application of ESOH principles and methodologies at the pointed end of the operational spear, both in garrison and while deployed executing contingency operations.


Eugene Collins

"My Ph.D. is in practical experience, from leading a highly industrial depot maintenance repair and overhaul organization to directing the daily operations of several flight line aircraft maintenance units, literally around the world. We handled and carefully disposed of hazardous materials and/or chemicals," Collins said. "So, yes, over my entire adult life, I've worked with these programs under the most demanding circumstances all while delivering non-stop combat capability to the warfighters."

And that's the perspective he has brought to this job since coming on board in June, as he provides executive leadership for all Army sustainability, environment, natural resources, safety and occupational health programs. He has seen first-hand how the effective and efficient application of these programs save lives, protects the environment and supports improved combat operations.

Saying he is "truly excited" to be leading the Army's ESOH activity, Collins points to people as the organization's biggest strength.

"An activity such as this is only as good as its people, their training and leaders who provide mentoring and coaching and constant reinforcement of successes when milestones are met or surpassed," he said.

"This means we have to ensure an enduring commitment to training, educating and developing our workforce, both military and federal civilians, to perform at appropriate levels toward mitigating and eliminating where possible hazards to Army personnel; ensuring Army installations are compliant; and safeguarding our precious natural resources including threatened and endangered species.

"They play a vital role in promoting resilient Army installations for future operations," Collins said.

Given that people are the organization's greatest strength, retaining them is equally challenging, in fact, Collins said the activity's greatest challenge is sustaining in an era of budget reductions and competition for the unique skills they possess. Equally challenging is the constant need to ensure the enabling organizations are right-sized for their missions today and in the future.

"We cannot become stagnant or rest on past accomplishments. We have to sustain the right balance of employees who are ready, trained, equipped and on hand to remain Army Strong," he said.

While Collins looks to the future, one of his focus areas for the near term is firmly rooted in ensuring Soldiers and civilians are safe from the hazards of unexploded munitions. "We have six Army installations that we are assisting to implement a comprehensive 3R (Recognize, Retreat and Report) program to address the potential hazards associated with military munitions that may be encountered by Soldiers, their families or the public," he said.

He noted that the use of the 3Rs is not limited to active duty Army installations. The U.S. Army Corps of Engineers uses the 3Rs to educate people who live on or near Formerly Used Defense Sites that the Army is cleaning up under the FUDS program.

"We're making a push in our cleanup efforts to address unexploded ordnance in known places where [the Department of Defense] conducted live-fire or tests, and have embarked on a very aggressive 3R explosives safety education program to help keep citizens safe," he said.

Also on his list of immediate actions is ensuring the ESOH mission areas are updated and relevant. A new Environmental Strategy has been developed "because nothing remains stagnant," Collins said. "It's incumbent upon us to have current policies and governance appropriate to changing times and emerging technologies, especially with the reality of reduced funding, staffing and ever increasing demands on our time and expertise.

"The last Army Environmental Strategy was released in 2004, and I can assure you that the environment and how we address it now is a different world from 2004 to 2015. It's time to update and ensure our relevance from 2015 to 2025 and beyond," he added.

"We're on the clock to publish a new and first-of-a-kind Army Environment, Safety and Occupational Health Strategy in 2016.

"A strategy relevant to the holistic view of the environment, internally and externally, and not just for environmental quality. It will be a strategy that includes safety and occupational health. After all, in many respects, I wear three hats," Collins said.

"We have a variety of structured, formal activities to share information and facilitate networking that includes committees and workgroups," he said, adding that he strongly encourages employees to participate in these opportunities to share technical skills, capabilities and past experiences to avoid duplication of effort and unnecessary expenditures of constrained taxpayer dollars.

"We must learn from others' experiences and harvest the lessons learned they have to share," Collins said. "We can't allow the 'not invented here syndrome' to handcuff our need to work with other DOD and non-DOD agencies. It's very important to participate in diversified forums, consortiums and technical exchanges where we can crosstalk and network, and ultimately leverage one another's tools and knowledge."

Collins said one area in which he expects the Army, DOD, U.S. Fish and Wildlife Services and the Department of Interior to work together more closely is to address the increasing number of endangered species and their impact on military training missions.

"We need to collectively consider all the constraints and work together more closely to find ways to address those issues affecting both humans and the species. We are going to have to join hands and work more closely together to figure out what critical priorities must be addressed first and what creative, mission-enabling solutions can be executed.

"We are looking at the Army Commands, Direct Reporting Units and Service Component Commands as well as the other Army environmental execution-level organizations to also work more cooperatively with environmental regulatory agencies," he said.

"To improve the overall effectiveness and efficiency of our program, the Army must view environmental resources as mission enabling assets and transform the cost of environmental compliance into investments that improve our military operational capability."

New Tribal Nations Technical Center of Expertise to track interactions, statistics enterprise-wide

By Lisa Morales
U.S. Army Corps of Engineers
Tribal Nations Program Manager

USACE Tribal Policy Principles

Recognition of tribal SOVEREIGNTY
Federal relationships with tribes are GOVERNMENT-TO-GOVERNMENT
We honor our TRUST RESPONSIBILITY to work for the benefit of tribes
CONSULTATION prior to decision making
Protection of CULTURAL and NATURAL resources
Promotion of GROWTH and ECONOMIC capacity

On Nov. 25, U.S. Army Corps of Engineers Chief of Engineers Lt. Gen. Thomas Bostick announced the formal establishment of the Corps of Engineers Tribal Nations Technical Center of Expertise located in Albuquerque District.

"The selection of the Albuquerque District reflects the district's demonstrated capability and expertise in the specialized area of tribal relations with the nation's federally recognized tribal communities," Bostick said.

USACE recognizes its unique relationship to federally recognized tribes, which is different than the relationship with state and local governments. This relationship has its foundations in the U.S. Constitution, treaties, statutes, Executive Orders, administrative rules and regulations, and judicial decisions.

"Each and every Corps employee must uphold our trust obligations to Native Americans, Alaska Natives and Native Hawaiian organizations," Bostick said. "And the creation of the dedicated TNTCX demonstrates the USACE commitment to meeting our trust obligations."

Establishing the TNTCX is a natural progression in the evolution of USACE's Tribal Nations Program, which is fairly young in comparison to other USACE programs. Corps of Engineers Tribal Policy Principles were developed in 1998 and the senior tribal liaison position was established at Headquarters in 2003, formalizing USACE's Tribal Nations Program. USACE's Tribal Consultation Policy was issued in 2012, consistent with Executive Order 13175, Tribal Consultation.

Districts will remain the foundation of mission execution. The TNTCX will provide assistance in closing gaps when there is limited capability, support to the USACE Tribal Nations Program, and reimbursable work for others, including other federal agencies.

USACE's Tribal Consultation Policy recognizes its unique legal and political relationship with tribal governments that recognizes self-government and self-determination. More and more, tribes are coming to USACE as project partners, seeking technical services from USACE's international and interagency services authorities, collaborating on environmental issues and consulting on USACE projects. One of the goals of the TNTCX is to ensure effective delivery of critically needed resources, such as ecosystem restoration and construction of infrastructure that USACE is uniquely positioned to provide while fulfilling Tribal trust responsibilities.

The TNTCX will provide support to the senior tribal liaison and the Tribal Nations Program to improve capabilities and management, reduce redundancies, optimize the use of specialized expertise and resources, enhance USACE-wide consistency, facilitate technology transfer, help maintain institutional knowledge and improve service to customers.

The TNTCX will work closely with the senior tribal liaison on the development and implementation of an enterprise-wide Tribal Tracker Program, which is different from how USACE has managed the Tribal Nations Program in the past. This Web-based program, already implemented in Albuquerque District, is used to capture institutional knowledge, track interaction with Tribes, provide metrics on tribal interactions, and track critical documents relating to each individual tribe.

Once fully implemented, the Tribal Tracker Program will track enterprise-wide statistics for business process analysis and for reporting on Executive Order 13175. This program was presented at the Tribal Nations Advanced Training and Community of Practice meetings in January 2014 and again in November 2014 to USACE tribal liaisons.

The TNTCX will be managed by Ronald Kneebone, who has served as an archaeologist, project manager and tribal liaison in the Albuquerque District since 1991. Kneebone brings more than three decades of experience to the TNTCX and has been a leader in the Tribal Nations Program, providing support to other Corps districts nationwide on a consistent basis. Kneebone said he and his team in Albuquerque are enthusiastic about being selected to serve as the host district for the TNTCX and are ready to serve USACE and others as needed.

Detroit District earns GreenGov Award

By Candy Walters
Headquarters, U.S. Army Corps of Engineers

For the third consecutive year, the U.S. Army Corps of Engineers walked away with a Presidential GreenGov Award, recognizing extraordinary federal accomplishment in meeting the goals of Executive Order 13693, Planning for Federal Sustainability in the Next Decade.

The Detroit District received the Lean, Clean and Green Award for its Flex Fuel Program during a Nov. 30 ceremony. The district's Flex Fuel Program encourages the workforce to use E-85 fuel in its flex-fuel General Services Administration vehicles. Within the first eight months of initiating the program, the district reduced its gasoline consumption by 20 percent and increased its usage of E-85 fuel from 2 percent to more than 71 percent of the fuel used in its flex-fuel vehicles.

"It all started with senior leadership a couple years ago, from the deputy commander and then all the supervisors getting on board to the men and women on the ground seeking these sites out (to find E-85), planning accordingly and then sticking to it," said Detroit District Engineer Lt. Col. Michael Sellers.

The area Detroit District covers "is quite large, and it is not always easy to find locations to get the fuel," he said. "But we were all committed to doing the right thing."

One way the Flex Fuel Program team helped the workforce do the right thing was to educate employees on why using E-85 was important and then providing them with fuel maps and logbooks to help them closely monitor their flex fuel usage. Through their efforts, the district reduced its gasoline demand by 20 percent, going from 40,000 gallons in fiscal year 2013 to a little more than 32,000 gallons in 2014, while executing the same missions. Also, at the same time the district was increasing the use of its GSA vehicle fleet to save money on temporary duty costs.

Joining Sellers at the ceremony were Sandra Watson, representing the district's logistics team, Gregory Muilenburg of the Great Lakes and Ohio River Division logistics team, the Assistant Secretary of the Army for Civil Works Jo-Ellen Darcy and the 53rd Chief of Engineers Lt. Gen. Thomas Bostick.

For Darcy and Bostick, the ceremony marked the fourth occasion for them to stand with Army Corps of Engineers GreenGov winners. In 2013, the Army Corps of Engineers won two awards — Kathleen White of the Institute for Water Resources and Mark Huber of the Army Geospatial Center received the Climate Champion Award as part of an interagency team that developed a Sandy Sea Level Rise tool, and Jeanette Fiess, the Northwestern Division's sustainability and energy program manager, was selected as the Sustainability Hero Award winner. In 2014, the late Dr. William Goran, who established the USACE Center for the Advancement of Sustainability Innovations at the U.S. Army Engineer Research and Development Center, received the Climate Champion Award.

Sellers said Detroit District is actively sharing its lessons learned on flex-fuel initiatives with other districts throughout the Corps of Engineers. And while the recognition was important for Detroit District, the workforce is not content to rest on its laurels.

"We are going to remain steadfast in our efforts," he said. "We're going to continue to push forward. We are not going to stop doing the right thing."

Natick aims for zero food waste

By U.S. Army Garrison
Natick, Massachusetts

Realizing that food makes up 21 percent of all the waste dropped into this nation's landfills, three ambitious folks at the Natick Soldier Systems Center (NSSC) in Massachusetts seek to put the installation on a diet of sorts.

Jo Ann Ratto, Danielle Froio and Rich Valcourt want to curb NSSC's appetite for the plastic foam containers and conventional plastic dinnerware available in the cafeteria, Combat Feeding Directorate sensory laboratory and pilot plant, and the dining facility, diverting those items, as well as food scraps, from the solid waste stream into a compost pile at a local farm.

"It's called 'Zero Waste Cafeteria,'" said Ratto of the Combat Feeding Directorate, Natick Soldier Research, Development and Engineering Center, or NSRDEC. "So, we're replacing all of the [plastic foam] in the cafeteria with compostable items, whether they're made out of a biodegradable plastic or ... a natural fiber material or paper."

The Commonwealth of Massachusetts recently announced a ban on food waste in commercial operations exceeding 1 ton per week. NSSC currently produces three-quarters of a ton per week, according to Valcourt, a U.S. Army Garrison Natick environmental engineer.

"So we're under the threshold, but … we want to be the stewards of the environment," Valcourt said. "That [maximum] could be lowered in the near future. So we went forward."

Through a Bootstrap Initiative sponsored by the NSRDEC chief scientists, Ratto was able to obtain $17,000 in funding for the project earlier this year. Such initiatives are submitted by NSRDEC employees in hopes of streamlining processes and minimizing bureaucracy.

A large portion of that money was used to buy biodegradable tableware that will be available in the cafeteria and individual bins that the workforce can use to dispose of food waste in their work areas.

The program kicked off Nov. 23 with Ratto, Froio and Valcourt standing by in the dining areas to answer questions.

"Given that the success of this initiative is largely dependent on the workforce's participation, a significant part of this effort will focus on educating the workforce about the switch over to compostable food service products in the cafeteria, and how this affects the way in which they dispose of their food waste and dinnerware," Froio said. "Visual cues will help guide employees through the sorting process, in an effort to minimize contamination of the compostable bins with non-compostable items, like condiment packets, potato chip bags and other commercial packaging that is either purchased in the cafeteria and PX or brought in from home and consumed in the dining area."

"We're going to be collecting all the food waste and those compostable items all in one bin," Valcourt said.

"You can take your plate that has leftover food on it and throw it right in the same bin," Ratto added.

Conventional trash bins will also still be available for the collection of all non-compostable items.

Waste from food preparation will also make its way to the compost pile, but what happens when employees take meals back to their offices?

"People in the work area [will] have little bins — they're 2-gallon bins — and we're going to have a biodegradable bag in there," Ratto said, noting that the bins are well vented. "They're odorless. They won't smell."

"That's important that people know where to put stuff," Valcourt said, "because there's going to be multiple places to put your trash."

The Natick Soldier Systems Center in Massachusetts is turning to compostable dinnerware and eliminating plastic foam containers like this one from the waste stream. (Photo by Tazanyia Mouton)

The waste will be picked up and transported weekly to the farm. The program will run three to four months, when data will be collected to assess how much waste has been diverted from landfills and, instead, converted into compost, a valuable product that can be used by the community.

Data collection will also include surveys, which collect employee feedback about the new compostable products and the initiative as a whole. This combination of data will help determine if the cafeteria can be a zero-waste facility.

"We want to collect at least three months of data," Ratto said. "I think it's going to be exciting for the base, and it's going to be educational and environmental."

Valcourt said the garrison will pick up where the program leaves off.

"We're going to move forward with it," Valcourt said, adding that he hopes it will help Natick reach a solid waste diversion rate of 60 percent this fiscal year. "Going to this … program will help out greatly. This is a great program. It's long overdue."

USACE helping reduce U.S. military's environmental footprint in Afghanistan

By Julia Bobick
U.S. Army Corps of Engineers Engineering and Support Center, Huntsville

The U.S. Army Corps of Engineers' Engineering and Support Center, Huntsville is managing the $21.5 million contract for the environmental footprint reduction at more than 60 U.S. military camps and bases being closed throughout Afghanistan as a result of the withdrawal of U.S. troops from the country.

Huntsville Center's International Operations Division Environmental Footprint Reduction (EFR), Afghanistan project supports the mission to remediate forward operating bases and combat outposts as units draw down. All former U.S. military sites not being turned over to the Government of Islamic Republic of Afghanistan must be restored to the environmental condition that existed prior to U.S. occupation, according to Huntsville Center's EFR Project Manager Karen R. Moore.

Environmental footprint reduction efforts aim to reduce the effect military activities have had on the environment — troops, vehicles. One initiative in the project — sorting waste in a 186-acre field and crushing concrete to create repurposed aggregate for Bagram — is estimated to save the garrison $4.5 million annually, Moore said. Additional tasks include the demilitarization of relocatable buildings, defensive barriers, miscellaneous concrete and/or steel structures, and other regulated materials, which could consist of black-water lagoons, petroleum products, petroleum tanks and tank farms, paints and burn pits.

As of the end of October, the seven teams of more than 300 contracted employees and local Afghanistan labor had removed more than 850 structures; more than 6,000 defensive barriers; 3,306,114 pounds of demolition and miscellaneous debris; 4,357,112 pounds of scrap metal; 7,302,698 pounds of scrap wood; and 207,956 pounds of wire and cable, as well as 11,849 pounds of florescent lights for hazardous material disposal.

"I am very impressed with the work being done helping to accelerate the retrograde of U.S. forces — it's making a positive impact in Afghanistan, as well as being economical for the Army," said Huntsville Center Commander Col. Robert Ruch, who visited Center employees and projects in Afghanistan in October.

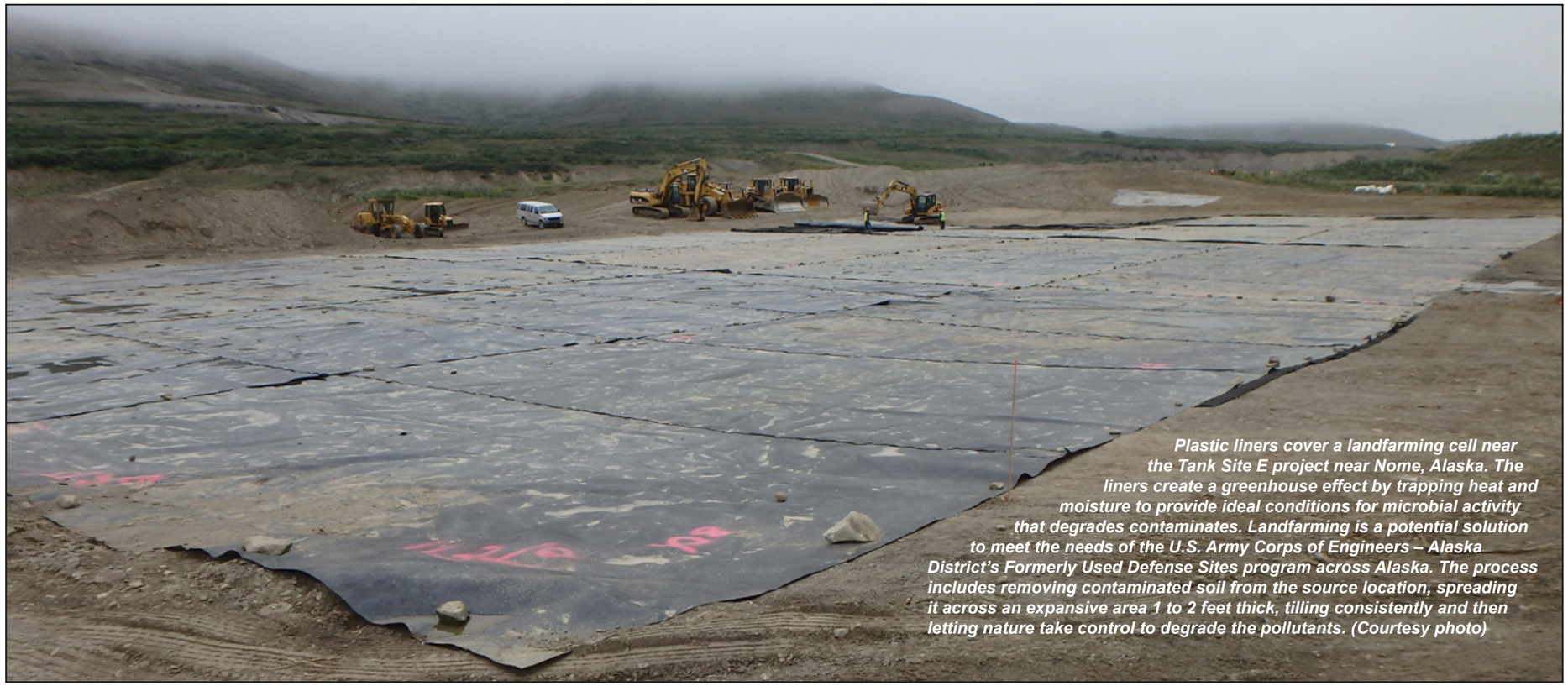
He added that Bagram Support Group (BASG) Afghanistan Commander Col. John D. Lawrence could not say enough good things about the program and has plenty of work on Bagram Airfield (BAF) to keep the Huntsville Center team busy.

Huntsville Center maintains a forward office at BAF to oversee several projects, including range clearance activities and the EFR Program. Sterling Global Operations was awarded the EFR task order under the Worldwide Environmental Remediation Services Multiple Award Task Order Contract in December 2014. The work is expected to be complete by the end of 2016.

The U.S. Army Reserve's 310th Engineer Detachment, Construction Management Team at BAF is executing the site remediation and footprint reduction mission, as prioritized by U.S. Forces-Afghanistan, 4th Resolute Support Sustainment Brigade, NATO, Army Garrison Directorate of Public Works and the Base Operating Support Integrator.

Landfarming offers viable environmental cleanup solution in Arctic

By John Budnik
U.S. Army Corps of Engineers Alaska District



Plastic liners cover a landfarming cell near the Tank Site E project near Nome, Alaska. The liners create a greenhouse effect by trapping heat and moisture to provide ideal conditions for microbial activity that degrades contaminates. Landfarming is a potential solution to meet the needs of the U.S. Army Corps of Engineers – Alaska District's Formerly Used Defense Sites program across Alaska. The process includes removing contaminated soil from the source location, spreading it across an expansive area 1 to 2 feet thick, tilling consistently and then letting nature take control to degrade the pollutants. (Courtesy photo)

For Alaska District environmental engineers, landfarming is not vegetable crops and livestock — it is a method used to clean contaminated soil associated with an obsolete fuel storage tank in the Arctic. Within the U.S. Army Corps of Engineers' Formerly Used Defense Sites (FUDS) Program, experts are challenged to find new and cost-effective means to clean up defunct military infrastructure left over from earlier generations. Alaska's remoteness, arctic climate and logistics pose the biggest challenges to accomplishing these missions. Engineers must consider expensive mobilization costs and availability of local resources when deciding how the sites will be remediated.

"Alaska is an entirely different environment than the rest of the U.S.," said Aaron Shewman, environmental engineer and innovative technology advocate for the Alaska District. "Our objective is to mobilize as few times as possible to get the work done and get a 'cleanup complete' designation from the Alaska Department of Environmental Conservation."

Landfarming is a potential solution to meet the needs of the FUDS program across Alaska. The process includes removing contaminated soil from the source location, spreading it across an expansive area 1 to 2 feet thick, tilling consistently and then letting nature take control. If a balance of warm soil temperature, moisture, aerobic activity and constant monitoring is achieved, then conditions are ideal to increase microbial activity that will degrade the pollutant.

"What landfarming does is attempt to accelerate nature's process that would take many years," said Will Mangano, environmental engineer and technical lead on the FUDS Tank Site E project near Nome.

Four miles north of downtown Nome, a World War II-era fuel storage tank left over from the Army Air Corps deteriorated over time and tainted the surrounding soil. The vessel could store about 1 million gallons of diesel fuel at one time. During the summer, the Corps removed the rusty steel container and its foundation, but was left with about 30,000 tons of petroleum-contaminated material to remediate.

Tank Site E is one example of a project that presents logistical difficulties that raises mobilization costs. With a population of about 4,000 and located more than 500 miles northwest of Anchorage, the city of Nome is only accessible by sea or air.

The Corps considered potential contractor proposed solutions that included burning the pollution out of the soil on site, excavating and barging the dirt off site, and, finally, landfarming. The latter presented a cost savings of about $3 million, Mangano said.

"So many innovative technologies that are developed are electricity or power intensive and require a lot of maintenance and monitoring," Shewman said. "Landfarming saves the government money. Excavating the soil, treating it and then possibly reusing it as fill is a money saver with less mobilization required."

Spread over 12 acres, the Corps is landfarming the soil at the Nome site and is expected to meet the state's cleanup requirements by 2019. If the conditions are not met, the contractor will remove the material off site, Mangano said.

However, there are significant challenges associated with the process. Contractors have to cover the soil with plastic liners to create a greenhouse effect to keep the area warm due to Nome's cold climate. Therefore, spring and summer months are the most effective for the procedure because the ground and material are thawed.

"Nome will definitely provide the wind (aeration)," Mangano said. "The summers are going to be when we aggressively keep the heat, moisture and tilling up."

Furthermore, the method's efficiency is determined by the type of waste being eradicated. If contaminates degrade through evaporation or microbial activity more easily, then there is a greater chance for a successful operation. For example, gasoline degenerates faster than heavy tars, Mangano said.

"We are confident it will work [at Nome]," he said. "I think it will be a good opportunity for the contractor to demonstrate that landfarming is a viable option even for the middle range hydrocarbons like diesel that the Corps sees at FUDS sites."

Indeed, landfarming is a flexible technology that can be customized as needed to the specifics of each case, Shewman said. Additives, such as fertilizers, help microbes do their job, Mangano added. Either way, the environmental cleanup method has the potential for positive results.

"Landfarming is not just a passive technology, you still need to engage it," Mangano said. "We jumped on the idea to pull this material out of the ground and let natural ambient conditions take over."

Can activated carbon be used to treat dredged sediments?

By Andrew Kornacki
U.S. Army Corps of Engineers Buffalo District

Super sacks of powdered and granular activated carbon are added to a scow of dredged sediment before mixing with a clamshell bucket. A clamshell is used to thoroughly mix activated carbon and dredged sediments in a scow, before it is placed in the open lake. (Courtesy photos)

The mission of dredging harbors and connecting federal navigation channels along Lake Erie and Lake Ontario is the responsibility of the Buffalo District and is vital to the functionality of the Great Lakes Navigation System (GLNS) and the overall U.S. economy.

While dredging has been taking place for hundreds of years, the management of dredged sediment is among the top Great Lakes priorities and challenges.

Adding to the challenge is that portions of dredged sediments contain contamination that can have a negative impact on the aquatic environment if not managed properly. There are a number of potential sources of sediment contamination, including municipal and industrial discharges, urban and agricultural runoff, sewer overflows and atmospheric deposition.

Using conventional dredging equipment, the Buffalo District along with the U.S. Army Engineer Research and Development Center (ERDC) have started the first of its kind large scale demonstration of treating dredged sediment, from Ashtabula Harbor, Ohio, with activated carbon to determine if bioaccumulation can be reduced in the bioactive zone of the 50-foot-deep open-lake placement site.

"I think it is important to note here that the sediments that we are treating are suitable for open-lake placement and the amount of contamination that we are talking about is minimal," said Mike Asquith, Buffalo District dredging program manager. "The objective of the study is to evaluate the performance of activated carbon under field conditions to determine if the technology can be utilized in situations or harbors where sediment contamination is a concern."

"Activated carbon has been used as a purification agent by many industries to treat water, air and alcohol to name a few," said Paul Schroeder, ERDC sediment management team leader. "It is considered 'activated' when it goes through a process in which the carbon is made more porous, increasing its surface area, and preparing it to accept contaminants."

In a process right from the text book of a high school chemistry class, when the contamination in the sediment comes in contact with the activated carbon the two bond together. The contaminants are so strongly bonded to the activated carbon they cannot be bioaccumulated by aquatic organisms that come into contact with the sediment.

The most biologically active zone in lake sediment is at the surface of the lake bottom. Knowing this, a part of the study is to examine how treated sediment can be used to cap previously placed or existing sediments on the bottom of the lake by placing a 2- to 5-centimeter layer of treated sediment to provide a protective bioactive zone.

During the 2015 dredging season a total of 7,200 cubic yards was placed in the open-lake area as part of the study, of which 1,200 cubic yards of sediment was treated with two types of activated carbon: powdered and granular. Two different types were used so that the study team could see how well each mixed with sediment, how each type acted when it was dropped from to scow to the 50-foot-deep placement site, and to measure how quickly the two different types adsorbed contaminants.

"We found that we could effectively mix both types of activated carbon into dredged sediment while it is contained in the placement scow just with using a clam shell bucket," Asquith said.

"Samples were taken at the placement site, after the sediment settled, and the results were positive."

"We found well blended granular activated carbon, and smears of powdered activated carbon in bioactive zone," Schroeder said. "This shows that both types of activated carbon will not be stripped from the mixture during placement in the open lake."

During the 2016 season the team will return to the open-lake placement site, take more samples from the bioactive zone and test for the reduction of the bioavailability of contaminants in the sediments.

"I am proud to proclaim that the USACE stands for public safety and environmental stewardship and we share in the public's concern for the well-being of the Great Lakes," said Brig. Gen Richard G. Kaiser, USACE Great Lakes and Ohio River Division commander. "We will continue to work hard at improving the condition and reliability of the GLNS — it is vital for our continued economic success and vital for the regional and national economies."

NASA using USACE Sustainability Component Planning in Net Zero tool kit

By Jim Frisinger
U.S. Army Corps of Engineers Fort Worth District

Federal installations seeking sustainability solutions are looking for any extra edge to meet the latest Net Zero mandates for energy, water and waste. For NASA master planners at the Lyndon B. Johnson Space Center (JSC) in Houston, that meant writing a Sustainability Component Plan (SCP) led by the U.S. Army Corps of Engineers. NASA headquarters views the SCP as a best practice for sustainability planning. It helps conserve natural, financial and human resources, according to JSC Environmental Engineer Michelle Fraser-Page.

JSC has been the hub of human space flight activity since 1961 and home of Mission Control. Trained generations of space explorers guide today's International Space Station missions and work on tomorrow's Orion Multi-Purpose Crew Vehicle program and NASA Commercial Crew operations. JSC also is engaged in a vast array of scientific research.

JSC includes about 100 buildings totaling 3.76 million square feet across the 1,620-acre campus. Many mature structures, dating to JSC's earliest days, are both a challenge and an opportunity for planning the next 50 years in today's Net Zero environment. In the next 20 years, JSC anticipates demolishing 613,000 square feet of facility space on its main campus while building more than 1.18 million square feet of new construction.

Fort Worth District's Regional Planning and Environmental Center is helping JSC craft a sustainability plan that completes the 18-month area development plan process. A training practicum in March engaged installation personnel in the process, which has a 20-year horizon. The holistic approach addresses energy, water, waste and stormwater on multiple levels. It created an executable plan for actions at individual facilities as well as campuswide, along with recommended changes in policy and personnel behavior.

The Net Zero Planner tool is being developed by the U.S. Army Engineer Research and Development Center, Construction Engineering Research Laboratory. It modeled hundreds of different scenarios and reported out three alternatives:

1. a no-new change base case,
2. a better case with a projection of reduced energy demand on buildings using cost effective Energy Efficiency Measures that meet mission goals and requirements, and
3. a best case representing more aggressive measures toward reducing total energy usage further using supply and distribution strategies such as cogeneration, solar, wind and storage.

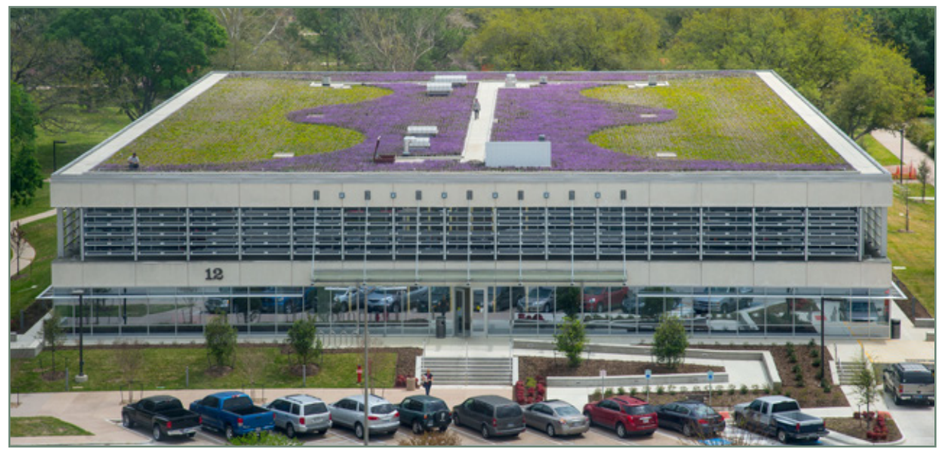
This dynamic planning and analysis tool can be rerun as conditions change. With a written sustainability plan, JSC can make daily decisions that keep true to its long-term plan.

Engaging employees as partners is a critical part of the sustainability program's success, said Fraser-Page. The end state is to have an effective functioning space center over the next 50 to 200 years.

"Sustainability is an integrated foundational component of master planning that needs to be included at the beginning and woven through all elements of master planning," Fraser-Page said.

"Writing the plan has engaged JSC staff who otherwise would have no motive to think about stormwater management and ecosystems. Now instead of being an afterthought, high-level planners can get ahead of future environmental requirements."

The SCP confirmed the overall direction JSC has been heading, although its analysis in some places differed from staff views, said JSC Energy Manager Kevin McCue. While only some of the suggested better- and best-case energy efficiency measures will be financially feasible, having them in the master plan may help make such recommendations click with senior management as energy security and efficiency become operational necessities.



Building 12 was the first to be built on Johnson Space Center's historic central mall in 1962, and the first to be renovated, in 2013. It was stripped to its steel frame and rebuilt to Gold Certification Leadership in Energy and Environmental Design (LEED). Outdated building systems were replaced with energy-efficient equipment. It became the first building at JSC to have a vegetative roof, which eliminates the heat-island effect, reduces stormwater runoff and increase the building's energy efficiency. (Photo courtesy of NASA)

Most JSC structures today consume more than 20 kilowatt-hours per square foot per year. This energy use intensity map shows that by adopting Best Case recommendations, most buildings consume less than 16 kilowatt-hours a year after 20 years (shown in green).

USACE best case recommendations to be implemented during next 20 years

A sampling of the Sustainability Component Plan's policy and hardware draft recommendations and achievement potential under best case scenarios compared with base case scenarios.

Water — 4.6% reduction (39 million fewer gallons/year turned into wastewater) Sample measures:	Energy — 49% reduction (90 million kilowatt-hours/year) Sample Energy Efficiency Measures:
➲ Rainwater harvesting to provide reliable renewable water source ➲ Develop native/drought-tolerant species list for landscaping ➲ Require dual-flush toilets in all new/renovated/ replacement ➲ Install purple pipes in new buildings for grey water distribution and reuse ➲ Meter all buildings	➲ Meter all new/renovated buildings ➲ Meet Architecture 2030/PassivHaus energy standard ➲ Improve boiler efficiency from 78% to 95% ➲ Add vestibules ➲ Ban personal refrigerators, microwaves, space heaters and fans ➲ Consider cogeneration to generate electricity and steam
Solid waste — 72% reduction (7.7 million pounds/year) Sample measures:	**Stormwater runoff — 25% reduction** (331 million gallons/year diverted from storm sewers) Sample measures:
➲ Adopt waste-to-energy composting strategies ➲ No handouts for meetings, no printing emails ➲ Built-in recycling casework ➲ Ban plastic bottle sales & install bottle-filling stations ➲ Implement green office certification program	➲ Implement swales and rain gardens ➲ Label storm drains that drain into Galveston Bay ➲ Install native trees/vegetation ➲ Catchment potential 80.8 million gallons/year

District kicks off 4-year restoration project of largest remaining freshwater wetlands in National Capitol Region

Story and photos by Sarah Gross
U.S. Army Corps of Engineers Baltimore District

Brent Steury, supervisory biologist with the National Park Service, discusses proposed restoration efforts at Dyke Marsh Wildlife Preserve to Baltimore District Environmental Protection Specialist Robin Armetta and other interagency project team members during a project kickoff boat tour on the Potomac River Sept. 29. The team is in the design phase of a project that will restore up to 100 acres of freshwater tidal marsh using dredged material, providing critical habitat for a variety of wildlife. Dyke Marsh encompasses 485 acres and is one of the largest remaining freshwater tidal wetlands in the Washington metropolitan area.

The National Park Service and the U.S. Army Corps of Engineers began small-scale geotechnical drilling at Dyke Marsh Wildlife Preserve in October in preparation for a proposed interagency project to restore up to 100 acres of freshwater tidal marsh within the 485-acre Dyke Marsh on the Virginia side of the Potomac River in Fairfax County. A 2009 study of Dyke Marsh by the NPS and the U.S. Geological Society found this unique ecosystem would be entirely lost by 2035 without restoration efforts.

Geotechnical drilling is part of the project's investigative process that will provide sediment samples from the marsh. The findings from sediment samples will help determine the stability and composition of the foundation for the proposed promontory and will help in the design of the project.

Dyke Marsh, managed by the George Washington Memorial Parkway, is home to more than 300 species of plants and 270 species of birds — including the only known breeding population of marsh wrens in the region.

"Dyke Marsh Wildlife Preserve is one of the largest remaining freshwater, tidal wetlands in the Washington (District of Columbia) metro area," said Alex Romero, superintendent of the George Washington Memorial Parkway. "Dyke Marsh has extensive value, not only for the flora and fauna that exist within, but for the recreational, educational and cultural values that the marsh provides. We are very excited to move forward with the first phase of the project to restore this very sensitive resource."

The marsh has been altered through 40 years of mining and other human factors, leaving the area exposed to storm waves, susceptible to erosion and unable to sustain itself.

"This vital project will provide a storm buffer for the historic and scenic George Washington Memorial Parkway, a natural filter to clean the Potomac River, and critical habitat for a variety of wildlife," said Baltimore District Commander Col. Ed Chamberlayne. "We are excited that restoration efforts are underway, and we are looking forward to working with our partners at the National Park Service on another successful project."

In 2013, Congress recognized Dyke Marsh as an invaluable resource to the greater Washington region and allocated $24.9 million to restore the site.

The restoration efforts, expected to take four years, are anticipated to begin in summer of 2017. The wetlands at Dyke Marsh will be restored using clean sandy material and planted with native wetland vegetation. The peninsula to the south of the marsh that had been previously removed will also be restored.

Goats hired to dine on overgrown, invasive plants at Cape Cod Canal

By Ann Marie R. Harvie
U.S. Army Corps of Engineers New England District

When people visit Massachusetts' Cape Cod Canal they expect to see some pretty amazing things — the occasional whale or seal passing through the water, birds and other wildlife. Goats are typically not on that list; however, a small herd of goats was seen at the canal in September snacking on the vegetation on the south side of the Railroad Bridge at the tidal flats recreation area.

The goats had not escaped from a local farm — they were invited guests hired by canal staff to eat all the invasive plants they could for about a week. The goats' handler set up a perimeter fence to meet the grazing requirements and delivered the goats.

Goats munch on vegetation, including invasive and nuisance plants like poison ivy, along the banks of the Cape Cod Canal in September. (Courtesy photo)

"The site was specifically chosen for several reasons," said Park Ranger Michele Breen, who came up with the eco-friendly idea of having the goats over for a meal. "The control of overgrowth by the Railroad Bridge increases physical security."

According to Breen, much of the vegetation the goats would eat was invasive and located very close to the water, so the use of herbicides was not an ideal option. The steep terrain where much of the vegetation was located could be hazardous for human workers and machinery. Goats are used to steep, hilly places and so it is an excellent environment for them.

"In addition, a large portion of the vegetation that had to be removed was poison ivy," Breen said. "Goats have a natural immunity to it and enjoy eating it."

Hosting a herd of goats for nearly a week had its challenges. Unlike lifeless equipment that can be turned on and off, goats have their own distinct personalities and like to do as they please. Like humans, they eat the food that they enjoy first and then, if they have room, they'll eat the rest. Goats are also not big fans of large bodies of water, so it took a little time for them to get used to eating so close to the canal waters.

"It was a learning curve to manage the goats," Breen said. "I learned a lot!"

Because goats aren't normally seen at the canal, they very quickly became very popular. Crowds of people came to see them munch.

"Although the goats loved it, all the attention did cut into their work time," Breen said.

The arrangement was win-win; the goats got to munch on tasty invasives, no herbicides polluted the water and human workers stayed safe. The advantages of having the goats at the canal far outweighed any minor adjustment period. "Goats can eat about one fourth of an acre in a week," Breen said. "The amount the goats cleared would have taken at least two government workers a day or two to do it by hand."

Controlling the fast growing, invasive plants that the goats ate — bittersweet, greenbrier, honeysuckle and poison ivy — must be done several times a season, according to Breen. The way the goats strip the plants actually slows down the regrowth, and the area does not have to be attended to as often.

Architects talk best practices for sustainability

By Eileen Williamson
U.S. Army Corps of Engineers
Omaha District

Three U.S. Army Corps of Engineers Omaha District architects who are providing in-house design for several facilities at Fort Carson, Colorado, that are part of the 4th Combat Aviation Brigade, recently sat down with USACE's Northwestern Division Military Construction program manager Dave Packard to talk about their projects and the design process. The three district architects — Andy Temeyer, Askelon Parker and Karen Jarvis — have designed several projects for hangars and support facilities at Fort Carson's Butts Army Airfield.

One of the unique aspects of the U.S. Army Corps of Engineers is taking on tough tasks. Stakeholders for military construction projects have unique needs and USACE engineers do their best to deliver on them in the most efficient and flexible way possible.

Here are some of the main thoughts from our project architects about how USACE design teams pride themselves in providing flexibility on even the most challenging projects and designing sustainable facilities for the U.S. military.

1. Engage USACE Project Delivery Teams. They are familiar with federal sustainability concepts, policies and goals. Tough questions early-on in planning and programming allow designers to plan realistically for design, construction and operations.

2. Start as early as possible. Early or proper planning and programming can yield long-term success during design and construction. Engage all appropriate stakeholders, including the Director of Public Works, base civil engineer and Centers of Standardization.

3. Establish clear goals. Root all stakeholders in higher-level policies to ensure they reflect the types of facilities that all are being tasked with procuring. USACE designers can often be the bridge among sometimes difficult challenges.

4. Coordinate. Building Information Modeling (BIM) and energy modeling are good tools to facilitate coordination among design teams. BIM allows designers to essentially construct a facility in virtual reality and so much more can be learned about a facility this way.

5. Iterate. An iterative design process yields better-tuned, higher performance facilities.

6. Choose the best design/contracting mechanism for the job. Not all projects are created equally. Choose the contracting mechanism that has the best potential to yield the intended results within schedule and budget limitations.

7. Invest in the design process. Committing to a successful design effort should yield payback over the life of the facility. There are so many parallel efforts between the different services, a collaborative investment in a design process can foster shared knowledge and a greater investment in the overall process.

8. Validate goals. Throughout the design and construction process, review the project goals to ensure work is focused on these goals. Validation is also beneficial during facility operations such as re-commissioning or retro-commissioning.

9. Stay Engaged. Design teams should stay engaged as appropriate through construction. Implementing an effective feedback loop that involves all stakeholders including USACE Headquarters will improve business processes.

10. Educate facility occupants and operations personnel at turnover. Proper operations and maintenance ensures a high-performance building stays tuned throughout its intended life.

HARVESTING
for future generations

Story and photo by Sara Corbett
U.S. Army Corps of Engineers Charleston District

As the sun starts to rise over the treetops at the St. Stephen Powerhouse and groups of harvesters methodically pull sweetgrass, a young girl is participating in pulling for the very first time and continuing her lineage.

Eleven-year-old Madison Horlback is just like any other pre-teen girl. She likes to hang out with her friends and play on her phone. But what sets her apart from other girls is that she is a sixth generation basket weaver. She is just beginning to learn the tradition and primarily sticks to weaving jewelry, such as earrings and bracelets.

Karen Horlback and daughter Madison, 11, harvested sweetgrass for the first time this year at Charleston District's Sweetgrass Pulling Day.

"I just like the process," Madison said. "It's pretty interesting but sometimes it's hard because I didn't do this right, and have to rip this out, but it's pretty interesting."

Her mother, Karen, has been weaving baskets since she was 6 years old, but despite that had not pulled grass before either. She is excited to make something with the sweetgrass she pulled.

"I'll take it home and you have to dry it out and I'll make jewelry out of it," Karen said. "Maybe since it's my first pull with my own grass I'll think of something special I can design."

While this was their first time pulling, it was the Charleston District's second year hosting the Sweetgrass Pulling Day. This year's pull was a little different from previous years, with the pull date so close to the tragedy at Mother Emanuel Church, this year's event was dedicated to the victims and a special sweetgrass cross was blessed and presented to the church.

The day started at 6:30 a.m. with sweetgrass basket weavers from around the Charleston area ready to pull sweetgrass before they head off to their jobs. They will use the sweetgrass to continue the tradition of the iconic sweetgrass baskets.

Sweetgrass basket makers and their baskets are an integral part of the Lowcountry's history that was first shaped by the captive Africans brought to the southern United States. Through oral history of the African slaves, the basket-making technique can be traced back to West Africa, their home. The sweetgrass basket has evolved from being an agricultural tool and storage for household items to famous artwork that hangs in the Smithsonian. Sweetgrass baskets and their makers are a vital part of the history of Charleston, South Carolina, and the nation.

Due to development along the South Carolina coastline, sweetgrass has become scarce in recent years. The number of sweetgrass basket makers and their stands have been greatly reduced and the basket weaving tradition in the area has been threatened. To help save this endangered history and provide a constant source of material for sweetgrass basket makers, the district created the Sweetgrass Pulling Day event to invite sweetgrass basket makers to harvest the sweetgrass at the St. Stephen Powerhouse.

"Sweetgrass grows naturally on the 2,500 acres at the powerhouse, and it should be harvested yearly for it to be healthy," said Joe Moran, fisheries biologist. "We have plenty of it out here so we thought asking the sweetgrass basket makers to harvest it was a win-win."

By providing this opportunity and resource, the district has helped secure the future of sweetgrass basket making for generations to come.

Corps breaks ground on Everglades project reservoir

By Jenn Miller
U.S. Army Corps of Engineers
Jacksonville District

The U.S. Army Corps of Engineers, alongside federal, state and local officials, celebrated the start of a major construction contract Nov. 20 for the reservoir component of the C-44 Reservoir and Stormwater Treatment Area project, a critical restoration project to restore America's Everglades.

The reservoir is the largest water storage component of the C-44 project, which is under construction in partnership with the South Florida Water Management District, as part of the Comprehensive Everglades Restoration Plan's (CERP) Indian River Lagoon-South project.

"The Obama Administration has already invested $2.2 billion in the restoration of the Everglades and today marks yet another groundbreaking on a project that will restore the most biologically diverse estuarine system in the United States," said Assistant Secretary of the Army for Civil Works Jo-Ellen Darcy, who spoke at the event. "We will save this system and preserve it for future generations."

Federal, state and local officials celebrated the start of a major construction contract for the reservoir component of the C-44 Reservoir and Stormwater Treatment Area project Nov. 20, a critical restoration project to restore America's Everglades. (Photo by John Campbell)

Jacksonville District awarded the $197 million construction contract to Barnard Construction Inc. from Bozeman, Montana. The contract involves the construction of a 3,400-acre reservoir that will store an additional 16.5 billion gallons of water from the C-44 basin.

"Awarding the C-44 reservoir contract demonstrates federal dollars at work to deliver much-needed water storage to this precious ecosystem," said Col. Jason Kirk, Jacksonville District commander. "In terms of cost, this $197 million construction contract is the largest single contract award for the Jacksonville District, and Corps-wide, is the second largest contract award for a project this past year."

Ceremony participants also included Florida Department of Environmental Protection Secretary Jon Steverson, Interior Department Principal Deputy Assistant Secretary for Fish and Wildlife and Parks Michael Bean, U.S. Congressman Patrick Murphy, State Senator Joe Negron, SFWMD Governing Board Vice-Chair Kevin Powers, and Martin County Commissioner Anne Scott.

"Florida remains steadfast in its commitment to restore and protect the Everglades ecosystem, and we are proud to be a vital partner in this important project," Steverson said. "Thanks to the support of Governor Rick Scott and the Florida Legislature, I look forward to completing this reservoir and moving forward with other projects to help protect this crucial natural resource."

In an effort to construct the project as expeditiously as possible, the SFWMD awarded construction contracts for the discharge canal, pump station and STA. The shared efforts on construction contracts will reduce the time needed to fully construct the project by at least two years.

"As a Florida native and a longtime resident of the Treasure Coast, I am proud of the state's significant contribution and the continued endeavors of the South Florida Water Management District in building this project," Powers said. "The C-44 project will be one of the greatest steps forward in a generation for the quality of the water in the St. Lucie Estuary and the quality of life for all its residents, people and wildlife."

Construction of the C-44 Reservoir and STA is scheduled to be complete in 2020. Upon construction completion, up to two years of operational testing will occur.

Once all work is complete, the project will capture local runoff from the C-44 basin, reducing average nutrient loads and improving salinity in the St. Lucie Estuary and the southern portion of the Indian River Lagoon. It will provide, in total, 60,500 acre-feet of new water storage (50,600 acre-feet in the reservoir and 9,900 acre-feet in the STAs) and 3,600 acres of new wetlands.

The Indian River Lagoon is the most biologically diverse estuarine system in the continental U.S. and is home to more than 3,000 species of plants and animals.

Additional information on the C-44 Reservoir and STA is available online at http://bit.ly/C-44_CERP.

A levee at Sears Point in Sonoma County, California, is breached as part of a project to restore wetlands and protect the San Francisco Bay area against anticipated sea level rise. The largest private environmental project in the Bay Area was authorized by the U.S. Army Corps of Engineers' San Francisco District under terms of the Clean Water Act. (Photo by Sahrye Cohen)

Bay area environmental restoration reaches milestone

By Nicholas Simeone
U.S. Army Corps of Engineers San Francisco District

The largest private environmental restoration project in the Bay Area — authorized by the U.S. Army Corps of Engineers two years ago — reached a major milestone in October with a levee breaching that will allow the San Francisco Bay to expand northward, restoring marshland and wildlife while also providing protection against sea level rise.

As several hundred people looked on Oct. 25, an earth mover toppled a levee at the Sears Point Restoration Project in southern Sonoma County, California, allowing water from the San Pablo Bay to begin pouring in and filling marshland, a key chapter in a years-long Sonoma Land Trust project intended to restore nearly 1,000 acres of tidal wetlands.

The breaching of the levee, which effectively connected the basin to the San Francisco Bay, is seen as key to protecting low-lying areas against anticipated sea level rise.

"The major benefit everyone is talking about is that it is providing additional tidal wetlands for when sea level rise occurs," said Sahrye Cohen, a San Francisco District regulatory project manager who has overseen the project.

"It will be a buffer in the bay, creating more tidal marsh habitat to account for the fact that we know that we are going to lose more down the line," she said, because of rising oceans. Some experts are predicting California sea levels could rise by as much as 3 feet during the next 50 years.

The U.S. Fish and Wildlife Service is the lead federal agency on the project, but under The Clean Water Act the Corps of Engineers is required to approve dredging involved in tidal marsh and wetland restoration. With the breaching of a levee that had been in place for more than a century, what had been largely mud is now expected to be transformed into a revitalized habitat for vegetation and wildlife.

"Had this not been done, 20 years down the road there'd be less tidal marsh in the bay, there'd be less habitat, there'd be less flood protection," Cohen said. "They protect all of the development that's behind the marsh so we're creating more of that buffer."

Balancing military training, environmental stewardship missions in Massachusetts

Story and photo by Bob Reinert
U.S. Army Garrison Natick, Massachusetts

Think about training Soldiers, and protecting the environment probably doesn't immediately come to mind.

Yet, finding a way to balance the two needs consumes each and every workday for Ben Amos, the Integrated Training Area Management, or ITAM, coordinator on Fort Devens, who is just as comfortable discussing how to thin a forest to accommodate land navigation training as he is talking about the nesting habits of the Grasshopper Sparrow.

"That's part of the balance that is desired … here, to make sure training will occur while environmental considerations are given as much [weight] as possible," Amos said. "It's a lot of fun. There's certainly never not enough to do."

A federal regulation — the Sikes Act of 1960 — provides for the protection and enhancement of wildlife and natural resources on military lands and led to the Army's Sustainable Range Program. As Fort Devens Range Control Officer Keith Jackson will tell you, it can get a little tricky.

"We really want to make sure the Soldiers get the best training," Jackson said. "Somehow, we have to balance this. That's where Ben's job is the hardest."

Consider the Turner Drop Zone on Fort Devens, which most people view as an area to conduct air operations. Amos has to take a different perspective on the site.

"I see it from an environmental perspective as a rare upland meadow," Amos said. "This being cleared, it's a unique environment."

That environment is favored by the Grasshopper Sparrow.

Ben Amos, the Integrated Training Area Management coordinator for Fort Devens, Massachusetts, points out damage invasive species have done to trees at the range complex.

"It and other birds that will use grasslands for nesting, they'll be nesting on the ground during … certain times of year," Amos said. "Part of our job … is to make sure that they're allowed to without either training or maintenance … impacting their life cycle.

"We mow the drop zone twice a year, and there's a certain … time when it can't occur. One of the goals is to leave it alone as much as possible while still allowing for use as training."

In another part of the 5,000-acre range complex on Fort Devens' South Post, Blanding's Turtles cross over from the nearby Oxbow National Wildlife Refuge to lay their eggs in the sandy soil at the range complex before returning to the refuge. To facilitate their movement, a road is sometimes closed and range users are alerted to the turtles' presence.

"Part of the ITAM program is Sustainable Range Awareness," he said.

Amos must be aware of more than just wildlife on Fort Devens. Invasive species are among his greatest concerns.

"The [Oriental] bittersweet is my personal arch-enemy, mostly because it's everywhere," Amos said. "It's a very rapidly growing vine that chokes out trees. It spreads like wildfire.

"Not only are you going to begin losing trees, which impacts the habitat, but you have dead trees falling into landing zones, dead branches falling onto people trying to train, and just basic maneuver impacts. You couldn't drive through it if you wanted to."

Amos said that mechanical clearing and spot herbicide application are used to battle the infestation.

"When you have a serious, problematic area like this, it will spread out," Amos said. "It's a multi-year process. We'll keep monitoring it for the years to come.

"The invasive species is the biggest threat to this and any other training area, or any other facility, in my opinion."

If you lose trees, erosion follows, he explained.

"And then you're losing land," Amos said. "Again, your ability to train and maintain the training with good stewardship is greatly reduced."

When he's not worrying about wildlife and invasive species, Amos is maintaining forests, maneuver trails and wetlands so Fort Devens' ranges remain viable for training and environmentally sound.

The forest lands undergo "rotational shaping" in which 75-acre parcels are thinned out every five years for the safety of troops using them.

"It's basically going in and clearing the dead stuff," Amos said. "One of the goals for training is to maintain safe passage for troops, both day and night, as they maneuver through the forest."

Maneuver trail maintenance can be just as important. Rutted trails lead to erosion and further loss of land.

"If they weren't maintained, if they weren't evaluated regularly, the trails may become impassable. All of a sudden, you have training lands that aren't being used."

Amos also keeps an eye on the range complex's many types of wetlands.

"The rule of thumb is that nothing occurs within 100 feet of a wetland," Amos said. "We are responsible for maintaining and protecting wetlands, regardless of the definition."

To help maintain the wetlands and maneuver trails, old corrugated steel culverts are being replaced with reinforced concrete culverts that encourage the flow of water and help fish and amphibians navigate between breeding and feeding areas.

"Culvert maintenance is another very big part of maintaining wetlands and streams and making sure that the required training areas, the required maneuver trails like this, won't impact the stream health," Amos said. "Again, it's a stewardship consideration."

For a big-picture look at what's happening on the range complex, Amos relies on ITAM's Geographic Information Systems, a highly accurate satellite view that can show changes over time. As an example, Amos used a hypothetical pair of landing zones, one of which never needs revegetation work and another that needs constant attention, regardless of usage.

"Well, then you know you have some other problem," said Amos, "some other erosion problem that needs to be addressed."

Twice a year, Amos will travel the entire range complex to identify possible problems.

"Any time you notice a situation, [you] put that on the menu to repair it," he said.

The goal is to provide the best training areas possible for future generations of American warfighters.

"We want … Fort Devens to be available for training," Amos said. "As long as it's needed or desired, it needs to be available and maintained for that purpose."

Crews distribute newly dredged sand along the Galveston Island shore as part of a beach renourishment project. The project used about 725,000 cubic yards of sand dredged from the Galveston Ship Channel to create 20 additional blocks of beach along the island's seawall. The $23 million project was a collaborative effort sponsored by the Galveston Park Board, City of Galveston and the Texas General Land Office. Galveston District, which dredges the ship channel every 18 to 24 months, placed the material on the beach in lieu of offshore. (Courtesy photo)

District completes Galveston beach expansion

U.S. Army Corps of Engineers Galveston District

Galveston District reopened sections of Galveston Beach Nov. 20 following a major beach expansion and the largest sand nourishment project to take place on the Texas Gulf Coast this summer.

The project, which began in August, used about 725,000 cubic yards of sand dredged from the Galveston Ship Channel to create 20 blocks of additional beach along the Galveston seawall between 61st and 81st streets.

"This is the single largest volume of sand ever placed on Galveston's beaches," said Park Board Executive Director Kelly de Schaun. "This project is part of a long-term strategy to build public beaches, protect community assets from storm surges and increase property values on the island."

The $23-million-project was a collaborative effort sponsored by the Galveston Park Board, City of Galveston and the Texas General Land Office. The U.S. Army Corps of Engineers Galveston District, which routinely dredges the ship channel every 18 to 24 months, placed dredged material on the beach in lieu of offshore.

"The USACE Galveston District is excited to partner with the Galveston Park Board of Trustees and Texas General Land Office in order to carry out a dredging project that will benefit channel users and Galveston residents," said Tricia Campbell, an operations manager with the Galveston District. "While undertaking its mission of keeping America's waterways navigable, the Corps is able to turn that into an added benefit for the community by placing dredged material (sand) on the Galveston Beach for tourists and residents to enjoy. This beneficial use project allows the Corps to work with a cost-sharing sponsor to place dredged material along the coastline."

"This project is a great example of what can happen when city, state and federal governments work together to accomplish a common objective," said Texas Land Commissioner George P. Bush. "Dredged material is not only a cost-effective way to renourish a beach, it will help boost Galveston's tourism and protect the seawall."

For more information on Galveston's beaches, visit www.galvestonparkboard.org.

Fort Drum wildlife biology team conducting fox research study

Story and photo by Melody Everly
Fort Drum, New York

A team of wildlife biologists from Fort Drum is tracking the movements and habits of wild canine species in the cantonment area. The study, intended to gather information about the concentration of coyotes living within the confines of the Fort Drum cantonment area, shifted gears when trapping showed a different trend.

"We found that we weren't catching any coyotes, but we were catching lots of red foxes," said Miranda Monica, Fort Drum Public Works Environmental Division wildlife biologist. "Yes, we wanted to catch coyotes, but at the same time, I can now say that cantonment has lots of foxes but it does not have a lot of coyotes."

There are many reasons for this, Monica said. The diets of coyotes and red foxes are very similar, she noted. In addition, coyotes and foxes establish their own home range and they do not like to share their home area with other canines.

"Red foxes — specifically — and coyotes do not mix," she said. "If you find a red fox in the area, you can almost guarantee you won't find a coyote unless the fox is just passing through."

A major benefit of the shift from a coyote study to a research project focused on red foxes is that the sightings of the species were becoming more frequent, and some community members had expressed concern over their proximity to more developed areas of post. Although these foxes are being observed in close proximity to housing and workplaces, they are still seeking out wooded areas, Monica said.

To obtain more information about the animals' movements and habits, Monica and her team tagged and collared 10 foxes — including one gray fox. The collars record information about the movements and home ranges of these canines.

The team was able to expand its knowledge base when Low Chee Pheng, a Fulbright scholar and graduate student at the State University of New York School of Environmental Science and Forestry (SUNY ESF) began a research project in conjunction with Fort Drum's wildlife biology team.

Jacqueline Frair, associate professor at SUNY ESF and assistant director of the Roosevelt Wildlife Station, has also been studying coyotes since she first came to the university nine years ago. Their work, which is focused on tracking the coyote species within post training areas, has expanded the scope of the post study.

Miranda Monica, Fort Drum wildlife biologist, uses a Yagi directional antenna to locate one of the foxes being tracked in a current fox research study in the cantonment area.

Monica said Chee Pheng's research has been very useful to the Fort Drum team.

"She is helping us to see if we can get a rough estimate of what our populations of foxes and coyotes are. From the track plots (sandy areas used to obtain canine footprints), [her] trail cameras and also the collars, we can get a more inclusive look at the population density," Monica said.

This information will be valuable as the Environmental Division makes management decisions.

Frair said the study has been mutually beneficial. Chee Feng's research can provide vital information to the team at Fort Drum, while giving her an opportunity to learn about how wildlife management is conducted in different world regions.

"She has worked as a professional in Malaysia with the Wildlife Conservation Society for a number of years," Frair said. "Being able to interact with North American wildlife managers and really learn our culture and how we manage populations is tremendous in helping to increase her breadth of knowledge so she can take that back with her."

Depot partnerships key to protecting Kentucky's natural resources

Story and photo by Nathan White
Blue Grass Army Depot, Kentucky

Blue Grass Army Depot's (BGAD) prime commitment is supporting joint warfighters — making sure they have the right ammunition, at the right place and at the right time. But the BGAD leadership and workforce are also committed to setting high standards of natural and cultural resource stewardship.

Partnerships

Partnerships cultivated during the past 15 years assist the Richmond, Kentucky, installation in maintaining excellence in wildlife management, as well as protecting endangered species. This shared commitment and partnering philosophy were key factors in BGAD's natural and cultural resource program receiving several recognitions, including the 2009 Army Materiel Command (AMC) award for cultural resource management, and the 2014 AMC award for natural resource conservation. In addition, BGAD has been recognized as a model for its successful efforts in expanding its quail population. BGAD is the sole quail focus area on federal land in Kentucky.

Besides the shared knowledge and expertise brought by these partnerships, there also is a budgetary benefit. Today's budget restrictions mean more strict resource management.

The cooperative and long-term partnerships BGAD has are critical to maintaining, improving and protecting its diverse natural resources, including white-tailed deer, wild turkey, migratory birds, bobwhite quail, bobcats, native warm-season grasses and numerous other native tree and plant species. Support agreements between BGAD, the Kentucky Department of Fish and Wildlife Resources (KDFWR) and Eastern Kentucky University (EKU), along with research projects conducted by University of Tennessee (UT), combine to provide invaluable low-to-no-cost research to the installation's natural resource program.

BGAD's most important partnership is with KDFWR. KDFWR biologists manage more than 800 acres for wildlife and native plants, and also support hunt programs, agriculture/grazing, forestry, and other projects. In return, BGAD provides partial salary, office space and vehicle fuel.

Like previous BGAD commanders, Col. Lee Hudson is involved and understands the imperative of passing on a healthy and rich ecosystem to future generations and the subsequent need for a robust natural resource program to ensure success.

"Federal land is public land," Hudson said. "We who work here on BGAD are entrusted as stewards of BGAD's lands and natural resources. Perhaps someday the 15,000 acres that are now BGAD may be returned to the citizens of Madison County and the state of Kentucky for hunting, farming and housing. But if or until that time comes, it is our obligation and duty to ensure BGAD's natural resources and wildlife are maintained in the same or better condition."

Hunting

Another particularly effective natural resource management tool is the BGAD hunting program, and again, support is key. The BGAD quality deer management program has been recognized by Kentucky as one of the most effective in the state. Year-round hunts help maintain healthy herd levels, as well as maintain Sikes Act obligations to provide public hunting on federal lands.

Wounded Warrior hunts, usually conducted for Soldiers from the Fort Knox and Fort Campbell Warrior Transition Battalions, are supported by BGAD volunteers, as well as generous donations of time, money and material from Ducks Unlimited and the National Wild Turkey Federation. Youth and adult hunts are supported by BGAD volunteer guides, as well as KDFWR and biology students from EKU. BGAD partners help ensure the hunt program is run at no cost to the installation.

Endangered species

BGAD'S endangered species include running buffalo clover, along with the Indiana bat and gray bat. Through an agreement with EKU, research is ongoing on how best to protect and enhance numbers of these species. The cooperation between BGAD, EKU, KDFWR and the U.S. Fish and Wildlife Service on Integrated Natural Resource Management Plans and Endangered Species Management Plans has been and continues to be a great success. As before, contributions from partners (KDFWR, EKU) greatly reduce the cost of Endangered Species Act compliance.

Agricultural leases

Nearly 9,000 acres of the installation are leased to private farmers for cattle grazing and hay mowing. These leases, bid on a competitive basis, earn the installation approximately $45,000 per year in rents. But the real success comes from the cost avoidance related to mowing. Lessees are required to mow road rights-of-way, ordnance storage igloos, fence lines and clear zones, resulting in an estimated annual cost of avoidance of $500,000. BGAD also relies on the Madison County Agricultural Extension Office to assist in developing and maintaining best management practices for the BGAD agricultural program.

Marcia Schroder of Kentucky Department of Fish and Wildlife Resources (KDFWR) harvests Indian Grass at Blue Grass Army Depot with a harvester on loan from Roundstone Native Seed Company. Cooperation with KDFWR, agricultural lessees on the installation, University of Tennessee, Knoxville and other organizations support planting, prescribed burn maintenance and seed harvesting operations. In addition, lessees and local farmers participate in ongoing research on potential benefits of native warm-season grasses as livestock fodder.

Forestry

The forestry program at BGAD is critical to water quality; hardwoods are planted along stream bottoms to increase filtration zones, which has led to a drop in fecal coliform levels. Thanks to the forestry program, installation drainage and the fecal coliform levels are lower when they leave the depot. Depot hardwoods, particularly oak and walnut, provide forage and habitat for wildlife, as well as a long-term investment for the installation in the form of potential timber sales. In the early 1900s, the American Chestnut tree was nearly wiped out by blight. BGAD and KDFWR, along with major support from The American Chestnut Cooperators Foundation and Kentucky Nut Growers Chestnut Committee, recently planted a test plot of blight resistant hybrids. This project may help restore this important source of timber and forage to the Eastern Woodlands.

Archeology

There are 182 recorded archaeological sites on the installation, reflecting the entire human history of the central Kentucky region, from the arrival of Paleo-Indian hunter-gatherers more than 12,000 years ago, to the circular villages of the Fort Ancient culture that flourished between 1000 and 1700, to the arrival of European and African-American settlers after 1770.

Native grasses

The depot's native warm-season grass program intersects with wildlife, agriculture and forestry programs.

Using native ecotype seed harvested from native prairie remnants on the installation, BGAD has restored more than 1,200 acres to native grasses, providing natural habitat for bobwhite quail, migratory songbirds and other species of concern. And once again, outside partners are ready to help on a no-cost basis. Research on native warm-season grasses as grazing fodder is supported by UT Knoxville, KDFWR and EKU.

Civil War history

In August 1862, Confederate forces engaged Union forces south of Richmond. A portion of the battlefield, listed on the National Register of Historic Places, falls within the depot fence line. Community partnerships with the Madison County Historical Society and the Battle of Richmond Association have been instrumental in raising the profile of the BGAD cultural resource management program. The Battle of Richmond Visitors Center, housed in the former BGAD Quarters 29, was donated to the Madison County Fiscal Court by the Army for use as a museum and interpretive center. A major cooperative effort with Department of Defense Legacy Resource Management Program/National Public Lands Day Foundation resulted in the creation of a nature/historical interpretive trail around BGAD's Lake Buck, which falls within the Battle of Richmond Battlefield.

Fort Leonard Wood deconstruction pilot project a success

By Amy Newcomb
U.S. Army Corps of Engineers
Engineering and Support Center, Huntsville

The U.S. Army Engineering and Support Center, Huntsville Facilities Reduction Program (FRP), in coordination with Kansas City District, recently finalized a deconstruction pilot project at Fort Leonard Wood, Missouri.

The project, awarded in September 2014, cost less than $800,000 — $10.31 per square foot — and entailed the salvage and reuse of materials from three World War II-era buildings.

During straight demolition a building is quickly and efficiently torn down, usually with large mechanical devices like excavators, with the main goals being cost reduction and material diversion.

"We reduce real property footprint at minimal cost and divert as much of the material from the removed building as possible to other financially viable uses — reuse or recycling — in lieu of sending it all to a landfill," said Dave Shockley, Facilities Division branch chief in Huntsville, Alabama. "The FRP is meeting or exceeding the 60 percent diversion standard using the demolition approach."

However, FRP is always exploring better ways and means of getting the job done, Shockley said.

"Experience is a great teacher," he said. "We realize there are situations where the way we've always done it may have been good enough, but we are not willing to just rest on past success when we have the ability to learn more and make it better.

"Deconstruction is one of those valuable nuances in the demolition arena that may allow us to increase our diversion percentages without significant cost in time or dollars," Shockley said.

Engineer Construction Bulletin (ECB) 2015-19: Deconstruction, Diversion, & Disposal of Debris, states "deconstructing buildings and structures to recover materials can significantly reduce demolition waste." The ECB also says project personnel have to be realistic when assessing a building for deconstruction because they can't all be deconstructed within the Army's cost and schedule parameters.

When deconstructing a building, a contractor removes the greatest amount of materials, components and products that are intact and suitable for reuse or recycle. When material is reused, it is used for its intended purpose. For example, a door or window would be used as a door or a window.

However, when an item is recycled, it can be broken down and used for something else. While recycling diverts material from landfill, it still requires energy to be transported and processed, and if it can't be recycled then it incurs disposal costs.

The Fort Leonard Wood buildings provided a situation for deconstruction that also supported the installation's Strategic Sustainability Plan, said Bryan Parker, Directorate of Public Works (DPW) chief of planning.

In 2010, Parker went to Joint Base Lewis-McChord (JBLM), Washington, as the Fort Leonard Wood DPW master planner to discuss sustainability and find new ways for Fort Leonard Wood to accomplish its mission without wasting water, land or fuel.

"Some of the people I had talked to were in the solid waste arena and they were talking about how they had just completed a project where they had deconstructed some old wood barracks and recovered the timber," Parker said.

Parker used JBLM's deconstruction method as a baseline for the World War II-era buildings project — a laundry, warehouse and chapel.

First, the buildings had to be evaluated.

When evaluating a building for deconstruction, engineers must consider the type of construction, contents and condition and their suitability for reuse, as well as the project itself, project schedule, and markets and industry capabilities.

Driving this process is exactly what former Research Architect Tom Napier, Construction Engineering Research Laboratory, did with the Fort Leonard Wood buildings.

"My role was to help support Fort Leonard Wood with the expectation that this project would be completed in parallel with the other sustainability demonstrations, and we would have a result and conclusion for the material salvage and reuse along with water quality and energy," Napier said.

Several things Napier said he looked at included the nature of the materials, which were mainly dimensional lumber, and whether there was a market for them.

Because there was a market for the lumber, deconstruction became even more feasible and work on the project began. But, after the project was underway, it hit a snag; the warehouse became unstable during deconstruction efforts because of excessive rotting of the wooden structure. Due to the increase in risk to contractor employees working inside and around the building, the decision was made to stop deconstruction and demolish the building.

LEFT: Bhate employees work to deconstruct a chapel — one of three World War II era buildings selected for the deconstruction pilot program — on Fort Leonard Wood, Missouri. BELOW: Deconstruction of the chapel began Sept. 16, with major deconstruction completed by Oct. 7. Once the building was removed, the contractors backfilled and seeded the lot. Overall, 252 tons, almost 85 percent of the material collected from the chapel was recycled or reused. (Courtesy photos)

However, while the building survived only a portion of the deconstruction effort, not all was lost. Bhate, the contractor, was still able to reuse or recycle 297 tons of material, diverting more than 63 percent from landfill.

The two buildings left — the chapel and laundry — proved even more successful. From the chapel, more than 250 tons of material was reused or recycled with almost 85 percent diversion, and nearly 700 tons of material was reused or recycled from the laundry with a 73 percent diversion rate.

Overall, the three buildings totaled 1,717 tons of material of which 1,246 tons was reused or recycled, making the project a successful venture.

Students learn river management is dam challenging

Story and photo by Eileen Williamson
U.S. Army Corps of Engineers Omaha District

The job is challenging. It's fall and you're in charge of scheduling water releases from two dams along an inland waterway. Along the river and in the reservoirs upstream from the dams, you have communities depending on the water for everyday life. The river and reservoirs are a source for drinking water, irrigation, fishing, boating, camping and attracting and sustaining wildlife.

Communities grew with farmers who found rich fertile soil and access to commerce through the rivers. Dams generate power for the communities along the river and the river supplies water for various industries. Dams help these communities by minimizing the damages caused by frequent flooding during spring thaws.

The river begins in the mountains where snowfall and snowmelt can be affected by warm or cool spring temperatures. If temperatures are warm, early spring rainfall can accelerate snowmelt and if temperatures are cool, snowmelt may be delayed or if snow accumulates into early summer, runoff could be delayed and extend later into the summer.

In 2013, the U.S. Army Corps of Engineers' Omaha District Leadership Development Class developed a video game that invites players to plan and make releases from two inland waterway dams.

The Omaha District, with class members as project managers, awarded a contract to the U.S. Army Game Design studio to design the game.

The game was beta tested by U.S. Army Corps of Engineers employees across the country as well as in fourth- and fifth-grade classrooms in Bellevue and La Vista, Nebraska.

"The hardest ones to keep green are ones where water is needed," said one student game tester. "If it's too high, you can let water out. But you can't control the weather or make more water."

Students, who beta tested the River Basin Balancer Game in early 2015, reported that sometimes it's not fair because the game doesn't let you control the weather, and you can't get water when there isn't any rain.

Another student said, "I just tried to keeps things green and hope they were red from too much water instead of not enough."

"Watching the students play the game, hearing their frustration when weather doesn't cooperate with their goals, and seeing them learn the challenge of balancing the authorized purposes was the grand finale for developing the game," said Michelle Schultz, the game's project manager.

The game allows players to take charge of river operations and experience the unique challenges presented when managing reservoir operations in a variety of weather conditions across a geographically diverse basin. Like the real world, the weather forecast isn't always accurate, presenting an additional challenge.

"The game's features were created just for the game and don't replicate any places, conditions or events, but hopefully will give the public a glimpse of the challenges water managers face," Schultz said.

The game is based on the authorized purposes for which the U.S. Army Corps of Engineers operates its many dams. Although navigation is a purpose in the game, these dams do not have locks to support barge traffic along the length of the river. The game features 14 items that are affected by release decisions. The items include: flood control with two towns, one with a levee surrounding it that can be affected by high water levels; navigation with a barge on the lower reach of the river; water quality, supply, and irrigation with two intake structures, a water treatment plant, and a farm; hydropower at each dam; fish and wildlife with a bird nesting location; and recreation including boat ramps, campgrounds, and playgrounds.

Like all USACE water managers, the goal for players is to achieve the maximum multi-purpose benefits for which the reservoirs are operated.

"The game doesn't just teach about water or the river management," said one of the teachers who hosted the game's beta test in her classroom. "It includes history, relationships, cause and effect, and even social studies because of the laws that determine how the dams are operated. We hope to include it in our classroom activities," she added.

CLASSROOM RESOURCES

Surf Your Watershed

Everyone lives in a watershed — the area that drains to a common waterway, such as a stream, lake, estuary, wetland, aquifer or even the ocean — and individual actions can have a direct impact on it. The Environmental Protection Agency's Surf Your Watershed site is a tool to locate and learn more about watersheds and citizen-based groups working to monitor and protect water quality in the area.

http://cfpub.epa.gov/surf/locate/index.cfm

Streamer

Explore the nation's major streams by tracing upstream to their source or downstream to where they empty. In addition to making maps, it creates reports about stream traces and the places they pass through.

http://nationalmap.gov/streamer/webApp/streamer.html

USGS Surface Water Information

Science to observe, analyze and understand the movement and condition of surface water.

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Pollinator Plan . . .

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and projects have already begun working with Texas Parks and Wildlife and the federal Fish and Wildlife Service to identify additional opportunities for Monarchs and other native pollinators. Granger Lake in Fort Worth District has already established a program to expand relic native prairies and protect genetic stock that will allow for future establishment of more resilient native prairie habitat for pollinators.

On the north end of the corridor, activities are occurring as well. In early August staff and volunteers from the Corps of Engineers, the Fish and Wildlife Service and Friends of Neal Smith National Wildlife Refuge planted approximately 400 milkweed plugs in lake area prairies at the Lake Red Rock Visitor Center garden, near Marion County, Iowa, and at the playscape natural play area.

Rock Island District personnel have been promoting native pollinators at Saylorville Lake, near Johnston, Iowa, since the 1980s by planting diverse prairies, doing road ditch conversions to native plants and maintaining an active butterfly garden. In 2015, the district ramped up efforts to improve habitat for the Monarch butterfly population after seeing dramatic declines in the population. Once one of the lake's most common local butterflies, Monarch numbers have plummeted, prompting the district to initiate several new projects to bring the populations up once again.

Among the first things the district did was learn more about pollinators and Monarch-specific initiatives available for federal agencies and then begin partnering with others who shared the same interests, resulting in three specific initiatives — partnering with the Iowa Department of Transportation to coordinate the refurbishment of Highway 415 as a Corps of Engineers constructed recreational access highway and seeded it with a diverse mix of Iowa tall grass prairies species highly attractive to butterflies and other pollinators; partnering with Northern Natural Gas to restore areas along natural gas lines crossing federal lands with native plants; and participating in the I-35 Corridor project to support the Monarch Joint Venture since Saylorville Lake is part of the historic fall migration route for the butterflies.

The Saylorville Lake staff also is participating in a monitoring program for Monarch butterflies through a partnership with the staff from the Neal Smith National Wildlife Refuge. More than 800 native seedlings were planted to attract Monarchs and other pollinators as well as two public demonstration beds in the Prairie Flower Campground to help raise public awareness of the pollinator plight.

At Carlyle Lake in Illinois, St. Louis District personnel partnered with the Illinois Department of Natural Resources to host "Bring Back the Monarchs," which attracted more than 150 volunteers to plant milkweed and wildflowers that will provide food, cover and host plants for the Monarchs to plant their eggs. Events such as this are helping to bring more public attention to the Monarchs' decline, something the lake staff has noticed for several years.

These are just a few of the examples of the great work being done by the Natural Resources Management staff at Corps of Engineers projects to improve pollinators, whether they be honey bees or Monarch butterflies, and their habitat.

"It is very exciting for the Corps of Engineers to be proactive in this national initiative along with all the major Federal Land Management agencies. The pollinator initiative illustrates the great value the Corps of Engineers lands and waters contribute to our nation," said Jeff Krause, Headquarters program manager for environmental stewardship.

The combined efforts of all agencies, non-profits and the public will ensure that the economic, ecological and social benefits provided by pollinators will be there for future generations.

Insulation . . . . . .

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Ridge National Laboratory and NanoPore Inc. on this project.

The MAI panels were installed on the exterior side of the walls of the test building and then covered with metal siding by a crew from Fort Drum Public Works' Carpentry and Electrical Shop.

"The two buildings being used for this project are both identical in features, size, construction, age and type of equipment, so we can monitor the energy use of both the test and baseline building," said Steve Rowley, Fort Drum Energy Branch manager.

An exterior retrofit allows for easier access and installation, with minimal disturbance to the interior of the building. It required a certain amount of caution not to damage the vacuum-sealed panels as they were attached to the walls.

"If the panels were punctured it would lose its vacuum, which provides a lot of the R-value," Patel said.

Fort Drum Public Works Energy Branch Manager Steve Rowley and Tapan Patel, the Construction Engineering Research Laboratory project manager, handle a panel of the high-performance Modified Atmosphere Insulation.

R-value is how insulating material is rated for thermal resistance — the higher the number, the greater the effectiveness.

"The use of MAI can significantly increase the thermal resistance of walls with a marginal increase in wall thickness, making it an ideal candidate for retrofit installation," Patel said.

The modified atmosphere insulation has an R-rating of 38 per inch, while the original wall material measured an R-19 value with six inches of fiberglass. Every inch of the MAI is equivalent to 17 inches of the fiberglass insulation. "And that's why we call this super insulation," Rowley said.

"Which is also one of the reasons why you can easily install this to the outside of the building," Patel added. "Imagine if we had to extend the building 17 inches all the way around."

The test and control buildings will be monitored for a year to cover the range of heating and cooling conditions for side-by-side comparisons. Temperature, heat flux and humidity sensors and instrumentation were installed in July, and they will be remotely monitored from the Oak Ridge National Laboratory in Tennessee. The team also conducted preliminary blower door tests to determine the air tightness of the building and infrared scanning that will show any thermal defects in the panels.

"We'll come back in late February or March to do the IR imaging again," Patel said. "There may be variables outside our control that could cause the panels to fail through the course of the winter."

The project is funded by the DOD's Environmental Security Technology Certification Program in Alexandria, Virginia. Travis Michaelke, an Environmental Security Technology Certification Program representative, was on site during the installation.

"I think this is a fantastic technology," he said. "It's fairly benign and essentially passive to where, once it's installed, there's really no operational maintenance required. The technology is really a step change, because the insulation is only an inch thick but you're getting so much more out of this than what is inside the building already."

While they continue to collect data and develop a test plan in the next several months, Patel said they will also conduct outreach activities to share knowledge of this technology across the DOD.

"One way of doing this is by presenting our work at conferences," Patel said. "Once we have some data and we are able to draw conclusions, we'll present our work in front of other engineers."

Rowley said there is a long history of Fort Drum supporting DOD research, and he cited a water mapping project and a corrosion study as two examples.

He said this research "has the potential to make a lot of difference. The better insulation you have, the smaller the heating system and the less fuel you need to use. So you're better off putting your money into better insulation than bigger heaters."