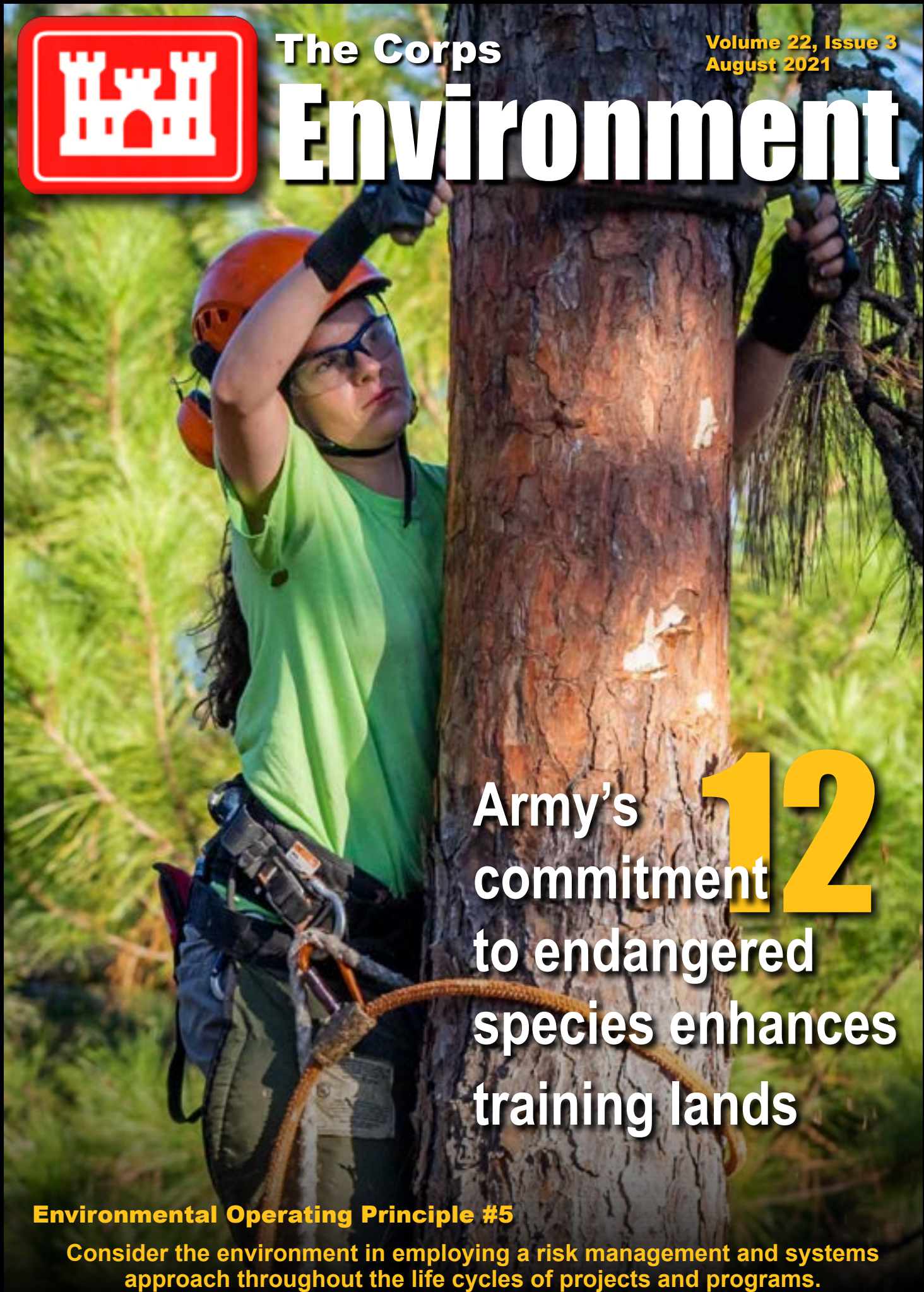




The Corps

Volume 22, Issue 3
August 2021

Environment



Army's
commitment
to endangered
species enhances
training lands

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Environmental Operating Principle #5

Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.

The Corps Environment





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The Corps Environment

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

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

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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.

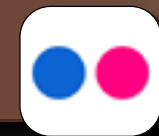
Send articles, photos, events, letters or questions to the editor, at Corps-Environment-Magazine@usace.army.mil.

Submission deadlines are indicated in red:

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March 15 May
June 15 August
September 15 November

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Tackling climate change through DOD environmental, energy resilience efforts

By Richard G. Kidd, IV
Deputy Assistant Secretary of Defense
Environment and Energy Resilience

The mission of the Department of Defense is to provide the military forces needed to deter war and ensure our nation's security.

Climate change poses a serious threat to our national security and DOD missions, operational plans and infrastructure.

We have committed to and have a successful track record of including climate, energy and environmental considerations in decision-making at all levels within the Defense Department.

I am proud to say the U.S. Army Corps of Engineers is at the front leading this effort for the Department.

With the help of USACE, the Defense Department is responding to climate change in two ways: adaptation, or actions to prepare for and adjust to changing climate conditions — thereby reducing negative impacts or taking advantage of new opportunities; and mitigation, or efforts to reduce the amount and speed of future climate change by limiting emissions or removing carbon dioxide from the atmosphere.

USACE is a national asset, not just a military asset, and through their activities they solve some of the nation's toughest engineering problems.

USACE has invested a significant amount of intellectual and financial capital to develop adaptation capabilities that enable built and natural installation infrastructure resilience to climate change-related vulnerabilities and impacts over the long term.

As we talk about climate change adaptation, combined approaches could be some of the best investments that we can make.

With the help of USACE climate resilience subject matter experts, DOD is addressing the unavoidable impacts of climate change through adaptation.

Our main effort thus far has been the development of the DOD Climate Adaptation Plan (CAP), which will be released in

September by the Council on Environmental Quality along with other agency CAPs.

We are also prioritizing the integration of climate vulnerability assessments into master planning activities at the installation level through Installation Climate Resilience Plans, or ICRPs, developed using the new DOD Climate Assessment Tool, launched in September 2020.

ICRPs identify existing and projected climate hazard risks and threats to military installations and inform investments in resilient natural and built infrastructure.

ICRPs also encompass Installation Energy Plans, thus integrating DOD strategic goals and installation missions to provide a holistic roadmap to implement energy efficiency, renewable energy and energy resilience at the installation level.

ICRPs thus address life cycles of projects and programs to adapt facilities and infrastructure to climate change projections, while continuing sustainability efforts that maximize effective use of limited resources, reduce energy consumption and greenhouse gas emissions, and increase renewable energy resources to sustain mission capability.

DOD builds environmental considerations throughout the life cycles of projects and programs in numerous ways.

One great example is through the Chemical and Material Risk Management Program (CMRMP) within the Office of the Assistant Secretary of Defense (Energy, Installations and Environment).

The program is proactive and seeks to anticipate risks to DOD by tracking emerging national and international regulations and characterizing subsequent risks to the Defense Department enterprise.

CMRMP is charged with identifying, assessing, and managing risks to DOD from emerging contaminants.

The program builds life cycle cost estimates of inflation with escalation rates for different products and treatment of contingent costs, e.g., potential future liabilities to DOD such as occupational health risk or water shortages.

See **ENVIROPOINTS**, page 5



Richard G. Kidd, IV
Deputy Assistant Secretary
of Defense (Environment
and Energy Resilience)

The team is committed to establishing a DOD-wide policy that requires weapon system developers to evaluate chemical toxicity and the potential impacts to human health early in the research phase to ensure selection of safer chemicals and avoid regrettable chemical selections and replacements.

This is important because among the drivers of the Defense Department's climate mitigation strategy is the recommitment to the Kigali Amendment to the Montreal Protocol, which took effect in January 2019. Hydrofluorocarbons (HFCs) and sulfur hexafluoride, chemicals with a high global warming potential (GWP), are impacted due to the global phase-down of production and consumption.

Also important is the American Innovation and Manufacturing Act, enacted by Congress on Dec. 27, 2020. It directs the EPA to address the environmental impact of HFCs by phasing down production and consumption, maximizing reclamation and minimizing releases from equipment,

and facilitating the transition to next-generation technologies through sector-based restrictions.

DOD applications that depend on these compounds may need to be substituted or replaced.

The technical performance characteristics of their substitutes may not fit within the design margins, such as electric consumption or refrigeration power in terms of volume and mass or safety characteristics of the substances being phased out and some substitutes are known to be highly flammable which is unacceptable in most air, maritime and land defense platforms.

It's not just GWP chemicals that will lead our climate mitigation strategy.

The Defense Department strongly supports the imperative to transition to clean energy technologies and infrastructure to achieve resilient and sustainable operations.

Specifically, as part of its evolving approach to its own carbon footprint, DOD is assessing how it can further field clean energy technologies at scale to

strengthen its energy resilience posture.

DOD has a long track record of investing in non-carbon power sources such as solar, wind, geothermal and biomass energy at its installations worldwide and is the largest producer of onsite renewable energy within the federal government. For example, from fiscal 2014 to fiscal 2019, DOD's onsite renewable energy production grew by 28% from 2.8 million megawatt hours to 3.7 million.

These and other efforts are in alignment with, and contribute to, the Federal Sustainability Framework goal of achieving federal carbon pollution-free electricity.

The Defense Department will pioneer the use of carbon-sequestering construction technologies. DOD will expect major suppliers to disclose greenhouse gas emissions, treat climate change vulnerabilities as a "material weakness" on financial reports, and expect commitments to public reporting on environmental, social and governance (ESG) features of their business operations.

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



Tyndall Coastal Resilience Study garners international award

By Holly Kuzmitski
Engineer Research and Development Center

The U.S. Army Corps of Engineers and its partners received the U.K. Environment Agency Flood & Coast International Excellence Award June 30 for the Tyndall Coastal Resilience Study.

The study focuses on rebuilding Tyndall Air Force Base, Florida, as an installation of the future in the aftermath of Hurricane Michael, a Category 5 storm, which damaged the base and surrounding area in October 2018.

“In addition to USACE’s Engineering with Nature program and the U.S. Army Engineer Research and Development Center, this great team included Jacobs Engineering Group, the Air Force and the U.S. Fish and Wildlife Service,” said Dr. Todd Bridges, national lead for EWN. “We’ve been working together on this project for nearly two years, and this international award recognizes our achievements – it’s a great honor.”

The U.K.’s Environment Agency is responsible for protecting and enhancing the environment, including flood and coastal risk management. It has a staff of more than 11,000, a budget of approximately \$2 billion and a range of responsibilities like those discharged by the

Federal Emergency Management Agency, the Environmental Protection Agency and USACE.

During the award presentation, an Environment Agency spokesperson said the judges were inspired by the Tyndall team’s collaborative international effort and the innovative nature-based solutions for rebuilding in complex and sensitive coastal locations. They were also impressed with the alternative finance strategies the study identified and how these could be used to fund similar projects.

The activities involved more than 30 organizations, working together to identify over \$4 million in potential grant opportunities.

The Tyndall team completed a number of technical studies to assess the level of flood risk, investigate a range of solutions and develop pilot projects to test the solutions.

The four pilot projects included reinforcing and building up dunes at the southern end of the base; investigating new strategies for rebuilding dunes on the barrier islands, including trapping sand by using fences, woody debris and new vegetation; strategically placing subtidal sediments and sand to enhance natural environments by buffering wave energy and reducing storm surges; and exploring opportunities for placing sediment to enhance intertidal flats and salt marshes, using oyster reefs or living shorelines to

reduce erosion, and constructing levees to reduce flooding.

“This project taught us that creating a diverse menu of nature-based solutions is critical to accommodating the range of site conditions encountered at military installations,” Bridges said.

“Each part of the project will deliver different combinations of multiple benefits: preventing erosion; protecting people and assets from damaging storm surge; enhancing the recreational value of the area for visitors, which will also contribute to the local economy and provide social value for Air Force personnel and the surrounding community; and providing habitat for threatened and endangered species, such as nesting sea turtles,” he said.

Retired Air Force Brig. Gen. Patrice Melancon, who served as the executive director of the Tyndall Air Force Base Reconstruction Program Management Office, and who participated in an EWN podcast, said, “We’re hoping it will be a model for all other coastal areas in the U.S.”

“We turned a catastrophe into an opportunity to rebuild better, using the latest science and engineering and EWN best practices,” Bridges said. “We know once the rebuilding is complete, Tyndall will be the base and the coastal facility everyone looks to as an example of what can be done.”



(Graphic by Brett Wylie, Jacobs)

A marked-up photo shows plans to rebuild Tyndall AFB and the surrounding area after the base was devastated by Hurricane Michael in 2018.

Far East District works to protect, preserve environment

By Sameria Zavala
USACE, Far East District

Protecting and preserving the environment is an enduring mission for the U.S. Army Corps of Engineers.

USACE has more than 4,000 environmental professionals who provide solutions to the nation's toughest environmental challenges.

One of the ways USACE, Far East District maintains those efforts is through the Spill Prevention and Response Plan.

SPRP, also known as the Spill Prevention, Control and Reporting (SPCR) plan, provides instructions and procedures for the prevention, response,

control and reporting of spills involving petroleum, oils and lubricants (POL) and hazardous substances.

U.S. Forces Korea Environmental Governing Standards, USFK Regulation 201-1, requires all USFK installations to develop and implement a SPCR plan and to update the plan every five years.

"Personnel and organizations that use or manage POL and hazardous substances are required to use this plan as a guide to ensure appropriate measures are taken to prevent spills, and to ensure prompt and effective response actions in the event that a spill occurs," said Dr. Hyun Jun Shin, geologist, Far East District.

The district's environmental section reviews all the regulatory and policy requirements, identifies organizational structure, roles and responsibilities of the

operational units for each installation, then identifies all potential spill sites to conduct site visits and surveys, identifying the installation's status of emergency spill response readiness.

"This plan can provide USFK-affiliated military forces and civilians with an understanding of a potential spill event, measures and procedures of spill prevention, and plans for spill response to mitigate further migration. It is crucial to protect human health and the environment (soil, groundwater, surface water)," Shin said.

Environmental stewardship is embedded in the district's culture. As the district continues to make progress, it also works to improve policy, processes and procedures.



Dr. Hyun Jun Shin, geologist, USACE, Far East District, works to protect and preserve the environment through the Spill Prevention and Response Plan. The plan provides instructions and procedures for the prevention, response, control and reporting of spills involving POL and hazardous substances. (Courtesy photo)

Environmental DNA provides key to identifying, protecting endangered species

By Adrian Salinas

U.S. Army Environmental Command

Environmental DNA analysis has emerged as a rapid, cost-effective option for detecting and monitoring rare and elusive wildlife, including species of conservation concern on military installations.

Under the aegis of the National Defense Center for Energy and Environment (NDCEE), Army scientists are currently conducting an eDNA demonstration/validation project at Army installations in Texas, Louisiana and Hawaii.

Many Army installations currently monitor threatened and endangered species as required by the Endangered Species Act of 1973, but traditional surveys can be labor intensive, costly and often require seasonal contracting of personnel with specialized expertise.

“eDNA analysis technology can detect and identify species from the DNA they have shed into the environment without requiring animals to be physically present at the time of sampling,” said Jinelle Sperry, a wildlife biologist with the Army’s Construction Engineering Research Laboratory and lead scientist for the eDNA demonstration/validation project.

“eDNA has the potential to transform Defense Department capabilities for monitoring endangered species and other species of conservation concern on military installations,” Sperry said.

“Compared to traditional survey methods, eDNA analysis can provide much greater detection sensitivity, reduces costs by not requiring labor-intensive field efforts, and does not require specialized expertise in visually identifying species,” she said.

As an example, Sperry explained that capturing an alligator snapping turtle using traditional trapping methods at Fort Polk, Louisiana, takes on average 210 hours of work per turtle, while using eDNA analysis methods requires only 22 hours. These results suggest a 90% reduction in labor expenses per capture using eDNA compared to traditional sampling for this species on DOD lands.

“Lands controlled by the Army provide habitat for a large number of the nation’s threatened and endangered species,” said Taura Huxley, a biologist in the



(Photo by Troy Darr)

Adrian Salinas, general engineer with the U.S. Army Environmental Command and environmental project manager with the National Defense Center for Energy and Environment, filters a water sample at the Natural Resources Conservation Office on Fort Hood, Texas.

Conservation Branch of the U.S. Army Environmental Command.

The Endangered Species Act imposes restrictions on military activities necessary to protect threatened and endangered species and their critical habitat, which can negatively impact the military’s readiness mission. The Army has identified over 250 threatened, endangered, proposed and candidate species on or near its installations.

“Military installations and ranges are critical for training Soldiers and preparing them for real-world missions,” said Jennifer Rawlings, NDCEE program manager.

“Successful validation of the eDNA technology could lead to more accurate data, reduce safety concerns and minimize survey costs for all DOD installations.”

The NDCEE serves as a national resource for advancing technologies and processes that address high-priority environmental, safety, occupational health and energy challenges. Created by congressional mandate in 1991, the NDCEE works to integrate environmental, safety, occupational health, and energy (ESOHE) impact decisions into the life cycle planning of DOD activities and new technologies.

USACE uses emerging technology to destroy munitions, explosives

By Marty Holmes
USACE, Baltimore District

The U.S. Army Corps of Engineers executes the Formerly Used Defense Sites Program on behalf of the Army and the Department of Defense. As part of this program, USACE is dedicated to protecting

human health and the environment by investigating and, if required, cleaning up potential contamination or munitions that may remain on properties from past military training and testing activities.

Munitions and Explosives of Concern (MEC) must be disposed of when discovered, usually by detonation using an explosive charge.

There are several classifications of MEC, with unexploded ordnance (UXO) being of the most concern.

A number of engineering controls have proven to be safe and effective in protecting personnel and property from containing potential debris or munitions constituents (MC).

Some of the engineering controls commonly used for disposal of MEC include sandbag mitigation, explosive detonation chambers and open-air detonations; however, one emerging control — the Buried Explosion Module (BEM) — is gaining attention for its efficiency.

Disposal methods

Sandbag Mitigation

- Can be used almost anywhere. Required number of sandbags for one munitions item is standardized, and the project team is limited to a single munition for each disposal setup to comply.
- Limited to one type of explosive counter charge, also known as donor charge.
- Labor intensive and time consuming; each bag must be filled (usually 30-40 pounds) and stacked in a specific manor.

Detonation Chambers

- Includes mobility and containment of all fragments and potential MC.
- Good option if disposal of munitions is needed in densely populated areas.
- Costly to maintain. Requires regular inspections and repairs.
- Limited to a single munitions item at a time.
- Limited to size of munitions and net explosive weight.

Open Air Detonation

- No labor-intensive setup. No costly materials. Usually not limited to a single item.
- Net explosive weight is determined by how much area is available to use.
- Usually only used for emergency situations.
- Hard to secure maximum fragmentation distance.
- In cases where 75 mm projectiles are to be disposed of, the site would have to be cleared of all non-essential personnel for a quarter of a mile in all directions.

Buried Explosion Module

- The construction of a BEM is tailored to the user's needs.
- The BEM leverages a calculation tool that requires users to input information related to the specific MEC item(s) being disposed of during operations.
- The user inputs the munitions data and how much donor explosives will be used.
- Through the calculator, the user also determines what safety distance is required and increases the earth (sand or water) placed on the munition(s) to reduce fragmentation and blast most effectively.

Some BEM Fast Facts include:

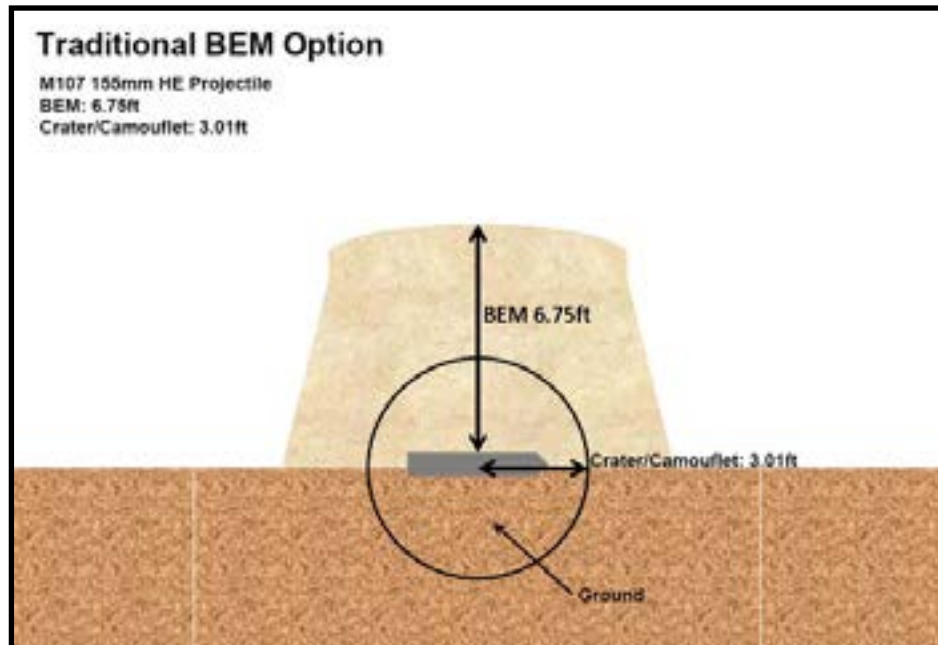
- One of the most effective engineering controls used.
- A method of disposal for more than one item at a time.
- Potentially reduces time and cost where multiple items are anticipated.
- Can be constructed almost anywhere.
- Reduces noise.
- Less labor intensive, as earth moving machines do most of the work.
- Biggest drawback on some sites is the transportation of the munitions to the location of the BEM.
- There are two different BEM options, the traditional BEM and the permanent BEM. Both methods will provide the same protection for fragmentation and blast, but the permanent BEM captures contaminants.



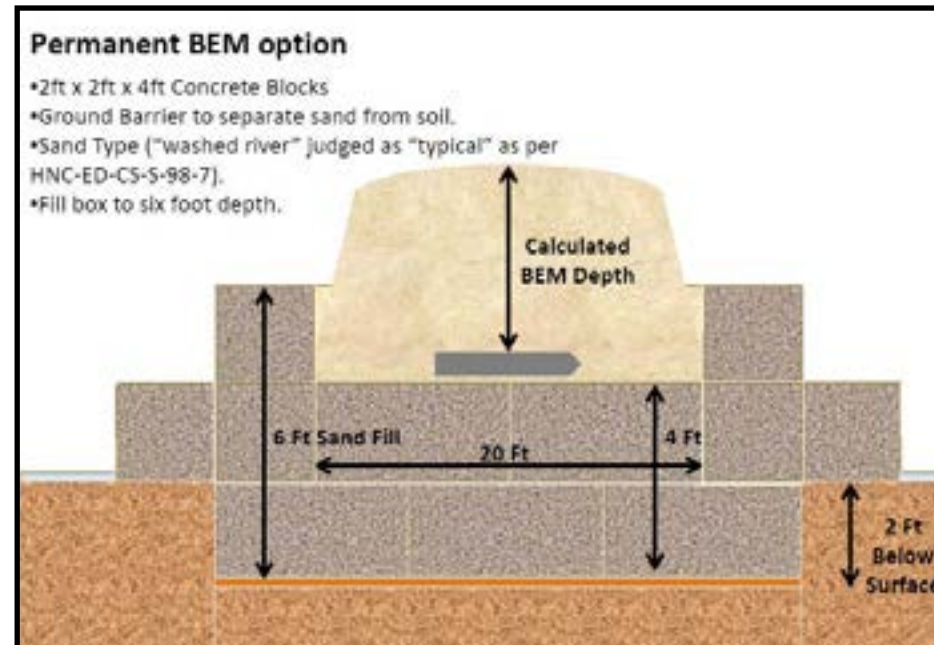
(Photos by John Day)
Sand being placed into the base of the Permanent BEM at Camp Ravenna, Ohio.



Permanent BEM liner being prepared for use at Camp Ravenna, Ohio.



Traditional BEM compared to permanent construction. (File image)



Camp Edwards provides habitat for Agassiz's clam shrimp

By Lori Hogan

U.S. Army Environmental Command

The Massachusetts Army National Guard's Camp Edwards encompasses 15,000 acres used for active mounted and dismounted maneuver training for engineer, infantry and field artillery units.

Surrounded by densely populated areas, the training lands contain 44 state-listed threatened or endangered species, including the Agassiz's clam shrimp. In fact, Camp Edwards has been designated as a Priority Habitat by the Massachusetts Division of Fisheries and Wildlife.

The designation requires the Natural Resource Conservation program to complete rigorous permitting and mitigation processes for any habitat impacts that may occur. This year, the NRC program accomplished a dramatic breakthrough for balancing habitat with training expansion.

During the past two years, the NRC program here negotiated a site development master plan permit with the Massachusetts Division of Fisheries and Wildlife. The permit agreement involved creating an onsite habitat mitigation bank, accruing acres through the implementation of projects detailed in the Integrated Natural Resources Management Plan for state-listed species habitat improvement.

For the banking program, the NRC has agreed to conduct four acres of mitigation for every one acre impacted by construction. Acres that have been restored during the past two years have been incorporated into the habitat mitigation bank to count against the new and proposed ranges.

Additionally, NRC has facilitated

transfers of excess state land as mitigation and is implementing extensive resource monitoring.

During mission support efforts, the NRC staff unexpectedly came across a globally endangered species, the Agassiz's clam shrimp. This newly found species indicates a symbiosis between military use and conservation. Prior to 2015, it was only known to exist in four locations, including one isolated wetland at Camp Edwards.

In the process of surveying roads for repair, the shrimp was found in puddles that pool in ruts and deeper potholes.

Concerned that the species' presence could limit operations, the NRC widened its survey efforts and found that the shrimp appears to be quite common and widespread in the area.

The shrimp's short lifecycle depends on the presence of shallow ephemeral pools like the kinds created by military vehicles.

The NRC also determined that the shrimp spread from pool to pool throughout the installation's roadways, which repopulated the species, allowing it to thrive on the training grounds.

In other words, military vehicles used for training are creating the ecosystem needed to save the Agassiz's clam shrimp.

In consultation with the Massachusetts Division of Fisheries and Wildlife, the NRC is now developing a road maintenance plan that will balance road repair with the preservation of shallow puddles. The shrimp's ability to thrive on the training site and the NRC staff documenting it at multiple sites throughout the region also suggest that the species is not actually as imperiled as assumed.

During the past year, the NRC targeted several key habitats, including the rare pitch pine-scrub oak barrens. Mechanical thinning was completed on 120 acres of pine oak forest, achieving a density that matches the historic character of the site and recovering a more open woodland with dense shrub thicket.

This restoration also accounts for the construction of the new machine gun range – providing healthier, more resilient woodlands and rare species habitat.

The NRC has helped transfer its techniques and management strategies to other working groups and technical committees working on species support throughout the region.

Camp Edwards is a partner in interagency efforts for wildland fire, habitat restoration and conservation of a wide variety of rare species including bats, rabbits, turtles, birds and butterflies.

During a recent regional biology conference, NRC staff encouraged other state and federal landholders to reevaluate the ecological role of ephemeral puddles and pools for the Agassiz's clam shrimp. In turn, this encouragement could reduce pressures for clam shrimp conservation.

"In every respect, Camp Edwards is an exemplar of the ways that environmental and military activities are thoroughly compatible," said Jake McCumber, natural resources and training lands manager.

"Camp Edwards' example of establishing habitat mitigation banks is a programmatic innovation that could benefit any military installation," he said. "Guard installations can use the habitat enhancement they already conduct for proactive conservation to establish this sort of credit account."



(U.S. Army Photo)

This restoration site was also a critical operations area during the 2019 Combined Arms Exercise at Camp Edwards with full Soldier support functions including prepared meals and field refueling, all while ensuring compliance with the stringent Environmental Performance Standards that govern the Upper Cape Water Supply Reserve.





“The Army has a unique role in stewardship of rare and protected species. Our training lands are among the last undeveloped areas in many locations around the world.”

Taura Huxley
U.S. Army Environmental Command

Army’s commitment to endangered species enhances training lands

By Lori Hogan
U.S. Army Environmental Command

The U.S. Army manages approximately 13.5 million acres of land across the country and depends on high-quality training ranges to conduct mission-critical training and readiness activities.

In 2020, there were approximately 226 species listed as threatened or endangered under the federal Endangered Species Act on Army lands, which formed the highest density of threatened and endangered species of all federal lands.

The U.S. Army Environmental Command provides technical support to installations through a combination of subject matter expertise, intra- and interagency collaboration, and innovative management strategies.

USAEC’s team delivers environmental solutions that enable stewardship of rare and protected species while ensuring that Soldiers can train in a realistic environment with minimal constraints.

Much of what drives conservation on military lands stems from the 1960 Sikes Act, which promotes effective natural resource planning and collaboration with regulatory agencies on military reservations.

The Sikes Act requires that conservation goals be cooperatively

developed and recorded in planning documents called Integrated Natural Resources Management Plans.

These plans identify specific actions to be taken to allow for outdoor recreation activities; maintain a safe and realistic training environment; and minimize effects to protected species while ensuring military mission requirements are met.

Although management activities vary by species and installation, they often include species inventories and habitat enhancement, prescribed burning, and invasive plant and animal control, explained Taura Huxley, a biologist in the conservation branch of USAEC.

“The Army has a unique role in stewardship of rare and protected species,” she said. “Our training lands are among the last undeveloped areas in many locations around the world.

“As a result, healthy habitat and wildlife species can be found in surprising numbers,” she said.

“Through collaboration with federal and state regulatory agencies, universities, and non-governmental organizations, we have developed innovative strategies to minimize or eliminate constraints on the Army’s mission while ensuring that sensitive species are protected,” Huxley said.

She adds that “in some cases, the Army has become a key player in species’ recovery.”

One of the greatest success stories has

been the Army’s contribution to recovery of the red-cockaded woodpecker.

This species digs cavities in longleaf pines and uses them for nesting. Logging, development and even hurricanes have impacted the woodpecker’s habitat, which has been replaced over the years with hardwoods and other pine species.

At Fort Polk, Louisiana, the post’s environmental staff performs restoration work for longleaf pine habitat on several hundred acres each year.

They also use artificial cavities that can be placed in any tree to provide additional nesting locations.

After more than half a century of protection under the Endangered Species Act, federal wildlife officials have begun the process of downgrading the status of the red-cockaded woodpecker from endangered to threatened.

Military installations throughout the southeast have been key players in the population increase of red-cockaded woodpeckers.

Successful stewardship ultimately depends on the skills and expertise of natural resources managers and their use of available tools, training and resources.

USAEC remains committed to making these resources available to installations so they can carry out the Army’s mission, while preserving, protecting, and enhancing the habitat and lands entrusted to them.

(Courtesy photo)
The Army supports the recovery of the red-cockaded woodpecker by creating artificial cavities in longleaf pine to provide additional nesting locations. After more than half a century of protection under the Endangered Species Act, federal wildlife officials have begun the process of downgrading its status from endangered to threatened.



(Photo by David Stinnett, North Wind Portage)

The last roll-off container filled with contaminated soil being loaded onto the back of a truck for disposal in Belleville, Michigan.

Luckey FUSRAP site hits milestone trifecta

By Arleen Kreusch
USACE, Buffalo District

Operations at the Luckey Formerly Utilized Sites Remedial Action Program Site cleanup proceeded as normal February 23, but this was no ordinary day.

Located in Luckey, Ohio, the cleanup of beryllium, lead, radium-226, thorium-230, uranium-234 and uranium-238 hit three significant milestones that day.

“The successes we’ve achieved at the Luckey project were only made possible by the amazing project delivery team members who constantly strive to make the project better,” said Steven Vriesen, project manager. “I couldn’t ask for a more dedicated and motivated team; and even though our incredible results speak for themselves, I’m very proud to tell our story.”

To reach the first milestone, the trucking subcontractor safely traveled more than a million miles, disposing 116,667 tons of contaminated material at U.S. Ecology in Belleville, Michigan. To put that into perspective, that is over two trips to the moon and back. The moon is 238,855 miles from the Earth.

For the second milestone, the remediation contractor finished loading contaminated soils excavated under their current contract into roll-off containers.

Since the soil cleanup contract was awarded in 2015, the U.S. Army Corps of Engineers’ contractor has worked over 451,000 hours without a lost-time accident, excavating and backfilling 93,777

cubic yards of contaminated soils from the Phase 1 and 2 areas of the site.

The site cleanup, which began April 16, 2018, is 50% complete and a new contract to continue the soil cleanup is currently scheduled to be awarded this summer.

“These outstanding achievements represent years of teamwork focused on the best balance of worker safety, community protection and production,” said David Frothingham, chief, Environmental Branch. “I’m so proud of this team.”

For the third significant milestone of the day, the first roll-off container was filled with building debris from the deconstruction of the maintenance office building.

USACE is removing several buildings at the Luckey site to gain access to contaminated soils underneath.

Vriesen emphasized that the last thing they wanted at the site was a demolition which typically involves explosives and huge clouds of dust.

“Deconstruction is a slower, more methodical process of taking a building apart in smaller pieces,” he said. “It produces much less dust that is controlled with water sprays.”

USACE uses this approach to remove buildings, helping to protect human health and the environment.

According to Vriesen, the safety of workers and the community is the top priority during remediation.

Deconstruction of the maintenance office building was completed in two days.

Deconstruction of the production building, where beryllium oxide, beryllium hydroxide and beryllium pebbles were produced beginning in 1949 for the Atomic Energy Commission, began February 18 and was completed March 15, 2021.

USACE is also actively monitoring the COVID-19 situation and is in regular communication with on-site personnel and contractors to emphasize the importance of taking appropriate actions — such as social distancing, wearing appropriate protective equipment, temperature screening of individuals before entry into the site, and personal hygiene measures — to safeguard employee health and welfare while working during the pandemic.

“Our contractor was very proactive in putting these safeguards in place and as a result there have been no impacts to the project since the start of the pandemic,” he said.

A thorough review of waste manifests through Feb. 4, 2021, indicates that 138 tons of beryllium and 30.9 tons of lead were included in the 113,326 tons of material that had been transported off-site for disposal. Soil excavation will resume in the Phase 4 area of the site once on-site building deconstruction is complete and the new remediation contractor has work plans in place.

Site progress infographics are available on the project website at: <https://www.lrb.usace.army.mil/Missions/HTRW/FUSRAP/Luckey-Site/>.





(Photo by Luke Burns)

Col. James Hundura, Sacramento District commander, joins members of the Mechoopda Tribe on a tour of the Tribal Partnership Program Clear Creek Ecosystem Restoration Project near Chico, California, May 7.

USACE, Mechoopda Tribe celebrate project partnership

By J. Paul Bruton
USACE, Sacramento District

Standing near the waters of a meandering California creek about 15 miles southeast of Chico, members of the U.S. Army Corps of Engineers, Sacramento District and the Mechoopda Tribe of Chico Rancheria recently celebrated two first-of-a-kind milestones: the first single-purpose ecosystem restoration study in the nation under the Tribal Partnership Program, and the district's first study in this program.

In the late 1800s, the Mechoopda Tribe had been displaced from their ancestral lands, and in their absence, ranching, farming and mining practices led to ecological degradation due to invasive plants and erosion.

In 2003, the tribe successfully reacquired 635 acres of their land, and in 2018 the Department of Interior's Bureau of Indian Affairs placed it into trust for the tribe. A piece of this parcel is now part of the study area.

For the Mechoopda, Clear Creek and the surrounding area hold cultural significance and they use the local plant resources for traditional cultural, medicinal and ceremonial purposes. But over the years, these resources diminished.

Furthermore, several points along Clear Creek have experienced erosion that has led to caving banks, thus reducing

floodplain connectivity. This study aims to correct this.

"The main purpose of the study is to restore a 1.6-mile reach of Clear Creek on the property, reduce the invasive, non-native species and restore the area with native and culturally significant riparian and floodplain plants," said Elise Jarrett, Sacramento District's lead planner for the project.

"This will support the Mechoopda's traditional, cultural, medicinal and ceremonial practices, in addition to reclaiming ecological stewardship activities for tribal members on their land," she said.

Since the fall of 2018, the district has continued to consult and work with the tribe in conjunction with ecosystem restoration experts to better understand what's happening in Clear Creek and the surrounding area.

"This helped us come up with a series of alternatives that would best address the problems and achieve the objectives of providing more culturally significant plant resources out here on the land," Jarrett said.

The tribe strongly supports the district's recommended plan and has provided Letters of Intent and Self-Certification of Financial Capability to continue their involvement in both the preconstruction engineering and design and the construction phases of the project. This next work will begin upon receipt of funding.

"Working with the Corps has been a great experience, and we are very happy to see the value that this project will add to

the land," said Colin Klinesteker, director of Office of Environmental Planning and Protection for the Mechoopda Tribe.

When completed, the project will have restored 42 acres of riparian habitat and oak woodland valley habitat, expanded the riparian corridor, and provided minor bank grading to allow for floodplain connectivity.

"This is a minor shaping of the creek bank that would allow water, during high flows, to escape the banks and fill in the surrounding areas, providing longer saturation that helps with the goal of the riparian restoration," said Brad Johnson, Sacramento District landscape architect.

Through this Tribal Partnership Program study, the district has been able to work with the tribe on a meaningful project, while building and strengthening relationships with both tribal council members and staff.

"We feel grateful to have the support and the partnership of the Army Corps of Engineers, and we feel like we're in good hands," Klinesteker said. "We've been very impressed."

One of the unique things about the program is the ability to roll from the feasibility phase directly into preconstruction engineering and design, and then into construction without additional congressional authorization.

"The work we are doing now sets a great precedent for work to come," said Jarrett. "This is a great example of future work with tribes."



ERDC forms tiger team to tackle climate change

By David I. Marquis
Engineer Research and Development Center

In response to an executive order detailing the intensifying effects of climate change and the global shift away from carbon-intensive energy sources, multiple laboratories from the U.S. Army Engineer Research and Development Center are combining their expertise to take on climatic variations.

The newly formed group, called a “tiger team,” was created to handle an important and expedient problem quickly. The goal of this tiger team is to understand the best ways to address climate change at home and abroad.

“We’ve been working very strongly as a team to bring the power of ERDC to this crisis,” said Dr. Justin Berman, associate technical director at ERDC’s Cold Regions

Research and Engineering Laboratory (CRREL). “Part of our focus is to help our peers throughout the U.S. Army Corps of Engineers understand the research and development projects and programs available to tackle this problem, and that we speak with one voice on climate change.”

According to “Executive Order on Climate-Related Financial Risks,” published May 20, 2021, “the intensifying impacts of climate change present physical risk to assets, publicly traded securities, private investments and companies — such as increased extreme weather risk leading to supply chain disruptions.”

The broad nature of USACE missions and support to the nation has enabled ERDC to play a role in adapting and mitigating impacts related to climate change. Adaptation addresses the impacts of current or expected effects of climate change. Mitigation actions reduce greenhouse gas emissions.

Nearly 8% of the world’s greenhouse gas emissions come from the process of using energy to develop construction materials, such

as concrete. The ERDC Geotechnical and Structures Laboratory (GSL) is researching new, more energy efficient ways of developing concrete or construction materials to reduce the greenhouse footprint on the planet.

The research laboratory has also been studying bio-based composite materials, such as mass timber and cross-laminated timber materials, as sustainable alternatives to

“Part of our focus is to help our peers throughout the U.S. Army Corps of Engineers understand the research and development projects and programs available to tackle this problem, and that we speak with one voice on climate change.”

- Dr. Justin Berman

ERDC, Cold Regions Research and Engineering Laboratory

conventional steel and concrete construction. The utilization of these materials has grown rapidly across the construction industry with benefits for accelerated construction and sustainability.

ERDC has also studied unique military requirements related to energy consumption, expeditionary construction and force protection in order to demonstrate the application of these sustainable building materials in future military construction criteria and specifications.

“When a lot of people think about reducing greenhouse gas emissions, they are thinking immediately about electric vehicles, hydropower, wind, solar or nuclear power,” said Dr. Joseph Corriveau, CRREL director, who manages the climate change tiger team.

“This is another way that we can reduce greenhouse gases, so when we go to build new infrastructure, we can do it in a way that takes less energy, and therefore a reduction in greenhouse gases,” he said.

“The U.S. Army Corps of Engineers has been conducting research and utilizing

sustainable approaches on construction materials, including concrete, since the mid-1900s,” said Dr. Robert Moser, GSL senior scientific technical manager for materials and structures.

“In the last decade, ERDC has supported multiple research and development efforts in response to the growing drivers for climate change mitigation and awareness of the significant carbon footprint that the construction industry and, in particular, cementitious building materials like concrete have,” Moser said. “ERDC has conducted collaborative research on sustainable alternative cementitious materials jointly with interagency partners including the Department of Transportation and the Department of Energy along with industry and academic collaborators.”

ERDC has leveraged prior experiments on other military applications, ranging from airfield damage repairs to rapid civil works infrastructure repairs, when investigating solutions for alternative cementitious materials.

These materials include variations of cementing chemistries that can reduce as much as 70% of the carbon footprint, and in some cases, rely on carbonation mechanisms that can actually capture or sequester carbon dioxide as part of their chemical reaction process.

“If we can somehow remove the carbon dioxide from construction, or mitigate it, that’s a direct contribution to climate change mitigation,” said Berman. “We have the unique opportunity, because in cold regions we often use slightly different cold-tolerant concrete formulations. We can look at some different technologies that might make mitigation of carbon dioxide more effective.”

GSL is home to experts in the development of construction materials, while CRREL is home to experts in cold and Arctic regions. In Fox, Alaska, CRREL’s Permafrost Tunnel Research Facility is used to study permafrost, a thick subsurface layer of soil that occurs chiefly in polar regions and remains

frozen throughout the year. Satellite images of the upper hemisphere show that 25% of that terrain is permafrost, while Alaska itself is 85% permafrost.

“The permafrost is thawing out, and as it thaws, any infrastructure on top of that thawing permafrost is at immense risk,” Corriveau said. “So what we’re doing with GSL is working together on ways to develop technologies so you can do construction and put infrastructure, not only on solid terrain, but also on terrain on cold regions of the planet, which are at risk of thawing out.”

Berman says CRREL is doing additional research to support the military’s efforts, such

as helping the Navy better understand how sea ice is thinning. CRREL has experts in the field monitoring those changes in the ocean and simultaneous developing solutions that will aid the warfighter in traversing icy terrain.

“We’re developing technologies that will allow the U.S. Army to do that efficiently and successfully,” Berman said. “Often that requires different technologies because the temperatures are so cold that a lot of the ways that we would do things in the lower latitudes don’t work as well in higher latitudes.”

In January 2021, the U.S. Army published a strategy titled “Regaining Arctic Dominance” to address the service’s approach to Arctic

regions.

The strategy states “the Army must understand the Arctic’s role in defending the homeland, the complicated geopolitical landscape within the context of great power competition, and how accelerated environmental change impacts future operations.”

“The strategy really contains a lot of what needs to occur in the Arctic region for us to be able to have dominance and protect the homeland,” Berman said. “Our efforts will help to address the climate crisis and investigate stabilizing forces to aid in regaining Arctic dominance.”



(Courtesy photo)

Engineers from the U.S. Army Engineer Research and Development Center’s Geotechnical and Structures Laboratory, located in Vicksburg, Mississippi, test non-destructive sustainable concrete materials at ERDC’s field exposure site at Treat Island, Maine.



(Photo by Troy Darr)

Damon Cardenas examines a stainless steel alloy plate that has been treated with citric acid passivation and run through a salt fog test at Corpus Christi Army Depot in Texas. This NDCEE project validated a lower cost, more environmentally friendly process for increasing corrosion resistance for metals used in Army weapons systems.

USAEC supports Army Modernization Strategy by moving technology from laboratory to field

By Lori Hogan
U.S. Army Environmental Command

The U.S. Army Environmental Command's primary means to support validating and demonstrating new technologies is through program management of the National Defense Center for Energy and Environment (NDCEE).

For the Army's modernization strategy to succeed, ideas must be turned into actions through continuous efforts to validate and demonstrate new technologies.

The Army Modernization Strategy addresses six key priorities: long-range precision fires; next generation combat vehicle; future vertical lift; the network; air and missile defense; and Soldier lethality.

The Army recently demonstrated its commitment to the six priorities by realigning \$33 million over the next five years to ensure adequate funding for the NDCEE program.

The NDCEE was established to help Department of Defense installations, ranges, weapon systems, and the warfighter

achieve performance advantages, enhance efficiency and cost effectiveness, and comply with regulations.

"All of the projects that NDCEE funds help support environmental, energy, safety and occupational health challenges currently facing DOD," said Jennifer Rawlings, USAEC NDCEE program manager. "These projects not only provide energy cost savings, but they also prevent pollution from entering the environment or create alternatives that improve safety."

One example of an NDCEE-funded demonstration/validation project is the Honey Badger 50 or HB50 Wearable Fuel Cell.

This lightweight, Soldier-borne power system is designed to meet the increased energy demand from Soldier Lethality Cross Functional Team initiatives.

The system frees up dismounted squads and platoons from the need to carry additional batteries or rely on battery resupply to meet their power and energy demands in the field.

Soldiers on extended missions equipped with the HB50 experience a significant reduction in load because they don't have

to carry any additional fuel other than what's needed to carry out the mission.

"The HB50 system incorporates key innovations that set it apart from other fuel cell systems," Rawlings said.

"For instance, the HB50 has been demonstrated to operate on liquid fuel already available in unit inventories, avoiding the need to add a new fuel into the DOD inventory, simplifying logistics and minimizing the impact on the environment," she said.

"The Army Modernization Strategy Framework uses a deliberate, synchronized approach that addresses how we fight, what we fight with and who we are," said Damon Cardenas, USAEC chief of Acquisition and Technology.

"USAEC enables these three approaches to provide Army modernization with environmental expertise, program management and project management across a broad array of technical specialties necessary to deliver cost-effective, efficient environmental solutions that can be applied to the Total Army's transformation into a multi-domain force," he said.



USACE chief signs report recommending Prado Basin ecosystem restoration

By Dena O'Dell
USACE, Los Angeles District

The U.S. Army Corps of Engineers' top general signed a report April 22 — Earth Day — recommending a plan to restore more than 600 acres of valuable riparian habitat within the largest riparian forest in Southern California.

Lt. Gen. Scott Spellmon, USACE's commanding general and 55th chief of engineers, signed the Chief of Engineers Report for the Prado Basin Ecosystem Restoration and Water Conservation Feasibility Study at USACE Headquarters in Washington, D.C. The project is headed by USACE, Los Angeles District, in partnership with the Orange County Water District.

During the signing, the general thanked the LA District and Orange County Water District for their hard work and collaboration on the study, while also recognizing the significance of signing the report on Earth Day.

"Today is Earth Day. This is a great message to approve for today," Spellmon said. "I want to thank (Col.) Julie (Balten) and her staff. Great work by your planners and all our partners in Orange County ... really well done. I'm really proud of this work."

Restoring the ecosystem

The project area, which is nestled along the Santa Ana River about 50 miles southeast of downtown Los Angeles, is within one of the world's top-25 most biologically rich and threatened terrestrial ecosystem regions.

It is a critical wildlife corridor — downstream of Prado Dam — which connects the public lands of Chino Hills State Park, Cleveland National Forest and the southwestern flyway.

The project aims at restoring riparian and associated habitats suitable to native species; reducing the presence and effects

of non-native wildlife; and providing critical habitat for threatened and endangered species, including birds like the least Bell's vireo and southwestern willow flycatcher.

The cost of the ecosystem restoration project is about \$46 million and is the most cost-effective and efficient plan for restoring aquatic, riparian and floodplain habitats along the Santa Ana River



(Photo by Philipp Tintner)

Lt. Gen. Scott Spellmon, commanding general of the U.S. Army Corps of Engineers and the 55th chief of engineers, signs the Chief of Engineers Report for the Prado Basin Ecosystem Restoration and Water Conservation Feasibility Study. The project, headed by USACE Los Angeles District in partnership with the Orange County Water District aims to restore more than 600 acres of valuable riparian habitat within the largest riparian forest in Southern California.

Mainstem upstream, downstream of Prado Dam, and along the Mill Creek and Chino Creek tributaries.

At the signing, Balten, LA District commander, recognized the Orange County Water District for its continued partnership, commitment and investment in the project, as well as the work of the LA District team for its "amazing work and dedication that was demonstrated during the entire study."

"The LA District is excited to be a part of this important project and is especially happy to mark the occasion on the 51st anniversary of Earth Day," Balten said. "We look forward to continuing the great partnership we have with the Orange County Water District, as well as Orange, San Bernardino and Riverside counties, to restore critical habitat within this region."

The Orange County Water District also reciprocated its gratitude to USACE for

getting the project from the study phase to the Chief's Report.

"The Orange County Water District would like to thank (USACE) for the great partnership that has culminated in the signing of the Chief's Report for our project," said Stephen Sheldon, president of the Orange County Water District Board of Directors.

With Spellmon's recommendation

for approval, the report is now elevated to the Assistant Secretary of the Army for Civil Works, U.S. Office of Management and Budget, and to Congress for consideration of project authorization.

Santa Ana River Watershed

The Santa Ana River watershed is about 2,650 square miles and is located within San Bernardino, Riverside and Orange counties.

The study area is primarily within the footprint of the Santa Ana River Mainstem Project and includes Prado Basin and extends for 7 miles downstream of Prado Dam.

Prado Dam and Basin was built in 1941 and serves as the principal regulating project on the Santa Ana River. Its primary authorized purpose is flood-risk management, followed by water conservation and recreation.

Water conservation benefits

In addition to ecosystem restoration, the study also recommended increased water conservation at Prado Basin, which has the potential to provide Orange County with up to 13,000 additional acre-feet of groundwater annually, supporting about 60,000 residents, while also reducing reliance on more costly imported water.

The National Economic Development Plan for water conservation has been approved by Brig. Gen. Paul Owen, commander of USACE's South Pacific Division, and is ready for implementation in time for the next rainy season.



Threatened, endangered species find refuge on military installations

By Lori Hogan

U.S. Army Environmental Command

Endangered species protection and military training land management often overlap as Army installations across the nation work collaboratively to ensure quality wildlife habitat exists in training areas where troops conduct mission critical readiness exercises.

In 2020, there were approximately 226 species listed as threatened or endangered under the federal Endangered Species Act on 13.5 million acres managed by the Army.

Today, the Army boasts a multitude of federally protected species that are flourishing due to its conservation efforts and land management practices.

The most well-known species are the bald eagle and the red-cockaded woodpecker.

For example, there are six breeding pairs of eagles that nest year-round on Fort Hunter Liggett in California and at Aberdeen Proving Ground in Maryland. The latest count found 201 bald eagles along APG shorelines.

Once endangered, the bald eagle populations have now recovered and have been delisted under the Endangered Species Act, but nonetheless are still federally protected by the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act.

Eagles and red-cockaded woodpeckers find a home on installations such as Fort Polk, Louisiana; Fort Benning, Georgia; and Fort Bragg, North Carolina, where the Army has worked to revitalize longleaf pine habitat and build artificial cavities designed to mimic their natural breeding grounds.

In fact, the woodpeckers have received a lot of press recently since they have been proposed to be reclassified from endangered to threatened, but many other species also deserve recognition.

Another example is the pine snake at Fort Polk. These non-venomous snakes spend 70% of their time underground feeding on pocket gophers. Since 1927, only 250 have been found in the wild. Military personnel there have started trapping them in 1999 and initially surveyed 30 pine snakes; a more recent

survey discovered 50.

“They are extremely rare and hard to find so we used radio telemetry equipment and placed trackers on the snakes, allowing us to see where they migrate underground, which is only about three feet, but at least we can monitor their activity,” explained Chris Melder, threatened and endangered



(Courtesy photo)

Fort Drum, New York, currently has two species of bat protected under the Endangered Species Act: the endangered Indiana bat and the threatened northern long-eared bat.

species biologist.

In addition to birds and mammals, there are also many other insects and invertebrates protected under the ESA, including pollinators.

Fort McCoy has a program to restore native lupine plants, which attract more than a dozen species of bees, including the endangered rusty patched bumble bee.

“The rusty patched bumble bee had never been observed on the installation until recently, so the fact that they are here now is a good sign that we’re doing things right,” said Tim Wilder, chief of the Natural Resource Branch.

Lupine is also the host plant for both the Karner blue and frosted elfin butterflies.

At most installations, Soldiers focus on limiting impacts to the species; however, on Fort McCoy, they report on habitat, such as the acres of Lupine that are disturbed rather than individual butterflies.

At Fort Drum, New York, general pollinator surveys began a few years ago to determine what species were present, and native plant species are used to enhance Soldiers’ training environment and protected species.

“We have also been performing invasive and grassland management to improve certain areas of the installation where we know we have monarch butterfly use,” said Christopher Dobony, a Fort Drum fish and wildlife biologist.

In some cases, the ability to maintain a population is just as important as trying to repopulate it.

The post currently has two species protected under the ESA: the endangered Indiana bat and the threatened northern long-eared bat.

Around 2006, a disease called white-nose syndrome started decimating these bats, along with other bat species across the U.S. Although their populations have declined dramatically in many parts of their original range, they still exist at Fort Drum in small numbers.

Amphibians and aquatic species such as toads and turtles play an important role in the ecosystem and are benefitting from Armywide conservation actions.

At Fort Hunter Liggett, the arroyo toad has been threatened by invasive species along the San Antonio River where the toads lay strands of eggs in shallow, slow-moving water.

“This year, we will start using hand crews to remove above-ground biomass of invasive plants and general stream clearance to rehabilitate important breeding areas,” said Jacquelyn Hancock, a garrison wildlife biologist.

There are also two turtle species on Forts Drum and McCoy that are under review for federal protection.

“We are currently developing some localized best management practices to proactively limit any adverse impacts to these species,” Dobony said.

“Overall, our goal is to ensure that troops can utilize the land in a meaningful way, and at the same time, be good stewards by removing plants like thatch, thistle and tamarisk to improve the habitat for species who have been here long before we were,” said Hancock.

“The mission comes first,” he said, “but we strive to ensure all species, not just threatened and endangered species, have a healthy environment where they can prosper.”



Division's cultural resources program focuses on partnerships

By Lori Hogan

U.S. Army Environmental Command

The U.S. Army Reserve's 63rd Readiness Division supports more than 40,000 Soldiers across California, Nevada, Arizona, New Mexico, Texas, Oklahoma and Arkansas.

Ensuring that cultural resources are protected across such a broad geographic area forces the division's cultural resources management (CRM) team to develop a wide spectrum of partnerships with local, state, federal and tribal organizations.

Although the challenge is monumental, the CRM team has successfully addressed the everyday tasks with a proactive approach, ensuring that the Army Reserve has been successful in protecting cultural resources while maintaining lands available for Soldiers to meet their training requirements.

While providing operations and building support, the CRM team also works with regulatory agencies to ensure compliance.

This partnership is necessary and required for all installations; however, the 63rd RD's ability to manage and coordinate these activities with seven states is remarkable.

Some of the agencies the CRM team works regularly with include the Council on Environmental Quality, which oversees implementation of the National Environmental Policy Act; and the Advisory Council on Historic Preservation (ACHP), which oversees the State Historic Preservation Offices, or SHPO, and Section 106 of the National Historic Preservation Act.

Other agencies include the Department of the Interior, Department of Agriculture and the Department of Defense, which provide uniform regulations and regulate access to archaeological resources on federal and Native American lands.

The CRM team also interacts with 194 federally recognized tribal partners.

Within each of these agencies, installations must navigate various permits and site reviews; and, the CRM team works to streamline these processes.

An example of this process is a negotiated programmatic agreement with the California SHPO, which covers 21



(Photo by Margaret Magat)

The 63rd Readiness Division Cultural Resources Management team protects a wide variety of historic properties across a seven-state area, including this rock building in Laredo, Texas, which was built in 1942 by the Works Projects Administration.

facilities across the state. This agreement will eliminate the need for a case-by-case consultation with the ACHP and SHPO regarding the Section 106 process.

Section 106 requires federal agencies to consult with SHPOs, tribes and other interested parties to identify historic properties, determine whether and how such properties may be affected, and resolve adverse effects.

The new agreement provides an opportunity to submit all the projects under one agreement and one consultation, avoiding the time-consuming review processes.

In addition, the CRP manager interacts with tribal representatives in formal conferences, individual meetings and through tribal participation to aid in the execution of their cultural programs.

The manager tracks correspondence meticulously and engages with tribes throughout the 30-day review period required for project implementation.

This open communication results in an awareness of issues that are sensitive to tribes and helps state and federal agencies understand why certain topics of interest are important to them.

During an environmental workshop, the CRM team invited representatives of the Navajo Nation Heritage and Historic

Preservation Office to provide an overview of cultural resources management within the Navajo Nation.

This perspective gave the CRM team a better understanding of the Navajo people and their interrelationship with nature, and how the Navajo's worldview does not separate nature and culture; they are one and the same.

The 63rd RD, like other Army organizations, is required to develop an Integrated Cultural Resources Management Plan (ICRMP).

The division sustains its ICRMP and supplements the plan with detailed archeological and cultural studies that support specific actions.

By taking an integrated approach that utilizes both staff resources and the work of outside contract resources, the 63rd ICRMP and the 63rd RD Environmental Division seek to maximize results with the efficient use of resources.

"We have shown how the ICRMP for the 63rd RD has risen to the challenge of addressing cultural resources showing a dedication to program management, robust stakeholder interaction, and an eye to cultural resources program implementation that promotes mission success," said Laura M. Caballero, cultural resources manager and environmental chief.



Fort McCoy enhances military training while preserving, protecting endangered species

By Lori Hogan
U.S. Army Environmental Command

One of the Army's premier Total Force Training Centers, Fort McCoy provides land for Soldiers to train, recreational areas for hunting and fishing, and forest for commercial agricultural purposes while simultaneously protecting four federal and 33 state-listed threatened and endangered species and controlling invasive species.

The Wisconsin-based installation provides a wide array of Army training opportunities for combat, combat service and combat service support personnel.

The land consists of a 7,773-acre impact area; 47,000 acres of forest; 3,475 acres of grassland; 4,400 acres of wetland, 71 miles of streams; and 10 lakes.

In collaboration with the U.S. Fish and Wildlife Service and the Wisconsin Department of Natural Resources, Fort McCoy completed the 2019-20 annual review of the Integrated Natural Resources Management Plan.

During the reporting period, 233 high-priority projects were scheduled and 230 were completed, exceeding a 98% completion rate.

In addition, no net loss of training occurred, resulting in higher-than-expected success for the center.

One of the high-priority projects was to enhance the mission through forest and land use management.

To help accomplish this, the Natural Resources Branch (NRB), in conjunction with the installation fire department, performs annual prescribed burns to reduce wildfire

potential in and around ranges, improve wildlife habitat, control invasive species and restore native plant communities.

During the reporting period, 10,206 acres were managed through prescribed burns. These burns also improved habitat for many rare species, including the federally endangered Karner blue, regal fritillary and Ottoo skipper butterflies, grasshopper sparrow, and the upland sandpiper.

Naturally restored land provides more room

and assist Fort McCoy in completing consultations if species are listed.

Actions included surveying for monarch butterflies within 3,400 acres of grasslands; mapping habitat for the regal fritillary butterfly on 321 acres; conducting 700 surveys for rare butterflies; implanting passive integrated transponder tags within 21 bull snakes; and using telemetry equipment to monitor turtles and snakes to determine critical nesting and hibernation locations.

To further its efforts to maintain a strong habitat and encourage community engagement, the post provides approximately 48,000 acres of accessible land for hunting and other recreational activities.

During the reporting period, the installation issued more than 15,000 hunting, fishing, trapping and firewood cutting permits, generating more than \$187,000 in revenue.

Fort McCoy held four free fishing weekends to encourage the use of its lakes, ponds and streams, offering public access for hiking, bird watching, and picking mushrooms and berries when military training is not being conducted.

"The NRB's accomplishments have enhanced military training, improved the quality of life for Soldiers and

(U.S. Army photo)



Three rare butterfly species, an Ottoo skipper, regal fritillary and monarch butterfly, along with the monarch caterpillar, are attached to one common milkweed flower. Fort McCoy is home to one of the largest remaining populations of the regal fritillary butterfly and is the only location remaining in Wisconsin where Ottoo skipper butterflies are found. These species are thriving here in part because military training improves the species' habitat.

for lupine to grow, which attracts more bees and butterflies.

To further improve the urban forest and make the grounds safe for training, the NRB also removed 228 hazard trees and 26 shrubs while pruning hundreds of others to improve the overall health of the forest.

Another project was to collect data on eight species undergoing status reviews by the Fish and Wildlife Service for potential listing under the Endangered Species Act. The data will assist the agency in making listing decisions,

civilians, and minimized both the internal and regulatory encroachment on the mission," said Tim Wilder, Natural Resources Branch chief.

"With 130-plus years of combined natural resources experience, the dedicated NRB professionals remain fully engaged in a collaborative effort with internal and external customers and stakeholders in supporting the mission while ensuring compliance with all laws and regulations," he said.



(U.S. Army photo)

The wood turtle is one of eight species found on Fort McCoy currently undergoing a status review by the Fish and Wildlife Service for potential listing under the Endangered Species Act. Jessup Weichelt, endangered species biologist, holds a male wood turtle that he located using telemetry equipment. Telemetry monitoring provides information on home range, habitat utilization and hibernation sites. With this data, Fort McCoy is now well positioned to draft a biological assessment should it be listed.

Revolutionary device promises efficient ecosystem management

Story & photos by Brigida Sanchez
USACE, Jacksonville District

Many of today's whirling watercraft operators pilot a new device that promises efficiency, efficacy, and most importantly, accountability.

Jessica Fair, biologist with U.S. Army Corps of Engineers, Jacksonville District and Keith Mangus, project manager at Applied Aquatic Management, explained how this small, inconspicuous device will revolutionize the management of invasive plants.

Congress has often left the management of invasive aquatic plants to government agencies and their contractors through its enacted "The Rivers and Harbors Act" of July 3, 1958, Public Law 85-500, Section 104.

Since the 1800s, USACE and its partners have taken on the daunting task of maintaining the Florida waterways and minimizing the impacts of invasive aquatic plant species.

In the U.S., invasive species are responsible for economic losses of more than \$138 billion annually. They clog up waterways that hinder, or in some cases bring to a halt, the transportation of recreational vehicles and commerce altogether. In addition, large mats of water hyacinth can take out a bridge or lock gate and outcompete native plants.

In order to stop the destruction of infrastructure, the Jacksonville District and its partners are using three methods of management: biological, mechanical and chemical.

Each process varies in its effectiveness depending on the species of aquatic plant being treated, leaving the team to rely heavily on data to determine the best method to inhibit invasive aquatic plant growth.

For years, the public has called for more transparency and efficacy of invasive plant management. The urgent appeal has increased with the awareness of how precious these water resources are and the fragility of the ecosystems that depend on them.

Florida Fish and Wildlife Conservation Commission, or FWC, is an active partner in the management of invasive species.

"FWC took a pause from managing invasive plants to ask for feedback from the public," Mangus said. "The response was: no one is overseeing the contractors, and they are out there spraying everything."

To meet the public's request for transparency, the agencies and contractors decided to revisit the process.

Alex Drew, FWC biologist, and his team examined technologies they felt could be implemented that would complement the methods used by state and federal agencies to manage invasive plants.

"We finished a project where we were using some GPS units, and we noticed that there was a signal and

gun pressure," Mangus said. "As this is happening, the platform records two separate tracks: one track that shows the navigational path of the airboat in one color; and another that shows the spray path in another. That spray tract indicates where we have actually treated the invasive aquatic plants."

The project manager explained that this is an essential tool for the industry. The GPS technology ensures that the licensed applicators are working efficiently in their designated areas. The platform also identifies parameters that need to be avoided, such as "snail kite nesting buffer zones" and water intakes.

At another location on the lake, the team found remnants of fragrant white lilies among the mats of water hyacinths.

"Water hyacinths are not native to our area," Fair said. "It outcompetes our native vegetation." She added that lilies or some other ecologically diverse patch of native aquatic plants can be overtaken by the invasive water hyacinths in a matter of weeks.

"They ruin the habitats, promote mosquito growth and impact both dissolved oxygen and turbidity," Fair said.

Once an area is treated for invasive plants, the team monitors the tracks from the platform. The program helps them know the exact location in real-time that an applicator applies the designated herbicide.

Since the waterlily is rooted in the soil, the lilies there will quickly produce new flowers and pads after the water hyacinth dies out, taking this area back from the invasive aquatic plants.

"For a biologist going out surveying, sometimes the effect of the herbicide takes days and even weeks for us to see," Fair said. "Before this technology, when biologists went out to survey, collect data and verify that the applications were working, we had a general idea of the treated areas."

Now with the program, she said biologists can pull up the platform and see if, and when, the area was treated.

"With that information, we can compile our survey data and direct our contractors better," the biologist said. "It helps us to be more effective, save time and money."

Largely as a result of this program, the team now has the data and imagery needed for full transparency to the public, providing requested information in real-time: when, where and how they are chemically and mechanically managing invasive aquatic plants, she said. "It is in keeping with the promise of efficiency, efficacy and accountability."



(Photo courtesy of USACE, Jacksonville District)

Jessica Fair, biologist with USACE, Jacksonville District and Keith Mangus, project manager at Applied Aquatic Management, use this small, inconspicuous device in managing invasive plants.

there were inputs on the wire," Drew said. "I started testing things out, and I figured out that I could rig up a switch valve to the herbicide tank and then use that to pair it with the GPS."

Once the units were installed, the team realized that they could also monitor mechanical management systems. "I just repurposed it and adapted it to use with our current technology," Drew said.

With the device and the platform still in their early stages, FWC invited its partners like USACE and local contractors to demonstrate the tool and become part of the pilot program.

"USACE wants to become more transparent in our spray programs," Fair explained. "We want to work together to improve oversight and be able to compile more accurate surveys of invasive aquatic plants. This program can do that and more."

Using their cell phones, the team could locate and now monitor the contractors' licensed applicators through the FWC's Spray Tracker platform.

"The Spray Tracker is an internet-based platform. It is a simple GPS tracker unit that has inputs and a solenoid valve that opens and closes as the applicator is applying



Jessica Fair, biologist with USACE, Jacksonville District holds up a Portable Series Wind Meter used to indicate wind speed. Licensed applicators use this device along with guidance from the Environmental Protection Agency to determine whether or not to spray invasive aquatic plants.

Research engineers conduct DamBot tests at Stillhouse Hollow Lake

Story & photos by Trevor Welsh
USACE, Fort Worth District

In an effort to prevent personnel exposure to high-risk environments and dangerous but necessary maintenance tasks, the U.S. Army Engineer Research and Development Center is currently developing an autonomous robotic system known as DamBot.

As part of this pilot program, ERDC's Information Technology Laboratory's Robotic Assessment of Dams team traveled to USACE, Fort Worth District's Stillhouse Hollow Lake in Temple, Texas, recently to test the capabilities of DamBot.

Chris Bryan, Asset and Maintenance Management technical lead for Fort Worth District Operations Division, Asset Management and Flood Risk Management Business Line, said the district jumped at the opportunity to have its dams chosen for DamBot testing.

"Well, it all started with an email," he said. "The Engineer Research and Development Center, also known as ERDC, sent out an email Corps-wide touting the program they developed known as DamBot."

According to Bryan, the leadership latched onto the email message and fully supported the district's involvement.

"We maintained communication and set up a site visit at Stillhouse Hollow Lake's discharge conduit," he said. Through that communication and coordination, the district was able to forge a partnership and identify other possible sites to inspect with DamBot.

Earthen embankment dams feature an outlet works structure that includes a tunnel that can be up to half-a-mile-long leading to gates that control water levels.

Construction materials are vulnerable to corrosion and fatigue issues that may compromise the structural integrity of the system and put personnel entering the tunnel in jeopardy.

DamBot is a robotic platform carrying a variety of sensors such as high-resolution cameras and Lidar and can create an extremely detailed model of the entire outlet

works system.

Typically, an inspection involves physically sending individuals into the tunnel to photograph concerning spots and document anomalies by hand.

The DamBot allows for precise and repeatable inspections that can be viewed remotely, meaning inspectors are no longer exposed to hazardous conditions.

Anton Netchaev, a research computer scientist in ERDC's Information Technology Lab, said the final goal of a DamBot inspection is to drive in through the discharge gates, deploy a robotic arm, scan the whole structure, and create a digital surrogate so the safety team can compare year-to-year looking for flaws or issues in the dam.

"We're trying to map the dam all the way through and reconstruct it in a 3D world," Netchaev said. "This is so the people don't have to go in and take smaller cameras and all the other equipment they need to go through the dam and take pictures of the dam."

"This will give you better data overall, you can record year to year, personnel are not in danger, and it's a lot easier to do," he said.

The DamBot program started with a statement of need that came out about three years ago specifically looking at non-destructive testing options for dams.

"How can we inspect the gate in situ, which means while it's still being installed," Netchaev said. "It's very expensive to remove the gear and put it back in."


"Right now, it can cost around a quarter million dollars to remove the gate and put it back," he explained. "So, we decided to tackle the first problem: how do we get to the gate and get a sensor to the gate itself?"

A diverse and multi-faceted research and engineering team is required to bring a project like DamBot to life.

Netchaev said the team is over 50-strong in terms of robotic development across many projects. The robotics efforts span across military and civil works needs.

"We have mechanical engineers, computer scientists, computers engineers, electrical engineers, biologists — it's full chunk of various engineers that make this work," he said.

See **DAMBOT**, page 28



Chuck Ellison, research mechanical engineer with the ERDC's Information Technology Laboratory's Robotic Assessment of Dams, operates a prototype site characterization vehicle known as "DamBot" during testing at USACE, Fort Worth District's Stillhouse Hollow Lake.

“Robotics is such a diverse field that you must have a deep knowledge of many different areas,” he said.

According to Netchaev, the team needs sensor and mechanical expertise to attach sensors to make the motion systems work; computer scientists to write software to interact with the systems; and autonomy specialists who are computer scientists and computer engineers to bring it all together.

“How do you interact that all together?,” he asked. “It’s a lot of pieces of the puzzle to bring together.”

This was only the second time the DamBot’s capabilities have been tested via dam outlet works inspection.

Despite not being able to conduct a full inspection due to unforeseen challenges, the team will use lessons learned to improve the DamBot’s capabilities.

“The goal for today was to do a full

inspection of the discharge conduit,” Bryan said. “We weren’t able to accomplish the mission today.

“This was the first time the DamBot has come out to Texas and put into use, so there’s some challenges that we didn’t really anticipate such as the algae and the slippery slope of the apron,” he added. “We tried to make entry, we just couldn’t do it safely, so we decided to stop operations for today so we can devise a plan to do it safely and effectively.”

“Hopefully we can come out here again, defeat this issue and soon drive through the dam and get some really good imagery,” Netchaev said.

As one of the most diverse engineering and scientific research organizations in the world, ERDC conducts research and development in support of the Soldier, military installations, and USACE’s civil

works mission, as well as for other federal agencies, state and municipal authorities, and U.S. industries through innovative work agreements.

ERDC operates more than \$1 billion in world-class facilities at seven labs located in four states with more than 2,100 employees to administer an annual research program exceeding \$1 billion.

To learn more about the ERDC, visit: <https://www.erd.usace.army.mil/>.

USACE, Fort Worth District was established in 1950 and 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>.



The DamBot is a robotic platform carrying a variety of sensors, such as high-resolution cameras, that can create extremely detailed models of the dam’s entire outlet works system. Typically, inspectors physically enter the tunnel to take photographs of concerning spots and document anomalies within the dam. The DamBot allows for precise and repeatable inspections that can be viewed remotely, meaning inspectors can do their jobs from a safe distance.

ERDC science helps USACE districts ease time-of-year dredging restrictions

By Holly Kuzmitski
Engineer Research and Development Center

It was when he was a graduate student at Virginia Commonwealth University that Dr. Matt Balazik, a research ecologist with the U.S. Army Engineer Research and Development Center's Environmental Laboratory, began intensely studying Atlantic sturgeon, its populations now listed as either threatened or endangered under the Endangered Species Act.

His research has now spanned 14 years and is focused on providing a better understanding of how dredging affects the environment — whether it's water quality or fish behavior during spawning migrations.

"Restrictions within most waterways are usually for migrating fish," Balazik said. "Some put in place in the '70s or '80s were not necessarily based on science.

"We are collecting data in field settings to get a better understanding of what is actually happening around active dredging projects," he said.

The restrictions Balazik refers to are time-of-year dredging restrictions or dredging windows — periods when dredging is prohibited.

They were developed by agencies based on what was known about the particular species under the purview of each agency and are implemented in coordination with the U.S. Army Corps of Engineers.

In the case of Wilmington and Norfolk districts, dredging windows were established in relation to Atlantic sturgeon spawning and migration.

Balazik and his team consider each unique situation and then either gather existing data or obtain new data to see whether the science shows the restriction is necessary; if not, armed with the data, the district works to remove it.

Emily Hughes, a biologist at USACE Wilmington District, describes how Balazik is testing water quality in the Wilmington and Morehead City harbors to facilitate the permanent removal of the traditional dredging window of December 1 – April 15.

Wilmington Harbor is part of the lower Cape Fear River, critical habitat for the Atlantic sturgeon.

"The Wilmington District completed an Environmental

Assessment and Finding of No Significant Impact, in accordance with the National Environmental Policy Act, that addressed impacts of removing the hopper dredging window," she said.

"As a result of coordination with federal and state environmental agencies, the district is required to perform water quality sampling before, during and after hopper dredging for the next three years to ensure there is no danger posed by hopper dredging to the sturgeon," Hughes said.

Keith Lockwood, chief of USACE Norfolk District's Water Resources Division, said that Balazik is now looking at the spawning and migration patterns of Atlantic sturgeon in the James River.

"He is trying to find spawning females in the upper portion near Richmond and looking at juveniles and their patterns in the middle and lower James River to see what effects these patterns could mean to navigation projects and dredging," Lockwood said.

See **ERDC SCIENCE**, page 31



(Photo by Matt Balazik)

A view from the research vessel illustrates how close research ecologists must be to the cutterhead dredger, Lexington, to monitor Atlantic sturgeon and their response to dredging.

Balazik describes how, after years of working with the Norfolk District to monitor the sturgeon around hydraulic cutterhead dredges on the James River, he hasn't found signs of avoidance from the sturgeon.

"They all swam past the dredges — none have turned around — they continued upstream," he said. "One fish passed the dredge 13 times."

The ERDC research ecologist made a discovery when he tried to collect data for the Norfolk District project.

"No one knew there was a fall spawning season — most species have a spring run and that's it," Balazik said. "We had to test, but there were restrictions already in place for the spring run. Once we learned that there was a fall run, and there were no dredging restrictions at that time, the pieces fell right in place — the weather conditions, the water, we got the telemetry."

The research biologist added that "this project has shown that dredging had no noticeable effect on migrating fish."

"This is the total opposite of what everyone expected to happen," he said.

Balazik's discovery could have a big impact on both districts.

"This research could eventually result in relaxation or reduction in time-of-year restrictions for Norfolk District," Lockwood said. "Sturgeon is a keystone species; if it's conclusively shown that dredging is not affecting migration and spawning at any time, we will request that the regulatory agencies relax the restrictions."

For the next three years, the Wilmington District has the flexibility to dredge the Wilmington and Morehead City harbors without the constraints of windows.

"With the hopper dredge shortage we are facing right now, the ability to dredge at any time of year will help guarantee that entry to the ports is maintained at project depth as much as possible," Hughes said.

"If sampling shows minimal and temporary changes to water quality, we may have the ability to dredge without seasonal restrictions permanently," Hughes concluded.



(USACE courtesy photo)

Dr. Matt Balazik, a research ecologist with the U.S. Army Engineer Research and Development Center's Environmental Laboratory, hauls an Atlantic sturgeon onto his boat on the James River in Virginia to evaluate the fish's health for tagging.

W.P. Franklin lock operator grants all-access tour

By Maya Jordan
USACE, Jacksonville District

Aye, aye captain.

You don't have to be a pirate to know that lock and dam operators are tasked with monitoring the nation's most precious treasure — delicate, blue waterways.

W.P. Franklin lock operator Glenn Hutson gave the communications team an inside look into the lock and dam's day-to-day operations.

Originally from Canada, Hutson has been with the U.S. Army Corps of Engineers for the past 13 years.

His fascination with the great outdoors began as a young boy who received animal books on subjects such as diamondback rattle snakes from his grandmother.

He's never looked back.

"As far as the job goes, I've always enjoyed it," he said.

USACE's navigation mission is to provide safe, reliable, efficient, effective and environmentally sustainable waterborne transportation systems for movement of commerce, national security needs and recreation.

The Jacksonville District executes that mission with a host of lock operators whose mission is defined as someone who

has sole authority of dam gates, control valves and other equipment required for private and commercial traffic through navigable waterways.

Hutson began his career locking at Ortona, Moore Haven, and a couple of months at Port Mayaca.

Notably, the Jacksonville District operates two other locks: the St. Lucie and Canaveral Lock for a total of six locks.

Today, Hutson begins each day at Alva, Florida, on the Caloosahatchee River from 7 a.m. until 5 p.m. with the last lockage at 4:30 p.m.

See **W.P. FRANKLIN**, page 33



(Photo by Maya Jordan)

Glenn Hutson, Jacksonville District lock and dam operator, begins each day with an inspection to ensure all is well at the W. P. Franklin Lock and Dam.





(Photo by Maya Jordan)

Glenn Hutson, lock and dam operator with USACE, Jacksonville District helps a small boat lock into the chamber as water is released from the Caloosahatchee River in Alva, Florida.

W.P. FRANKLIN

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His office consists of a control room that overlooks the river, complete with digital technology, a restroom, refrigerator and a microwave.

Early in his shift, Hutson files a morning report stating how many lockages, as well as report if any algae or rain has accumulated on the spillway.

He explained the process involved in opening and closing the gates.

When boaters request access, they usually contact the lock operator.

The lock operator radios the captain to wait for the green signal before proceeding. The operator in turn advises the captain of the mandatory requirement to wear properly sized life jackets. The greenlight signals boaters to enter after water goes down.

The operator then secures the bow and stern to ensure the boat stays in position while the engine is turned off.

After about 20 to 30 minutes, the boat moves through the gate and is off on its way.

Lock operators are superior multi-taskers. Their responsibilities include monitoring the spillway, ensuring patrons' safety at the recreation area on land and water as well as providing quality customer service to boaters.

When asked about how lock operators are able to keep their eyes on everything, Hutson said, "It's experience."

"Operators have to keep their eyes on the river level as well as the boaters out at each end," he said. "Of course, we are not letting a lot of water out, but if you are not paying attention, behind that gate you

would not see them."

He reemphasized the importance of paying attention to those boaters at each side and what they are doing, just to make sure an accident doesn't occur.

Hutson recalls an incident when 22 boaters entered the chamber all at once and a tugboat with two barges could barely fit into the estimated 400-foot-long chamber.

On average, more than 100 boats traverse the lake in east and west directions.

Generally, there are three operators stationed at each lock who work independent shifts manning and operating the lock.

However, there are times when operators at other locks provide an all-hands approach, like for pulse releases.

"When we are doing a pulse release, I have to set the gate so that a certain amount of water goes through," he explained. "If I run out of water or if I get too much water, I'll call Jennifer [at Ortona Lock] and she will either open more gates or slow down the water to maintain the right levels."

Hutson adds that at any time, operators have at their fingertips a ton of tools and equipment.

W.P. Franklin Lock and Dam has eight gates.

"We have to try to set those gates so that no one will have to come here in the middle of the night. Now, if that happens, there is a computer system known as the 'SUTRON' that has the capability of phoning somebody if the river gets to 265

and 355," Hutson said.

The 'SUTRON' is a computer that reads the lake levels at the head and tail and determines sea level rise and fall.

Next, there is the Manatee Positioning System that helps determine the sea level and pressure for the gates that move the sector gates on each side.

Mission-essential lock operators work tirelessly all year, including holidays and during inclement weather such as catastrophic hurricanes.

When disaster strikes, operators work 12-hour days in a full team approach.

Additionally, lock operators also issue safety policy ensuring all boat passengers are wearing the proper lifejacket.

There is a trifold brochure handed to all boaters to ensure they are aware of lockage protocol, something so simple as calling the lock operator is not always done.

William Keeney, USACE lock supervisor, said right now there are five operators on the waterways that are standing there alone making decisions.

"They are liable for everything on here," said Keeney.

Hutson, who celebrated his birthday in March, recently retired.

For more information on locking and safety tips as a boater visit:

<https://www.saj.usace.army.mil/Missions/Civil-Works/Navigation/Notices-to-Navigation/Notice-to-Navigation-2019-001-Guidance-about-Canaveral-and-Okeechobee-Waterway-Lock-procedures/>.



Virtual teaming key to superfund success

New York District, EPA, Kansas City District, and contractor staff tour landfill cap construction progress at the Ellenville Scrap Iron and Metal Superfund Site in 2011.

By Jill Fraley
USACE, Kansas City District

The U.S. Army Corps of Engineers' support to the Superfund Program ties back to Congress passing Public Law 96-510, the Comprehensive Environmental Response, Compensation and Liability Act, in 1980.

The legislation made provisions for the Environmental Protection Agency (EPA) Superfund Program to use the existing capabilities of other federal agencies in meeting its objectives.

EPA and USACE signed agreements in 1982 and

1984 stating that, upon EPA request, USACE will manage and design construction contracts and provide technical assistance in the remediation of hazardous waste sites.

In 2016, this agreement was renewed and updated and continues to serve as the basis for Superfund projects today.

In the earliest days of the mission, none of the USACE districts had teams of engineers and scientists familiar with hazardous, toxic and radioactive waste.

The former Missouri River Division — precursor to what is now the Northwestern Division headquartered in Portland, Oregon — oversees five districts, including Kansas City District which was given the Superfund

mission and designated as the National Design Center for the Superfund Program.

This authority extended to include Superfund design assistance to the EPA for five of its 10 regions.

Between 1982 and 1987, the Kansas City District supported over \$48 million in Superfund work — a number that tripled by 1988.

As the environmental mission and USACE customers expanded, more districts hired staff and gained expertise in the expanding field of environmental remediation, and decentralization of the environmental mission continued.

One of the key regions originally assigned to the district was EPA Region 2, covering the Superfund sites

in New York and New Jersey, and due to the sheer volume and complexity of the work, it developed and maintained strong ties with them even as the mission decentralized in the 1990s.

The successful execution of the Superfund mission is attributed to strong partnerships and trust within the local geographic districts, and the New York and Philadelphia districts in the North Atlantic Division.

Virtual teaming has been a part of the Superfund culture for so long that Kansas City, New York and Philadelphia district staff don't think twice when new assignments arrive from EPA Region 2.

See **VIRTUAL**, page 36





U.S. Army Corps of Engineers, Philadelphia District; Environmental Protection Agency; and USACE, Kansas City District staff tour ongoing radioactive remediation efforts outside the fence at the Welsbach/General Gas Mantle Superfund Site in 2017.

VIRTUAL

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The Kansas City District typically handles the engineering and science expertise for the projects, as well as the contract capacity and execution of the contract actions for design, construction and remedial action operations/long-term monitoring.

The Philadelphia District provides technical and contracting expertise on select projects while the New York and Philadelphia districts provide all the construction oversight, contracting officer representative and administrative contracting officer functions to the projects.

Project managers reside in all three districts with the Kansas City project managers leading the investigations and design, and New York and Philadelphia project managers leading remedial action and remedial action operations.

Contract awards are coordinated between the Kansas City contracting

officers and the geographic districts.

Because so many of the EPA Region 2 projects are executed as cost-reimbursable contracts, the expertise and oversight of cost-reimbursable environmental remediation from the construction resident offices are unique and valued skills within the Superfund Program.

The management team at these districts work to ensure their roles and responsibilities make sense for the project and that the combined Superfund team meets the customer's needs.

For example, when the COVID-19 pandemic hit, travel by Kansas City District staff for normal technical oversight was difficult.

The Philadelphia and New York districts were able to provide added oversight and have reach-back support to the Kansas City team, as needed.

Communication between the districts and with EPA Region 2 has been key to

the program's successful mission execution for nearly 40 years.

The district teams, along with the North Atlantic Division, meet bi-monthly with EPA Region 2 to review progress, identify challenges on all the active projects, and collaborate on ways to resolve issues.

These direct meetings with EPA and the united USACE team have taken place for over 20 years and have set the standard for what it means to work successfully as a virtual team.

Currently, the combined New York, Philadelphia and Kansas City district teams execute approximately \$60 million each year managing and designing construction contracts and providing technical assistance in the remediation of hazardous waste sites within EPA Region 2, which is typically the largest segment of the EPA workload executed by USACE.





(Courtesy photo)

The Onyx Super Computer at the Engineer Research and Development Center, one of five DOD Supercomputer Resource Centers, consists of 212,000 processors and can perform 1.7 quadrillion (1,700,000,000,000,000) calculations per second.

Huntsville Center's supercomputer team provides cradle-to-grave procurement

By Mark Dowhy & Patrick Parten
Engineering and Support Center, Huntsville

When the Department of Defense needed an innovative strategy for meeting the ever-changing, highly technical requirements of its High Performance Computing (HPC) Modernization Program, it called on the experts at the Engineering and Support Center, Huntsville.

Created in 2012, the Huntsville Center's HPC team was created to provide cradle-to-grave procurement of supercomputers specifically for the modernization program, but is expanding its reach to offer critical program management and contract support services to all government agencies.

Currently, the center boasts the only execution team within DOD that has three major acquisition vehicles in place to provide key supercomputing deliverables in an efficient and cost-effective manner.

The objective of the HPC Modernization Program is to accelerate technology development and transition to superior defense capabilities, and provide DOD scientists and engineers

with the resources necessary to solve the most demanding warfighter problems through the strategic application of high-performance computing, networking and computational expertise.

The program is composed of three primary elements: five DOD Supercomputing Resource Centers (DSRCs), which provide large-scale supercomputers and operations staff; the Defense Research and Engineering Network, a nationwide high-speed, low-latency, research and development network connecting the DSRCs and major user communities; and a collection of efforts in software applications to develop, modernize and maintain software to address the Defense Department's science and engineering challenges.

The High Performance Computing management office is located at the Engineer Research and Development Center in Vicksburg, Mississippi, and administratively reports to the assistant secretary of the Army for acquisitions, logistics, and technology.

Huntsville Center's HPC team is a highly skilled, multi-disciplined group of subject matter experts in the areas of program management, project management, engineering, contracting,

resource management and legal counsel.

Its members bring to the team vast amounts of experience in information technology, networking, cybersecurity, hardware, training and communications infrastructure which has proven especially beneficial when working with the HPC management office staff to strategize, plan and deliver key products and services to all of DOD centers and their respective stakeholders.

The critical acquisition vehicles used by the HPC team provide for the procurement, testing, installation, operation, administration and maintenance of supercomputers.

This efficiency reduces defense system costs by shortening the design cycle and reducing reliance on expensive and destructive live experiments and prototype demonstrations.

Given the current national security events that mandate the most agile and modern technology to meet the warfighters' needs, the Defense Department is able to maintain its competitive edge on a global stage by continually modernizing its high-performance computing assets thanks to the efforts of the Huntsville Center's high performance computing team.



Omaha District leverages innovative approach to clean up, restore formerly used defense site

By Nathan Hoffman
USACE, Omaha District



*(Courtesy photo)
Historical photograph of Former Offutt Air
Force Base Atlas "D" Missile Site 2 in Nebraska.*

Former Offutt Air Force Base Atlas “D” Missile Site 2 (Site 2) is located near Arlington, Nebraska.

It is a Formerly Used Defense Site that was previously used by the Air Force for the maintenance, storage and potential launch of Atlas “D” intercontinental ballistic missiles.

The former 274-acre missile complex was constructed in 1960, used for about two years, and eventually declared excess in 1966.

Missile fuel systems were periodically cleaned with trichloroethene (TCE) while Site 2 was in operation. Each of the three launch and service buildings had a flame pit area where the waste TCE and residual rocket fuel were washed into and presumably burned. These pits would seasonally fill with water, which eventually leached into the soil and groundwater.

TCE is the primary contaminant of concern at Site 2, along with the breakdown products cis-1, 2-dichloroethene (DCE) and vinyl chloride (VC).

The maximum contaminant level (MCL) of TCE in groundwater is five micrograms per liter or parts per billion (ppb).

The nature and extent of potential contamination at the site was delineated between 1991 and 2007.

Five possible source areas were investigated and over 100 monitoring wells were installed to delineate the groundwater plume.

Direct push borings with membrane interface probes (MIP) were used to determine if contamination was still present in unsaturated soils at concentrations that would continue acting as a source of contamination to groundwater.

The results of the MIP borings indicated that the flame pit area behind the #2 launch and service building (LSB #2) was the only remaining source of contamination to groundwater.

TCE was detected at concentrations as high as 133,000 ppb in soil and 717,000 ppb in groundwater at the source area.

Remediation of the source area at LSB #2 was needed before effective remediation of groundwater contamination could begin.

Soil and groundwater contamination extended to depths of 30 to 35 feet below ground surface at the LSB #2 source area.

Conventional soil excavation and disposal options were evaluated but deemed undesirable due to potential

complete the treatment.

The post-pilot test analytical data indicated the vadose soil contamination was reduced below residential soil standards for all contaminants.

Groundwater contamination was treated site-wide using in-situ enhanced bioremediation following treatment of the source area. This remedy uses bacteria to degrade TCE to DCE and then VC before final degradation to ethene.

Initially, 533 injections delivered a total of 43,793 gallons of amendment in 2011 to treat the 53-acre TCE plume.

By the fall of 2012, analytical data indicated that 91% of the TCE and 68% of the total contaminant mass had been eliminated by the remedy.

The rate of TCE reduction began to slow and supplemental injections were performed from 2013

to 2017 that included the injection of sodium dithionite.

Currently, TCE is only detected above the MCL in two monitoring wells.

Most of the groundwater contaminant mass remaining at the site is in the form of the final breakdown product VC and has proven to be less amenable to treatment by in-situ enhanced bioremediation.

Although an aggressive amendment injection plan has reduced the total contaminant mass by over 97%, the current project delivery team pushed the boundaries even more to put aggressive metrics within the current five-year contract, awarded in April 2021.

The approach is to reach specific molar mass reductions of TCE (100% below MCL), DCE (100% below MCL) and VC (30% below MCL) by the end of the period of performance.

Additionally, there is another performance goal to conduct a pilot study on VC that will support response complete for the project within 10 years.

This is an attempt to leverage innovative thinking and approaches that could be tested for viability on-site and potentially set the strategy for the follow-on contract.

Response complete is anticipated at Site 2 by 2031.



(Photo courtesy of USACE, Omaha District)

An engineer positions the containment shroud and auger over a treatment cell in the source area.

worker safety concerns and the high cost for excavating, transporting and disposing of the large volume of hazardous waste that would be generated.

An aggressive and innovative in-situ thermal treatment pilot test was used to remediate the source area in 163 treatment cells that advanced an 8-foot diameter auger to depths of 40-plus feet across the source area.

The pilot test actively mixed and heated soil with steam and hot air through the auger itself in addition to injecting zero-valent iron. The steam heated the contaminated soil and groundwater, thermally desorbing the contamination and volatilizing the non-adsorbed contaminants. The hot air carried the volatilized off-gas contamination to the surface where it was collected within a containment shroud and treated.

Additional passes up and down the treatment cell were conducted at the areas of highest contamination while the off-gases were monitored for contaminants of concern with a real-time data acquisition system.

After each cell reached the treatment goal, a ZVI slurry was injected through the auger into the cell and mixed into the pre-conditioned soil and groundwater to



“Biodiversity provides the basis for all life on Earth. I think a natural resource survey is the basic element of understanding proper protection and restoration of biodiversity. As government employees, it is our responsibility to protect our natural resource[s] in accordance with laws and policies.”

Sung Sik Paek
USACE, Far East District

Far East District leads biodiversity efforts for American forces in Korea

By Sameria Zavala
USACE, Far East District

The U.S. Army Corps of Engineers, Far East District is entrusted with ensuring that natural resource conservation measures and activities on all U.S. Forces Korea (USFK) installations are integrated and consistent with federal stewardship requirements.

The district strives to restore ecosystem structure and processes, manage land resources and construction activities in a sustainable manner, and support cleanup and protection activities efficiently and effectively, all while minimizing its footprint.

Sung Sik Paek, environmental engineer, Far East District, assists U.S. military installations in the Republic of Korea with developing an Integrated Natural Resource Management Plan (INRMP) by preparing contract document packages and serving as the contracting officer representative.

“Biodiversity provides the basis for all life on Earth,” Paek said. “I think a natural resource survey is the basic element of understanding proper protection and restoration of biodiversity. As government employees, it is our responsibility to protect our natural resource[s] in accordance with laws and policies.”

The INRMP provides technical guidance to achieve sustainable biodiversity, and better use of military training ranges and other land assets.

As such, all branches of the military in Korea are required to comply with USFK Regulation 201-1, Environmental Governing Standards.

“The EGS requires that the USFK devise plans to ensure proper protection, enhancement and management of natural resources and any species (flora and fauna) declared endangered or threatened by either the United States or ROK government,” Paek said.

The Far East District ensures the USFK plan is carried out by using the following tips:

- Follow all requirements listed in USFK Regulation 201-1, 2020 Environmental Governing Standard and Army Regulation 200-1 for management of natural resources.
- Maintain vegetated buffer zones around natural habitats, especially where current activities adjacent to natural habitats are causing noticeable adverse impacts on the habitat.
- Activities within buffer zones should be limited to those that would cause little or no ground disturbance.
- Maintain grounds to meet designated mission use and ensure harmony with the natural landscape.

Each installation should develop an environmental awareness pamphlet that details environmental awareness and wildlife population on the installation, responsibilities and requirements for environmental protection, and measures that are taken for environmental preservation.

The efforts of the INRMP are ongoing and the Far East District continues to ensure the U.S. military maintains good stewardship of the land they occupy, while also partnering with the Republic of Korea.



(Courtesy photo)

USACE strives to restore ecosystem structure and processes, manage land resources and construction activities in a sustainable manner, and support cleanup and protection activities efficiently and effectively, all while minimizing its footprint.



(Courtesy photo)

Sung Sik Paek, environmental engineer, USACE Far East District, assists U.S. military in Korea with developing an Integrated Natural Resource Management Plan by preparing contract document packages and serving as the contracting officer representative.



(Courtesy photo)

U.S. Army Corps of Engineers, Far East District is entrusted with ensuring that natural resource conservation measures and activities on all U.S. Forces Korea installations are integrated and consistent with federal stewardship requirements.

Kindergartners 'design' dream Cape Cod Canal bridges

By Ann Marie R. Harvie
USACE, New England District

Heather Cedrone is a kindergarten teacher at the Apple Orchard School in Brookline, Massachusetts.

When she heard that the U.S. Army Corps of Engineers, New England District and the commonwealth of Massachusetts decided the 86-year-old bridges needed to be replaced, she talked to her students about it.

Cedrone's class had ideas on what should be included as features on the new bridges. Big ideas. So big, that she asked them to draw their ideal Cape Cod Canal bridge.

The mini engineers went straight to work, each designing the "perfect" bridge. Their creative designs included a unicorn bridge, two dinosaur bridges and a magical bridge.

Most of the 10 designs submitted incorporated access for people, bikes and animals as well as vehicles, including special touches to take their designs over the top.

For example, one design included room for a post office building.

Another forward thinker compensated for possible tornadoes in his design, and included a racetrack.

Once the young designers finished their drawings, Cedrone sent them to Col. John Atilano II, New England district commander.

He was so delighted with the drawings, he sent a letter to the class thanking them for their wonderful ideas.

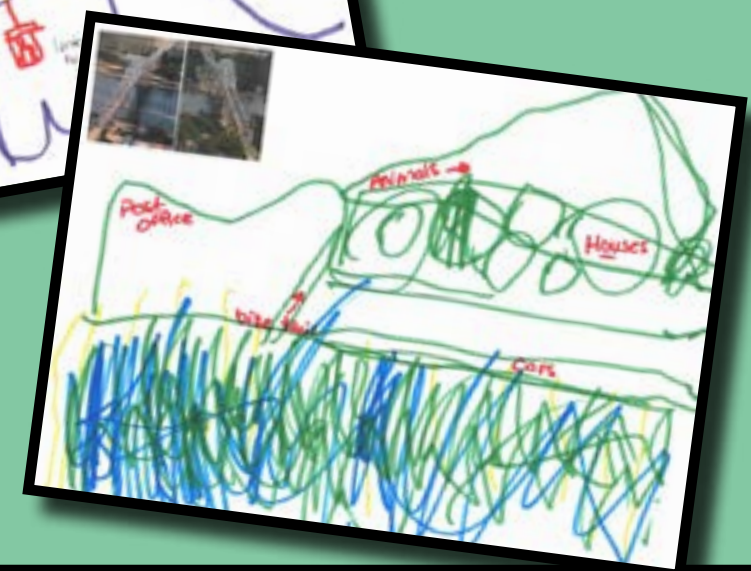
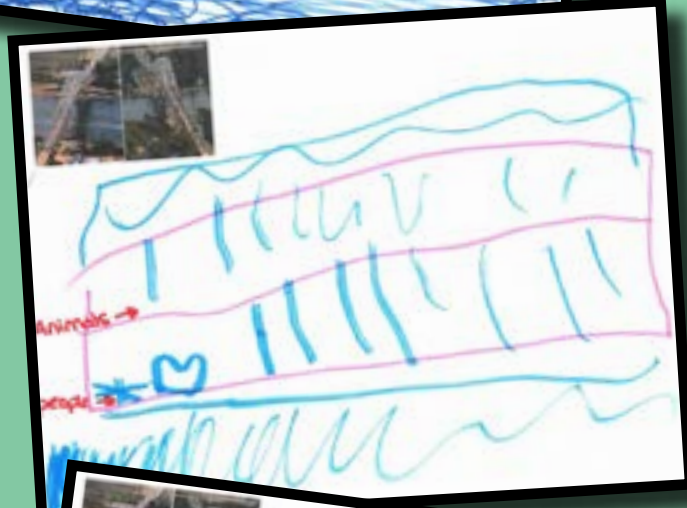
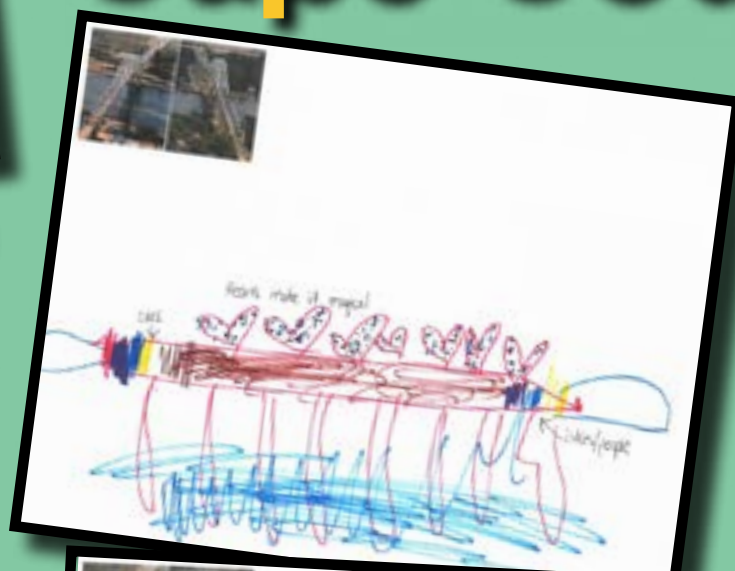
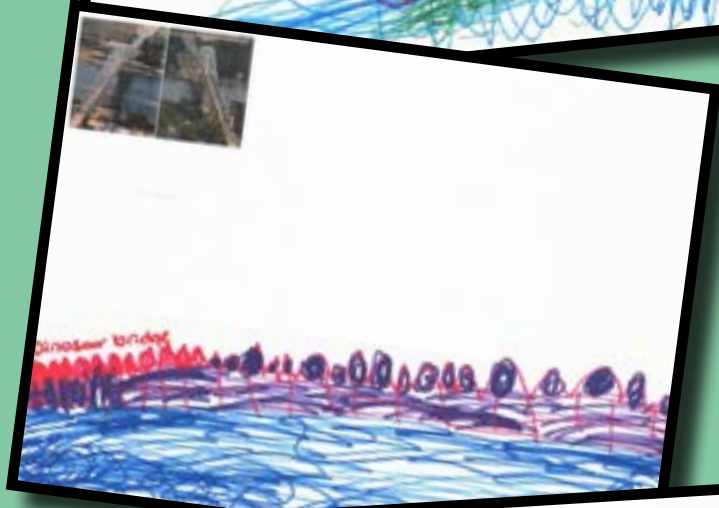
The colonel made sure he addressed each bridge design and how each of them would make a special addition to the Cape Cod landscape.

"Ellie's unicorn bridge will be the most colorful and unique bridge," he wrote. "Lonam's dinosaur bridge will certainly be the toughest bridge in the world."

The district commander hoped that the children would see the new bridges being built and that they might even see some of their ideas incorporated.

"I can see that there are many future engineers and scientists in this group," he wrote. "Keep up the hard work and I hope you stay interested in science and engineering!"

Graphics accompanying this article are design ideas for the new Cape Cod Canal bridges drawn by Heather Cedrone's kindergarten class at the Apple Orchard School in Brookline, Massachusetts



Eagle Scout completes project at West Hill Dam

By AnnMarie R. Harvie
USACE, New England District

John DeNegris, Boy Scout Troop 2 from Milford, Massachusetts, completed his Eagle Scout project April 11 at West Hill Dam.

DeNegris upgraded and installed eight bluebird houses and removed old boxes that could injure wildlife.

According to Viola Bramel, park ranger, the new boxes were not only built to code, but were placed in areas where the birds would likely select them to nest.

In addition, DeNergis and his team cleaned all the bird boxes at the remaining 10 sites, readying them for spring arrivals. DeNegris constructed extra boxes to use for future seasons.

“John joins a fine line of 62 Eagle Scouts at West Hill Dam,” said Bramel. “Houses for bluebirds, like the ones John made, as well as houses for wood ducks and bats are critical for these animals.”

DeNegris said that working with the West Hill Dam team was a positive experience.

“This project was fun,” he said. “I’m glad I could help out the West Hill Dam.”



(Photos by Paige DeNegris)

John DeNegris, Boy Scout Troop 2, removes an old bluebird box from West Hill Dam.



John DeNegris and members of Boy Scout Troop 2 assemble bluebird houses to install around West Hill Dam.



COLLABORATION IN ACTION:

The Department of Defense Memorandum of Agreement Program

By Katie Reed

Environmental and Munitions Center of Expertise

Department of Defense environmental cleanup activities are complicated.

Close collaboration is required between the federal government and state agencies to review and comment on environmental documents, participate in

Building Strong! SALUTE



Dr. Richard Meyer

Retiring after 25 years, including three years as a college professor, Dr. Richard Meyer has provided exceptional chemistry and environmental remediation support to the Environmental Protection Agency and Department of Defense organizations.

He started his career at the Missouri River Division Laboratory in 1996 prior to coming to the Environmental and Munitions Center of Expertise where he served as the chief, Environmental Sciences Division.

meetings, conference calls, site visits and public outreach.

The Department of Defense Memorandum of Agreement (DSMOA) program, authorized in 1986, expedites environmental restoration of active and formerly used defense sites through partnerships with states and territories.

These partnerships promote cooperation in cleaning up environmental restoration projects funded by either the Defense Environmental Restoration Program (DERP) or the Base Realignment and Closure (BRAC) Program.

“Our agency has participated in the DSMOA program for over 10 years,” said Bradley Clawson, Restoration Division chief for Defense Logistics Agency Installation Management, Environmental Management.

“In addition to the military services, DSMOA is a great platform for the defense agencies to connect and work with state regulators,” he said. “DOD personnel perform all roles of the DSMOA program.”

“The correlation between our project managers and state regulators, the division of roles in the program, and the framework of DSMOA significantly helps our restoration programs and helps ensure consistent delivery of quality products,” Clawson added.

Through this framework, relationships are cultivated, thus improving communication and cooperation between states and DOD components.

While a DSMOA is the foundation for partnerships, the actual agreed upon work and funding are achieved through a cooperative agreement.

Every two years, a state submits a cooperative agreement application.

A cooperative agreement, issued to each participating state or territory, ensures that DERP or BRAC funding can be used to help defray the state or territory’s cost of expediting reviews and other activities that support DOD environmental restoration projects.

These agreements help the military service components achieve closure of environmental restoration projects as efficiently and expeditiously as possible in a manner that protects human health and

the environment.

“We sit down with the regulators every two years and create a fairly detailed plan of what we want to do at the project sites and how both our agency and the state see the state being involved, functionally establishing the regulatory milestones to close sites,” explained Justin Peach, senior project manager – Adak with Naval Facilities Engineering Systems Command Northwest.

“We reach agreement on that. It is a great step in having a collaborative team working together with shared goals,” he said.

Moreover, it is this agreement that serves as the vehicle in which funding and installations are identified and may receive financial reimbursement from DOD for eligible services.

Development of the cooperative agreement is almost exclusively accomplished through a web-based DSMOA portal.

The DSMOA portal is a secure, restricted DOD website available only to registered users participating in the DSMOA Program.

The DSMOA community utilizes this portal to facilitate communication and conduct official DSMOA business. As such, it serves as a one-stop shop for everything DSMOA-related.

“One benefit of the DSMOA program is the DSMOA portal,” said Mark Lawrensen with the state of South Dakota Department of Environment and Natural Resources. “It is a great tool to find general information and state-specific documents.”

“The portal also makes developing new cooperative agreements between DOD and states an efficient and straightforward process,” he said.

Throughout the years, states have repeatedly expressed their appreciation of the DSMOA program and how much more quickly sites are closed because of it.

Environmental restorations and cleanups are challenging, however, through programs such as DSMOA, these challenges become opportunities to work together to achieve the shared mission of protecting human health and the environment.



ERDC scientist garners Arthur S. Flemming Award

By Holly Kuzmitski
U.S. Army Engineer Research and Development Center

Dr. Igor Linkov, senior science and technology manager at the U.S. Army Engineer Research and Development Center's Environmental Laboratory, has been selected by the George Washington University and Arthur S. Flemming Commission as one of 12 exceptional public servants in 2020.

The winners – who represent a range of federal agencies – are recognized for performing outstanding service in the fields of applied science and engineering, basic science, leadership and management, legal achievement and social science.

Linkov was recognized in the leadership and management category for his work supporting multiple agencies throughout the COVID-19 pandemic.

“I am pleased and humbled to receive this recognition,” Linkov said. “This is a credit to ERDC's Risk and Decision Science Team's achievements.”

“I am extremely grateful for all of my colleagues, who worked around the clock during the COVID-19 crisis and were able to apply risk and resilience analytics and decision science to address urgent societal needs,” he said.

“I have also benefited from the vision of ERDC and EL leadership, who supported my team's research developing tools and methods that we were able to transition into practice in record time,” Linkov stated.

Established in 1948 to recognize federal employees for outstanding service, the award also serves to attract, recruit and help retain the “best of the best” in government service.

The award celebrates stellar employees with three to 15 years of federal service. Past recipients of the award include Neil Armstrong, Dr. Anthony Fauci, Robert Gates and many others.

Linkov leads ERDC's portfolio in resilience and crises management. His research vision and methodology in risk, resilience and decision science have generated tools and practices that are in use by the Department of Defense, Department of Homeland Security, Department of Health and Human Services and other agencies.

“In the 13 years he has been a part of the ERDC Environmental Laboratory, Linkov has demonstrated a strong commitment to improving understanding of risk and decision science at the ERDC, the Defense Department and throughout academia,” said Dr. David Pittman, ERDC



Dr. Igor Linkov

director, in a written statement.

He has communicated scientific principles through peer-reviewed publications, conference proceedings and presentations, and has published 26 books and over 400 peer-reviewed papers and book chapters.

Pittman described how Linkov's contributions to the scientific community have made him a role model in the field of risk and decision science.

“Igor's efforts to advance the common good are exemplified through his extensive collaborations with academic partners,” he said.

More than 100 undergraduate and graduate students and post-doctoral fellows have been integrated into these collaborations under Linkov's direction.

Linkov will be honored at the 72nd annual Arthur S. Flemming Awards virtual celebration later this summer.

ERDC researchers give back to developing communities

By Holly Kuzmitski

Engineer Research and Development Center

Since the start of the fiscal year, two environmental engineers from the Engineer Research and Development Center's Environmental Laboratory have contributed their time and expertise as mentors to college-aged students as part of an all-volunteer organization dedicated to improving the health and quality of life in developing communities across Latin America.

Dr. Edith Martinez-Guerra and Damarys Acevedo have volunteered through the Clean Water Science Network (CWSN).

"It is a networking program where mentors and mentees work together," Acevedo said. "In the past, they have also done research projects on water and sanitation issues in Latin American developing countries."

Dr. Farith Diaz, one of the co-founders and co-directors of the program, described how similar networking opportunities are usually available only to students from schools in large urban areas. So, he and two other University of Texas at Austin alumni established CWSN to help students from smaller schools.

Acevedo was aware of CWSN because she and Diaz became friends while attending graduate school at the university.

Acevedo shared the volunteer opportunity with Martinez-Guerra, who is originally from El Salvador and knows firsthand the kinds of water challenges these countries can face.

"I'm from a small village located in San Miguel," she said. "When we had to carry water from wells, sometimes we dropped chlorine tablets in the water to purify it. We have volcanic activity in the area, and after the civil war that ended in 1992, there hasn't been any cleanup of contaminants. A lot of people are getting kidney problems from contaminants in the water."

This year, there are approximately 100 mentors and 100 students from all over Latin America: Mexico, Venezuela, El Salvador, Peru, Brazil, Colombia and Ecuador.

Seminars and discussion groups are held once a month. Students have homework related to the topics presented at the seminars, usually in the form of questionnaires that they answer and share with their mentors.

The weekly seminars are on topics related to water and environmental engineering as well as about practical matters, such as how to prepare your resume, write a statement of purpose or apply to graduate school.

Martinez-Guerra also teaches English as a second language to a group of mentees once a month.

"English is a tricky language, and I'm trying to give them those tips that helped me when learning the language," she said.

Mark Noel, acting deputy director of the ERDC Environmental Laboratory, said that Martinez-Guerra and Acevedo show great initiative every day.

"This effort is just another example of their commitment to their careers and willingness to go the extra mile," he said.

By participating in CWSN, Acevedo said she is providing others with mentorship that she did not have.

"I took classes in English in Puerto Rico when I was growing



(Courtesy photo)
Dr. Edith Martinez-Guerra (left) met with one of the CWSN students, Daniela, on a recent trip to El Salvador.

up, but there was no one to provide me with mentorship on how to navigate the system, how to prepare a resume, how to apply for a job or how to apply to graduate school," she said. "I would like to give back to the community by helping others with things I wish I had help for – it's all about helping others."

"We are lucky to have mentors like Damarys and Edith in our program," Diaz said. "From their academic backgrounds to their work at ERDC, they both provide unique and valuable experience to our mentorship program that helps us grow, and that particularly benefits our mentees."

The researchers' volunteer work has also helped them build partnerships for the future.

"We're able to build a network with people from other countries, and we are able to understand their water issues better," Acevedo said. "Some of the problems they're dealing with, we have already dealt with in the U.S."

"It's a way to help the students, but it's also a way to network, because there are other mentors from different universities around the country, from different government agencies such as the U.S. Environmental Protection Agency and the National Oceanic and Atmospheric Administration, private companies and consulting firms," Martinez-Guerra said.

"Many of them perform research or work on projects that are similar to ours, so I think maybe in the future we'll be working professionally with other mentors as colleagues," she said.



Researcher leads development of internationally recognized nanomaterial testing guidance

By Holly Kuzmitski
Engineer Research and Development Center

In the world of science, established standards of testing make replication of research possible, which aids in the advancement of technologies.

Testing standards are vital on even the smallest of scales, and Alan Kennedy, a research biologist with the U.S. Army Engineer Research and Development Center's Environmental Laboratory, has helped to achieve such standards for nanomaterials on an international stage.

Kennedy, along with researchers Elijah Petersen of the National Institute of Standards and Technology and Greg Goss of the University of Alberta (Canada), led a team of 23 international researchers over seven years to develop guidance for the testing of nanomaterials. These standards were accepted by the Organisation for Economic Co-operation and Development (OECD) in July 2020.

"Before the guidance, there was just a general concern about whether nanomaterials were going to be available to the Soldier," he said.

Kennedy described how he seized the opportunity in 2013 when OECD expressed the need for an international standard nanomaterial testing framework at an international meeting in Germany.

"They called specifically for a guidance document," Kennedy said. "We reached back to the organization and said we would lead it, and we held our first meeting in 2014 in Vienna, Austria."

The development of acceptable testing standards and information has significant implications for the Army, as a lack of information slows the transition of mission-critical nanotechnologies into Army acquisitions.

"We were very motivated to lead the effort, because we thought back in 2013 that these standards could profoundly impact the Army's mission, especially overseas," Kennedy said.

"Regulators in Europe had put a moratorium on use of certain nanomaterials in products in part because



Alan Kennedy

there was no internationally accepted guidance about how to test these products and get good data," he said.

"This is the method for testing and getting good data, to hopefully reduce such moratoriums based solely on a lack of information, not actual hazard concern, so the Army can use the best materials for its technologies overseas," the research biologist added.

He explained that a small repository of testing protocols for nanomaterials had been developed by the International Organization for Standardization, the American Society for Testing and Materials International and the OECD.

"However, their focus on Army nano-specific products was limited, and we wanted to make sure that the testing guidance would also be applicable to nanomaterials relevant to the Army mission," he said.

The Toxic Substances and Control Act of 1976, now known as the Frank R. Lautenberg Chemical Safety for the 21st Century Act, is executed by the Environmental Protection Agency and classifies nanomaterials as "chemical

substances."

In an effort to assess the risk and impact of nanomaterials on environment, health and safety, the agency is developing a comprehensive regulatory approach under the act with a significant new use notice, to require those who manufacture, import or process new nanoscale materials to submit notice.

Kennedy points out that most of the agency's research does not encompass military-relevant nanomaterials.

"Many of the regulations and testing protocols generated focus on only the nanomaterial itself rather than the product that incorporates the nanomaterial," he said.

"This does not consider the potential release mechanisms for nanomaterials from the product during use and the overall characteristics of the particles once embedded into a material and, in some cases, this view may affect the transitioning of a nanotechnology based on erroneous interpretations of potential environmental risk," he said.

Kennedy added that the absence of Army-specific information and guidance can create significant gaps in terms of fielding or testing new technology incorporating nanomaterials.

"The new OECD standards address the challenges raised by manufactured nanomaterials," he said.

"This is a commendable achievement by Kennedy, and he has made a meaningful impact on the Army both now and for the future," said Dr. Edmond Russo, director, ERDC Environmental Laboratory. "I'm so proud of his commitment to this long-term effort. The use of nanomaterials in military technology is likely to become only more prevalent over time."

In January 2021, the ERDC research biologist was invited by the OECD to deliver an international seminar on the standards, and he presented the guidance document to and fielded questions from approximately 375 attendees worldwide.



ERDC mourns loss of dredging industry expert

By Carol C. Coleman

Engineer Research and Development Center

The dredging industry has suffered a great loss with the recent death of Timothy L. Welp, a research hydraulic engineer with the Engineer Research and Development Center.

A member of the Coastal Engineering Branch with ERDC's Coastal and Hydraulic Laboratory, Welp was a leader in the field of dredging and dredged material management.

His research projects and technical support reached across the U.S. Army Corps of Engineers and beyond, and his activities were supported by programs within USACE, the Department of Defense, the Environmental Protection Agency and the World Bank, as well as many others in the private sector.

"Tim was a great engineer, mentor and friend to many across USACE," said Dr. Ty Wamsley, director of the Coastal and Hydraulics Laboratory. "He was a giant in the field. The entire dredging industry will miss him greatly."

USACE is responsible for maintaining and improving 25,000 miles of inland and coastal waterways and channels, ports, harbors and turning basins throughout the United States.

Yet only a few of them are naturally deep, and in most cases, channels must be excavated and then dredged periodically to remain clear and safe for navigation.

Dredging and navigation infrastructure supports major portions of the U.S. economy.

Welp was primarily involved in prototype data collection and analyses and research projects investigating dredging and dredged material placement.

His research included dredging equipment optimization, environmental impacts of dredging, production estimation and analyses and beneficial uses of dredged material.

"Tim loved being in the field and working on a dredge," said Dr. Todd Bridges, senior research scientist at ERDC. "His enthusiasm for working on a floating machine as long as a football field always



(Courtesy photo)

The Engineer Research and Development Center mourns the loss of one of its research hydraulic engineers, Timothy L. Welp.

showed in a big way, and that's one of the reasons why he was so good at what he did and why his work made a difference."

He was the focus area leader for dredged material management in the Dredging Operations Environmental Research program and played a leading role in shaping future research directions and technology development.

Welp was also a valued and trusted technical advisor to colleagues across USACE — those colleagues reached out to him through the Dredging Operations Technical Support program, known as DOTS.

One of his more recent research efforts was advancing the use of the aptly named tickler chains, which can be used on dredges to reduce risks to sea turtles.

These chains are hung like a curtain from the drag arm of the dredge to stimulate the sea turtles to move off the bottom and away from the dredge.

Welp authored countless publications related to dredging and dredged material

management research and development and served as the editor and principal author of two chapters of the Dredging and Dredged Material Management Engineer Manual 1110-2-5025.

He was an active member of the Western Dredging Association, the World Association for Waterborne Transport Infrastructure, and the Coasts, Oceans, Ports and Rivers Institute of the American Society of Civil Engineers where he served as committee chair of the waterways committee.

"Being a leader in dredged materials research, Tim had a profound impact on both the profession and on our USACE team," said Dr. David Pittman, ERDC director.

"He was generous with his time, mentoring colleagues across ERDC and the Corps of Engineers," he added. "Tim was a valued colleague, mentor and good friend to many of us, and he will be sorely missed."