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The Corps Environment

American icon rescued from brink of extinction

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Environmental Operating Principle #4

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

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Environment

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

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

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ENVIROPOINTS

Protecting, preserving and restoring the environment

By Col. Alicia M. Masson
Commander
U.S. Army Environmental Command

The U.S. Army Environmental Command's vision to provide premier environmental solutions for our Army and our nation is a central tenet of our purpose to support Army readiness while protecting and preserving the natural environment.

Historically, USAEC's most labor intense mission has been environmental restoration of active, reserve and non-BRAC excess Army installations. Just over 48 years ago, we began our cleanup mission and in 1986, 12,699 sites were identified for remediation.

Today, we are down to less than 1,200 sites still to complete. While we've had great success so far, some of the toughest cleanup projects still remain. Add to that emerging cleanup requirements such as per- and polyfluoroalkyl substances (PFAS), and we have our work cut out for us in the future.

Three years ago we launched a massive effort to identify and clean up lands affected by the Army's historical use of firefighting foam containing PFAS. USAEC manages cleanup at 94 active installations, one Army Reserve location, 12 excess installations where property has been or is being transferred to other government and non-governmental organizations, and Kwajalein Atoll.

The PFAS cleanup currently includes 14 Preliminary Assessments, 78 Site Inspections, and three Remedial Investigations ongoing at Army installations, not counting PFAS activities at installations in Germany. So far we have 13 installations that require no further action.

Restoration of Army lands is an important mission, not only for USAEC, but also for the U.S. Army Corps of Engineers, the National Guard and our partners in the Navy and Air Force. It ensures service members have a safe environment to train, work and live, and also ensures land is available for future uses such as modernization, stationing, training, construction projects, or whatever our nation needs to support readiness requirements.

I would be remiss if I did not mention Earth Day. Last year we celebrated 50 years of Earth Day on April 22, as usual, but our celebration was much less robust than planned because of the ongoing COVID-19 response.

Likewise, this year our celebration of Earth Day was low-key. But still we celebrated where and when we could across the Army. The theme for this year's Army Earth Day was Restore the Earth, and as I've mentioned, we've come a long way since our organization was born.

The USAEC staff was not able to host our annual Nature Field Trip this year with our partners, the Fort Sam Houston Elementary School; however, we distributed Earth books, and bookmarks highlighting various threatened and endangered species to Army installations around the world.

In addition to our team's work to restore the land at Army installations, we have staff experts in a variety of areas including entomology, toxicology, archaeology, biology, chemistry, physics, and all types of engineers working every day to protect and preserve the environment.

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Col. Alicia M. Masson
Commander
U.S. Army Environmental Command

ENVIROPOINTS

They help commanders' efforts to protect threatened and endangered species such as the red-cockaded woodpecker and gopher tortoise, cultural resources such as petroglyphs at military training areas, and historic buildings at Army posts, camps, ammunition plants, arsenals and depots.

The USAEC staff of experts advises installation staffs and commanders on compliance with environmental laws and regulations, assists with technology acquisition for Army modernization, and conducts programmatic environmental assessments and impact statements in keeping with the National Environmental Policy Act.

All of our environmental efforts and those of our Army partners combine to support the Army Environmental Program with oversight and guidance from the Army's Deputy Chief of Staff, G-9 and the Office of the Assistant Secretary of the Army for Installations, Energy and Environment.

The Army Environmental Program encompasses 170 Army sites on 13.6 million acres of land protecting and preserving 1.3 million acres of wetlands, 266 endangered and threated species, 84,637 archeological sites, 53,820 buildings subject to the National Historic Preservation Act, and 130 Native American Sacred Sites.

Our mission is vital to the success of our Army and our nation, and we are humbled to be so entrusted by the American people. To that trust we remain faithful and loyal members of the Army environmental enterprise team, enabling Army operations while protecting Soldiers, civilian employees and Army Families.

The past year has been tough for America, but our support to the Army Environmental Program has been strong and our dedication to Soldier and installation readiness has remained steadfast. Things are looking up. This year will be good. Next year will be even better.

Environmental Operating Principles

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

Learn more about the EOPs at:

www.usace.army.mil/Environmental-Operating-Principles

(Photo by Pfc. Vincent Levelev)

Soldiers conduct react-to-contact maneuvers during a rotation through Fort Polk, Louisiana. Training such as this is enabled because of the post's sustainability practices and principles that enhance training opportunities and ensure long-term availability of training areas.

Fort Polk's sustainability program supports Army readiness

By Lori Hogan
U.S. Army Environmental Command

Surrounded by dense woodlands in west-central Louisiana, Fort Polk encompasses 240,000 acres of land and is home to the Joint Readiness Training Center.

The installation includes one brigade combat team and four deployable combat battalions, with additional support units and organizations.

Approximately 44,000 Soldiers, civilians, and family members live and work at JRTC and Fort Polk.

Fort Polk's Sustainability Program focuses on enhancing training opportunities and ensuring long-term availability of training areas by reducing life-cycle costs, increasing unit performance and managing cost avoidance, all of which directly support the installation's training mission.

Additionally, Fort Polk works to reduce energy and water consumption, conserve resources, and minimize waste.

Through these efforts, the installation was awarded the 2020 Secretary of the Army Environmental Award in Sustainability for a Non-Industrial Installation.

To improve environmental performance, Fort Polk developed an Environmental Management Performance Review. The EMPR tracks training missions and environmental program changes from year to year. It is an important resource for installation leaders, planners and environmental staff who seek to analyze environmental and mission impacts and identify long-term environmental trends and performance.

This and other collaborative efforts create a cohesive group of professionals who can focus primarily on sustainability.

Examples of these groups are the Environmental Quality Control Committee, the Green Procurement Working Group, and the Green Building Materials Working Group who all work collectively to ensure all programs are in full compliance with Department of Defense and Department of the Army regulations and requirements.

Additional partnerships and increased stakeholder involvement also led to master planning workshops called Area Development Plans.

Fort Polk's energy and water priorities have moved beyond conservation to resilience and efficiency.

In 2020, Fort Polk's energy, planning, and life-cycle cost analysis identified multiple projects to make the installation more self-sufficient while reducing its utility cost and dependence on conventional sources.

These improvement projects included replacing outdated chillers, boilers, building automation controls, lighting, and recommissioning old facilities no longer operating as designed, creating approximately $4 million in energy savings annually and reducing energy use by 267,300 million British thermal units.

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To conserve water, reduce energy use and save money, Fort Polk stopped using potable water for wastewater treatment plant operational processes and began using treated wastewater, thus conserving millions of gallons of potable drinking water.

Fort Polk has also implemented resource-efficient practices that have significantly increased the number of recyclables and waste diverted from landfills.

The team partnered with Vernon Parish through an Intergovernmental Service Agreement for solid waste disposal and significantly increased recycled tonnage for the installation's Qualified Recycling Program.

In 2019-2020, recycled materials generated $883,000 in revenue and saved the installation $2 million in contract costs.

Another major feat was better management of hazardous waste. Through this process, Fort Polk was able to reclaim 272 gallons of solvent and 4,619 gallons of antifreeze for reuse, saving the installation $62,556, a significant cost avoidance.

It also conducted an efficient process of managing 48,000 gallons of recycled cooking and motor oil and 250,000 pounds of recycled batteries, saving the installation $224,749 in hazardous waste disposal costs.

Fort Polk developed a comprehensive Environmental Outreach Program plan to coordinate and identify all environmental outreach activities to meet outreach mission requirements. This included interacting with stakeholders through dynamic multimedia marketing and environmental education outreach programs to include videos, mascots, skits, and hosted events that effectively imparted environmental sustainability awareness.

The combined training and outreach efforts in 2019 through 2020 reached over 24,300 Soldiers, family members, school children and civilian employees.

"The JRTC and Fort Polk uses integrated environmental outreach to foster stewardship in Soldiers, civilians, and youth to sustain the environment for future generations." said Jonathan West, Directorate of Public Works -Environmental, Conservation Branch chief.

Career Program-18 changes name

By Karla Langland
USACE, Headquarters

Greetings from CP-18 — or should I say Construction, Engineering, and Infrastructure!

As I wrote in the last edition of *The Corps Environment*, there has been a change to civilian career management structure. As part of this change, 32 career programs have been consolidated into 11 career fields. There will still be career programs, but the idea is to provide synergy and opportunities for civilian employees in closely related career programs.

As a result, similar career programs will be grouped into one of 11 career fields.

There are three career fields that will be stand-alone career fields, where there will be only one career program within those career fields.

One of these career fields is Career Program-18 (CP-18).

Although there is only one career program in the career field, there is still a career field name and for CP-18 that career field name is Construction, Engineering, and Infrastructure.

The Construction, Engineering, and Infrastructure career field is composed of over 100 occupational series. Engineering series (0800) makes up the majority of the career field occupational series at approximately 62%, leaving 38% of the career field in non-engineering positions.

The second largest series by population in the career field is 0401, Natural Resources Management and Biological Sciences at 10% of the total population.

In addition to a very diverse occupational series population, the Construction, Engineering, and Infrastructure career field is also represented in close to 30 different commands and other Army organizations.

The U.S. Army Corps of Engineers comprises the largest percentage of the career field at 75%.

Army Materiel Command is approximately 19%, with most of those positions in Installation Management Command. There are also Construction, Engineering, and Infrastructure career field employees in a myriad of other commands as varied as Army Service Component Commands, Direct Reporting Units, and Army staff organizations. We also have one employee at the U.S. Military Entrance Processing Command.

Make sure you are subscribed to our Army Career Tracker webpage for various training and development opportunities.

For more information about your training and developmental needs, please drop us a line at: CP18ProponencyTeam@usace.army.mil.

USACE environmental quality, research efforts provide key contributions to Army Installations Strategy

(USACE courtesy photo)

A photograph of the environmental chamber, or cold room, where ice growth and adhesion testing are conducted at temperatures from -8 ˚C to -20 ˚C. The chamber can reach -40 ˚C, which is important for studies with saline ices.

(USACE courtesy photo)

Bobcat captured via game camera at Fort Hood, Texas.

By Cynthia A. Ries
USACE, Headquarters

The U.S. Army Environmental Quality program supports compliance with applicable environmental laws, regulations, executive orders, Department of Defense directives, and overseas country-specific final governing standards.

It also resources environmental conservation, pollution prevention, range military construction to address one-time mitigation actions and installation National Environmental Policy Act documentation.

The program outcomes help to protect human health and Soldier readiness by limiting installation and community exposure to pollutants that may be discharged by Army activities.

They also support installation readiness by delivering access and capability to mission-critical training areas and ranges that may be encumbered by statutorily protected natural and cultural resources.

The Environmental Quality program outcomes will become more significant as Army actions over time are directed toward achieving the following end state identified in the Army Installations Strategy, published in December 2020: "Modern, resilient, sustainable installations, enhancing strategic readiness in a contested Multi-Domain Operations battlespace, while providing quality facilities, services, and support to our Soldiers, families and civilians."

The Army Installations Strategy includes four strategic outcomes, including Strategic Outcome 4: healthy, sustainable training, working and living environment, which seek to ensure the Army's readiness posture, modernization efforts and our duty to protect the safety, health and welfare of Soldiers.

Integral to Strategic Outcome 4 is the line of effort to promote stewardship through implementation of actions to preserve natural resources and sustain the mission.

The U. S. Army Corps of Engineers' execution of Army Environmental Quality projects and conducting of basic research in support of Army Futures Command will provide invaluable contributions to the AIS strategic outcomes.

These projects support timely equipment stationing, real estate transactions, and access and capability to training areas and ranges.

They also serve to mitigate human health risks associated with potential pollutant migration and/or exposure.

USACE teams and experts not only deliver these projects, but more importantly, are working to advance concepts and ideas to streamline execution.

In a constrained fiscal environment, efforts to impart greater efficiency are increasingly essential.

The following research and program support activities demonstrate the important contributions being made in this regard.

Autonomous monitoring

This research is sponsored by the National Defense Center for Energy and Environment and Fort Polk, Louisiana.

It is led by Jinelle Sperry, U.S. Army Engineer Research and Development Center (ERDC).

The Defense Department is responsible for 30 million acres of land in the U.S., necessitating a balance between military training and environmental considerations.

Many installations provide refuge for threatened and endangered species, and yet restrictions caused by these species can have a detrimental impact on the military's ability to train.

Installations are often tasked with monitoring threatened and endangers species, but this can be time intensive and costly, particularly for cryptic species.

To address this challenge, wildlife biologists are evaluating and demonstrating the use of autonomous (game) cameras and machine learning software to monitor and identify wildlife species on military lands.

Although game cameras have been used extensively, the sizable datafiles produced from these devices (often several terabytes over a season) require considerable time to sort and analyze.

Machine learning software can substantially reduce the time and costs for such efforts.

ERDC biologists are currently using game cameras and machine learning software across a number of installations, including surveys for skunks at Fort Hood, Texas; feral hogs at Fort Polk, Louisiana; and bird-plant interactions at Pōhakuloa Training Area, Hawaii.

This work has demonstrated the effectiveness of game cameras for monitoring wildlife species, including previously undocumented species interactions.

Furthermore, machine learning has been shown to be an effective solution for image annotation, potentially saving hundreds of man hours for image identification.

Physics of Ice Adhesion

This research is sponsored by the U.S. Army and Office of Naval Research. It is led by Dr. Emily Asenath-Smith at ERDC.

The adhesion of ice to structures and vehicles halts missions and severs communications across a wide array of settings.

Although active mitigation systems requiring use of fluids and heaters are available, they present drawbacks. De-icing fluids have environmental impact, and thermal methods are energy intensive.

Increased safety and reliability of transportation and communication networks in cold environments can be accomplished by controlling ice adhesion with passive methods, such as advanced material coatings.

Despite extensive DOD investments in passive ice mitigation methods, such as advanced material coatings that resist ice accumulation or facilitate ice shedding, few outcomes have been transitioned to Army assets.

The barrier to transitioning passive ice mitigation technologies stems from the lack of formal standards for ice adhesion testing and data analysis.

Measured as the force required to remove ice that is adhered to a surface, ice adhesion depends on many factors including ice type, temperature, loading mode and rate.

In addition, the properties of the substrates and coatings themselves affect ice adhesion. Moreover, it is very difficult to scientifically study each of these variables in isolation.

With decades of experience in ice adhesion testing and evaluation services, ERDC's Cold Regions Research and Engineering Laboratory is conducting basic research to unravel the fundamental physics of ice adhesion by focusing on testing and data analysis.

The outcomes of this research will provide the framework needed to transition coating technologies to field scenarios, and to develop new solutions that will increase agility in a broad range of icing scenarios while minimizing environmental impact.

Environmental clearance

NEPA requires federal agencies to consider the environmental impacts of their proposed actions, evaluate reasonable alternatives, and ensure compliance with other applicable environmental laws and regulations.

NEPA environmental clearance is a prerequisite action for deployment of new weapons systems, land retention and development of training lands.

USACE has effectively partnered with the U.S. Army Installation Management Command, U.S. Army Environmental Command and Headquarters Department of Army G-9 to ensure effective and efficient NEPA project execution.

NEPA experts located at the USACE Environmental and Munitions Center of Expertise and ERDC routinely partner with USACE geographic districts to enhance the quality of NEPA projects, develop contract strategies for efficient project execution, and provide in-house resources for development of planning documents.

Efficient execution of NEPA actions has become critically important to readiness, particularly as related to on-time deployment of new weapons systems required by Army Futures Command.

USAEC streamlines environmental analysis process

By Lori Hogan
U.S. Army Environmental Command

The U.S. Army Environmental Command has implemented several practices that streamline the National Environmental Policy Act process including placing staff in direct contact with program managers in the acquisition community, installation, and Army capability managers who develop the training requirements for new weapons systems.

This change enables the USAEC NEPA team to more accurately describe the potential installation environment where the systems may be used and how the system(s) may impact those installations.

"We are concentrating our efforts on streamlining Army modernization processes, pushing key systems through some choke points such as demonstrating and validating concepts, efficiently and effectively informing Army planners and decision-makers how to integrate environmental considerations into the decision-making process and providing environmental expertise to help ensure acquisition compliance with environment, safety and occupational health requirements," said Damon Cardenas, USAEC chief of Acquisition and Technology.

USAEC's support streamlines the Army's modernization efforts by overcoming bureaucratic inertia and stovepiping that can affect the acquisition process.

It will allow the Army to generate prototype concepts on a continuous basis with carefully considered and planned systems that address the environmental impacts prior to or early on in the process and potentially speed up production.

The speed of this process is particularly critical when it comes to training and equipping Soldiers to fight and win the nation's wars.

Prioritizing Soldier lethality ensures they have a decisive advantage over prospective adversaries and their units can survive and operate in any environment.

"The single most important aspect of my work is to facilitate and enable mission readiness," said Jenny Lechuga, USAEC biologist. "Our work at USAEC is designed to support the installations receiving these new technologies by helping them meet regulatory requirements prior to implementing the action. Not doing so could present significant time delays that impact mission readiness."

(USACE courtesy photo)

The U.S. Army Environmental Command supports installations receiving new technologies such as the Interim Maneuver Short-Range Air Defense.

Some examples include the MQ9 Reaper Drone, the Laser Avenger and the IM-SHORAD, which stands for Initial Maneuver Short Range Air Defense. These weapons give U.S. troops the advantage on any battlefield in the world. Some of these weapons have been around for several years but were recently modified, and some are still in production.

The IM-SHORAD action alternative includes analysis of impacts at six possible locations, although currently only three locations are under consideration for initial fielding.

The analysis can be applied, if required, to additional fielding; however, information supplementation would be likely.

Despite this, the IM-SHORAD Programmatic Environmental Assessment would still shorten and facilitate future NEPA compliance needs if the system is fielded at additional locations.

One of the biggest challenges that USAEC staff face is balancing and safeguarding operational security protocols with providing sufficient descriptions of the system's capabilities. Providing too much detail could expose critical information that adversaries might use to discern vulnerabilities of Soldiers or the tactics, techniques and procedures they plan to use during a conflict.

"There is a fine line between the information needed to describe an action the Army is analyzing the environmental impacts of while avoiding disclosure of critical information," said Roger Paugh, USAEC physical scientist. "Close coordination is required with program managers in the acquisition community, Army capability managers who develop the training requirements, and installation staff to identify the critical information and ensure it is not in the publicly available NEPA documents."

USAEC's synchronized support to Army modernization across multiple lines of effort helps ensure the Army has well-trained Soldiers with modern weapon systems and sufficient capacity to win in any conflict, on any battlefield, anywhere in the world.

Collaboration a key theme at Engineering With Nature book launch event

By Holly Kuzmitski
Engineer Research and Development Center

The U.S. Army Corps of Engineers Engineering With Nature program's Book Launch Event celebrated the release of Engineering With Nature, an Atlas, Volume 2 with the public, and included speakers conveying a shared goal for expanding EWN practices globally through collaboration, April 7.

The Atlas, Volume 2, now available online, showcases EWN principles and practices in action through illustrations and descriptions of 62 projects from around the world — from as far afield as Nigeria to as close to the U.S. Army Engineer Research and Development Center as Ship Island off the Gulf Coast of Mississippi. Twenty-three of the projects were contributed by 16 different USACE districts.

Dr. Todd Bridges, national lead of the EWN program, opened the event by welcoming virtual attendees.

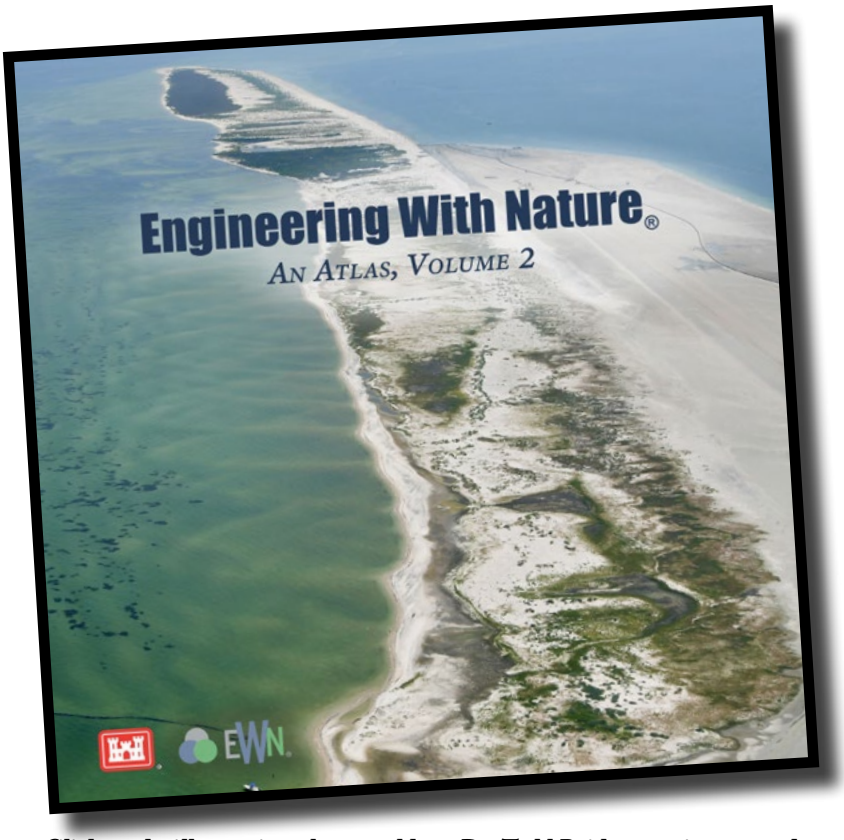
"The projects illustrate the power of multisectoral collaboration and partnership in delivering nature-based solutions," he said. "The infrastructure community knows how to build nature-based solutions. The opportunity before us is to expand the application of that know-how and experience to create value for all."

Harmonizing with Bridges' themes, Lt. Gen. Scott A. Spellmon, 55th chief of engineers and commanding general, USACE, said that partnering with nature will be a vital part of delivering infrastructure solutions in the 21st century.

"In the Atlas," he said, "USACE and a host of organizations show what it means to engineer solutions to meet our climate change challenges."

"Relationships and partnerships are vital ingredients for innovation and progress," Spellmon continued. "We don't succeed in delivering the program without partners."

The four critical elements that define the EWN approach are using science and engineering to produce operational efficiencies; using natural processes to maximum benefit; increasing the value provided by projects to include social, environmental and economic benefits; and using collaborative processes to organize, engage and focus interests, stakeholders and partners.



Click on the illustration above and hear Dr. Todd Bridges, senior research scientist and national lead of the Engineering With Nature initiative, describe the program's four major elements.

Seven executives and leaders from a range of internal and external, national and international partners delivered perspectives on the release of the book.

Organizations such as the USACE Mobile District and Rijkswaterstaat of the Netherlands were represented.

Jennifer Morris, chief executive officer of The Nature Conservancy, said, "Investing in nature can provide clean and reliable water supplies, support fish habitats, and reduce risks from floods, droughts, extreme heat and fires — nature-based solutions can save money, too.

"After Hurricane Sandy in 2012, TNC scientists found that coastal wetlands prevented more than $625 million in potential property damages.

"Having been in the forefront of nature-based solutions for more than a decade, it's clear that the Corps, through the Engineering With Nature program, is well-positioned to accelerate these types of projects in the period ahead," she said.

The hour-long program also featured a live discussion panel of several guests, including Eunice Heath, global director of sustainability and implementation leader for valuing nature for Dow, and Dan Bond, deputy director of flood and coastal risk management strategy for the Environment Agency of England.

"We're really proud to showcase four projects in the Atlas this time around," Heath said. "No matter what the organizational framework we're in, we need to drive to both fiscal and environmental responsibility — and it takes collaboration. Collaboration is key and is critical for us all."

Bond shared his perspective on the key benefits of international collaboration on EWN and nature-based solutions.

"The real value of the Atlas is that you can pick it up and see that the context in the United States is often no different from the context in England, Europe or Africa," he said. "The international collaboration is about being aware that there are often others who are better-suited and ahead of you in the game."

The Atlas, Volume 2 is now available online and can be accessed here: **http://dx.doi.org/10.21079/11681/40124**.

For more information about the USACE Engineering With Nature program, please visit **https://ewn.el.erdc.dren.mil/** or **engineeringwithnature.org**.

Alaska District garners second consecutive Army Environmental Award

Story & photos by Rachel Napolitan
USACE, Alaska District

Climbing up the hillside of a remote Alaskan island, an old tramway rusts into the ground beneath it. With gnarled rails, the 2,400-foot structure is a remanent of an abandoned radar facility that provided early warning of approaching enemy aircraft during World War II.

The tramway is part of a formerly used defense site that the U.S. Army Corps of Engineers, Alaska District worked to clean up the past two summers.

This impressive endeavor earned the project team a Secretary of the Army Environmental Award, the second in as many years for the Alaska District.

In 2019, the organization received top honors for its remediation of the Fort Rousseau Formerly Used Defense Site near Sitka.

"The Cape Prominence team has delivered another successful Formerly Used Defense Site project in remote Alaska," said Randy Bowker, deputy district engineer and chief of the Programs and Project Management Division at the Alaska District. "Overcoming some of our most difficult environmental and logistical challenges, they are most deserving of this prestigious award."

Located on a remote peninsula of Unalaska about 30 air miles from Dutch Harbor in the Aleutian Islands, the former U.S. Army Signal Corps facility consists of two primary areas: a lower camp in a natural valley and an upper camp atop a steep slope that cover a combined 160 acres.

The tramway connects the two sites at an average grade of 52% and moved troops and supplies from the shoreline where they lived to the high rocky bluff where they worked.

"There are only a few sites that were ever built like that," said Jeremy Craner, project manager, while describing the unique connecting tramway.

The project falls within the Aleutian Islands Unit of the Alaska Maritime National Wildlife Refuge and is under the jurisdiction and management of the U.S. Fish and Wildlife Service.

"We've had a really good partnership with the U.S. Fish and Wildlife Service," Craner said. "They have been outstanding to work with. They see the big picture and understand the work we do out there — that we want to make it better. Without their cooperation, we would not be able to do our jobs out there."

This strong sense of collaboration and comradery carried over to the district team and its contractor.

"We work together to get some pretty incredible stuff done in the field that nobody can get done by themselves," Craner said. Prior to the cleanup, the team used aerial photos, online maps and previous site visits to determine the areas of contamination on the remote location.

USACE investigated Cape Prominence and did some remediation work on the project in the 1990s.

In 2017, the organization did an in-house follow-up investigation with photos and samples of the remote site.

"Based on those results, we determined there was contamination out there," Craner said.

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A crew member for the U.S. Army Corps of Engineers, Alaska District excavates contaminated soil at the Cape Prominence Formerly Used Defense Site. During the 2019 and 2020 field seasons, the team removed more than 1,400 tons of contaminated soil from the remote cleanup location.

View looking down the tramway from the upper camp to the lower camp at the Cape Prominence Formerly Used Defense Site. The 2,400-foot tram connected two camps that moved people and supplies during World War II when it operated as a U.S. Army Signal Corps radar facility.

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Though rusting, the rails of the tram pose no threat to human health or the environment.

"There wasn't any contamination related to the tramway or underneath the tramway to deal with," Craner said. "We are going to leave it in place as a cool historic piece for potential visitors."

The connecting infrastructure is just one aspect of the site though. In total, the district identified 19 structures for cleanup including the former radar site, storage areas, barracks, powerhouses and other facilities.

In the 2019 field season, contractors got to work cleaning up the site by decommissioning tanks, consolidating and removing drums, and excavating more than 1,000 tons of soil.

The site needed further work though. So, in 2020, a local Alaskan company prepared to finish the cleanup project at Cape Prominence. But then, the COVID-19 pandemic started.

"We had a plan," Craner said. "We were getting ready to go to the field and then we had to change plans on the fly."

Once new health measures were in place to keep contractors and the local community safe from the virus, work got underway to continue restoration activities.

To prevent impacts to the land beyond what was needed to clean the soil, the team did not build a road between the two project sites. Instead, they used a helicopter to transport people, equipment and materials.

"We used a mini excavator that the contractor broke into pieces and slung up to the upper camp," Craner said.

Once the excavator was reassembled, the team filled bulk bags with contaminated soil and transported it to the lower camp for staging.

Before the contaminated soil was removed, the field team carefully set aside and preserved the existing vegetative mat.

Upon completion, the workers recontoured the excavations to match the surrounding topography and replaced the organic layer to further enhance restoration and promote natural revegetation of the site.

Though a major hurdle for the project, COVID-19 was not the only challenge to the cleanup effort.

"The weather and remoteness are tough," Craner said. "When things don't go right, like when things are breaking, it can be tough. Lots of planning, thought and extra effort go into a project like this."

Despite the hardships of operating in an isolated location, dealing with equipment setbacks and tackling logistical issues, the crew completed the work by the end of the summer with zero incidents, accidents or lost time during the field work.

"Cape Prominence shows the grit and tenancy of our contractors and what they can do," Craner said. "When things got tough, they just kept on going and found ways to overcome these obstacles."

Under the FUDS Program, the Alaska District performs environmental remediation of properties that were once occupied by the military. In the Aleutians, that presence was primarily during the World War II era.

"In the process of using these sites, people spilled some things — most likely gasoline, diesel and things like that," Craner said. "As much as we can, our goal is to clean things up to their natural state in a manner that is as safe and minimally invasive as possible."

During the spring and summer of 2020, the district team collaborated with industry partners, communities and regulators to successfully execute multiple challenging projects in the Aleutians, including the waste removal at Cape Prominence.

Similar sites exist all over the state and to date, the Alaska District has closed 77 of 137 properties that were identified to have environmental hazards. The estimated cost to execute the remaining workload is approximately $1.2 billion.

"We get to make a positive difference in the environment through this work," Craner said. "We get to make the world a better place."

Crews work to recontour excavated areas to match the surrounding topography and replace the organic layer at the Cape Prominence Formerly Used Defense Site.

Residential soil remediation ensures community health, welfare

By Shatara Riis
USACE, Louisville District

From 2019 to 2020, the U.S. Army Corps of Engineers, Louisville District, on behalf of the Environmental Protection Agency, removed more than 30,000 tons of contaminated soil and installed 857,980 square feet of sod at residential properties of the Jacobsville neighborhood in Evansville, Indiana.

Airborne dust, soot and smoke from manufacturing companies that once occupied the neighborhood contaminated the soil with lead and arsenic through industrial operations in the late 1800s at nearly 4,000 residential properties.

The EPA remediated about half of those properties at the Jacobsville Neighborhood Soil Contamination Superfund site, and asked USACE to remediate the remaining 2,000 properties.

"The Louisville District started remediating the properties in 2019," said Corey Knox, Louisville District Environmental Support Section project manager. "We awarded a new task order in September 2020 for $11.2 million to continue (environmental remediation) of the properties with our current contractor, Tetra Tech, until 2023. Currently, we have an Interagency Agreement with the EPA to assist with the remediation of the properties until 2025."

This remedial action includes excavation of contaminated soil per EPA-provided remedial designs, backfill/restoration of disturbed areas, transportation and disposal of contaminated soil, and completion of remediation reports documenting cleanup, said Dr. Robin Sternberg, Louisville District Environmental Support Section biologist and lead technical manager.

Returning the soil to beneficial use takes time, but USACE is making good on plans to restore the Indiana soil to its former health and has completed a total of 188 residential soil remediations during the 2020 field season.

The team also accomplished 38 of the planned 350 (estimated) residential soil remediations for the next field season, Knox said.

Currently, the project is in the Remedial Action-Construction phase within the Comprehensive Environmental Response, Compensation, and Liability Act process.

(Photo by Brett Smith)

A.D. McDill, an equipment operator/leadman of one of the excavation crews, removes soil from a Jacobsville neighborhood property.

This phase of the process includes preparing for and doing the bulk of the cleanup at the site.

While work continues to progress, COVID-19 presented some challenges.

Though the pandemic has affected the work process, "the team adjusted and pushed forward to review and approve the workplans in a timely fashion," Knox said. "The contractor was able to complete the planned 150 property remediations at the end of the 2020 field season."

"The COVID-19 pandemic has not delayed the field work. However, it has affected the site health and safety plan," Sternberg said. "Temperatures of site workers are taken during morning safety briefings, and site workers must always wear masks while on site. Contactless communication with property owners, such as phone calls and mailings, is now preferred over in-person interactions."

One key factor of safety and to the continued remediation progress is having an on-site representative available.

"The Louisville District has an on-site project engineer/construction representative residing in Evansville who reaches out to reluctant property owners to allay their concerns," Sternberg said.

Not only does Brett Smith, Louisville District project engineer/construction representative, reach out to the residents, he ensures health and well-being protocols are followed.

Smith monitors the overall remediation at the residential sites and is responsible for the coordination with the district when historical artifacts, eg., cisterns, old building foundations, etc., are encountered during excavation activities.

"Brett has added additional tasks to ensure the workforce is not only protecting themselves from the harms of the work, but also protecting themselves, their co-workers and the property owners from the risk of contracting COVID-19," Knox said. "This has taken additional effort to ensure safe practices are being followed and to obtain and maintain trust with the property owners."

According to Knox, the Jacobsville Soil Remediation Superfund site is a large remediation project within the district's area of responsibility that is being executed by using a complex cost-reimbursable contracting tool.

"Projects of this nature benefit the Louisville District, specifically the Superfund program, by demonstrating to outside stakeholders that we have the resources, knowledge and capabilities to manage and execute high-profile environmental projects," Knox said.

"The Louisville District is effecting change in the everyday lives of Evansville residents by making their community a healthier place to live," Sternberg said.

BALD EAGLE WATCH!

American icon rescued from brink of extinction

By Amber Tilton
USACE, Portland District

Bald eagle watches are a popular winter event in many states with wintering eagle populations.

Watches began after eagle populations crashed in the 1960s to share information about challenges threatening the birds' survival.

The main challenges at the time were pesticide DDT use and habitat loss.

A lesser talked about cause of death was eagle unpopularity.

It's hard to imagine, I know. However, the saying "gossip kills" holds truth as tall tales of bald eagles carrying away children and killing livestock contributed heavily to the senseless shootings and poisonings of eagles.

Add to that the myth that they would outcompete fishermen for salmon and, well, they basically suffered from a bad image in the extreme, shoot-to-kill on a wanted poster kind of way.

Since then, the reputation of the bald eagle has shifted 180 degrees.

The introduction of the "Bald Eagle Watch" has helped create that change by providing outdoor eagle viewing and educational opportunities focused on recovery efforts.

As many U.S. Army Corps of Engineers projects around the country have concentrations of wintering eagles congregating near dams and powerhouses, and along the shorelines of our lakes and rivers, so too shall you find a park ranger pointing at them.

All over the country, USACE park rangers host annual eagle watch events.

This year, many groups held those activities virtually to help prevent the spread of COVID-19. Park rangers used videos, webinars, websites, zoom, press and social media to reach audiences.

Today, eagle watches are more of a celebratory event than an alarm bell as the bald eagle has made a full recovery.

Once on the brink of extinction, eagles are now one of the greatest success stories of the Environmental Protection Act.

When people gaze at the bald eagle today, they no longer see villain; they see victory.

We get to reflect on the success of the changes we have made as a society that prevented this species from disappearing completely.

There is hope because, if we can save the bald eagle, then what else can we save?

Watch Fly Like an Eagle: Exploring Winter Gorge Eagle Migration, a webinar that explores migration, behavior and biology and the history of the Gorge Eagle Watch program. You can find the recorded webinar, other videos and more at: www.nwp.usace.army.mil/eaglewatch2021.

Marty Underwood, USACE Fort Worth District Environmental Stewardship Business Line manager, searches for aquatic wildlife below Bardwell Lake's emergency spillway during dewater maintenance.

USACE joins state's efforts to conserve, protect natural resources

Story & photo by Trevor Welsh
USACE, Fort Worth District

In an effort to preserve the natural resources at Bardwell Lake, the U.S. Army Corps of Engineers, Fort Worth District partnered with the Texas Parks and Wildlife Department to relocate aquatic wildlife as part of the lake's emergency spillway dewater and maintenance.

Due to the nature of maintenance being done on the lake's emergency spillway, aquatic wildlife would be stranded and in danger. USACE and TPWD took measures to locate, identify and safely move these species of freshwater mussels and fish to another part of the lake.

"Flood risk management is our primary mission, but the environmental stewardship mission is just as important in regard to the dewater," said Marty Underwood, USACE Fort Worth District, Trinity Region Environmental Stewardship Business line manager. "We are obliged to relocate the treasured aquatic resources in the state of Texas when we dewater these stilling basins.

"The FRM team is in charge of removing all the water and cleaning up the still basin," he added. "When they do that, freshwater mussels and fish are stranded, so our job is to relocate the freshwater mussels and the fish back to the lake."

As the state's steward of aquatic resources, TPWD stepped in to ensure the process was done properly.

"My role is to help with the permitting process, and I am here on site today to help with the freshwater mussel relocation," said Bregan Brown, TPWD Kills and Spills coordinator for Region 2 out of Tyler, Texas.

"It's my job to help protect aquatic resources in the state," Brown said. "That job is twofold. I am responsible for helping people obtain the permitting they need to relocate aquatic resources that are in danger from the work they are doing, and the other half of my job is to record incidents where we do have injuries and damages to fish and wildlife."

As the FRM team uses industrial pumps to remove the water from the stilling basin, the shoreline recedes, and the freshwater mussels and fish are exposed. As they are exposed, the environmental stewardship team locates and collects the wildlife.

"There were five species of mussels: giant floater, paper pondshell, yellow sandshell, lilliput and southern mapleleaf," Underwood said. "There were 13 species of fish removed; some were quite large, most of them were game fish.

"I have done eight of these dewaters in the past seven years and this one had the worst conditions for us to get in there," he said. "It was mostly mud; there wasn't much water."

This wildlife plays a major role in the lake's ecosystem.

"For one, freshwater mussels are really good indicators of stream and lake health," Underwood said. "If they are in good condition, the water is usually in good condition as well."

Even though the emergency spillway at Bardwell has only been activated once in the dam's 57-year life, this 10-year periodic maintenance is required and necessary.

"We are removing the layer of basin water that is down below the concrete structure of the emergency spillway," said Jeremy Spencer, Bardwell Lake manager. "We're doing that in order to inspect the basin walls, spillway chute, and baffle blocks for cracks or damage, and clean out the basin below the spillway."

A total of 25 people took seven days to complete this dewater event and wildlife relocation. The inspection revealed that the spillway structure was fully intact and free of any damage.

"I would like to thank Texas Parks and Wildlife," Underwood said. "Over the years we have built a really good relationship with them. They trust us and we work cooperatively to get the job done."

To learn about Bardwell Lake, visit: **https://www.swf-wc.usace.army.mil/bardwell/**.

For more about the TPWD Kills and Spills team, visit: **https://tpwd.texas.gov/landwater/water/environconcerns/kills_and_spills/**.

Established in 1950, the Fort Worth District is responsible for water resources development in two-thirds of Texas, and design and construction at military installations in Texas and parts of Louisiana and New Mexico.

Visit the Fort Worth District website at: **www.swf.usace.army.mil** and social media at: **https://about.me/usacefortworth**.

ERDC researcher uses sound to deter invasive Asian carp

By Holly Kuzmitski
Engineer Research and Development Center

When Dr. Christa Woodley, a research biologist with the U.S. Army Engineer Research and Development Center, heard about the U.S. Geological Survey study to control invasive Asian carp through acoustics, she was excited by the possibilities.

Led by USGS Research Fish Biologist Dr. Marybeth Brey, the multiagency team intends to deter the fish from moving further up the Mississippi River by broadcasting underwater sounds the researchers believe are intrusive only to the invasive carp; and the method will leave virtually no footprint on the environment.

"Whenever you put something in the water, you are usually going to have to pay a cost," Woodley said. "But this is a win-win — the public should be very interested in any deterrent research that allows us to achieve our mission without damaging the environment."

Silver carp, bighead carp, black carp and grass carp are the four types of Asian carp that pose a threat to the Great Lakes' $7 billion fisheries; the invasive fish grow quickly and compete aggressively with native fish for food and habitat.

The sounds will be released from an underwater Acoustic Deterrent System (uADS) housed in a weldment — a 105-foot-long beam with 16 speakers — in the approach channel of Lock and Dam 19, located in Keokuk, Iowa.

"This is all new; it's not a design that's been used before and it's never been recessed in a lock's discharge lateral," Brey said.

Designed by a team of 15 USGS and USACE personnel led by Kirk Sunderman, a USACE, Rock Island District project engineer and project manager, the uADS was installed in the lock approach Feb. 3.

The study is a precursor to the Brandon Road Lock and Dam project, which has just commenced. Woodley will utilize the data collected by the study to evaluate the effectiveness of using the acoustic deterrent for that project.

"In the Brandon Road project, 90% of the lock is being cut out and rebuilt with deterrent systems; the acoustic system will be one of several types of deterrents," she said.

(Photo by George Gonzalez)

A 350-ton crane swings the underwater Acoustic Deterrent System weldment, which includes speakers for emitting sounds specific to the hearing range of invasive Asian carp, into place at Lock and Dam 19 on the Mississippi River Feb. 3.

What will the Asian carp hear that will cause them to avoid the area? Woodley compares some of the sounds to "an engine coming towards you," others to the predators found in the fish's home range — dolphins.

Woodley performed the acoustic research to isolate the sounds, and she describes how her work built on previous work completed by partners.

"We do have some universities involved in the project that helped us with documenting the fish hearing; the University of Minnesota Duluth did quite a bit of that kind of work."

"They're the ones who said, 'Asian carp can hear at this range and at these decibels,'" Woodley said. "I took that information and said, 'Okay, if this is the hearing range, then that allows me to create all sorts of sounds that are within this decibel range and frequency band for the fish to hear' and then ERDC tested the sounds."

Woodley observed the fish either stopped or turned around when they heard the sounds in the ERDC-Environmental Laboratory's 10,000-gallon Cognitive Ecology and Ecohydraulics Research Facility.

In the meantime, USGS researchers had collected laboratory and field data about the effects of a 100-horsepower boat motor playback on fish behavior, concluding that the boat motor and the playback of the boat motor showed potential for deterring invasive carp.

"I was able to take the 100-horsepower boat motor sound, and say, 'Okay, what part of this sound pattern makes the fish move away versus what part makes them comfortable to return?'" Woodley said.

She took that sound and broke it down into 30 principal parts, and played each part back to the carp to find the exact components that were causing the fish to stop.

Woodley then integrated those components into the sounds she had previously engineered, and the team had their sound vocabulary, based on multiple sources.

Now that the weldment has been successfully installed, the next major project milestone will be tagging the fish.

The USGS team, led by Brey, will manage that portion of the study.

"The idea is to put together an analysis that describes how long it took a fish to get through the deterrent or to turn around from the deterrent, to mark different types of behaviors that a fish might have in that lock approach, and compare those to when the sound is running and when the sound is off," she said.

The study will last up to three years.

Agreement greenlights completion of pre-construction engineering, design phase

By Samantha Heilig
USACE, Rock Island District

The U.S. Army Corps of Engineers, Rock Island District and the state of Illinois signed a design agreement Dec. 29, 2020, allowing for completion of the Pre-construction Engineering and Design phase of the Brandon Road Project.

This project, located at the Brandon Road Lock and Dam in the Chicago Area Waterway System near Joliet, Illinois, is part of a National Ecosystem Restoration Plan to keep bighead, silver and black carp — the invasive Asian carp species of greatest concern — out of the Great Lakes.

The state is the non-federal sponsor and is responsible for cost sharing the project's design, construction, operations and maintenance.

To help support this effort, it coordinated a third-party agreement with the state of Michigan to assist with funding for the Pre-construction Engineering and Design phase.

Design of the Brandon Road Project includes installation of layered technologies such as an electric barrier, underwater acoustic deterrent, air bubble curtain and a flushing lock in a newly engineered channel.

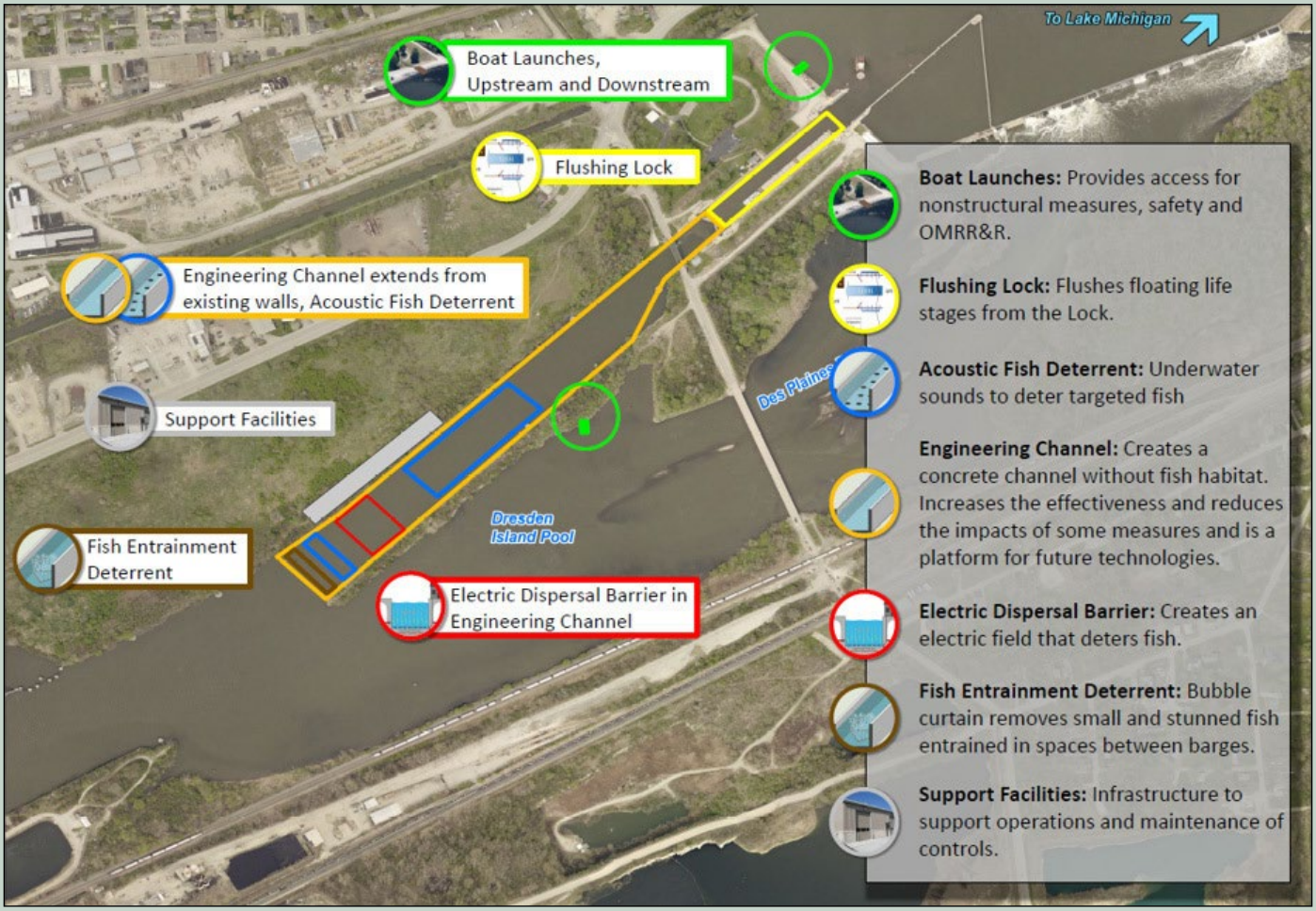
These structural measures aim to prevent invasive carp movement while continuing to allow commercial and recreational craft passage through the lock.

In addition to the structural measures, non-structural measures such as enhanced public outreach, monitoring of fish populations, integrated pest management, physical removal of invasive fish, and research and development are included as part of the National Ecosystem Restoration Plan.

These efforts, which will be implemented primarily by other federal agencies, can begin upon appropriation of funding before the physical elements are installed.

"We're excited to be part of this vital project," said Col. Steve Sattinger, Rock Island District commander. "We're going to roll up our sleeves and work hand-in-hand with our partners and with our stakeholders across the country who have an interest in protecting the Great Lakes while maintaining efficient navigation on the Illinois Waterway."

Pre-construction Engineering and Design of the project is anticipated to take three to four years and is the final step before construction can proceed.



(Photo illustration by Kelcy Hanson)

Projected map of the design agreement at Brandon Road Lock and Dam.

Team of teams takes top honors in cultural resources

By Lori Hogan
U.S. Army Environmental Command

Fort Stewart/Hunter Army Airfield is located southwest of Savannah, Georgia, and is home to the 3rd Infantry Division.

This combined arms division is the largest Army installation east of the Mississippi River and has a distinguished history, dating back to World War I.

The installation's Cultural Resources Management (CRM) program team has long been successful in supporting and complementing the military mission by reducing training land restrictions, elevating conservation efforts, advancing archaeological surveys, and reinforcing the Army's commitment to the history and cultural resources abundant in the community.

The installation was recently awarded the 2020 Secretary of the Army Environmental Award for Cultural Resource Management for the Team/Individual category.

When a breached tide gate was discovered, installation officials knew they needed to pull together a team of experts to address the unique combination of engineering and regulatory issues related to the age and location of the structures.

The location of the breach was in proximity to two 19th century water control structures that were causing erosion to and around the structures; the structures affected included an 18th century ranger outpost listed on the National Register of Historic Places, and an upstream railway causeway and trestle.

Through early coordinated efforts with the State Historic Preservation Office, the team was able to develop an archaeological avoidance plan to preserve the two water control structures.

This effort included encapsulation of the exposed historic structure back to its original pre-tide gate breach condition. The team also monitored the construction activities to ensure no adverse impacts would occur.

"While we regularly review all real property, range, maintenance, engineering projects, and non-routine training events, this project has set us up for future success and will provide cost savings and installation readiness in the future."

— Thomas Fry, Chief, Environmental/Natural Resources Division, Fort Stewart/Hunter Army Airfiled

To prevent erosion and sedimentation at the site, the team placed fill and riprap in the marsh to stabilize and protect the historic causeway and wharf structure. Those measures will help prevent future flooding at the "Sleepy Hollow" Training Area, reduce continued erosion of the upstream rail assets used for deployment, and protect the natural and cultural resources that have been entrusted to FS/HAAF.

CRM staff also used the opportunity to conduct archaeological surveys on 265,911 acres of the installation's 266,862 acres that are accessible, and completed building surveys on all structures built up to 1990.

The staff identified eligible properties for the NRHP designation and added them to the Cultural Resource Action Plan for long-term protection and monitoring.

These efforts also reduced the number of encumbered areas, allowing for unrestricted access to more training grounds and land management activities.

This level of access supports the Installation Strategic Plan through active participation in the Sustainability Management System's Training Lands Process Action Team and the Integrated Management Prescription Team.

"While this project was unique, this type of project coordination with multiple partner agencies is not unique," said Thomas Fry, Environmental/Natural Resources Division chief. "Our team's ongoing relationships with important stakeholders has served us well.

"While we regularly review all real property, range, maintenance, engineering projects, and non-routine training events, this project has set us up for future success and will provide cost savings and installation readiness in the future," he said.

Throughout the process, the team reinforced community relations through a comprehensive public outreach program that included archaeology discussion panels at Georgia Southern University, Historic Communities and Cemeteries Council meetings, hands-on historic cemetery preservation events with local schoolchildren, and presentations, briefings, and training for FS/HAAF personnel and military families.

Installation personnel also participated in Earth Day and Native American Heritage Day celebrations.

The team was led by Brian Greer, CRM program manager, and included HAAF Tide Gate Project team members: Kyle Daniels, FS/HAAF Engineering; Dena Thompson and Mark Puhalla, U.S. Army Corps of Engineers project managers; Melissa Kendrick, FS/HAAF National Environmental Policy Act program manager; Larry Carlile, FS/HAAF Fish & Wildlife Branch chief; and contract staff provided by Aerostar SES: Ashley Moss, archaeological field technician; Jessie Larson, archaeological and curations specialist; and George Harris, wetlands/water resources specialist.

(U.S. Army photo)

Children from the Youth Center assist in cleaning headstones during a cemetery cleanup event at Taylors Creek Cemetery. The event provided them an opportunity to learn about civic responsibility, the installation's cultural resources, and the importance of protecting and preserving them for future generations.

Treatment plant, system upgrades help reduce uncontrolled release of mine waste

Story & photo by Rodney Zion
USACE, Seattle District

The upgraded Bunker Hill Central Treatment Plant includes the filter and polymer feed building (foreground), high density sludge thickener tank (center), and lime/polymer reactor structure (to the left of Sludge Thickener).

At the Bunker Hill Superfund Site in Kellogg, Idaho, the Bunker Hill Central Treatment Plant (CTP) Upgrade and Groundwater Collection System (GWCS) project achieved a significant milestone in October 2020 by commencing the one-year operations and maintenance phase of the contract.

Since December 2016, the CTP has undergone several facility-wide upgrades, increasing capacity, improving treatment efficacy, and converting the plant to a high-density sludge treatment facility.

Also constructed was an approximately 8,000-linear-foot soil-bentonite groundwater cutoff wall and new GWCS.

All upgrades were achieved under an ongoing $49.8 million Operate-Design-Build-Operate (ODBO) contract between the U.S. Army Corps of Engineers and Wood Environmental & Infrastructure Solutions, Inc., with funding provided by the Environmental Protection Agency.

Prior to this contract, the CTP (constructed in 1974 by the Bunker Hill Corporation) treated contaminated mine waters from the Bunker Hill Mine.

The old treatment plant had a treatment capacity of roughly 2,500 gallons per minute (gpm). The project upgraded the CTP treatment capacity to 8,000 gpm with the ability to accommodate future capacity expansion to 10,000 gpm.

The project also included conversion to a high-density sludge process with an added filtration system for treatment operations, enabling the plant to meet new discharge requirements.

In addition to treatment of contaminated mine water, the facility now also treats contaminated groundwater intercepted and collected by the newly constructed GWCS.

Prior to this project, contaminated groundwater flowing below the approximately 270-acre Central Impoundment Area carried dissolved mine waste contaminants to the South Fork Coeur d'Alene River.

The newly constructed soil-bentonite groundwater cutoff wall and GWCS now intercept and collect the contaminated groundwater and convey it for treatment at the upgraded treatment plant.

The project also included construction of a new 110,000-cubic-yard geomembrane-lined Sludge Impoundment Area.

Soon after award of the ODBO contract, the contractor constructed, activated and operated an on-site temporary treatment system (TTS) to allow uninterrupted treatment of mine water during demolition of portions of the old facility and construction of the new facility upgrades.

In March 2020, after a series of operational tests and initial commissioning of the upgraded facility, treatment operations were permanently transitioned from the TTS to the upgraded CTP.

The GWCS was gradually brought online through the spring of 2020 to begin permanently conveying collected groundwater for treatment at the CTP.

Commissioning and testing activities of the CTP and the GWCS continued through the summer and early fall of 2020.

After completion of prerequisite testing activities, the one-year Operations and Maintenance phase of the contract commenced Oct. 21, 2020.

This phase will enable the contractor to complete a full year of operations at the upgraded facility, experiencing various seasonal and influent flow/quality conditions to "shake down" the system as well as implement and incorporate any necessary system and/or operational revisions.

Additional high flow/high strength acceptance testing will be completed during the high flow period this spring.

In October 2021, operations will then transfer to a follow-on operations contractor under contract with the Idaho Department of Environmental Quality.

The expected reductions in the uncontrolled release of mine waste contaminants to the environment is a significant achievement in the ongoing cleanup at the Bunker Hill Superfund Site and the Coeur d'Alene River Basin.

Most noteworthy is the facility's ability to measurably reduce the amount of dissolved metals (particularly zinc) that were being discharged by contaminated groundwater to the South Fork Coeur d'Alene River.

Historic estimates of dissolved zinc loading to the South Fork Coeur d'Alene River adjacent to the Central Impoundment Area range from 150 to 450 pounds per day. It is estimated that the collection and treatment of groundwater by the GWCS and CTP constructed and upgraded under this project will reduce the zinc loading to the South Fork Coeur d'Alene River by up to 90%.

Mississippi River mussel cleaning provides ecological, operational benefits

By Joe Jordan & Dan Kelner
USACE, St. Paul District

This year marks the 20th year the U.S. Army Corps of Engineers, St. Paul District and other resource agencies on the Upper Mississippi River take a day and clean native mussels free from zebra mussels.

No, they do not use scrub brushes, soap, and water, just a little elbow grease.

Between 1998 and 2000, the St. Paul District and the U.S Fish and Wildlife Service were involved in formal consultation under the Endangered Species Act, Section 7.

This consultation focused on the Higgins eye pearlymussel and impacts from operation and maintenance of the existing 9-foot channel project for another 50 years.

(Photo by Joe Jordan)

Zebra mussels are removed from freshwater native pocketbook mussels, and safely returned to the river during the annual Cordova Mussel Cleaning.

Zebra mussels, transported by towboats and other large craft to upstream areas on the Upper Mississippi River using the federal navigation system, were a primary concern because they harm native mussels by effectively smothering them and interfering with respiration, feeding and reproduction.

As a result, in its April 2000 Biological Opinion (BiOp), FWS determined the continued operation and maintenance of the navigation project would jeopardize the existence of the federally endangered Higgins eye pearlymussel.

In order to avoid jeopardy, FWS recommended USACE establish new populations of Higgins eye pearlymussels within the species' historic range in areas with no or few zebra mussels and implement a zebra mussel control program.

The Mussel Coordination Team (MCT) was formed to assist USACE in complying with the terms and conditions of the 2000 BiOp.

The team includes malacologists from the USACE St. Paul and Rock Island districts, FWS, U.S. Geological Survey, National Park Service, state departments of natural resources, universities, and non-governmental organizations.

Over the years, the MCT has evolved from an oversight group into an award-winning team dedicated to freshwater mussel conservation on the Upper Mississippi River.

Since 2000, the St. Paul District has spent over $8 million on a variety of mussel relocation activities with assistance from the MCT. This involved propagating Higgins eye pearlymussel and placing them into waters not infested with zebra mussels.

The plan used a combination of five propagation and relocation methods at 10 sites to reach the goal of at least five new populations over 10 years that would become self-reproducing and viable long term.

For the propagation efforts, the MCT used three sites for collecting gravid (egg release condition) females and glochidia (mussel parasitic life stage): Lower St. Croix River at Hudson, Wisconsin; Pool 11 at Cassville, Wisconsin; and Pool 14 at Cordova, Illinois. These sites were chosen for their Higgins eye pearlymussel genetic variability and availability of individuals.

In the summer of 2001, this relocation was accomplished as part of a mussel workshop conducted by the Illinois Chapter of the American Fisheries Society.

As part of the collection of gravid Higgins eye pearlymussels, the group hand-rubbed off any zebra mussels attached to the mussels prior to relocation. Additional processing techniques were used prior to laboratory and relocation activities.

Any unused Higgins eye pearlymussels were placed in two specific stockpile sites within the Cordova bed for future propagation efforts.

Prior to their placement at these stockpile sites, "cleaning" zebra mussels off the live mussels became a common practice.

As with any relocation, the stockpile sites diminish over time based on escape, burrowing and natural mortality.

The MCT began to replenish the site with mussels found within the mussel bed, encompassing approximately a 3-mile river reach along the Illinois bank.

One of the most interesting discoveries was the abundance of adult Higgins eye pearlymussels found in shallow water areas where previous studies have shown that they're usually associated with deeper water.

In 2002, the MCT collected 371 adult Higgins eye pearlymussels from the Cordova Higgins eye Essential Habitat Area (EHA); of which most came from shallow water by wading (pollywogging).

The Cordova EHA is one of 14 EHAs in the Upper Mississippi River's two tributaries, the St. Croix and Wisconsin rivers, which are used to guide the Higgins eye Recovery Team to recovery efforts of the species.

Since 2002, the multiagency and academic groups have come together for a one-day Cordova Mussel Cleaning event to restock the stockpile sites using shallow water dwelling mussels.

During the event, every mussel is identified, cleaned of any zebra mussels, and returned to the water. All Higgins eye are returned to the stockpile sites for future propagation and all zebra mussels are destroyed and properly disposed. Upwards of 75 people usually attend and collect several thousand mussels representing over 25 live species.

This year, the annual event will be held August 4.

Exchange strives for safe, efficient fuel delivery service

By Capt. Garrett Chesonis
HQ, Army & Air Force Exchange Service

If you have been on an Air Force base or Army post, you have likely driven past or filled up your tank at one of the many exchange retail fuel stations.

Currently, the Exchange operates over 250 Express stations across the nation and abroad, providing quality fuel and convenient retail to service members and their families.

This footprint includes over 850-plus separate underground storage tanks and supporting fuel dispensing equipment systems.

Maintenance and operation of all this equipment is a daunting task, further complicated by stringent environmental compliance requirements that vary depending on which state, U.S. territory, or country the Express Station is physically located.

Additionally, the Exchange faces challenges educating its Department of Defense teammates on retail fuel equipment and operation because it requires a niche competency separate from bulk fuel storage and above-ground storage tank systems more commonly employed and required by DOD missions.

To address these challenges, the Exchange looks to private industry for best practices and standards, then adapts them to be DOD compliant.

Managing its product inventory along with the associated equipment alarms and environmental compliance testing across its massive retail fuel footprint proved challenging.

The root cause of these problems was a general lack of standardization in fielded inventory control equipment and training.

Each site incorporated different systems and procedures for monitoring its product and equipment, resulting in redundant, repetitive tasks and inefficient manpower uses. These supply chain challenges were further compounded at the Exchange's regional headquarters where products are ordered and delivery is coordinated.

In 2015, Exchange engineers and fuel specialists addressed this issue and hatched a plan to overhaul how it monitors its fuel systems and completes inventory control.

The crux of the plan revolved around a massive standardization effort to install or replace existing UST Automatic Tank Gauges with the new Veeder-Root TLS 450Plus ATG, commensurate with private industry standards and proven track records of success in the field.

(Photo courtesy of Army & Air Force Exchange Service)

Accompanying this ATG was an online, remote monitoring platform called Insite360.

The benefits of these upgrades were instant, returning countless hours to associates, providing real-time inventory control and system monitoring, and improving environmental compliance practices.

The upgrade benefits include:

24/7, 365-day, remote monitoring

The whole host of subgrade tanks, sumps and product lines are constantly monitored and tested for leaks, then reported in real time to a staffed operations center, where technicians and tank operators are immediately notified of potential issues or water intrusions into the equipment.

Since this constant monitoring was employed, over 60% of problems identified have been resolved remotely, saving on average $350 per issue and countless labor hours per month by not having to dispatch fuel technicians.

Environmental compliance

With the subgrade tanks, sumps and product lines constantly monitored and pressure tested, site operators can keep accurate and up-to-date records of their systems. This has improved the Exchange's compliance programs and led to a decrease in the number of Notice of Violations issued from various regulators at the local, state and federal levels.

Rapid, direct alarm notification

The Exchange has configured the TLS 450Plus to send direct alerts (email/text) to specified people when an alarm occurs. Each site can then customize who at the installation receives the notification, while the Exchange arranges for the fire department, environmental personnel and Department of Public Works technicians to get alerts. This streamlines communication across all parties and reduces response times when spills or leaks occur.

Access to Insite360 website

All data is uploaded in real-time to a secure web portal, where a common operating picture is established, and reports and documents can be accessed and downloaded at any time. Moreover, the portal can be accessed from mobile devices, allowing for more efficient troubleshooting by field technicians and site equipment operators.

Exact tank charts

The software in the Veeder-Root TLS 450Plus maps the inside of the tanks, gives a detailed analysis of the tank's size and creates a detailed tank chart. It also corrects any dimensional issues that occur due to tank deflection or tank tilt.

Retail fuel site operations and equipment are an ever-evolving industry and practice.

The Exchange serves as the DOD's subject matter expert on retail fueling and is committed to ensuring that the best and safest systems are employed on U.S. installations.

For more information, contact the Exchange Environmental Team at: zzhqreenvironmental@aafes.com.

Partnership solves complexities of long-standing Superfund site

(Photo by Andre Billeaudeaux)

Remnants of an old factory on the Eagle Zinc Superfund Site property.

By Janet Meredith
USACE, St. Louis District

The U.S. Army Corps of Engineers, in collaboration with the U.S Environmental Protection Agency and Illinois EPA, reached substantial completion remediation status of the 132-acre Eagle Zinc Superfund site in Hillsboro, Illinois, on Dec. 30, 2020.

Located 50 miles northeast of St. Louis, Missouri, the Superfund site saw commercial operations terminated in 2003 when Eagle Zinc, the last of a handful of commercial owners, ceased its zinc oxide production there. But the location had seen 81 years of production, and the affiliated environmental output was diverse.

"Zinc has been an important element in society for about 2,500 years," said Dr. Michael Larranaga, co-author of Hawley's Condensed Chemical Dictionary, when asked about commercial uses.

"It was used by Romans to make coins, kettles and decorations," he said. "It is a key ingredient in brass and bronze alloys, galvanizing materials and marine paints, as well as cosmetics, pharmaceuticals, plastics, inks, soaps and batteries."

Years and layers of deposits

The proud city of Hillsboro, once visited by Abraham Lincoln, celebrates its manufacturing history, highlighting that their quality of life and growth story is interwoven with stories of companies who make things.

According to the city's 2020 Strategic Plan, "Hillsboro Glass Company made bottles for a variety of products that were distributed across the country, supplying bottles for companies like the Hiram Walker Distillery. The mines of Hillsboro supplied much needed energy to our country and the Eagle-Picher Company provided zinc oxide for the production of paint to a large section of that industry."

Meanwhile, the nearly 6,000 citizens of Hillsboro, which incorporated only one year after zinc mining activity started in 1912, also witnessed the byproduct production of sulfuric acid, zinc oxide and leaded zinc oxide over the years. Other products beyond paint included galvanized steel, vulcanized rubber and brass electrical conductors.

But production of paint there took a turn in 1981 when Sherwin Williams reported to the state environmental protection agency that toxic slag deposits had been discovered.

The state's water test samples indicated high levels of zinc, iron, lead and copper resulting in the removal of 18,000 tons of residue from 10 acres, as well as the issuance of a company violation. Around this same time period two key events took place that would shape the future of Hillsboro.

First, in 1984 the facility was sold to Eagle Zinc Co., which continued production for 19 more years despite the 1981 violations. Second, the EPA and USACE signed groundbreaking Superfund partnership agreements in 1982 and again in 1984 allowing USACE to provide the EPA with remedial hazardous waste technical cleanup assistance, among other provisions.

Post-1984 Superfund years

The 20 years between 2001 and 2021 can reasonably be called the "Hillsboro Superfund Years" as lead agency EPA cleaned the contaminated site, made the responsible party pay for the work, involved the community in the process and returned the Superfund site to productive use with assistance from partner agencies such as USACE.

With a contract for on-site remediation awarded in early 2017, Kevin Slattery, a 21-year-USACE veteran, and the USACE St. Louis District project team were eager after several years of coordination with EPA Region 5 to put an Interagency Agreement in place to provide the technical assistance for the remedial action effort.

"The first day was just anticipation of something that we had worked so hard to try and get a project … to finally be able to prove we had the capabilities," he said.

Slattery, who holds an environmental studies degree, explained his previous hazardous material consolidation cell experience at an abandoned glass factory was used to help pitch USACE's technical expertise.

"We would eventually encapsulate the (Eagle Zinc) material very similar to what we did on the glass factory job," he explained.

Consolidation cells are constructed from impermeable layers of clay which, ultimately, fully enclose the excavated materials.

(Photo by Andre Billeaudeaux)

USACE, in collaboration with the U.S Environmental Protection Agency and Illinois EPA, reached substantial completion remediation status of the Eagle Zinc Superfund site in Hillsboro, Illinois, on Dec. 30, 2020.

In the case of Eagle Zinc, remediated soils contained antimony, cadmium, cobalt, lead, nickel, and zinc and would be consolidated in massive cells as deep as 40-feet-deep and spread over 10 acres.

But, as good as the initial remediation plan provided by EPA was, 81 years of commercial production and layers of dangerous unanticipated residual materials immediately challenged the USACE project delivery team on both cleanup tactics and cost.

Indeed, the PDT had to work closely with the U.S. EPA and the Illinois EPA to coordinate, innovate, and tactically readjust for a 250% increase in residue treatment and a 680% increase in concrete excavation which led to 35 contract modifications and a mid-project increase of the volume of the all-important servicing consolidation cell by 40%.

From start to finish, the four-year massive cleanup project resulted in the protection of public health and the environment while setting the stage for the city's revitalization.

The project also serves as just one example of how USACE serves the nation by supporting the EPA's Superfund Program under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980.

Later this year, the PDT will move past the substantial completion phase to fully complete the $25 million project and return it to the EPA and ultimately back to Hillsboro for redevelopment.

Army announces excellence in environmental programs

"The Army recognizes successes that demonstrate the Army Environmental Program's focus on supporting the highest level of installation and Soldier readiness."

J.E. "Jack" Surash, P.E.
Assistant Secretary of the Army for Installations, Energy and Environment

By Troy Darr
U.S. Army Environmental Command

The Army announced the winners of the 2020 Secretary of the Army Environmental Awards Program, the highest honor conferred by the Army in the field of environmental science and sustainability.

The senior official performing the duties of the Assistant Secretary of the Army for Installations, Energy and Environment, J. E. "Jack" Surash, P.E., selected four installations and two teams to represent the Army in the 2021 Secretary of Defense Environmental Awards Program.

"The Army recognizes successes that demonstrate the Army Environmental Program's focus on supporting the highest level of installation and Soldier readiness," Surash said.

"This focus ensures the Army continues to preserve the natural infrastructure and realistic environments our Soldiers need in order to train, fight and win," he added. "Our Army environmental teams deserve this recognition. Their work protects human health, improves Soldier and family quality of life and protects the natural environment."

This year's winners demonstrated superior program management and presented a variety of environmental technical solutions that benefit and enable the mission, are transferrable to other Army organizations and installations, involve local stakeholders, and produce measurable outcomes and a positive impact.

The winners of this year's environmental awards stand out as examples of how environmental stewardship and sustainability play a crucial role in the Army's mission readiness.

Investments that the Army makes in environmental programs and sustainability initiatives pay dividends in sustaining realistic training and testing capabilities both now and in the future.

For more information about the Secretary of the Army Environmental Awards program, visit the U.S. Army Environmental Command website at https://aec.army.mil/index.php/awards.

Award winners

- **Natural Resources Conservation – Large Installation:**
  Fort Stewart/Hunter Army Airfield
- **Cultural Resources Management – Small Installation:**
  Camp Umatilla
  Oregon Army National Guard
- **Sustainability – Non-Industrial Installation:**
  U.S. Army Garrison, Fort Polk
- **Environmental Restoration – Installation:**
  U.S. Army Corps of Engineers, Alaska District
- **Cultural Resources Management – Team/Individual:**
  Cultural Resources Management Team, Fort Stewart/Hunter Army Airfield
- **Sustainability – Team/Individual:**
  Sustainability Team, Minnesota Army National Guard

(U.S. Army Photo)

The Minnesota Army National Guard's Sustainability Team played an integral role in the design and construction of the new Arden Hills Division Headquarters. The sustainability features include a 60-kilowatt solar photovoltaic system expected to meet 2.5% of the electrical load, daylighting, solar tube style skylighting and a ground source heat pump system.

(U.S. Army Photo)

Recognized by national fire experts as one of the largest prescribed burn programs in the world, Fort Stewart's forestry branch utilizes an aerial ignition system and ground ignition terra-torches to implement its record-setting burn program. Prescribed burns such as these provide installations with wildfire reduction, a superior military training platform, enhanced threatened and endangered species habitat and an improved forest ecosystem health.

(U.S. Army Photo)

An archeologist recovers a cache of musket balls from an excavated trench from this Fort Stewart archaeological site during phase III mitigation of an 18th century ranger outpost known as Fort Argyle. Fort Argyle was the first colonial settlement at Fort Stewart and is listed on the National Registry of Historic Places. The team also completed a project to mitigate river erosion that could have adversely affected the site.

New England District, EPA mark project milestone with land transfer

By Ann Marie R. Harvie
USACE, New England District

The U.S. Army Corps of Engineers, New England District and the Environmental Protection Agency recently turned back a valuable piece of waterfront property to the city of New Bedford, Massachusetts.

The turnover, which took place Jan. 7, signaled a milestone in the decades-old cleanup of the New Bedford Harbor Superfund Site.

The 5-acre property, located along the harbor, was formerly used as a sediment dewatering facility (Area D).

When in operation, the facility dewatered hundreds of thousands of cubic yards of contaminated dredged material before sending it off-site for safe disposal at licensed facilities.

The New England District completed dredging to remove polychlorinated biphenyl (PCB)-contaminated sediments from the bottom of the harbor in early 2020, marking the conclusion the sub-tidal remediation that makes up much of the overall project.

"Today is a historic day, and a proud day, for the U.S. Army Corps of Engineers," said Col. John Atilano II, New England District commander. "We have partnered with EPA on the cleanup of this harbor since the late 1980s and we are now closer than ever to the finish line."

Contaminated since the 1940s because of decades of PCB-contaminated waste being dumped into the harbor by local manufacturers, the New Bedford Harbor is one of the largest and most complex cleanups the district has ever undertaken.

Marie Esten, New England District's project manager, outlined the challenges of cleaning up such a large area.

"The site itself is 18,000 acres and is more than six miles long, with several areas so shallow we could not bring a dredge in," she said. "It's also spanned by low bridges that made it difficult to get equipment in and out.

"Additionally, the project is on a tidal estuary where water flowing both ways makes recontamination during work a constant concern," Esten said.

According to Atilano, when the New England District first began this project, the technology to remediate the harbor's contaminants properly and efficiently did not exist.

"Over the past two decades, this building housed equipment and processes that emerged from the evolving state-of-the-art and enabled us to get to where we are today," he said.

In the last decade alone, approximately 600,000 cubic yards of material passed through the dewatering facility, equal to about 50,000 dump trucks.

"Today, we are turning this valuable piece of real estate back to the people of New Bedford," Atilano added. "The sediment dewatering process building was a necessary component and in some ways a symbol of our subtidal cleanup work. Now that the subtidal environment has been remediated, we are very happy to no longer have need of it.

"We will continue to work diligently on the next phases of the project," he said. "This spring, we look forward to cleaning up several wetland areas in New Bedford, Fairhaven and Acushnet."

Intertidal/wetland remediation and restoration continues along the Harbor shoreline; four of the eight remaining zones will be completed in 2021.

The district commander credited the strong partnership with EPA and the city of New Bedford for the progress on the project.

"Strong partnerships like that are critical to almost every project the New England District undertakes," he said. "I want to thank Mayor Mitchell, Mr. Deziel and my New Bedford Superfund team for the hard work and dedication they put into getting this project to where we are now."

Atilano also thanked the residents of New Bedford, Fairhaven and Acushnet for their continued resilience, assistance and interest in the harbor cleanup process.

"I cannot guarantee you an end date to this phase or the project overall," he said. "But I can guarantee you that the New England District will continue to work hard with the EPA and local officials to ensure the efforts are a success."

(Photo by MaryEllen Lorio)
USACE, New England District completed dredging to remove PCB-contaminated sediments from the bottom of the harbor in early 2020, marking the conclusion of the sub-tidal remediation that makes up much of the overall project.

(Photo by Michael Haley)

Once a heavily contaminated site, Maywood Riverfront Park has been cleaned up and redeveloped for community use.

Maywood Superfund site redeveloped for community use

By Claudia Garcia
USACE, Los Angeles District

For the first time since 1940, the last area of the 4-acre Pemaco Maywood Superfund Site, located along the Los Angeles River in Maywood, California, is redeveloped for community use.

The park — located in a mixed industrial and residential neighborhood — offers much-needed athletic and recreational facilities to a heavily populated urban area.

The U.S. Army Corps of Engineers, Los Angeles District provided technical assistance to the Environmental Protection Agency through the Comprehensive Environmental Response, Compensation, and Liability Act, or CERCLA, Long-Term Response Action phase.

From the late 1940s to 1991, the Pemaco Maywood Superfund Site was a former chemical-mixing facility of chlorinated solvents, aromatic solvents and flammable liquids. Activities at the site contaminated the soil and groundwater with various contaminants.

After a fire destroyed the plant in 1993, EPA investigations confirmed the presence of hazardous chemicals in the soil and groundwater.

With USACE's support, the EPA completed a number of cleanup actions to protect human health and the environment.

A carbon-based treatment system for soil vapors and groundwater continues to operate while a solar powered energy system provides supplemental energy to the treatment plant.

The 3.4-kilowatt-hour solar energy system produces about 5,600 kilowatt hours annually, offsetting about 3.3 tons of carbon dioxide emissions each year.

USACE assisted the EPA in estimating that it would take two to five years to recover the capital investment cost for the solar-powered energy system when compared to buying electricity for the site operations.

Long-term operations and maintenance of the site's cleanup plan are ongoing with oversight by California's Department of Toxic Substances Control.

The city of Maywood, together with the Trust for Public Land, incorporated the Maywood Superfund Site into a community park as part of the Los Angeles River Greenway project.

Maywood Riverfront Park opened in May 2008, and the remaining areas where USACE supported cleanup activities were opened in November 2018.

The groundwater and soil vapor extraction and treatment systems continue to operate at the site. Vapor is treated to meet all air quality standards prior to discharging to ambient air. Treated groundwater and vapor condensate is discharged to the L.A. County Sanitary District sewer system. Groundwater is sampled semi-annually.

USACE provided environmental technical assistance and construction oversight of the last undeveloped 1.4 acres of the Pemaco Maywood Superfund site.

Redevelopment included installation of a geo-membrane and soil cover cap, landscaping and monitoring wells.

The Pemaco Maywood Superfund site was an EPA Superfund Redevelopment Initiative, which helps communities reclaim and reuse thousands of acres of formerly contaminated land.

Post's conservation efforts garner recognition

(U.S. Army photo)
Access to hunting and fishing areas supports the morale of Soldiers and family members at a reasonable cost. With more than 148,000 visits in 2019-2020, the natural resources management program allows customers to enjoy the environment while assisting with the management of fish and game populations on the installation.

By Lori Hogan
U.S. Army Environmental Command

Fort Stewart/Hunter Army Airfield recently received the 2020 Secretary of the Army Environmental Award for Natural Resources Conservation for a Large Installation.

Fort Stewart's 284,000 acres in southeast Georgia provide unrivaled training opportunities for Soldiers in a diverse environment.

The lands contain some of the state's most biologically and ecologically diverse areas, including pine forest, wetlands, blackwater rivers, hardwood management areas, forest clearings, and the largest tract of longleaf pine ecosystem.

Its wildlife habitat includes seven species protected by the Endangered Species Act, more than 20 species of concern and a diverse landscape of 948 different plant species.

Through the management strategies developed in the Integrated Natural Resources Management Plan, natural resource managers have formulated a balance between military training needs and the responsible stewardship of natural resources.

To achieve its goals, a team of environmental, cultural resources, and training and security branches developed detailed integrated management prescriptions for each of the installation's 120 training areas.

Those prescriptions dealt with habitat restoration, threatened/endangered species, forestry, cultural resource sites and surveys, wetlands and training facilities.

The team also worked with federal and state agencies, universities, research institutions and nongovernmental organizations to ensure that environmental activities were backed by the best science available.

Some of the most notable achievements included protecting 17,003 additional acres under the Army Compatible Use Buffer Program.

The ACUB program aids in preventing encroachment from incompatible development adjacent to installation boundaries. The result increased the total acreage protected to 94,597 acres, guaranteeing superior training opportunities for both current and future generations of Soldiers.

Another long-lasting accomplishment was achieved through land use and forest management with support from external partners, including the U.S. Fish and Wildlife Service, Georgia Department of Natural Resources, U.S. Forest Service, Georgia Forestry Commission and the Natural Resources Conservation Service.

Together, the organizations were able to restore the native longleaf pine/wiregrass ecosystem by planting 134 acres of wiregrass and 438 acres of longleaf pine, and by conducting timber thinning on 5,531 acres.

The thinning and future prescribed management actions will serve to reduce the threat of wildfire-related damages to people and property both on and off the installation.

"The prescribed burn program not only sustains the longleaf pine-wiregrass ecosystem, it opens up the landscape, creating better training grounds with less restrictions," said Jamie Heidle, director of public works.

Additionally, the forestry branch manages an extensive timber harvest program, conducting timber sales that totaled $5.3 million in support of the Army's Conservation Reimbursable and Fee Collection Program.

The combination of these actions led to improved habitat for the eastern indigo snake, gopher tortoise and the red-cockaded woodpecker.

In fact, continued protection of the woodpecker has resulted in a 63% increase in its population since they reached recovery in 2012.

FS/HAAF receives more than 148,000 visitors each year who recreate, hunt and fish on the installation.

Providing ample, well-maintained hunting and fishing areas bolstered participation in the recreation program and enhances the community outreach program.

From 2019 to 2020, the team held 287 public outreach events that reached more than 45,000 area residents. School programs, both on- and off-post, included Earth Day events, community showcases, community safety days and back-to-school fairs. These educational events help to increase conservation awareness, which is instrumental in successfully conducting natural resource management to audiences that reach beyond the borders of the installation.

"The lands on Fort Stewart and Hunter Army Airfield have been used to serve our nation's defense for well over half a century, and this legacy is not taken lightly by those who use them today," said Col. Bryan Logan, garrison commander, Fort Stewart/Hunter Army Airfield.

"The natural resource team is dedicated to future generations who will use these lands and their resources."

Guard recognized for efforts in sustainability

By Lori Hogan
U.S. Army Environmental Command

The Minnesota Army National Guard has two main bases, the 53,000-acre Camp Riley Training Center, and the 1,500-acre Arden Hills Army Training Site; the command's responsibilities also include 62 facilities in 58 communities.

The MNARNG Sustainability Team is charged with securing the viability, resiliency and efficiency of these sites.

Its efforts directly support one of the Minnesota Guard's priority actions to "Optimize Capabilities — establish a collaborative environment through sustainability efforts and resource efficiencies to improve global mobility, cyber and support capabilities," said Lori Ruff, sustainability manager.

The team set its sights on implementing several comprehensive sustainability plans between 2019 and 2020 while working with community partners and internal cross-directorate groups, MNARNG Sustainability Working Group and the Office of Enterprise Sustainability, supporting implementation and helping to navigate licensing and permitting requirements.

The Joint Sustainability Master Plan focused on reducing energy use, increasing recycling, promoting a "greener" fleet with reduced emissions, and eliminating waste streams.

The Adjutant General's Campaign Plan also emphasizes sustainability projects vital to the Guard's mission, particularly energy conservation, renewable energy production, and building new facilities to the LEED or SB2030 design standards.

From these plans, the team identified multiple projects over a two-year period that would transform MNARNG's overall footprint on the environment.

Renovation projects at St. Cloud Training and Community Center, Arden Hills Army Training Site and the Inver Grove Heights TACC provided the perfect opportunity to take advantage of renewable energy.

Overall the team installed six solar photovoltaic (PV arrays), producing 234 kilowatts of electricity. The team also contributed to the building's design phase, integrating features like geothermal heating and cooling, daylighting, and water-conserving fixtures.

To meet state and federal mandates for fuel-efficient or zero-emissions vehicles, the team obtained four Chevy Volt PHEVs for Camp Ripley's staff.

The team also replaced older fleet vehicles with more fuel-efficient models, purchasing two Chrysler Pacificas, two Toyota Camrys, and one Toyota Rav4.

Other measures in the sustainability plans focused on reducing waste and water consumption.

A previously piloted composting program at Camp Ripley's dining facilities emphasized reducing waste by recycling plastics and aluminum, reducing Styrofoam use and composting organic material by separating it from other miscellaneous trash items.

(U.S. Army Photo)

The Minnesota Army National Guard's Sustainability Team played an integral role in the design and construction of the new Arden Hills Division Headquarters. The sustainability features include a 60-kilowatt solar photovoltaic system that is expected to meet 2.5% of the electrical load, daylighting, solar tube style skylighting and a ground source heat pump system.

This program has been expanded and includes education and awareness campaigns.

Though the pandemic disrupted operations, they tracked a diversion rate of over 37% by the third quarter of 2020, with 110 tons of material recycled. They also achieved 100% diversion rates for non-hazardous construction and demolition materials, recycling 62 tons of this debris in 2020.

Water consumption was also reduced over the two-year period. In 2019, cumulative water use intensity was 0.0123 kilogallons per square foot; and in 2020, the intensity dropped to 0.0088 kilogallons per square foot, a 28% reduction.

To further reduce water use, a turfgrass feasibility study started in July 2020 is expected to increase water reduction in 2021 and beyond.

In addition to water conservation, the team looked at ways to improve water quality.

They identified potential harm to water resources through the unavoidable use of salt to treat icy roads, sidewalks and parking lots during Minnesota winters.

Salt is the most cost-effective treatment for ice on pavement; however, its overuse leads to sodium chloride washing off roads and into surface and groundwater sources.

This led to the "Smart Salting" program that provided training and awareness of over application.

The Sustainability Team is the cornerstone of the MNARNG's long-term sustainability strategy. Its work has helped to slash waste and grow efficiencies across waste, water and energy usage while realizing cost savings.

For these reasons, the MNARNG was awarded the 2020 Secretary of the Army Environmental Award for Sustainability for a Team/Individual.

"The MNARNG Sustainability Team works with staff and units to instill sustainable practices within operations, empowering all components of the organization to enhance environmental activities while keeping the focus on installation readiness," said Jay Brezinka, environmental program manager.

Oregon Guard recognized for preservation efforts at Camp Umatilla

By Lori Hogan
U.S. Army Environmental Command

Camp Umatilla is a small installation that sits on the banks of the Columbia River, west of Hermiston in northeastern Oregon.

The camp recently received the Secretary of the Army Environmental Award for Cultural Resources Management – Small Installation for its work in preserving the historical aspects of the site while upgrading it to a modern training facility.

The Army established Camp Umatilla in 1940 as a munitions depot, used primarily for storage, consisting of a thousand concrete igloos, maintenance facilities and grounds for testing, demolition and disposal.

Throughout World War II, the installation grew, eventually containing 536 structures and a cantonment area of historical significance based on the wartime era in which they were built.

In addition, the grounds included tribal cultural properties and religious sites deemed important to the Confederated Tribes of Umatilla Indian Reservation (CTUIR).

In 2005, as part of the Army Base Realignment and Closure program, Camp Umatilla began the process of transferring 7,500 acres to the Oregon Army National Guard.

The Guard's environmental office and the Cultural Resources Management (CRM) program were charged with bringing in stakeholders and finding ways to preserve the consequential and cultural value of the site while allowing modern training and operations to proceed.

A daunting task, but even more so considering the National Historic Preservation Act of 1966, which requires federal agencies to consider the effects of its actions on all historic properties by identifying such properties, assessing adverse effects and resolving those effects.

Knowing that it was going to be a monumental task, the CRM program conducted an environmental assessment of Camp Umatilla under the National Environmental Policy Act process.

This evaluation revealed that all buildings within the 7,500 acres could be eligible to be placed on the National Register of Historic Places, which meant that all future work on the buildings would require individual Section 106 reviews. This type of review is a costly and timely process that would have tied up the project for years, delaying construction and crucial training exercises.

A solution was developed by the environmental office and CRM program, in consultation with the State Historic Preservation Office, considered a "Grand Bargain" where 12 buildings and six igloos concentrated in a 15.5-acre and an 8-acre parcel, respectively, would be preserved and established as a historic district.

Those structures were declared significant and would adequately represent American WWII construction and history. The remaining 518 buildings were rendered non-significant or unsafe, meaning they could be demolished or re-purposed as needed by the Army.

Another accomplishment was the development of a comprehensive Historic District Management Manual designed to guide users on how to conduct maintenance on the remaining historic structures, complete archaeological surveys across 4,200 acres and document the remnants of an 1874 wagon trail that was part of a connecting spur to the historic Oregon Trail.

To address the tribal cultural assets, Oregon Guard partnered with tribal leaders of CTUIR to ensure access while protecting cultural and religious sites.

Transferability is a key aspect in the Army's ability to reorganize and use existing grounds more efficiently and effectively.

Camp Umatilla is a case in which hundreds of potentially historic buildings would have prevented an affordable and smooth transfer of land to the Guard and resulted in a significant mission impact.

"It was our agency's engagement and relationship with SHPO that led to a customized approach to balancing preservation with the growing needs of modern facilities," said James Arnold, Environmental Branch chief, Oregon Military Department. "Combining this commitment to cooperation and the best practices in historic management allowed Camp Umatilla to open with limited impacts on development or training activities."

The installation is now ready to move forward with renovations and new construction of barracks, classrooms and dining halls, as well as the establishment of small arms ranges and maneuver areas.

"An added benefit of the transfer is Camp Umatilla's ability to connect with the community," Arnold added. "Portions of the training site are accessible to the public and hold potential for further outreach and educational opportunities. Interpretive panels will be erected in the historic district providing way-finding and historical context for the area."

(U.S. Army Photo)
The entry gate to the former Umatilla Chemical Depot will be updated to reflect the change in mission with the Oregon Military Department.

(Photo by Libby Watt)

Work executed at the Nolin River Lake will help keep sediment in place and provide multiple benefits, including improved water quality, increased habitat for aquatic life, reduced siltation, and protecting and prolonging the function of the flood control structure.

Multi-agency partnership stabilizes lake bank, improves fish habitat

By Libby Watt
USACE, Louisville District

As part of a multi-agency partnership, the U.S. Army Corps of Engineers Nolin River Lake was the first reservoir in the Louisville District to install large concrete reef balls as both fish habitat and as a wave break for bank stabilization measures.

The collaboration is part of a larger effort with the Kentucky Department of Fish and Wildlife Resources, Friends of Nolin, Friends of Reservoirs, and the Reservoir Fish Habitat Partnership to complete a $300,000 bank stabilization project.

This included installing rip rap using the longitudinal peak stone toe protection method to promote bank stabilization, planting native seed and shrubs to target pollinators, and creating more bank fishing opportunities by enhancing fish habitat with various fish attractors.

The concept of using reef balls as fish habitat came about due to a strong partnership with KDFWR.

Jeremy Shiflet, a fisheries biologist for Kentucky Fish and Wildlife, offered to collaborate on this project and suggested a partnership with the Reservoir Fish Habitat Partnership, a non-profit group that works to improve fish habitat, working alongside government agencies.

The grant awarded through Reservoir Fish Habitat Partnership included $30,000 for patented fiberglass reef ball molds, supply kits, and training from Reef Innovations to make the reef balls.

While the reef balls are primarily for fish habitat, USACE also plans to experiment using the larger balls as wave breaks to further protect the shoreline.

To date, accomplishments include over 1,000 feet of bank stabilization structure installed; 2,600 square feet of fish habitat structures deployed; 48 reef balls placed; and 4,500 square feet of native seed planted.

Weather permitting, the final step of the project will be planting over 1,000 live stakes with assistance from Friends of Nolin in the spring.

Louisville District plans to continue installation of bank stabilization projects in coordination with Chris Haring from the USACE Engineer Research and Development Center.

Haring visited in 2019 through a water operations technical support request and has provided consultation for prioritizing projects and incorporating Engineering With Nature through the application of natural and nature-based features sedimentation and sustainability techniques.

This effort will help keep sediment in place and provide multiple benefits that include improved water quality, increased habitat for aquatic life, reduced siltation, and protecting and prolonging the function of the flood control structure.

USAEC supports Army readiness through water management

(Photo by Quentin Johnson)

Elementary school students learn how animal waste and garbage, if not properly managed, can be harmful to local water sources, including groundwater, stormwater and drinking water during an Earth Day Fair at Corpus Christi Army Depot in 2019. The students also learned about the importance of preserving the environment, watersheds and the effects on sea life.

By Lori Hogan
U.S. Army Environmental Command

The U.S. Army Environmental Command's Water Management Program safeguards stormwater by meeting environmental standards designed to reduce pollutants discharged into the nation's waters.

Stormwater is water from rain or snow melt that is not absorbed into the groundwater supply and which then flows over impervious surfaces collecting trash and pollutants. This water flows into storm drains, and eventually into creeks, streams and rivers without benefit of treatment.

USAEC's team of subject matter experts works diligently to help installations understand and comply with federal and state requirements.

Suzy Rohrs, a water subject matter expert in the Compliance Branch of the Environmental Quality Division, works primarily with the Environmental Performance Assessment System program.

This program evaluates environmental risk and compliance points at installations, providing an external assessment of how environmental programs meet requirements of regulatory agencies.

"Our team goes in and reviews National Pollutant Discharge Elimination Systems permits and associated plans to determine if they are the right size and scope for the installation," said Rohrs. "We make sure they are in compliance with applicable regulations and determine if their compliance footprint can be downsized.

"This centralized approach helps installations avoid compliance violations, which can be costly and time consuming to manage," she said. "Violations can reduce readiness by requiring an installation to use resources to respond to compliance issues that should have gone toward mission readiness."

An NPDES permit allows municipalities or facilities to discharge a specified amount of pollutants into a receiving body of water as long as they meet the permit conditions.

The permits fall into two primary categories: general and individual.

A Municipal Separate Storm Sewer System is an example of a general permit, whereas an individual permit is specific to an individual facility.

"We continue looking for ways to streamline the process to make it more manageable for the installations," Rohrs added. "For instance, some installations were permitted as industrial-like facilities, but they didn't meet the Standard Industrial Classification definition for an industrial stormwater permit.

"Industrial stormwater permits carry resource-intensive requirements for inspections and analytical sampling," she said. "Our analysis indicated these facilities should have received an MS4 permit and they were already meeting those requirements.

"Negotiations with the regulators allows USAEC to ensure the installation is correctly permitted and reduces the compliance burden."

In addition to working with installations one-on-one, USAEC works on large-scale programs such as the Chesapeake Bay Watershed Program.

This watershed spans six states from New York to Virginia and encompasses over 64,000 square miles.

Under the Clean Water Act, the Chesapeake Bay was designated as impaired, showing more than the total maximum daily load allowable for nitrogen, phosphorus and total suspended solids.

In 2010, states were required to develop Watershed Implementation Plans and were given a deadline of 2025 to bring the watershed to a non-impaired status.

That meant anyone discharging into the bay had to mitigate their pollutants and come into compliance. This includes nine Army installations.

Elisa Ortiz, the Northeast Division subject matter expert on water, supports the installations under the Chesapeake Bay Program and assists with Environmental Performance Assessment System (EPAS) assessments.

For Ortiz, this means thinking outside the box and using innovative ways to minimize sediment and reduce pollutants accumulated during runoff.

"Each site is unique, and a best management practice (BMP) that works in Maryland is not necessarily going to work in Virginia," she said. "We had to evaluate each site and come up with projects that would work well based on the local site conditions."

Some of those solutions include building pocket sand filters, tree boxes and bioretention ponds; and removing fine solids and sediments while allowing trees, grasses and other vegetation to absorb the nutrients.

Another method uses pervious concrete, which permits water from precipitation and other sources to pass directly through the concrete, allowing groundwater to recharge.

Ortiz noted there has been a shift in the way stormwater is thought about and how it is managed.

"In years past, municipalities and facilities were concerned about the quantity of stormwater and how it affected flooding, whereas today the concern is with both quantity and quality," she said. "Instead of using large basins to manage runoff, communities are looking at site-specific, localized stormwater solutions."

Ortiz also sits on the Water Services Steering Committee, made up of all the armed services, who often tackle policy and regulations that impact the Department of Defense.

While she does not draft policy, she offers guidance, conducts briefings and reviews new regulations so DOD can formally comment on topics related to water management.

Ortiz also leads a community of practice consisting of water managers at Army installations.

"I act as a conduit between the military services, regulatory agencies and installations, which allows me to effectively communicate issues up and down the chain," she said.

USAEC's mission is to deliver cost-effective environmental services globally to enable Army readiness. Its team of experts continues to provide solutions that focus on being proactive.

"One of our greatest challenges is educating garrison leadership that BMPs are assets and must be maintained," Ortiz said. "By looking at it in a different light to see what can be done versus what has to be done, we could reduce costs over time."

Rohrs echoed that sentiment.

"By shifting from a culture of 'this is the way we've always done it,' to investing time and resources on the front end, the program will become easier to manage and more cost effective in the long run," she said.

ERDC evaluates engineering benefits of Florida's mangrove forests

By Carol C. Coleman
Engineer Research & Development Center

Along the Florida coastline, forests of trees with a dense tangle of prop roots appear to be standing on stilts above the water.

These trees, or mangroves, are not only magnificent to see, but are a key element in protecting coastlines and communities during coastal storms.

Researchers at the U.S. Army Engineer Research and Development Center have partnered with the U.S. Army Corps of Engineers, Jacksonville District and the U.S. Naval Academy to explore the engineering value of Florida's mangrove forests.

For more than a decade, the USACE Engineering With Nature Program has pursued the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits.

One opportunity is the application of natural and nature-based features, or landscapes, such as mangrove trees, that are used to provide engineering functions relevant to flood risk management.

"Natural and nature-based features have been identified as a pathway to increase coastal resiliency and reduce coastal storm impacts for quite a while," said Dr. Duncan Bryant, a research hydraulic engineer with ERDC's Coastal and Hydraulics Laboratory.

He said that the districts are really starting to ask how to implement them, and how to value and include them in future designs; and across the board, that need to understand how these features can serve effectively.

"This research on mangroves is incredibly important," said Dr. Jeff King, USACE's EWN program manager.

"Duncan and this collaborative team are advancing practice through their ongoing investigations. The results of this effort will help inform our future approach for the use of mangrove forest to reduce flood and storm risk."

With the substantial number of mangroves growing throughout their area of responsibility, the Jacksonville District reached out to the researchers at ERDC to help them better understand how to successfully use the trees in their project planning processes as well as quantifying their added value.

(USACE courtesy photo)

Mary Bryant, a research hydraulic engineer with ERDC's Coastal and Hydraulics Laboratory, overlooks the 1:2 scale model of mangrove forest like those located on the Florida coastline.

To answer those questions, Bryant and his team collaborated with professors at the Naval Academy to build a scale model of coastal mangroves.

For their project, which began in early 2020, they focused on two specific components.

"First, we felt it necessary to narrow our consideration to the properties of mangroves in Florida," he said. "Some other experiments have been conducted focusing on the same species in Asia, but they seem to have some different regional growth habits. Those different growth habits can influence the engineer performance, so we really wanted to concentrate on what they look like specific to Florida."

With field reconnaissance provided by the academy team, and using documents and dissertations from similar studies that gave an overview of the Florida area, the ERDC team was able to build a 1:2 scale model.

"That was the other aspect we felt was necessary. Previous studies have been done on a smaller scale, but when working with smaller scaled models, you could unintentionally skew your results," Bryant explained. "Because of the size, some physics, some property, some physical process is not being accurately represented. In this case, we're talking about turbulence. We felt like going as large-scale as we could, would help alleviate that concern.

"Oregon State University actually built a 1:1 model," he added. "Their focus is a little bit different than ours, but we have been able to share data and see how similar or how different our results are. We've learned a lot about the basic science and about our experiments. They're doing some work, and we're doing some work — so to get the most and learn the most, it really helps us to share and let each other know what we're doing, how it's going and what we're learning."

As phase one testing on the model began to wrap up in December, Bryant and the team set their sights on the next phase.

"Now that we've completed testing on waves and transport, we're actually going to switch gears a little bit. We're planning experiments that will include sediment," he said. "That's a big deal for USACE, especially considering dredging and where sediments are going and sediment retention. We want to do some experiments this summer to capture some of the physics and the processes that happen within the mangroves from a sediment retention standpoint."

Looking toward the future, Bryant says, "I imagine a lot of this will move into design and a numerical modeling type of approach for planning," he said. "Once you have a physical-based description of the processes and what happens inside of these forests, you can now move up to larger implementation. We can start using that to make designs — to make plans — to say, 'Okay, how does this compare to that?' and make educated decisions for USACE."

"ERDC is working to describe, measure and provide predictive capabilities for the use of natural and nature-based features in the districts for the districts," he said. "We heard the districts, and we're trying to execute that. And at the same time, I would say through the efforts of the EWN Program, it's really moved USACE into a leadership position across the world."

USACE's enduring mission addresses environmental impacts on tribal lands

By Anisha Downs
USACE, Headquarters

The Native American Lands Environmental Mitigation Program (NALEMP) was created by the Department of Defense to address environmental impacts on tribal lands from former DOD activities.

The U.S. Army Corps of Engineers executes this program for DOD through the applicable USACE geographic districts and the NALEMP program manager located at USACE Headquarters with maximum tribal participation, through government-to-government consultation.

Past DOD operational and training activities may have had adverse effects on tribal lands.

Impacts NALEMP helps address include hazardous materials, munitions debris, unsafe buildings or structures, lead-based paint or asbestos and abandoned equipment.

Since 1993, Congress has provided funds annually to mitigate environmental impacts to tribal lands.

In the Fiscal Year 2021 National Defense Authorization Act, NALEMP received authorization legislation and codification.

This will provide enduring authority for the program to continue to mitigate environmental damage to tribal lands from past DOD operations.

Through fiscal 2020, the program has executed 341 cooperative agreements, totaling more than $157 million.

USACE is committed to working with DOD and tribes to support programmatic updates, award and manage cooperative agreements, and ensure the program is successful in mitigating environmental damage to Native American lands.

(USACE Alaska District)

NALEMP addresses environmental impacts on tribal lands from former Defense Department activities. Recent activities include the removal of World War II debris in Unalaska Valley, Alaska, in July 2020.

(U.S. Army courtesy photo)

Through the Army's Base Realignment and Closure environmental mission, Fort Monmouth housing units were cleaned up, restored and transferred to the Affordable Housing Alliance to provide shelter to homeless individuals.

Fort Monmouth property cleanup provides benefits to community

By James T. Moore
USACE, Headquarters

In support of the U.S. Army's Base Realignment and Closure (BRAC) environmental mission, the U.S. Army Corps of Engineers provides environmental cleanup support to the Army when closing active Army and Army Reserve Centers.

The purpose of the BRAC program is to transfer excess/surplus property to the appropriate recipient (such as a local reuse authority) in accordance with mutually accepted reuse standards.

USACE provides environmental restoration and cleanup support to the Army's BRAC program through such activities as performing studies, developing designs and conducting remedial actions in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act.

As a result of completed cleanup and property transfers under the BRAC program at the former Fort Monmouth in Monmouth County, New York, housing units are now being constructed through a local reuse authority to provide shelter to homeless individuals.

The Fort Monmouth Economic Revitalization Authority (FMERA) purchased 20 permanent supportive housing units that were being developed as part of a residential unit project.

FMERA used its Homeless Trust Fund to pay for the units and immediately transferred those units to the Affordable Housing Alliance. For each acre of developable land sold by FMERA, approximately $20,000/acre is put into the Homeless Trust Fund to fund these efforts.

As development continues to move forward on Fort Monmouth, FMERA will construct an additional 20 permanent supportive housing units.

USACE will continue to support the Army's BRAC environmental mission to transfer property and address environmental liabilities at Fort Monmouth.

To date, environmental cleanup activities on the site includes the completion of remedial investigations and feasibility studies at 18 Installation Restoration Program sites, 12 time-critical removal actions to address polychlorinated biphenyls (PCBs); volatile organic compounds (VOCs); petroleum, oil and lubricant (POL) contamination; and five records of decision.

Fort Monmouth History

Established in June 1917 as Camp Little Silver, Fort Monmouth changed its name in 1925 when it assumed its new mission in signal corps training and electronics research.

In 1929, the first radio-equipped weather balloon was launched here, marking the first major development in the application of electronics to the study of weather and atmospheric conditions.

Also during this time, the post housed the Pigeon Breeding and Training Center, which bred and trained birds to fly in darkness to exchange communications.

Much of the communications equipment used by the armed forces during World War II was designed and developed here, including radar which had emerged from the defensive need to counter the possibility of massive aerial bombardment.

After the war, the post remained a vital part of research and development for technologies used by the military during the Cold War and Vietnam Conflict.

From 1981 until it closed Sept. 15, 2011, the post served as headquarters for the U.S. Army Communications-Electronics Command.

After its closure, Fort Monmouth continued to be used for a variety of purposes, including as temporary housing for 2,000 New Jersey residents (and their pets) impacted by Superstorm Sandy.

Advanced geophysical classification supports data quality at munitions response sites

By John Jackson
Environmental & Munitions Center of Expertise

Advanced Geophysical Classification (AGC) was developed by the Department of Defense, through the Strategic Environmental Research and Development Program (SERDP) and Environmental Security Technology Certification Program (ESTCP), as a geophysical data classification process to improve the efficiency of munitions response actions (cleanup) at property known or suspected to contain military munitions.

The classification process allows remediation to focus resources on identifying specific geophysical targets that are characterized to present potential explosive safety hazards at a munitions response site.

As technology continues to be developed and deployed on multiple platforms, the concurrent development of quality measurements and quality control criteria has been tracked and monitored by the DOD Environmental Data Quality Workgroup in coordination with the U.S. Army Corps of Engineers Environmental and Munitions Center of Expertise (EMCX) to ensure contractors have been validated by the DOD Advanced Geophysical Classification Accreditation Program (DAGCAP) when deploying these systems.

Development of this program has been a resounding success of collaboration within the munitions response community. Besides an emphasis on quality, DAGCAP has promoted fair and open competition among commercial entities offering AGC services and interoperability among DOD components.

Geophysical Classification

Geophysical classification is a broad term that has historically been used in various ways; however, "Advanced" Geophysical Classification refers to a specific subset of multi-axis, multi-coil electromagnetic induction sensors and methodologies that are used in a way to isolate specific characteristics of detected anomalies which can then be used to classify each item as targets of interest, e.g., possible munitions or non-target of interests, e.g., metal debris.

The process begins with initial geophysical detection and measures the intrinsic properties of the detected anomaly sources (buried metallic objects) to generate principal-axis polarizability decay curves. The polarizability curves reflect an estimated size, symmetry, material composition and wall thickness of the buried metallic objects.

The definition of targets of interest includes unexploded ordnance, discarded military munitions, intact munitions debris, and seeds planted as quality tests to simulate a buried munition.

The process allows a field team to select targets of interest for isolated removal and has the added safety benefits of anticipating the nature of the item to be removed, reducing the digging of unharmful metal debris, and reducing exclusion zone evacuations.

DAGCAP and the EMCX maintain the DOD AGC library that contains over 200 of the most common polarizability curves representing munitions on munitions response sites. The library is used to "match" detected anomalies to the characteristics of items within the inventory.

Lessons Learned

In 2010, ESTCP developed a Live Site Demonstration Program to test and validate classification capabilities of available and emerging technologies on real sites under operational conditions.

This program provides transparent and documented demonstrations of current classification technologies and their capabilities; validates the potential cost offsets; and determines the potential use of these technologies to accelerate cleanup at munitions response sites.

The ESTCP concluded it is possible for an analyst to correctly identify 100% of detected anomalies as a target of interest and 75% of the time as non-targets of interest.

The ESTCP based its conclusion on data from over 30 demonstrations at over 20 munitions response sites. The ESTCP also noted that the use of current AGC technologies had limitations; therefore, was not appropriate for use at some munitions response sites.

These limitations included munitions response sites with 20-millimeter munitions and smaller munitions of concern, and areas with anomaly densities that were too high.

In addition to a long list of technical capabilities and lessons learned, the ESTCP Live Site Demonstration Program highlighted two critical points.

First, an auditable trail of quality control checks is critical to ensuring data quality. If the environmental data is to be defensible, then a strong quality control program is required to verify each step and validate results. The advanced sensors provide a larger number of data streams with increased opportunity for quality control reviews. This allows USACE and its regulators to understand not only what is being detected and classified but, more importantly, what is being left behind.

The second issue was more difficult to control. It was identified as the differences among field team personnel responsible for instrument use or performing data analysis. This inconsistency necessitated the development of quality conditions to ensure a trained, experienced geophysicist is producing, analyzing and classifying the data. DOD determined that an accreditation program could be used to address both issues.

By developing standardized quality control requirements for the various steps and on the increased number of data, an auditable trail is generated to verify the performance of the technology and the operator as a united and unique quality system.

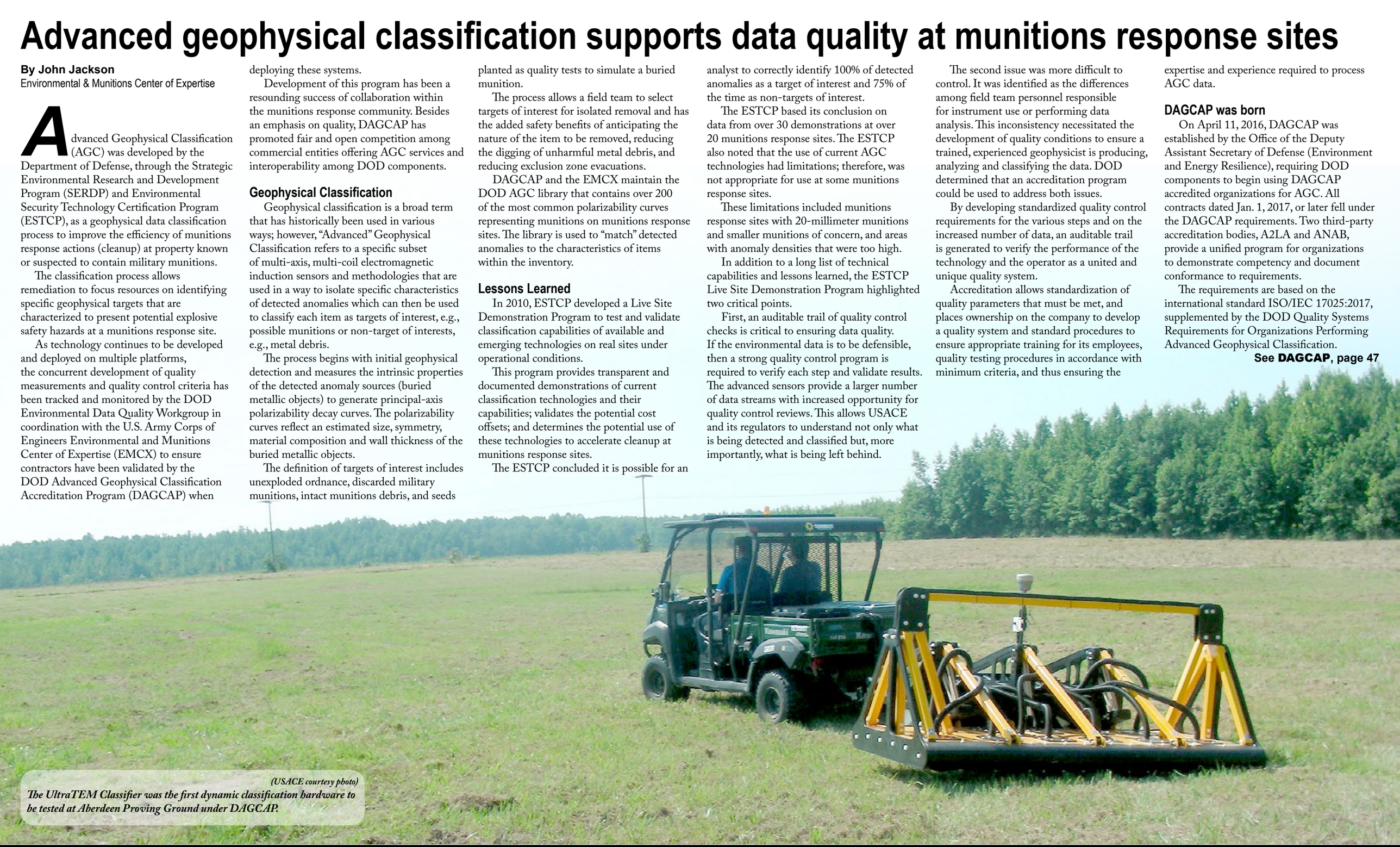
Accreditation allows standardization of quality parameters that must be met, and places ownership on the company to develop a quality system and standard procedures to ensure appropriate training for its employees, quality testing procedures in accordance with minimum criteria, and thus ensuring the expertise and experience required to process AGC data.

DAGCAP was born

On April 11, 2016, DAGCAP was established by the Office of the Deputy Assistant Secretary of Defense (Environment and Energy Resilience), requiring DOD components to begin using DAGCAP accredited organizations for AGC. All contracts dated Jan. 1, 2017, or later fell under the DAGCAP requirements. Two third-party accreditation bodies, A2LA and ANAB, provide a unified program for organizations to demonstrate competency and document conformance to requirements.

The requirements are based on the international standard ISO/IEC 17025:2017, supplemented by the DOD Quality Systems Requirements for Organizations Performing Advanced Geophysical Classification.

See DAGCAP, page 47



(USACE courtesy photo)
The UltraTEM Classifier was the first dynamic classification hardware to be tested at Aberdeen Proving Ground under DAGCAP.

continued from page 46

The scope of accreditation is as follows: ISO 17025:2017, General Requirements for the Competence of Testing and Calibration laboratories, accreditation for Technology (Electro Magnetic Induction), Test (Subsurface Munitions), and Method (Advanced Geophysical Accreditation).

The Environmental Data Quality Workgroup provides management and oversight of the DAGCAP.

Accreditation under DAGCAP is achieved through a two-step process: assessing the organization's quality system and successfully demonstrating capabilities performed at the proving ground DAGCAP test site.

Generally, the assessment of the quality system is performed on-site by a quality and technical assessor. As part of the quality system, the standard operating procedures and training records are audited, and. when needed, revisions are brought to the DAGCAP committee for review and acceptance.

The second step is the on-site demonstration of capability at Aberdeen Proving Ground in Maryland.

The Aberdeen Test Center Trench Warfare UXO Test Site has been developed to support the test. A random 0.5 acre across a total of 5 acres is selected for the Geophysical Classification Organization to perform the full process of AGC — from dynamic mapping, to cueing, to processing, to a final dig list submittal. The test is pass/fail and 100% correct classification of all targets of interest with 60% reduction in clutter is required to pass.

After inception of DAGCAP, 15 government contractors working as geophysical classification organizations have been accredited and 12 of the 15 have already undergone reaccreditation. Six of these organizations qualify as small businesses, providing a healthy competition of small and unrestricted business opportunities.

In addition to their accreditation, DAGCAP addresses software and hardware validation, development of the Aberdeen Proving Ground test site, moving towards AGC file format standardization, maintenance of the DOD AGC library, and root cause analysis/corrective action procedures and approval. At this time, there are three different software suites validated to process AGC data.

Hardware validation is similar to the capability demonstration in that the instrument manufacturer must demonstrate their equipment and pass a similar test with 100% correct classification of targets of interest and rejection of clutter.

At this time, hardware is considered "approved" if it was successfully utilized in the ESTCP Live Site Demonstration Program or successfully demonstrated at Aberdeen.

There have been five new pieces of equipment validated at Aberdeen under DAGCAP, the MetalMapper 2x2, UltraTEM Classifier and UltraTEM Screener, APEX and TEMSENSE.

These instruments are considered approved for use on Military Munitions Response Program (MMRP) sites and will be considered fully validated once they produce raw data files in a standardized format.

The standardized data format is the next big initiative under DAGCAP and is expected to be established mid-fiscal 2021.

Ongoing Emphasis on Quality

Under DAGCAP, industry has produced higher quality data and government has seen cost savings on proposals using AGC when compared to traditional methodologies attempting similar quality.

Overall, the program has been successful with 15 accredited companies, three validated software suites, and four additional validated hardware systems.

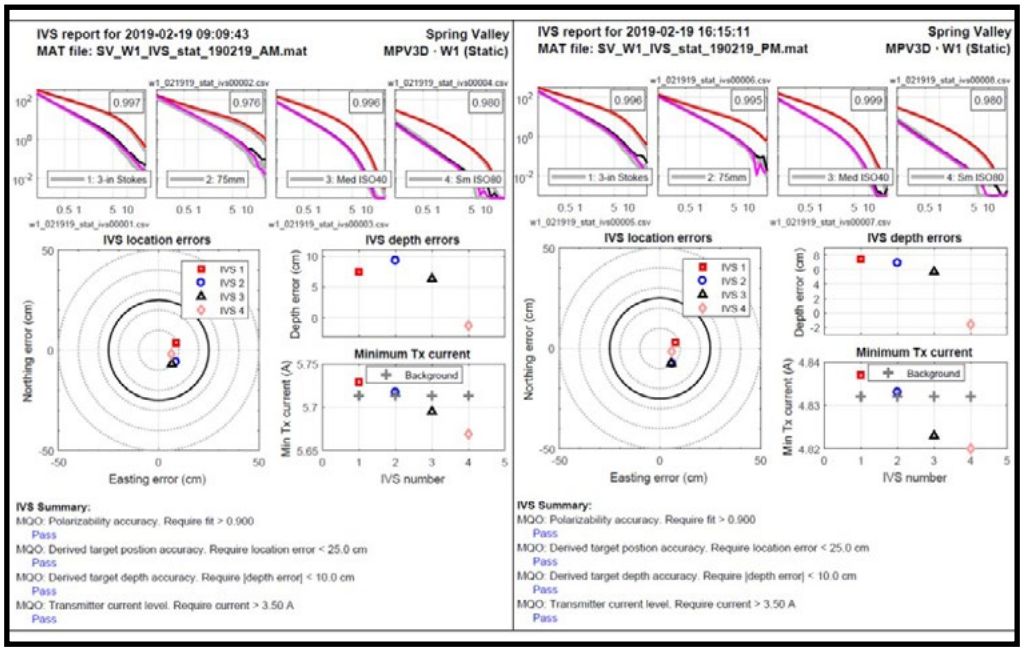
The program has identified multiple areas for growth including equipment availability, data file format consistency, software self-validation capabilities, and ensuring consistent quality across all geophysical data collection instruments.

DAGCAP and the requirements of the Munitions Response Quality Assurance Project Planning documents provide a recipe for documenting data quality and quality control. These data streams roll up into a Data Usability Assessment at the end of a project.

The Data Usability Assessment allows project teams to evaluate data and its use, make informed decisions, document lessons learned, and apply that information to future phases of the project or even other projects.

As DAGCAP continues to grow, greater improvements in data quality should help establish munitions cleanup processes to make the MMRP successful.

Additional information on DAGCAP can be found on the DENIX website at: https://www.denix.osd.mil/mmrp/advanced-geophysical-classification-accreditation-and-other-tools/.



(File photo)

The DOD AGC library is used to "match" detected anomalies to the characteristics of items within the inventory. This figure shows a common DOD AGC library matching plot with data from an instrument verification strip.

Water in the desert

Water catchments help sustain diverse wildlife at Yuma Proving Ground

Yuma Proving Ground helps sustain natural wildlife, such as these Sonoran pronghorn, with a steady source of life-sustaining water collected from water runoff following the desert's rare rain events.

Story & photo by Mark Schauer
USAG, Yuma Proving Ground

With more than 1,200 square miles of land area, Yuma Proving Ground is the fourth-largest Army installation in the Department of Defense in terms of land area.

Testers see the proving ground as a natural laboratory, and thus have a vested interest in good environmental stewardship.

Home to a wide variety of animals, including the Sonoran pronghorn and one of the largest and most genetically diverse populations of bighorn sheep in Arizona, YPG helps sustain the creatures with 25 wildlife water drinkers situated across its mountains and desert range.

"These waters are some of the most phenomenal things we have for wildlife," said Daniel Steward, wildlife biologist. "It allows animals to spread across the range and get full use of the habitat."

The drinkers are a stabilizing presence in one of the nation's driest desert regions, with mechanical apparatus to keep a steady supply of water available for wildlife. Mule deer, bobcats, coyotes, multiple bird species, even bees benefit from their presence.

"We have dry years and not so dry years," Steward added. "One of the values of having adequate water storage out here is having a buffer in dry years — they give resiliency to our ecosystem."

The drinkers run the gamut in age, with some concrete ones dating back to the 1950s.

"A lot of these drinkers are like granddad's axe: it might be on its second head and fifth handle," Steward said. "Some of these drinkers have had different troughs and tanks over the years. We're always swapping components when something breaks."

Wildlife officials are meticulous about keeping the drinkers a viable and perennial presence on the range.

"It's important to keep them in the same location because wildlife get used to them and they're an important feature of the habitat," he explained. "We want to keep them up and going for the long term."

More recent underground storage tanks for the drinkers such as one that was recently inspected on YPG's Cibola Range are made of PVC and filled by water runoff from the desert's rare rain events.

A steady rain event can fill the 10,000-gallon tank, and they are situated with care near washes that will run, but not large ones that will run so violently that the tank fills with sediment instead of water.

Experience has shown that rain water has a lower saline level than water from local wells, which means less sediment buildup to foul water apparatus' moving surfaces.

The PVC is also hardier than the vinyl liner inside an adjacent above-ground rain tank constructed decades ago, which tends to degrade when not continuously filled with water. This older tank has a persistent leak now, but wildlife officials have no plans to remove it.

"Even though this tank has a leak in it and isn't what we want to depend on, it has water in it, and we won't ever let water go to waste," said Steward. "We can pump the water out of this rain tank and put it in our better system, because we haven't had very much rain this year."

An important innovation for the drinkers in recent years was the addition of solar-powered sensors to continuously monitor water levels.

"We were already using the existing sensors on our wash monitor systems, which range control uses to see the depths of the various washes across the range when they start running," said Ryan Ingham, electronic technician with YPG's meteorology team. "The pressure transducer gives a pressure reading that we convert to inches of water."

Topographical features surrounding many of these drinkers obstruct radio signal that sends the data out, requiring some clever workarounds.

"Most of the drinkers sit inside a terrain bowl or at the bottom of a canyon," said Ingham. "We had to create relays to bounce the signals to our existing system."

The sensors spare personnel from having to regularly travel to extremely remote and rugged parts of the range to monitor water levels, and allow for a rapid response if there is a sudden and catastrophic loss of water in one of the drinkers. The instrumentation accurately measures the daily water loss rate, which changes with the seasons and soaring desert temperatures.

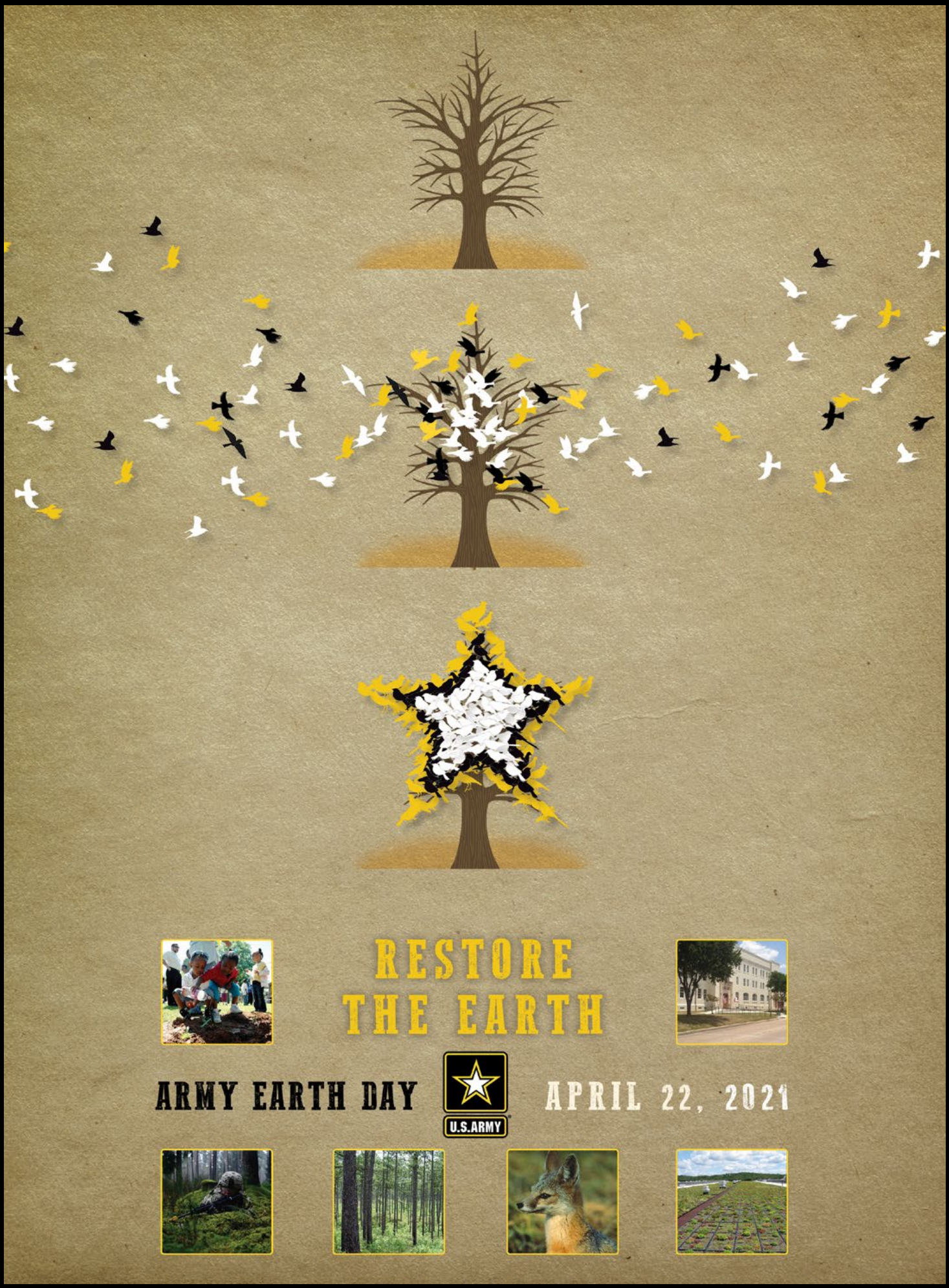
"That allows us to continuously update forecast models of the consumption rate of the animals, particularly deer and bighorn sheep," said John Hervert, terrestrial wildlife program manager with the Arizona Game and Fish Department. "It really helps us fine-tune our estimates."

"Our meteorologists can take historic weather data and come up with a trend," added Ingham. "The longer these monitoring systems are in place, the more data we'll have and the better picture of what the actual burn rate is."

Though the proving ground is the nation's largest artillery tester, it also encompasses the best preserved and protected Sonoran desert landscape in the American Southwest.

The healthy proliferation of a diversity of desert creatures under careful stewardship is, undoubtedly, one of the positive results of this.

"The partnership that Arizona Game and Fish enjoys with Yuma Proving Ground is very helpful to our agency," said Hervert.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