Volume 21, Issue 2
May 2020

The Corps Environment

EVERGLADES

Corps of Engineers helps protect, restore nation's ecosystem

22

Environmental Operating Principle #4

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

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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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www.usace.army.mil/Missions/Environmental.aspx

Advancing our environmental mission

By Lara E. Beasley
Chief, U.S. Army Corps of Engineers
Environmental Division

On April 22 we celebrated the 50th anniversary of Earth Day. This was a time to reflect on our accomplishments and reaffirm our commitment to protecting and preserving the environment for future generations.

While physical Earth Day events had to be canceled this year, the results of the past 50 years of environmental stewardship remain present all around us.

We have a saying here in the U.S. Army Corps of Engineers Environmental Division: The environment is everywhere. The same goes for our environmental mission, which touches the lives of nearly every American.

Our efforts to protect and preserve the environment are an enduring mission. A mission that in the face of all challenges, including a global pandemic, will continue to advance. These efforts are carried forward by more than 4,000 environmental professionals who support the execution of our Military, Civil Works, and Research and Development programs within the Corps.

Additionally, our workload and technical competencies continue to evolve and adapt in response to the needs of our customers and our nation, as exemplified by our support to COVID-19 response efforts.

While nearly half of our dedicated workforce stepped up to assist our nation, either on-site or virtually, in response to COVID-19, the remainder of our workforce continued to push forward in ensuring the delivery of our critical and enduring missions across the enterprise.

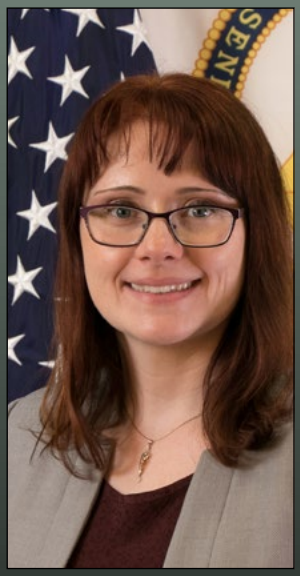
Within our environmental programs, work never stopped. Adapting to new work settings and surrounded by ever-evolving conditions, our dedicated environmental professionals continue to push forward, providing ecological and economic benefits to our stakeholders, our partners, and our nation.

Environmental stewardship is part of our culture. It is grounded in our Environmental Operating Principles (EOPs), which we incorporate into all that we do, across all mission areas.

This issue of *The Corps Environment* focuses on protecting and preserving the environment, in support of Environmental Operating Principle #4. The content within this issue showcases the extraordinary environmental stewardship efforts across the Army.

Did you know that the Army has been managing some of our nation's most valuable environmental resources since before Earth Day became a national day of recognition? Read more about this in Assistant Secretary of the Army for Installations, Energy and Environment Alex Beehler's Army Earth Day message on page 6.

See ENVIROPOINTS, page 5



Lara E. Beasley
Chief,
U.S. Army
Corps of Engineers
Environmental Division

ENVIROPOINTS

You can also read more about the five installations and three teams recognized as winners in the 2020 Secretary of the Army Environmental Awards program throughout this issue as well. This awards program is the highest honor conferred by the Army in the field of environment and sustainability.

Alaska District's Fort Rousseau Formerly Used Defense Sites (FUDS) project team is one the award recipients for their efforts to excavate and dispose of contaminated soil from a coastal landfill that was actively eroding into the ocean.

In this issue, you can also read about how our Jacksonville District is working to restore the quality, quantity, timing and distribution of water into America's Everglades on page 22 and how our New York District's streambank management projects protect New York's drinking water on page 37.

We also celebrate some of our environmental heroes, who have spent their careers championing environmental stewardship across different disciplines, including scientific research and geology.

On the 50th anniversary of Earth Day, let us reflect on all we have accomplished to protect and preserve the environment — our environment.

While much progress has been made, there is still more work to be done and together we will continue to advance our collective efforts for the greater good of our environment and our nation.

Environmental Operating Principles

In the spirit of Earth Day and our environment, let us reflect and recommit to these guiding principles, which advise us to:

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

Learn more about the EOPs at:

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

Army Earth Day Message 2020

By Alex A. Beehler
Assistant Secretary of the Army
Installations, Energy & Environment

This year the Army and our nation celebrate 50 years of Earth Day. From installations on the Chesapeake Bay to training sites in the Mojave Desert, the Army has been managing some of our nation's most valuable environmental resources since before Earth Day became a national day of recognition.

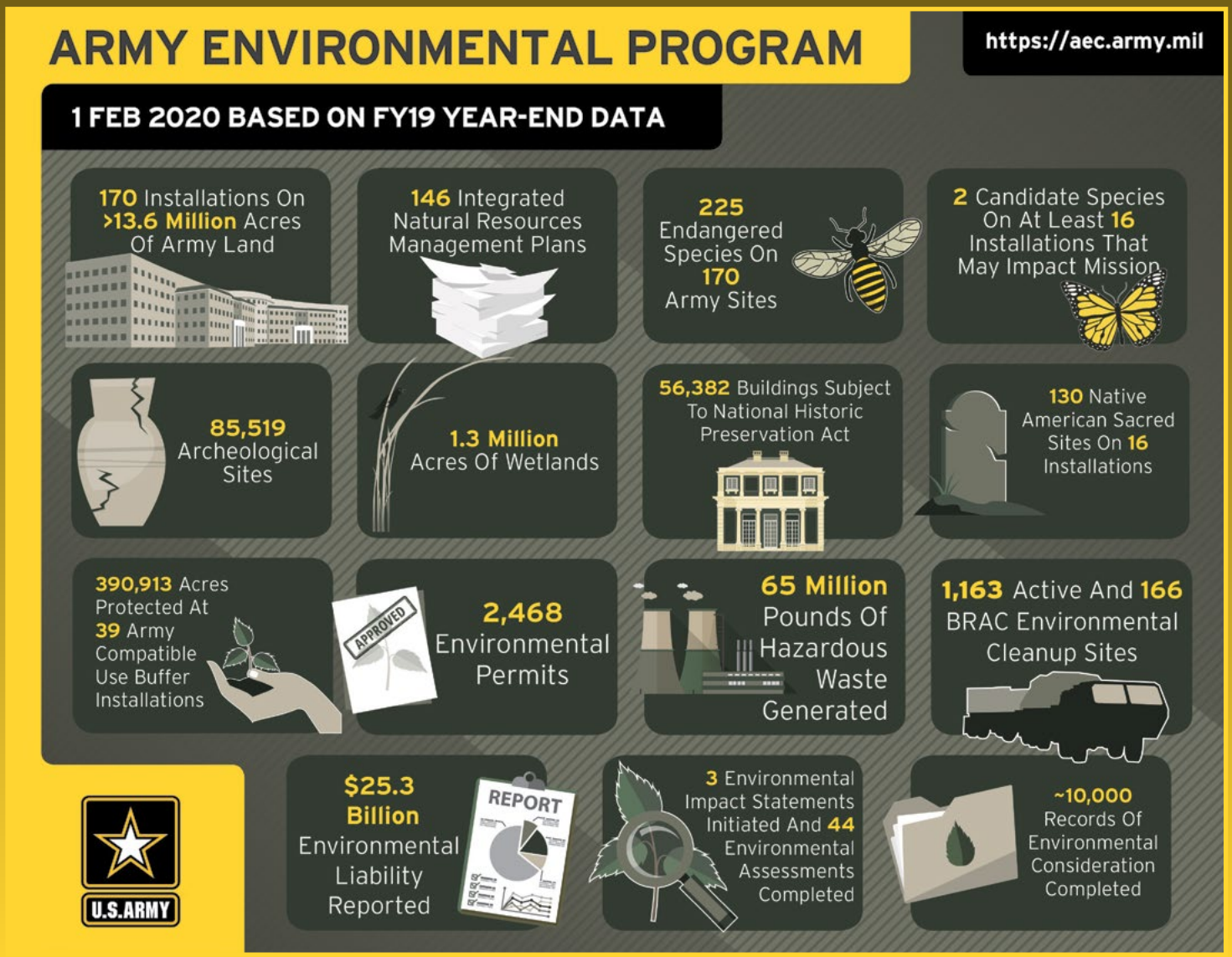
Stewardship of our ecological treasures contributes to quality environment and is an important part of military readiness. By preserving our nation's history, conserving natural resources, and restoring lands, we protect where Army personnel live, train and work while keeping our Army mission-ready. Army forests and wetlands are often the last refuge for some threatened and endangered species. The Army protects 225 threatened and endangered species on its installations and training sites. Every effort taken to ensure our ecosystems thrive also provides realistic and resilient training grounds for our Soldiers.

Investments in environmentally friendly alternatives to the solvents, chemicals and other materials needed to operate and maintain Army weapon systems, ammunition, vehicles, aircraft and support equipment help prevent pollution and reduces disposal and remediation costs.

Environmental stewardship is an investment in everyone's future. Every effort you take to lessen your effect on the environment, every time you use less water or energy, recycle or reuse products, or select products with less packaging rated as more environmentally friendly or energy efficient, you too are making a difference. By safeguarding the environment today, we can ensure cleaner land, cleaner water and cleaner air in the future.

Earth Day isn't just what we do on April 22 each year but what we should do every day. To learn more about what the Army is doing for Earth Day 2020 visit https://aec.army.mil/index.php/earth-day.

With your help, we will be able to look back in another 50 years and know that our Army protected vulnerable facilities, infrastructure, and environmental resources.



Company F, 2nd Battalion, 48th Infantry Regiment, completes a ruck march as part of basic training at Fort Leonard Wood, Missouri. One of three gender-integrated reception stations for the Army, the post recently garnered the U.S. Army Environmental Award for Environmental Quality, Non-Industrial Installation.

Army recognizes environmental excellence

By U.S. Army Environmental Command

The Assistant Secretary of the Army for Installations, Energy and Environment announced the Army's top environmental programs for 2020.

The Honorable Alex A. Beehler identified five installations and three teams as winners in the Secretary of the Army Environmental Awards program, the highest honor conferred by the Army in the field of environment and sustainability. The eight winners will represent the Army in the 2020 Secretary of Defense Environmental Awards Program.

"Responsible stewardship of environmental resources is not only essential to Army training and readiness, but also imperative to the overall effectiveness of our military," said Beehler. "I commend our Army's environmental professionals for the stewardship they provide that ensures the Army simultaneously meets current as well as future mission requirements worldwide. Their efforts safeguard human health, improve quality of life, and also enhance the natural environment."

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

The winners of this year's environmental awards stand out as examples of how environmental stewardship and sustainability play a crucial role in the Army's mission readiness. Investments that the Army makes in environmental programs and sustainability initiatives pay dividends in sustaining realistic training and testing capabilities both now and in the future.

Natural Resources Conservation - Small Installation

The Michigan Army National Guard's Fort Custer Training Center has long been recognized for its Natural Resources Conservation program.

Encompassing 7,500 acres, Fort Custer blends excellence in natural and cultural resource management with innovation in sustainability and environmental quality to enhance and protect the training lands that support small arms, bivouac and land navigation training as well as specialized convoy reaction and improvised explosive device training.

The center is recognized for a range of initiatives to include serving as the Army's representative in the Department of Defense climate change preparedness pilot program, modernizing the installation's forestry and timber practices to emphasize ecological function in conjunction with adoption of the Michigan Forest Inventory System to enhance the value of forestry data, leading cooperative interagency efforts in the state to address future ecological needs and adaptations to current management strategies, and developing a sustainable solar energy program that will allow the installation to go off the grid in the near future if required.

Natural Resources Conservation - Individual/Team

The Minnesota Army National Guard Conservation-Training Enhancement Team is composed of staff from three departments: Environmental Natural Resources, Integrated Training Area Management and the Department of Public Works.

See **ENVIRONMENTAL AWARDS**, page 9

ENVIRONMENTAL AWARDS

continued from page 8

By working across their directorates, this team has been able to identify mission overlap and synchronize land management priorities. The team's work has helped Camp Ripley to remain at the forefront of conservation practices while sustaining over 365,000 annual man-days of training.

Among the milestones accomplished over the past two years is a new forest management plan, which has allowed the team to align timber harvest trails with maneuver trails, match accessibility needs with habitat thinning needs, and eradicate invasive species to the benefit of both Soldiers and wildlife.

Their forestry timber program also generates $80,000 to $90,000 each year to fund conservation while expanding training ranges as needed and improving ecological health.

U.S. Army's 2020 award winners

- **Natural Resources Conservation Small Installation:**
  Michigan Army National Guard
  Fort Custer Training Center
- **Natural Resources Conservation Individual/Team:**
  Minnesota Army National Guard, Camp Ripley
  Conservation-Training Enhancement Team
- **Environmental Quality Non-Industrial Installation:**
  U.S. Army Garrison, Fort Leonard Wood
- **Environmental Quality Individual/Team:**
  Louisiana Army National Guard Compliance Team
- **Sustainability – Industrial Installation:**
  Indiana Army National Guard
  Surface Equipment Maintenance Facility 14
- **Environmental Restoration Installation:**
  Massachusetts Army National Guard, Camp Edwards
- **Environmental Restoration Individual/Team:**
  U.S. Army Corps of Engineers, Alaska District
  Fort Rousseau Formerly Used Defense Site Team
- **Cultural Resources Management Large Installation:**
  U.S. Army Garrison, Fort Leonard Wood

Environmental Quality - Non-Industrial Installation

U.S. Army Garrison, Fort Leonard Wood, located in the Missouri Ozarks, trains over 80,000 students each year. The highlights of the post's environmental program include exceeding DOD solid waste diversion goals for municipal solid waste and construction and demolition wastes eight years in a row. The recycling program earned $1.98 million dollars in revenue and helped avoid landfill costs of more than $3 million over the past two years.

Fort Leonard Wood developed an improved National Environmental Policy Act process using online tools and completion of a Programmatic Environmental Assessment to cover many of the ongoing mission activities.

The post was also praised by Missouri officials for its outreach programs and activities including the Earth Day Fair, Kid's Trout Fishing Derby, Environmental Compliance Officer Training, Environmental Quality Control Committee meetings, newcomers' briefs, multiple newspaper articles and staff assistance visits to tenant units.

Environmental Quality – Individual/Team

The Louisiana Army National Guard's Compliance Team, composed of three regional coordinators and three specialized environmental managers, established a communication network between operators and environmental leadership necessary to accomplish real operational change.

Across dozens of readiness centers, 16 maintenance facilities, and three major training sites, the team has achieved unmatched success in compliance for the state, completing the best Environmental Performance Assessment System inspection in LAARNG history in 2018.

As an outcome of this groundwork, the team has been able to not only respond to compliance issues, but to anticipate and prevent them from happening.

Sustainability – Industrial Installation

The Indiana Army National Guard Surface Equipment Maintenance Facility 14 has been a proving ground for new sustainability initiatives that can then be rolled out to other industrial sites throughout the state.

One of the most successful sustainability projects for SEMF 14 has been the introduction of a rechargeable aerosol system for use with a bulk brake cleaner.

While the system was acquired several years ago, it is over the past two years that SEMF 14 has been able to demonstrate the positive impacts that have accrued. Based on their example, the Indiana Army National Guard is now implementing this system in all its industrial facilities.

Environmental Restoration – Installation

At Camp Edwards, on Joint Base Cape Cod, the Massachusetts Army National Guard is improving and increasing military training and readiness through the successful restoration efforts of the Impact Area Groundwater Study Program.

Because Camp Edwards sits on top of the sole source aquifer for Cape Cod, virtually all restoration has been driven by groundwater protection and remediation, which includes pump-and-treat groundwater treatment systems and unexploded ordnance removal.

Camp Edwards has been extraordinarily successful, not only in restoring groundwater resources and addressing unexploded ordnance, but also in reintroducing training capabilities and creating new training assets, particularly over the past two years.

Environmental Restoration – Individual/Team

The U.S. Army Corps of Engineers Alaska District completed a remedial action at the Fort Rousseau Formerly Used Defense Site.

The focus of the project was to remove and dispose of contaminated soil from a World War II coastal landfill that was eroding into the ocean.

Accomplishments of this cleanup action included removal of 933 tons of hazardous waste and 5,157 tons of non-hazardous waste. Other items removed included 317 pounds of electronic equipment, 168 pounds of broken lead-acid battery plates and approximately 133 tons of steel.

The remediation activities were effective in protecting, enhancing, and restoring the environment. This project significantly reduced risk to human health and the environment at a high-priority site.

Cultural Resources Management - Large Installation

The U.S. Army Garrison Fort Leonard Wood Cultural Resource Management Program works closely with internal stakeholders and military organizations on project reviews in support of the military mission.

Some highlights of the program include rehabilitating the Historic Black Officers' Club; completing phase I archaeological surveys of 1,300 acres of installation lands and 330 acres leased from Missouri; hosting and participating in three tribal meetings; and updating protection protocols with a focus on type and degree of disturbance, presence of rock art and other significant features, and evidence of archaeological Resources Protection Act violations.

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

At the Fort Rousseau Formerly Used Defense Site a tracked dump truck, called a Marooka, is loaded with contaminated soil. In the back of the Marooka is a 5-cubic-yard bulk bag. The Marooka is being transported via a landing craft to another island. (Photo by A. Shewman)

Camp Ripley's 53,000 acres support training for the Minnesota Army National Guard and also support hundreds of plants and animal species through the efforts of the Conservation-Training Enhancement Team who prioritizes management of all its natural resources, including 18 miles of untouched Mississippi River shoreline. (U.S. Army Environmental Command courtesy photo)

Stephanie Nutt, Directorate of Public Works cultural resources coordinator, shows archaeological artifacts to students at the 2019 Earth Day Fair.

Post garners two top environmental awards

Story & photo by Brian Hill
U.S. Army Garrison
Fort Leonard Wood, Missouri

Fort Leonard Wood's Directorate of Public Works took home two Army-level awards for the post's environmental and cultural resources management programs.

The winners were announced late February, covering both the 2018 and 2019 annual awards.

"We feel fantastic," said Charlie Neel, chief, DPW Environmental Division. "The awards signify that for the last two years Fort Leonard Wood had the best environmental and cultural resources programs in the Army. Those are two very competitive areas, and to be selected is a great honor."

Alex Beehler, Assistant Secretary of the Army for Installations, Energy and Environment, identified five installations and three teams as winners in the Secretary of the Army Environmental Awards Program, the highest honor conferred by the Army in the field of environment and sustainability.

See **ENVIRONMENTAL AWARDS**, page 12

It's your career...
Do you know where it will take you?

By Karla Langland
USACE, CP-18 director

Many of you probably have an idea of what you need to do to learn and grow in your profession.

You likely have a mental map (better yet an individual development plan, or IDP, with this all laid out!) of what you would like to accomplish professionally and how you will get there.

But what if you don't really have an idea of what you should do to develop yourself professionally?

What if you are an entry-level Army civilian, or a mid-grade hire from private industry, or a supervisor of employees who isn't in your series? Well, we have a tool for you in CP-18… a career map.

See **CAREER MAP**, page 12

ENVIRONMENTAL AWARDS

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"Responsible stewardship of environmental resources is not only essential to Army training and readiness, but also imperative to the overall effectiveness of our military," Beehler said.

Fort Leonard Wood won in the Environmental Quality — Non-Industrial Installation and Cultural Resources Management — Large Installation categories.

The highlights of the installation's environmental program include exceeding the Defense Department's solid waste diversion goals for municipal solid waste and construction, and demolition wastes eight years in a row.

"They are very difficult targets to hit," said Craig French, chief, Environmental Compliance Branch. "Our program has been extremely forward-looking."

The recycling program earned $1.98 million in revenue and helped avoid landfill costs of more than $3 million over the past two years.

"It's just an outstanding program," French said. "We've been able to pick up new streams of recyclables, due to the work of the folks in the program, and the money that comes in from the recycling comes back to the post."

The post implemented a recycling competition, awarding unit winners $1,000 a quarter.

"The program has evolved tremendously," French added. "There's been a lot of innovative ideas to move recycling forward."

In addition, the post was praised for its outreach programs and activities including the Earth Day Fair, Kid's Trout Fishing Derby, newcomers' briefs and staff assistance visits to tenant units.

"Any time there's an event, we try to get over there and provide information to the public, interact and promote," Neel said. "It's something we've had a lot of success at."

"It's something that we work at nonstop," French added. "The transient nature of Fort Leonard Wood's population makes it a constant challenge for us to educate and promote how we do things, because just about the time people start figuring out how it all works, they rotate out and we've got a whole new group of people to train."

The post's cultural resource management program was crucial to the 2019 rehabilitation of the World War II-era Black Officers' Club. They also completed archaeological surveys of 1,300 acres of installation lands and 330 acres leased from Missouri, and hosted and participated in three tribal meetings.

"We have tremendous cultural heritage sites from prehistoric and historic — about 750 of them in total," said Kenton Lohraff, chief, Natural Resources Branch. "It's our job to be good stewards, and we're very proud to protect them."

Neel stressed that the two awards represent not only the efforts of DPW, but Fort Leonard Wood as a whole.

"We can't get to be the best of the best without having the best people — leadership and community — everybody playing a role in helping us do what we do," he said. "We have a great team of teams here and that's what it takes to have great programs in both those areas."

"The eight winners represented the Army in the 2020 Secretary of Defense Environmental Awards Program. The Secretary of Defense award winners were announced April 22.

CAREER MAP

continued from page 11

A career map documents the types of training, education and professional development at each level of progression and provides the requisite competencies required of the position or grade.

So a career map is a graphic depiction of competencies, training and education, career opportunities and additional information that is designed to assist you as you plan your future.

A word of caution: career maps are not designed to be very specific. When we facilitate a group of subject matter experts to create or update a career map, the SMEs are representative of all Army civilians in that occupational series.

Think about it! If you're a 0028 environmental protection specialist working with the U.S. Army Installation Management Command, your specific developmental needs are far different than a 0028 working in an Army hospital.

And, of course, a USACE environmental protection specialist will have different developmental needs than the others.

But there are foundational competencies, tasks and training that all 0028s, as an example, should possess.

Talk to colleagues and senior professionals within your field and ask them what training they would recommend.

Career maps are just one tool. In your quest for self-development, be sure you are talking with your supervisor.

Talk to colleagues and senior professionals within your field and ask them what training they would recommend.

Read professional journals to stay abreast of changes in your field. And finally make sure you sign up for automatic notices from the CP-18 Army Career Tracker webpage. We post all of our training opportunities on this webpage.

If there are ways that CP-18 can assist you in reaching your professional goals, please feel free to drop us a line at cp18proponencyteam@usace.army.mil.

Camp Edwards achieves groundwater restoration goals

By Lauren Schatz
U.S. Army Environmental Command

Cape Cod is famous for its clean, beautiful beaches making it a favorite vacation destination for millions each year. It is also home to Joint Base Cape Cod, a 22,000-acre military installation training Soldiers for over 100 years.

Camp Edwards Army National Guard Training Site is the largest tenant with over 15,000 acres, and is the primary military training facility for Guard and Reserve Soldiers throughout New England.

The Massachusetts Army National Guard continues making great progress in mitigating past environmental impacts while increasing military training capabilities.

In fact, their efforts have earned them a 2020 First Place Award from the Secretary of the Army for Environmental Restoration (Installation).

The restoration successes are a direct result of the work and dedication of the entire Impact Area Groundwater Study Program team and their partners at the local, state and federal level. To mitigate this threat and protect public health and the environment, the team created long-term environmental restoration and remediation programs.

What makes groundwater of particular interest here is the fact that Camp Edwards sits on top of the sole source aquifer for Cape Cod. The area's famously sandy soils allow contaminants to migrate quickly into the groundwater, which if not identified and properly addressed could potentially impact public and private drinking water wells. Thus, groundwater protection and remediation are priorities for everyone on Cape Cod.

"We have incredibly dedicated people working and training here that help ensure that current and future military activity is compatible and protective of the valuable natural resources found on Cape Cod," said Shawn Cody, IAGWSP program manager. "Our restoration goals ensure safe, quality water for those inside and outside the camp."

During the past two years, the Massachusetts Guard has remediated dozens of training ranges throughout the base and has since restored them to a standard that has significantly improved their military training value.

The IAGWSP utilizes cutting-edge science and technology to locate, identify, remove and render safe munitions when necessary.

> *"Winning a secretariat-level award at the Army installation level is a tremendous accomplishment for any Army installation, let alone a National Guard Training Site."*
>
> Col. Matt Porter
> Commander, Camp Edwards

For example, electromagnetic induction sensor technology, or "metal mapper," is used as a foundational tool in properly identifying unexploded ordnance at the camp's Central Impact Area.

This technology not only reduces costs, but also enhances accuracy because it is able to identify munitions with more fidelity and helps discriminate which targets need to be addressed thus reducing the number of needless digs due to false positives. It will be used potentially over 100 acres on Camp Edwards, having successfully cleared over 70 acres thus far. The program's statistical objective is the removal of at least 90% of unexploded ordnance and reduce unnecessary digs by 70% in one of the most heavily used impact areas in the Army.

The Massachusetts Guard's accomplishments at Camp Edwards are especially remarkable when given the camp's historic context of contamination.

It is the only operational range that has ever had training stopped by an Environmental Protection Agency enforcement action due to a perceived threat of contamination linked to training involving artillery and mortar firing.

The Guard has made great strides in remediating past contamination and works closely with its stakeholders to ensure that current and future activities are protective of environmental resources.

The IAGWSP treats groundwater contamination with 14 systems on-site, processing more than 4 million gallons of groundwater each day.

Additionally, the Camp Edwards Training Site has since reemerged as not just a functional training site, but also one of the premier training resources in the region.

Marksmanship training and qualification are accomplished here utilizing the new enhanced-performance rounds. These pure copper rounds perform better on the battlefield, are safer for the environment, and are very desirable for recycling, making them an overall more appealing alternative to lead. Camp Edwards was the first training site in the National Guard to use these rounds.

Collaboration enabled Camp Edwards to reemerge from the Cold War era of contamination cleaner and with more compatible military training available to Soldiers.

The IAGWSP team does this through a partnership with the U.S. Army Corps of Engineers. The Corps serves as the general contractor for the National Guard Bureau who is charged with budgeting, funding and managing the successful accomplishment of mission objectives.

"It was an honor to receive such an award," said Col. Matt Porter, commander, Camp Edwards. "Winning a secretariat-level award at the Army installation level is a tremendous accomplishment for any Army installation, let alone a National Guard Training Site.

"It is a credit to the hard-working people on staff and all those who take part in this program," he said. "They prove daily that collaboration and strong, open, honest communication channels with the public and all stakeholders are the most effective means to success."

Cleanup efforts enable North St. Louis County revitalization

FUSRAP cleanup efforts have, in part, set the stage for some of the development in the St. Louis Airport Site vicinity properties industrial area in Hazelwood and Berkeley, Missouri.

Story & photo by Andrea Wales
USACE, St. Louis District

After the U.S. Army Corps of Engineers, under the Formerly Utilized Sites Remedial Action Program, cleans up and restores properties contaminated as a result of America's early atomic programs, business owners take it from there.

"Redevelopment of the remediated properties has helped create hundreds of jobs in Hazelwood," said Rebecca "Becky" Ahlvin, community and economic development coordinator for the city of Hazelwood, Missouri, where there are three FUSRAP project sites.

Ahlvin quoted the 2019 business-license database, saying that about 280 jobs have been created in Aviator Business Park alone.

The appraised building values of the three Hazelwood sites featured in this article total more than $56 million, she said.

Under FUSRAP, the U.S. Army Corps of Engineers, St. Louis District has released for beneficial use 131 out of the 148 St. Louis Airport Site vicinity properties identified in the project's Record of Decision.

Remediation activities of FUSRAP projects are conducted using the framework of the Comprehensive Environmental Response, Compensation and Liability Act of 1980. The U.S. Environmental Protection Agency is CERCLA's chief enforcer.

Although the FUSRAP team sometimes uses hand tools for detailed work, they most often use heavy equipment like excavators and backhoes to accomplish cleanup and restoration. Contaminated soil is loaded into covered gondola railcars and shipped to licensed, approved, out-of-state commercial disposal facilities.

FUSRAP cleanup efforts have, in part, set the stage for some of the development in the St. Louis Airport Site vicinity properties industrial area in Hazelwood and Berkeley, Missouri.

The following properties are prime examples of how FUSRAP cleanup efforts have helped promote revitalization within North St. Louis County, Missouri.

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FUSRAP

continued from page 15

New and improved

Remediation was completed on the vacant FW Logistics warehouse at 9151 Latty Ave. in Berkeley, Missouri, in 2013 and released for beneficial use. As part of these efforts, the FUSRAP team removed 16,608 cubic yards of contaminated soil. The property was purchased by Plumbers Supply Company in January 2019.

While the property was under contract, Plumbers Supply Company Chief Executive Officer John G.D. Dubuque contacted Bruce Munholand, St. Louis District FUSRAP program manager, to discuss the work that had been done to clean up the site.

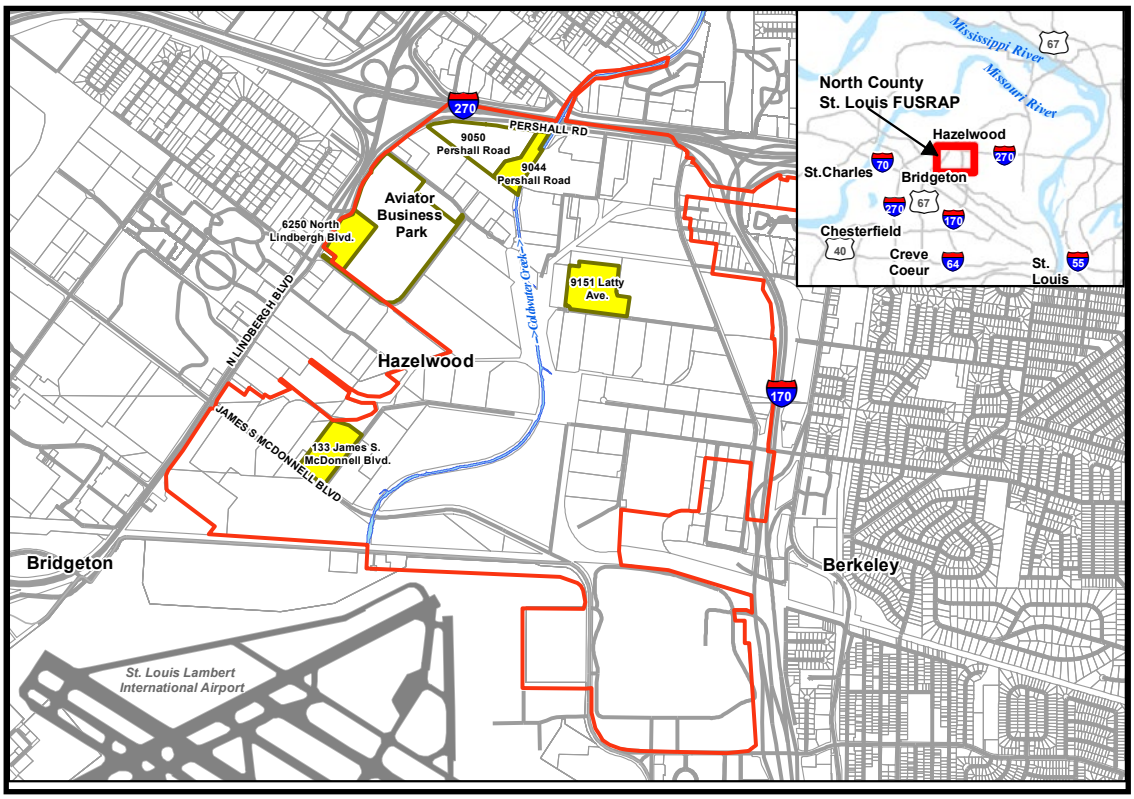
"Naturally, we were concerned when we first learned the history of the site we'd purchased for our distribution center," Dubuque said. "Our first step was to reach out to the Army Corps of Engineers to get a detailed description of the cleanup that had been done at the site.

"After speaking with Bruce Munholand, I felt totally comfortable moving forward with our project," he added.

Following purchase, Dubuque invited members of the St. Louis District FUSRAP team to a town hall meeting for employees and their spouses to learn firsthand about the successful remediation.

According to Dubuque, the town hall meeting included a presentation and question and answer session with FUSRAP specialists, which alleviated concerns and put everyone at ease.

"Since then, we've invested lots of money in the site, and plan to be there for many years to come," he said.



The highlighted areas on this map depicts four properties remediated by the USACE, St. Louis District to help build the future of North St. Louis County. (Leidos).

Starting from scratch

The concrete-and-steel behemoth of a building at 133 James S. McDonnell Blvd. in Hazelwood, Missouri, will be more than a warehouse, according to current redevelopment plans.

The FUSRAP team removed 51 cubic yards of contaminated soil under a utility support in 2003. In 2009, the team performed additional investigation sampling and prepared documentation to make the property available for beneficial use.

NorthPoint Development has partnered with the city of Hazelwood in developing the property, which had been vacant for more than 15 years, said NorthPoint's Robert Jonathan "R.J." Agee, director of development.

"While our prior projects in Hazelwood have attracted a lot of warehousing and distribution tenants, we believe that the property is strategically positioned for manufacturing users and the associated need for skilled labor," Agee said.

Calm before the storm

After the property at 9050 Pershall Road in Hazelwood was subdivided, the FUSRAP team removed 15,251 cubic yards of contaminated soil from 9044 Pershall Road adjacent to Coldwater Creek from 2015 to 2016.

This utility-support work allowed the Metropolitan St. Louis Sewer District to construct a large overflow storage tank there as part of its combined sewer overflow project to handle excessive stormwater run-off.

The timely remediation, restoration and release of this site enabled the sewer district to maintain its schedule for this high-visibility project.

Doing business

What was once Ford Motor Company's St. Louis Assembly Plant at 6250 North Lindbergh Blvd. in Hazelwood is now part of the 155-acre Aviator Business Park.

The Aviator Business Park Redevelopment Corporation's infill (land-recycling) development has several tenants as well as sites that are still available for build-to-suit construction.

In 2010, the FUSRAP team performed pre-design investigation sampling on the main property where a large assembly plant building was once located.

In the right of way at the front of the property between the plant and Lindbergh Boulevard, the team removed 105 cubic yards of contaminated soil. The property was released for beneficial use in 2011.

By remediating these properties and others like them, the St. Louis District FUSRAP team helps build the future in North St. Louis County.

Indiana Guard improves statewide industrial sustainability

By Kathy Alward
U.S. Army Environmental Command

Surface Equipment Maintenance Facility 14 in Lafayette is the third largest SEMF of the Indiana Army National Guard, employing 15 direct-labor mechanics and two support staff.

The Lafayette facility is composed of a shop, motor pool parking and a readiness center. It not only provides equipment and vehicle support to Indiana National Guard units, but it also assists military units convoying through the state, as is standard for all its maintenance facilities.

In the course of their work, SEMF 14 personnel recognized the benefits of environmental sustainability to their operations and undertook steps to improve the sustainability at their facility.

SEMF 14 was awarded the 2020 Secretary of the Army Environmental Award for Sustainability for an industrial installation. Through their efforts, the facility saved money, time and resources while setting the standard for other Guard activities.

"It's great having the Secretary of the Army recognize SEMF 14 for their dedication to resource stewardship," said Jerry Hartley, chief of the Indiana National Guard's Environmental Management Branch. "But I am not surprised, all 15 of our SEMFs operate at a high level of environmental performance."

SEMF 14 achieved immediate cost savings, waste reduction and improved safety by switching from conventional brake cleaners to a sustainable refillable charging station. The station uses refillable spray cans that refill from bulk drums of brake cleaner and use compressed air as the propellant. Further, the cleaner is a low volatile organic compound cleaner.

Immediate cost savings, waste reduction and improved safety were realized by the Indiana Army National Guard by switching from conventional brake cleaners to a sustainable refillable charging station that uses rechargeable cans to reduce the aerosol waste stream. (U.S. Army Environmental Command courtesy photo)

The shop's efficiency was improved through the purchase of a single 55-gallon drum of cleaner every two years, compared to previous purchase, storage and use of approximately 220 aerosol cans each year.

The shop reduced both the amount and cost for disposal of solid and hazardous waste. Startup costs for the refillable system were recovered within the first year and it is now in use at three additional SEMFs in Indiana.

SEMFs throughout the state work to reduce waste and increase sustainability throughout their operations.

An example of this dedication is its participation in the Qualified Recycling Program, which recycles cardboard, plastic, wood and scrap metal from shop activities.

These sustainability efforts also include a vendor that recovers oil and fuel products, avoiding disposal costs. Additionally, the purchase and use of an antifreeze recycler has reduced the need to purchase new antifreeze.

From a prior statewide sustainability effort across all 15 of the Indiana Guard's maintenance facilities, SEMF 14 adopted a technology system for recharging batteries that reduces new battery requirements by approximately 50%, while also reducing environmental impacts and disposal costs. This system provides a slow recharge on seemingly dead batteries over a seven-day period.

"We are proud of SEMF 14's achievement being awarded the 2020 Secretary of the Army sustainability award," said Chief Warrant Officer 4 Todd Brown, supervisory surface maintenance specialist. "We look forward to continuing the great working relationship with the Environmental Office and our efforts to achieve environmental sustainability."

SEMF 14 coordinates closely with the Indiana Guard's Environmental Management Branch to ensure products are sustainable and the shop's compliance record is protected.

SEMFs and environmental staff throughout the state consistently work together to achieve environmental compliance and improve sustainability efforts.

Surface maintenance staff and the state warehouse staff identify products that could be shared across all Indiana Guard locations to amplify the benefits of sustainability efforts.

The state warehouse is a single access point for products that multiple shops use, which reduces compliance oversight, simplifies operations and enhances purchasing accountability.

Louisiana Guard garners Army's environmental award for sustainability

By Lauren Schatz
U.S. Army Environmental Command

Louisiana is known as the "Bayou State" for its marshy waterways and overall unique environment.

The Louisiana Army National Guard has shown dedication to the environment through its conservation efforts and has been recognized for these outstanding efforts with the 2020 Secretary of the Army Environmental Award for Sustainability.

During the past two years, the Louisiana National Guard successfully implemented a new model for promoting compliance that has improved environmental quality throughout the state.

The Guard's Compliance Team, composed of three regional coordinators and three specialized environmental managers, has enhanced collaboration between leadership and ground operations.

The Guard believes these collaborative efforts are essential to accomplishing positive operational change and has implemented them across dozens of readiness centers, 16 maintenance facilities, and three major training sites, enhancing communication channels across the state.

Increasing communication, clearly defining roles and relationships, establishing new protocols and improving plans have all contributed to the success of the mission.

In fact, the team has achieved unmatched success in compliance for the state, completing the best Environmental Performance Assessment System inspection in the history of the Louisiana Army National Guard.

Understanding roles and responsibilities has contributed to their success.

One role which was more clearly defined was the regional coordinator. This role was carefully laid out to decrease ambiguity of the position. A model for the position was created with a comprehensive protocol laying out weekly, monthly, quarterly and annual responsibilities.

These responsibilities are outlined in the revised Environmental Regional Coordinator Playbook, which provides an overview of all aspects of compliance, i.e., inspections, material handling, permit compliance, etc. This document also contains guidelines for relationships with unit environmental compliance officers and other helpful material, such as comprehensive Internal Performance Assessment System inspection checklists, which are customized to the site's needs.

(U.S. Army Environmental Command courtesy photo)

Jeffery Carmouche, central regional coordinator, inspects the Consolidated Maintenance Facility and discusses the future recycling program with the facility environmental compliance officer.

"The groundwork our team has put forth has helped us to not only respond to compliance issues, but also to anticipate and prevent them from happening," said Capt. Jeremy Futrell, environmental program manager. "We strive for both preparation and prevention."

This past year, the team successfully demonstrated their strides toward prevention when they identified and avoided a potential leak risk involving legacy display equipment. That issue was quickly identified and addressed statewide.

Aligning with their goal of cost effectiveness, the team's efforts have helped reduce costs for the Guard. Prevention of compliance issues is less expensive than the treatment.

The compliance team is actively involved with compliance coordination in and outside of the Guard. This integration allows the team to be fully embedded within the environmental decision-making processes and maximizes their input.

"Our team is composed of extremely hard-working and knowledgeable individuals who are collectively conserving the environment in our great state," said Col. Jason Mahfouz, consolidated facility maintenance officer. "Our new model promotes more integrated communications and truly allows our voice to be heard."

Other responsibilities of the team include fully implementing the Guard's compliance-related management plans and ensuring Soldiers and staff fully understand and follow these plans. Some of the plans they are responsible for include hazardous waste, solid waste, stormwater, and waste prevention management plans, the environmental management system, and the spill prevention, control and countermeasures plans.

The team has laid out comprehensive groundwork for operations to ensure sustainability.

Regional coordinators, in addition to providing technical assistance, conduct IPAS/EPAS inspections on all the sites in their regions on a schedule that reflects potential compliance risk and operational priority. The number of sites range between 20 and 25 facilities.

The team always aims for the prevention of incidents. However, if an incident does occur, they respond quickly to identify and systematically address the issue throughout the state.

The Environmental Quality Control Committee identified hazardous waste reduction as a significant goal.

Subsequently, during the past two years, the team has achieved virtual elimination of waste such as used oil and antifreeze products.

When regional coordinators encounter an issue that they are not empowered to address, they consult the team's managers and ultimately the EQCC. This helps create a system of top-system guidance.

At Camp Minden, the team helps manage a superfund site with an extensive requirement for water sampling. The regional coordinator is charged with various tasks, such as maintaining compliance discharge permits on the site, collecting water samples, reviewing lab reports, and reporting information to the state's Department of Environmental Quality.

The framework created by the Louisiana Army National Guard's Compliance Team has helped create a more uniformed effort, creating positive impacts in the present and ensuring correct procedures in the future.

Minnesota Guard lauded for nature conservation

By Lauren Schatz
U.S. Army Environmental Command

Camp Ripley, spanning across 53,000 acres in Minnesota, has become known as one of the most ecologically pristine training sites in the nation.

The Minnesota Army National Guard has been recognized for its conservation and sustainability efforts at Camp Ripley, and most recently was awarded the 2020 Secretary of the Army Environmental Award for their Natural Resources Team.

Not only does the installation support training for Guard units there, it also contains a treasure trove of plants and wildlife, including 600 plant species, 233 migratory and resident bird species, 51 mammal species, and 23 reptile and amphibian species.

With almost 20 miles of untouched Mississippi River frontage, Camp Ripley houses a diverse range of natural habitats.

The Minnesota Guard has always sought to protect these habitats through natural resources conservation (NRC) efforts; and, during the past two years, the NRC team has intensified these efforts.

The team has created an even more comprehensive and integrated approach toward caring for the surrounding environment. Increasing collaboration between staff members of three of its departments: Environmental Natural Resources, Integrated Training Area Management and the Department of Public Works, has allowed the Guard to better align training area management with stewardship.

Open communication between these staff members makes efforts more efficient and avoids redundancies. This has helped the team achieve their goals in an incredibly cost-effective manner.

"The strengthening of the cross-functional team has made a significant and visual impact on Camp Ripley," said Brig. Gen. Lowell Kruse, Camp Ripley senior commander. "Their equal commitment to conservation and the mission has been clear through their many collective achievements."

The creation of several new positions, such as the training area coordinator, which acts as liaison between the team, military and civilian personnel, has enhanced communication between the team and the Soldiers, enabling a variety of measurable accomplishments.

(U.S. Army Environmental Command courtesy photo)

The team releases a golden eagle that will be tracked and monitored using a radio telemetry collar to gain better insight into its habitat usage.

The forestry-timber program generates $80,000 to $90,000 each year. A native seed collection program, in which ITAM members collected approximately 4,000 pounds of seed in two years, saved approximately $60,000 in purchasing costs. Both were collaborative efforts.

The team's efforts enabled acquisition of $12,000 in National Public Lands Day grants, which has been applied toward improving habitats.

One major success has been the positive impact on pollinator species, which have faced multiple challenges in the region, including habitat loss, impacts of pesticides, pathogens and changing climate. For example, the monarch butterfly, which migrates more than 3,000 miles from Mexico to Canada each year, relies on habitat in the United States along the way.

A mutually beneficial collaboration with college-age youth, through an interagency agreement with St. Cloud State University, provided three summer interns to support the Minnesota Guard and focus on controlling invasive species, such as vegetation.

The acquisition of a $150,000 landscape stewardship grant from the U.S. Forest Service enabled prescribed fire for more than 4,000 acres within the Camp Ripley landscape.

The team is gaining insight into wildlife habitat usage. One current initiative monitors eight black bears using radio telemetry collars; a similar technique was used to monitor turtle hatchlings and golden eagles.

The Minnesota Army National Guard has established mutually beneficial community partnerships. The annual Earth Day celebration and the annual Water Festival, which hosts around 500 sixth graders, is an example of benefits from these partnerships.

Additionally, the NRC team considers training promotion to be one of their primary focuses. For example, the team has conducted more than 50 presentations, tours and briefs to approximately 3,000 visitors, Soldiers and community groups, both at Camp Ripley and within the local community. By implementing training, the team, in turn, generates awareness, increases community support and demonstrates an ongoing commitment to fostering environmental conservation at Camp Ripley.

In 2019, the team developed and implemented a new forestry management plan, which laid out 10-year management goals.

"We have been very successful over the past two years and plan to make these efforts sustainable," said Josh Pennington, Camp Ripley environmental supervisor. "We believe the forestry management plan will help us achieve this."

The NRC team's work has helped Camp Ripley remain at the forefront of conservation practices and inspired others to strive toward a better future. Thanks to their innovative and collaborative efforts, hundreds of plant and wildlife species continue to call the "Land of 10,000 Lakes" their home.

Michigan Guard trains in harmony with nature

By Lydia Shuart
U.S. Army Environmental Command

The Michigan Army National Guard's Fort Custer Training Center spans 7,500 acres and is home to a vital, globally unique environment that is flourishing under the installation's watchful eye.

Unrivaled in its biodiversity, the center supports a wide variety of training, including land navigation, small arms, bivouac, improvised explosive device and specialized convoy reaction training, all while having no adverse effect on wildlife.

The installation also maintains and improves the surrounding land through pest management, wildland fire management, regional partnerships and natural resource management plans.

Fort Custer has assembled an environmental staff that has made it a nationwide leader in the development and current implementation of a climate preparedness plan — brought on by the Department of Defense Climate Preparedness Pilot program.

Through water monitoring, energy resilience, sustainability, wildlife monitoring and forestry improvements, the center's modernization in sustainability and environmental planning help to not only maintain, but also enhance the quality of the land surrounding the installation.

It is through these efforts that the Michigan Army National Guard's Fort Custer Training Center won the 2020 Secretary of the Army Award for Natural Resources Conservation in the small installation category.

To maintain a proactive approach to climate change, DOD selected the center as the Army representative for the Climate Change Preparedness Pilot program. It is the first installation to develop and fully implement the climate adaptation plan successfully.

"FCTC (Fort Custer Training Center) is part of the Michigan Climate Coalition and is also working with other stakeholders to process environmental data and adjust its management goals accordingly," said Michele Richards, natural resource manager, Michigan Army National Guard.

The data collected identified the potential for significant shifts in the regional flora and fauna, and its staff is planning and identifying best practices that accommodate both present and future habitats.

(U.S. Army Environmental Command courtesy photo)

A trumpeter swan is tagged with a GPS collar by U.S. Fish and Wildlife Service. Data collected will be used to study migration, year-round movements, habitat use and mortality risk.

The natural resources conservation (NRC) staff has partnered with statewide organizations to work closely to mitigate the installation's affect on endangered species and habitats.

Prescribed fire monitoring, modernized forestry techniques and wildlife monitoring are a few ways that the center has adjusted its maintenance to implement climate preparedness goals.

Habitat management is the motivation for wildlife support, and the installation will prioritize which habitats they should invest in to obtain the best results. The center staff ensures that the wildlife in the area is free from the encroachment of invasive species and not further disturbed by destructive forestry techniques.

Fort Custer and its partners combined their data and planning to improve the installation's prescribed fire management program by determining the best fire application regimes to promote the growth of native plant species and to control the invasive ones. During each burn, NRC staff monitor temperature, wind speed, flame height and spread-rate conditions to determine when and how best to conduct a burn. They are also examining how to time burns so that they have minimal impact on wildlife species, especially during nesting season and hibernation emergence.

By transforming its forestry and timber harvesting, Fort Custer has abandoned traditional methods of using skidders and dragging cut trees across the land. Instead, the staff uses high-tech harvesters, which uproot only the targeted trees and cut them in size in place, preventing unnecessary damage to the land and surrounding valuable tree species.

Additionally, the installation is initiating a new hybrid wildlife-monitoring program that will replace traditional live trapping methods with remote motion-sensor cameras.

"We're trying to determine whether cameras could effectively become the primary monitoring method," said Curt Roebuck, installation site environmental manager.

The staff also uses acoustical monitoring — similar to what is used to monitor bats — to conduct reptile and amphibian surveys. This acoustical monitoring may later be used to monitor other animals.

The Fort Custer Training Center has the largest number of solar panels of any military installation. It has established a microgrid and solar power project that, when implemented, will provide an immediate and uninterrupted source of electricity through a dispatchable generation hub for interconnected military facilities. Its comprehensive surface-water monitoring program measures water quality at 32 test sites on the installation.

The expertise of Fort Custer's NRC staff and its partners has helped to minimize management costs while adding to the wealth of data and knowledge these institutions can share.

The mission at the Fort Custer Training Center supports the environment and the community. From conducting prescriptive deer hunts for veterans and the general public, to supporting environmental projects that benefit the community, it is a valuable asset to the military and Michigan.

USACE, Honolulu District teamed up with the Photogrammetric Mapping Center of Expertise from USACE, St. Louis District to gather high resolution orthophotography using the Light Detection and Ranging sensor system dually mounted with a 40mm multispectral camera in an MD500D Helicopter.
(Photo courtesy of Aerial Filmworks)

Aerial scans help identify, solve ground munitions hazards

By Benjamin Konshak
USACE, Honolulu District

As one of the largest and most complex Formerly Used Defense Sites under the purview of the U.S. Army Corps of Engineers, cleanup of the former Waikoloa Maneuver Area on the Island of Hawaii may benefit from a new, top-to-bottom, "eagle eye'" view.

To create this bird's eye view, the USACE, Honolulu District's Environmental Branch teamed up with the Photogrammetric Mapping Center of Expertise from USACE, St. Louis District to gather high-resolution orthophotography and light detection and ranging geospatial imaging. The goal is to assist with planning and executing the munitions response program at Waikoloa.

The history of the maneuver area began when the U.S. Marine Corps, through an agreement with Waimea's Parker Ranch, acquired more than 220,000 acres in December 1943, for use as an artillery firing range and troop maneuver area.

The Camp Tarawa Marine Corps Base was quickly established there by the 2nd Marine Division as a site for recuperating Marines following the battle on Tarawa Atoll, as well as a training location for future Saipan and Tinian campaigns.

During World War II, Waikoloa hosted an estimated 55,000 Marines, Navy corpsmen and seabees who utilized multiple camp ranges for artillery and mortar training, and maneuver areas for amphibious training.

Following the war, the maneuver area that encompasses most of the South Kohala District on Hawaii Island has grown from a sleepy cattle ranching hamlet to a vibrant community of nearly 20,000 residents.

With land use that includes multiple shoreline resorts, schools and historic parks along with ranching and farming, the public is at potential risk of encountering unexploded ordnance left behind from training.

Injury and fatality accidents in 1945, 1954 and 1983, resulted in its designation as a priority munitions response area for unexploded ordnance investigations and removal actions.

Since the late 1990s, more than 2,700 unexploded ordnance have been discovered and disposed of across 29,000 acres of the Waikoloa Maneuver Area FUDS.

With tens of thousands more acres remaining to be surveyed or cleared, the need for accurate data is key to planning and executing work.

"In order to efficiently contract remedial investigation or remedial action projects, we need to understand the attributes of each diverse area including terrain, vegetation, and obstructions such as buildings and roads," said Loren Zulick, Waikoloa Maneuver Area project manager, USACE Honolulu District. "Geospatial imaging is part of the data solution for understanding our site."

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EVERGLADES

Corps of Engineers helps protect, restore nation's ecosystem

Story & photos by
Brigida I. Sanchez
USACE, Jacksonville District

Having spent a great part of my life living in South Florida, I have visited the Everglades many times and have marveled at its beauty from Clyde Butcher's romantic landscapes to the words of poet Campbell McGrath and journalist/activist Marjorie Stoneman Douglas. I have immersed myself in its monumentality, and stood still in its vigor.

For generations, artists, musicians and poets have been inspired by the wonders of the great outdoors, capturing a fleeting moment of expansiveness to share with the world.

But recently, I had the chance to wake up early with the mosquitoes to document the Florida wild. With my boots suctioned in mud I could not help but think how the U. S. Army Corps of Engineers had earned a seat at the ecosystem restoration table and why it is so important.

Here's a concise history of how the Corps got into the business of draining South Florida and why it's now in the business of reversing some of those efforts to bring the ecosystem back to a restored form.

In the 1920s, the federal government started "draining projects," seeing Florida not only for its opportunities in tourism, but for its perfect climate for certain types of agriculture.

However, it wasn't until after two destructive hurricanes devastated the region that Floridians decided to shape the landscape to suit their needs.

The first was "The Great Miami Hurricane" of 1926 that destroyed property, killing thousands or leaving them homeless. The amount of water generated by the storm caused the dikes around Lake Okeechobee to breach.

The second was Hurricane Okeechobee that struck in 1928, killing an estimated 2,500 people.

A confluence of needs to provide safety, security and economic growth is what drove Congress to authorize the Corps to work in collaboration with the state under the Central and South Florida Project to drain its southern wetlands.

Knowing this much led me to Eric Summa, chief of Jacksonville District's Planning and Policy Division, who took the time to answer my questions about the importance of ecosystem restoration.

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The U.S. Army Corps of Engineers, Jacksonville District works to maintain the beauty and charm of the Everglades.

EVERGLADES

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Summa explained that ecological restoration helps whole populations. It cleans water for use by humans and wildlife, and makes more water available for consumption and the ecosystem during both wet and dry times.

The Corps has four priorities when it comes to ecosystem restoration: improving the quality, quantity, timing and distribution of water.

"When we improve the quality and quantity of the water in the ecosystem, life flourishes. Everything from the microbiotic species to small invertebrates, fish, birds, small mammals and deer all benefit from ecosystem restoration efforts," Summa said. "When we get the water right, these species become abundant, growing populations and providing benefits to everyone from those that subsist on the ecosystem to those that recreate or depend upon recreation as a commercial business."

In an article published in Markets Insider titled, "13 Mind-blowing Facts about Florida's Economy," two-thirds of the state is farmland.

According to a National Park Service report, the Everglades had more than 597,000 visits in 2018 that generated more than $58 million in total visitor spending. More than 97% of the visits were by non-local visitors.

This does not include the ecological benefits such as carbon sequestration, and an ideal environment for a variety of species to breed.

Authorized by the U.S. Congress in 2000, the Comprehensive Everglades Restoration Plan is a partnership to restore, protect and preserve water resources in the region, in turn, providing a sustainable way of life.

Since then, the Corps has invested $2.4 billion to date into the overarching South Florida Ecosystem Restoration Plan since the restoration process began.

As we advance further into 2020, the Corps has already completed a number of projects including the Melaleuca Eradication and Other Exotic Plants Annex, Picayune Strand and the Kissimmee River Restoration projects.

Being one of the world's largest ecosystem restoration programs means that there are lots of moving pieces and that it takes time to restore more than 2.4 million acres of vulnerable wetlands.

Draining the marshlands during the late 1920s was simpler with fewer inhabitants, along with the promise of economic growth to come with the environmental modification. Now that population has escalated past 8 million.

"Those populations all enjoy a level of flood mitigation that can't be disrupted by ecosystem restoration efforts," Summa said. "This balance of trying to achieve restoration, while maintaining flood protection benefits, significantly complicates and extends ecosystem restoration efforts."

People and flood risk management aren't the only challenges that the Corps and its partners face.

Of primary importance, the water used for restoration purposes must be clean to state water quality standards. The Corps treats it further to standards necessary for full restoration, which are often higher than the state criteria. As a consequence, the Corps participates with its non-federal sponsor in the necessary treatment of agriculture, development, septic and waste water for its high nutrient levels.

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The beauty and charm of the Everglades.

AERIAL

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The geospatial imaging across the maneuver area was completed with a helicopter-mounted dual sensor array containing a Riegl airborne laser scanner providing LiDAR data and a PhaseOne iXU-1000 40 millimeter camera providing multispectral images (red, green, blue and near infrared). This sensor array was flown nearly 400 meters above the ground with a 70% overlap in the flight lines, preventing data gaps and increasing laser pulse return information.

Aerial targets were collected throughout the project area to geospatially correct the imagery. This consisted of high accuracy global navigation satellite system locations collected at existing photo-identifiable features painted on asphalt, such as handicap parking signs, and various traffic and street markings.

The imaging project covered 152,000 acres, including all of the known firing ranges and a buffer into adjacent areas used for maneuvers.

The geospatial data collected provided more accurate detail when compared to satellite images often used to view and portray project sites.

With more than 50 pulses/square meter in the LiDAR data and an orthophoto pixel resolution of less than 5 centimeters/pixel, this data showed detail down to the level of tree branches, clusters of grass and fence posts.

The LiDAR data contains multiple returns from each pulse, representing different elevation levels of features, such as buildings or trees, with the last usually being the ground level. The numerous pulse returns within the dataset are referred to as a point cloud or a collection of points that represent a 3D shape or feature resulting in topographical landscape maps with 2-foot contour lines and yielding nearly eight terabytes of information.

The imaging project covered 152,000 acres, including all of the known firing ranges and a buffer into adjacent areas used for maneuvers.

This detailed data is anticipated to be a major tool for a variety of remediation purposes including project planning, cost estimating and remedial design, with an emphasis on selecting the best remedial technologies for use over various terrains.

One of the major challenges with cleaning up munition sites is the difficulty in traversing terrain and vegetation with a geophysical sensor (metal detector) required to be near the ground surface. The young geology of rocky, rough basalt flows, often hidden under grasslands on Hawaii Island, compounds this challenge.

The use of advanced geophysical classification detection instruments that differentiate potentially hazardous munitions from non-hazardous pieces of scrap metal, are mandated, where practical, on all FUDS projects.

One of the goals of this geospatial imaging project is to assess where it is feasible to use these heavier instruments (50- to 80-pound arrays) over the maneuver area's varied terrain.

"AGC has the potential to save money, reduce impacts to the community such as evacuations, and generally move the munitions response portion of FUDS significantly forward," said John Jackson, geophysicist with USACE's Environmental and Munitions Center of Expertise. "Part of the challenge is correctly planning for and implementing the appropriate remediation tools for the numerous landscapes of our project sites."

In addition to enabling the team to discern which type of technology is best suited at the various munitions response sites, the data imagery is made available to biologists and archeologists conducting remedial work to assess, monitor, and protect natural and cultural resources at the Waikoloa Maneuver Area.

Additionally, stakeholders within the FUDS property, such as landowners, local government and non-profit organizations, may potentially benefit from this geospatial data collection.

One local non-profit, Hawaii Wildfire Management Organization, has expressed an interest in using the LiDAR data for assessing fire fuel loads around residential interfaces.

According to the team members, this newly acquired geospatial imagery capability promises to be a valuable resource in their remedial action toolkit, and will assist in helping them make smart decisions in managing the cleanup of unexploded ordnance at Waikoloa.

ECOSYSTEM

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"High nutrient water causes the ecosystem to react in a dramatically different way than it did in its pre-drainage condition," Summa explained.

"Where we have poor quality, high nutrient water we have more algal blooms. Low water quality also converts historic sawgrass marsh to nutrient loving cattail and willow," he said. "So much of the challenge with the restoration is collecting and treating water first before distributing it to the Everglades and other natural landscapes so the quality of the water doesn't change the character of the ecosystem."

Lands for all projects are the responsibility of the non-federal sponsor, so though we help to identify the lands, they help too and ultimately acquire the requisite real estate interests in those lands to create Stormwater Treatment Areas. These STAs function as natural filtration systems, wetlands that work in conjunction with reservoirs such as C-44 east of Lake Okeechobee and C-43 west of Lake Okeechobee which help to restore and sustain flows and mitigate flooding.

"What we have learned from our past is that the land serves humans best when it also serves the needs of a broader, diverse ecosystem," Summa said. "When shallow water is sheet flowing across the landscape it creates a dynamic ecosystem, where terrestrial and aquatic life work symbiotically supporting diversity, primary production and food webs that ultimately serve human populations."

Summa added that the goal of the U.S. Army Corps of Engineers is to protect and restore the nation's ecosystems for the economic, environmental and social well-being of current and future generations.

"We will continue to collaborate with others to deliver state-of-the-art natural and engineered solutions for many of the nation's most complex environmental challenges," he said.

The cleanup and restoration of Fort Rousseau, a formerly used defense site, was achieved through the efforts of the U.S. Army Corps of Engineers, Alaska District. (Photo by Will Mangano, USACE, Alaska District)

FUDS team clears historic military site of contaminated soil

By Kathy Alward
U.S. Army Environmental Command

Historical military facilities can sometimes require a cleanup of environmental contamination that was released during legacy operations. The Defense Environmental Restoration Program – Formerly Used Defense Sites program is responsible for this cleanup.

The U.S. Army Corps of Engineers is responsible for the FUDS program and must address more than 532 FUDS properties within its Alaska District. The cleanup requires the district to overcome unique challenges due to complex site conditions and difficult logistics.

Fort Rousseau is one high-priority FUDS in the Alaska District that overcame all challenges and earned the 2020 Secretary of the Army Environmental Award for environmental restoration. Its successful cleanup and restoration included excavation and off-site disposal of contaminated soil from the primary coastal landfill source, located on Virublennoi Island, which was actively eroding into the ocean.

Fort Rousseau was the headquarters for the Sitka Harbor Defenses that, according to historical sources, prepared for but was never engaged in active combat during World War II.

Fort Rousseau is located in Sitka, and encompasses 65 acres of land, including eight islands connected by a causeway.

The islands, currently designated as the Fort Rousseau Causeway State Historical Site, were chosen as military installation sites during World War II to protect the Naval Air Station on Japonski Island against attacks from the Pacific.

Repeated wave scouring and erosion prevented construction efforts to build an 8,100-foot-long, concrete-capped causeway that would connect the island chain to Japonski Island for road access and for use as a utility conduit.

The U.S. Army Corps of Engineers, Alaska District completed the remediation of all contaminated soil identified in a decision document approved in August 2016 by the Alaska Department of Environmental Conservation.

"Because of the extremely high mobilization costs in Alaska, remedial actions must be as efficient as possible to limit cost growth and achieve program objectives in a reasonable timeframe," said Ken Andraschko, FUDS program chief, USACE Alaska District. "The lessons learned at Fort Rousseau will be used at many other sites to lower remediation costs and increase project effectiveness."

The site that can only be accessed by marine vessels was successfully excavated, and soil and other wastes were transported to offsite locations. With the removal of 933 tons of hazardous waste, 5,157 tons of non-hazardous waste, 317 pounds of electronic equipment, 168 pounds of broken lead-acid battery plates, and approximately 133 tons of steel — that were later recycled — human health risks and environmental risks were significantly reduced.

An on-site, lead-in-soil analysis system was developed, reducing the turnaround time for sample results from one week to 24 hours.

Tidally driven logistics helped to carefully time landfill removal activities to coincide with the lowest high tides of the year — occurring over a limited week-long period. The logistics aided in the success of crucial cleanup work, including the complete removal of contaminated soil down to bedrock from depths that would normally be underwater.

To minimize the risk of contaminating the ocean with landfill material during severe weather, cleanup work was conducted in the spring.

A temporary dike was created using large-capacity bulk soil bags that were filled with clean gravel and plastic sheeting. At the same time, a permanent breakwater was designed using large rocks from within the landfill excavation to limit future shoreline erosion and to provide protection for the excavation area from storm surges.

Contaminant leakage was avoided by using plastic and felt-lined soil bags during marine barge, railway, and truck transportation to the disposal sites. When the temporary dike was removed, the clean gravel from the bulk bags were used to resurface a hiking trail system that had been damaged by heavy equipment during cleanup activities.

Remote cameras were used to monitor the progress of site activities and real-time weather/tidal conditions, 24-hours-a-day. This monitoring system allowed the state regulator to identify potential issues and to prevent sediment and pollutants from entering the intertidal area of Sitka Sound.

The USACE project delivery team accessed the camera website to verify site conditions, tidal cycles, marine visibility and weather, construction equipment movement and waste handling.

"USACE worked hard to maintain communications with the landowner and regulatory agency, and realized the importance of public participation and interaction throughout this project," Andraschko said.

The project was completed early in the summer, benefitting tourists and local sightseers who can now enjoy the island's historical features.

Unexpected partnership advances mutual goals

In October 2019, work with The Nature Conservancy helped restore the Lightning Point project in Alabama and created 1.5 miles of breakwaters, including two new jetties and 40 acres of coastal habitat consisting of scrub shrub, tidal marsh and tidal creeks to reset the foundation of Bayou La Batre's once-healthy natural waterfront. (Photo by Hunter Nichols for TNC).

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

They seem like an unlikely pair: the U.S. Army Corps of Engineers and The Nature Conservancy.

What could a federal agency that develops large-scale infrastructure projects have in common with a 501(c)(3) environmental organization? The answer from the Corps' side is the Engineering With Nature® initiative; from TNC's perspective, it's the opportunity to promote natural infrastructure investments, in part, through its relationship with the Natural Infrastructure Initiative (NII).

Sarah Murdock, director of TNC's U.S. Climate Resilience and Water Policy, describes the NII as a collaboration of partners that came together after the 2015 Restoring Natural Infrastructure Summit.

"NII brings together private-sector and non-government organizations and academia," she said. "Founding members include TNC; Caterpillar Inc.; Great Lakes Dredge and Dock Company; AECOM, an international engineering firm; Ducks Unlimited; and the University of Georgia."

Murdock described the goals and visions of EWN® and NII as very aligned and similar.

"We look at how we can work together to promote the use and investment in natural or nature-based approaches to achieve maximum benefits," she said.

"EWN and NII are definitely in sync," said Dr. Jeff King, deputy national lead of the EWN initiative. "We're jointly pursuing communication at the highest levels to get the public and decision-makers engaged about natural infrastructure and why it should be prioritized."

Murdock described how natural infrastructure generally refers to work that restores the function of ecosystems while increasing resilience within natural systems.

"We're really talking about reconnecting floodplains and protecting and restoring marshes, sand dunes, reefs and mangroves," she said. "We're thinking about work that is seeking to maximize not only the benefit of those ecosystem functions, but the environmental, economic and societal or community benefits. So we're thinking about nature in that context, and the benefits to both people and nature itself."

She sees EWN as approaching these goals from a scientific and technical perspective, conducting demonstrations on how best to utilize and work with nature, where the right locations are to implement these solutions, and what the right techniques and guidance are when investing in natural infrastructure.

Murdock thought the creation of "Engineering With Nature®: an Atlas" was valuable, and pointed out that TNC, along with National Association of Counties, the Association of State Floodplain Managers and others created something similar, the Naturally Resilient Communities, a website (www.Nrcsolutions.org) that also showcases case studies of successful projects. She feels that because it's still a new way of thinking and a new way of executing projects, it's important to illustrate what investing in nature and using nature-based approaches actually mean.

The two groups also teamed up last year to do a couple of briefings on Capitol Hill, to members of Congress and their staff.

"I'll say I've been working on and communicating these issues on the Hill for the last five years or so," she said. "While I've been in this U.S. government relations position, I've seen a huge transformation in Congress's understanding of natural infrastructure. The phrase has now been codified into various statutes like the Water Resources Development Act."

Murdock thinks natural infrastructure is a very bi-partisan issue.

"I've seen several hearings in the last six months where members from both sides of the aisle are talking about the need to invest in resilience and how nature can help play a role in enhancing resilience," she said. "It's great to see that kind of understanding grow. I really think because EWN and NII are an unusual partnership, people pay attention when we walk through the door together; it piques people's curiosity and garners some attention."

NII has been working with the U.S. Army Engineer Research and Development Center to help devise the Natural Infrastructure Opportunities Tool (NIOT, https://ewn.el.erdc.dren.mil/tools.html). This application helps align the supply and demand of dredged sediment. The idea behind the tool is that opportunities for natural infrastructure construction and ecosystem restoration projects can be maximized through shared knowledge about availability of, and need for, dredged sediment, similar to the way it's being optimized in TNC's project for Lightning Point, Alabama.

"We hope to continue our close collaboration with the EWN initiative as both TNC and the NII," Murdock said. "We'll continue to champion the EWN initiative within the Corps and find ways to promote the work both within and outside the Corps.

"And then there's definitely a need to think about advancing policy solutions to challenges that are ongoing like how best to measure ecosystem services, so that we can fully account for all of the benefits that natural infrastructure projects deliver," Murdock said.

For more information about the EWN initiative, please visit www.engineeringwithnature.org.

Corps defends against invasive lizards

Invasive species, such as the cold-stunned green iguanas, wreak havoc in the South Florida communities. (Photo by Andy Wraitmell)

By Erica Skolte
USACE, Jacksonville District

Cold-stunned green iguanas, dubbed "chicken of the trees," made national headlines as they fell from the trees in South Florida during a recent cold snap.

News stories and social media helped to raise public awareness about the damage that can be wrought by the large invasive lizards, which can reach more than five feet and 20 pounds.

According to the media reports, the lizards weren't just munching their way through the succulent plants of South Florida's gardens, they also wreaked havoc on private properties and public infrastructure, shorting out power lines and burrowing under structures, causing some of them to collapse.

In one city, the lizards reportedly caused enough damage to a water control structure that the repair bill reached $1.8 million.

Construction, rehabilitation and maintenance of critical infrastructure are key missions for the U.S. Army Corps of Engineers, which is responsible for the 143-mile Herbert Hoover Dike around Lake Okeechobee, five navigation locks and dams and recreation areas along the 154-mile-long Okeechobee Waterway, and Everglades restoration.

Maintaining the integrity of these structures and protecting them from damage are integral to the success of these missions.

The U.S. Army Corps of Engineers, Jacksonville District has managed invasive aquatic plant species since the late 1800s, when water hyacinth spread and blocked navigation throughout the St. Johns River. It was a turning point, when invasive species were recognized as a serious threat to navigation, agriculture, public health, flood control, and native plant and animal communities.

Since then, the Corps has developed strong partnerships, working on invasive species issues with local, state and federal agencies and other groups, including participation in the Everglades Cooperative Invasive Species Management Area.

Based on those relationships, the Corps' Invasive Species Management Branch has been able to monitor and anticipate the movement of animal species as they expanded their ranges in South Florida, and proactively put together a plan to maintain the integrity of much of the critical infrastructure within the Corps' area of responsibility.

"The Corps has a really good relationship with the U.S. Department of Agriculture's Wildlife Services and their missions align with ours. We were able to partner with them to provide invasive management services under the Economy Act," said Jessica Spencer, Corps biologist. "The main goal is to manage invasives that may compromise structural integrity and restore ecological stability. They are the main federal agency that has been responsible for controlling nuisance animal populations, with more than 100 years of experience."

Nelson Colon, manager, Natural Resources Program, explained that these large, invasive lizards burrow and damage Corps structures, so a plan had to be put in place to address those potential issues and safeguard the structures' integrity.

"The program to protect critical infrastructure has been very successful," he said.

Since the beginning of the program in 2018, more than 3,700 redhead agamas and more than 350 green iguanas have been removed from the Herbert Hoover Dike, the South Florida Operations Office in Clewiston and the surrounding area, the Port Mayaca Lock and Dam, the St. Lucie Lock and Dam, and the St. Lucie C-44 Canal.

A similar program was implemented this year to monitor and remove invasive species that may affect Comprehensive Everglades Restoration Plan projects and the South Florida ecosystem.

For Jon Lane, chief of the Invasive Species Management Branch, and Joshua Bauer, Corps biologist, the most important message for the public is this: Don't release exotic plants or pets into natural ecosystems. These invasive exotic species, both plant and animal, are problematic.

"Before you buy a pet, especially an exotic animal, do your research and make sure you fully understand what you are getting into before making a purchase," Bauer said. "These animals are beautiful and wonderful pets as long as owners have clear expectations and remain responsible."

Sometimes, he adds, it is not always understood that a cute 10-inch iguana could become a 5-foot-long animal with breeding or food-related aggression, and carry diseases such as salmonella.

"More importantly, if you find that you are unable to care for your pet appropriately, please don't release it into the natural system," Bauer said. "Exotics thrive in the South Florida ecosystem, which is often similar to their native habitat, without natural predators or environmental pressures."

He adds that not only do they cause extensive damage to the infrastructure as well as the ecosystem, battling the invasive species costs taxpayers millions of dollars every year.

"Many people know that pythons are a huge problem, but so are other invasive reptiles, such as tegus, which are driven to nesting sites and eat the eggs of gopher tortoises, crocodilian species and ground nesting birds," Bauer said. "Tegus are an omnivorous large lizard species that will eat pretty much anything — even if they deplete the resource, they'll continue eating whatever they find. If not managed, the predation and depletion of resources caused by these invasives could drive many native species into extinction."

The Fish and Wildlife Conservation Commission's Exotic Pet Amnesty Program helps reduce the number of nonnative species being introduced into the wild by offering individuals an alternative to releasing their animals without penalty or cost.

Pet owners can surrender their exotic pets, whether they are being kept legally or illegally, at events held around the state throughout the year. The Pet Amnesty Program does not euthanize animals, and finds a responsible home for them.

For more information about the program, visit **MyFWC.com/Nonnatives** or call the FWC's exotic species hotline at 888-Ive-Got1 (888-483-4681). Individuals unable to attend pet amnesty events or who are interested in adopting an exotic pet can also call this number year-round for assistance.

The public can also call the hotline to report invasive species sightings.

To learn more about the Corps' Invasive Species Management programs visit **www.saj.usace.army.mil/InvasiveSpecies**.

Yuma Proving Ground ensures wildlife, like these wild horses, can transverse the ranges unhampered by military training activies. (Yuma Proving Ground courtesy photo)

Yuma recognized for outstanding environmental stewardship

By Mark Schauer
USAG, Yuma Proving Ground

As a natural laboratory for testing virtually every piece of equipment in the Army's ground combat arsenal, U.S. Army Yuma Proving Ground has an existential interest in responsible ecological stewardship.

Located within North America's most diverse desert, the proving ground is home to a wide array of wildlife, from desert tortoises to one of Arizona's healthiest and most genetically-diverse populations of bighorn sheep.

More than 100 unique bird species pass through or call YPG home.

The Mojave fringe-toed lizard, imperiled in much of the western United States, thrives in dunes here.

The Sonoran pronghorn was brought back from the verge of extinction in the past 20 years by Arizona Game and Fish Department officials in part due to utilizing YPG as a protected habitat for it to regenerate.

In January, the proving ground received the Arizona Game and Fish Commission Award of Excellence recognizing its efforts in wildlife and natural resource conservation.

"I think it shows the strong partnership and stakeholder relations between both organizations," said Col. Ross Poppenberger, commander, Yuma Proving Ground. "We do a lot to facilitate access to our range while still maintaining our test mission."

Though the installation boasts the longest overland artillery range in the United States, a relatively small portion of its vast land area is subject to the impact of artillery projectiles and a safe haven for wildlife, including conservation-dependent species that Arizona Game and Fish Department assists.

"We have a lot of cooperative agreements and work joint projects together a lot," said Daniel Steward, YPG wildlife biologist. "Pretty much all of our wildlife monitoring is conducted hand-in-hand with Arizona Game and Fish. We prioritize our resources to best fit what we need for wildlife in the region."

Yuma's wildlife biology program coordinates access for Arizona Game and Fish to conduct regular monitoring of the pronghorn population, including regular overflights of the range to track pronghorn, bighorn sheep, and other conservation-dependent species equipped with GPS and telemetry collars.

Both organizations also utilize trail cameras at manmade water stations across the proving ground and the wildlife refuge to monitor wildlife activities. Yuma's range control section helps accomplish access to the range efficiently and safely on a continuing basis whenever the need arises.

"It's facilitating working around our schedule so both parties can meet their goals and missions," said Darrell Williams, range operations lead. "You need to ensure they aren't encroaching on the installation's test activities or danger zones. Our test schedule is very robust and dynamic, and does not always allow entities to easily gain range access in either the airspace or land space during a standard work week."

"We have very unique hazards here," Steward said. "When we're doing wildlife conservation work on the range, it's not just a matter of hopping into a truck and going out in the desert to do your work. A lot of times we have to thread our way through the range and ensure we have appropriate demolition support and range clearances to make sure we aren't going into somewhere dangerous or that will interfere with YPG mission activities."

Though the proving ground is the nation's largest artillery tester, it also encompasses the best preserved and protected Sonoran desert landscape in the American Southwest, he added. The healthy proliferation of a diversity of desert creatures under careful stewardship is, undoubtedly, one of the positive results of this.

Andrew Willey is one of two foresters with USACE, Norfolk District responsible for timber disposal and helping manage forests on military installations and other Army-owned land in the North Atlantic Division sector.
(Photo by Patrick Bloodgood)

Foresters manage Army's landscape

By Vince Little
USACE, Norfolk District

For a pair of real estate staffers at the U.S. Army Corps of Engineers, Norfolk District, there really is no confusing the forest for the trees.

District foresters Andrew Willey and Stefan Flores are responsible for timber sales and helping manage forests on military installations and other Army real property.

Through competitive industry bids – while meeting environmental compliance – they administer contracts, provide oversight of logging operations, and obtain maximum proceeds for federal projects and local communities.

In support of installation foresters, the two handle timber removal for all of North Atlantic Division, and they've got the woods covered — from the Canadian border down to North Carolina.

"Fort A.P. Hill is along the southern extent of our border," Willey said. "We run into the New England states and extend over to Fort Drum in western New York. The entire North Atlantic corridor is the area we manage from Norfolk District.

"Conducting timber harvests at these military installations allows for the opportunity to manage the Army's landscape. It's a large portfolio of land," he said. "What we can do as a service to the taxpayer is not only own and use this land, but maintain it as well."

By carrying out timber disposal, the district's forestry section facilitates the USACE mission across the region, clearing space for military construction, housing, environmental and civil works projects, he said.

Proper harvesting and removal also align with military operational needs. Open ranges are created for large vehicles, infantry maneuvers and other field-training exercises.

"The Army has a lot of standing timber out here that, without timber harvest, would otherwise go untreated," Willey said. "The untreated stands are less desirable to be mission ready for troop training."

Flores says managing the real property — the timber on each installation — supports the overall Army mission.

"It's an active part in sculpting an individual training area's objective for readiness," he said. "Our services enable the Army not only to adapt the training area and ranges but also capture value in the process. We are able to manage Army real estate and make way for changing military needs while collecting potential profits and funneling that money back into the landscape through different natural-resource management projects."

Forest management ensures healthier forests, future timber supply, sustained growth and replacement. Safety and eliminating environmental risks are other key factors.

"If you have unmanaged stands, you can have an invasion of disease or pests that attack trees," Willey said. "If you had a monoculture stand of pine, for example, and the Southern pine beetle sweeps through, essentially you now have a dead stand of pine.

"We're mitigating that risk by doing timber harvests," he said.

Dead trees add another threat to Army installations and surrounding communities: forest fire.

"The last thing we want to do is load our woods with fuel or potential for more fire," he added. "We're fortunate on the East Coast — we're generally wetter than the West. However, if we fall into an extended drought, we're at risk for fire here."

Willey said the Norfolk District program generates more than $1 million annually in timber sales for the Army, including $550,000 from Fort A.P. Hill.

The district's Real Estate Office works with installation foresters to prepare each sale.

"We award contracts to purchasers, monitor the sale and close it out," he said. "All the revenue that comes in from that sale goes through our section. We ensure the Army gets the money for disposal of its real property, and the local communities also see a monetary benefit through state entitlements."

Flores said there are misconceptions about forestry, timber harvesting and all that goes into today's industry.

"I always try to encourage those who haven't sat down and analyzed just how much forest products are integrated into everyday life to do so," he said. "That is the simplest way to realize how important an industry and mission it is, and increase awareness about the need for proper management. There are places where we have long been producing paper, lumber and other products through the management of forested lands."

Beyond economics and mission support, however, land management is among the federal government's most significant roles, he said.

"We are put in a position of public trust where it's expected of us and all other federal land managers to do what's for the greatest good of this resource and the American people to which it belongs," Flores said. "Preservation, growth, planned disposal with regard to purpose and results. That's what we do as foresters."

Remediation team on target to clear former WWII range

By Shatara Riis
USACE, Louisville District

By surface area, Lake Michigan is the third largest of the Great Lakes and the second largest by volume.

Additionally, located on Lake Michigan is Waugoshance Point Target, a Formerly Used Defense Site in which the U.S. Army Corps of Engineers recently completed a remedial investigation.

"The area was formerly used by the U.S. Navy for a short time between 1944 and 1945, in support of Naval Air Station Traverse City, Michigan," said Dr. David Brancato, risk assessment subject matter expert with the U.S. Army Corps of Engineers Louisville District. "There were limited equipment testing and scheduled bombing missions, as well as machine gun strafing practice from aircraft."

After World War II, the needs of the nation changed, and eventually, the Michigan Department of Natural Resources began managing Waugoshance Point Target under the Wilderness State Park, offering year-round recreational activities and natural resource conservation.

Training missions ceased at the former naval air station, and the leased target areas, including at Waugoshance, were no longer needed.

The property was declared eligible for the FUDS program in June 2007, said Nick Stolte, a munitions response subject matter expert with the Corps' Environmental and Munitions Center of Expertise, U.S. Army Engineering and Support Center, Huntsville, Alabama.

Following the authorization of the Military Munitions Response Program in the spring of 2010, a preliminary assessment was completed with the recommendation of a remedial investigation.

According to Stolte, no munitions have been discovered, but for a small amount of munitions debris.

"Based on the results of the remedial investigation, there is no evidence that high-explosive munitions were used," he said. "All evidence suggests that only practice bombs were used."

(Photo by Dr. Kari Meier)

A diver prepares for an underwater investigation in the area surrounding the lighthouse at Waugoshance Point, Michigan. Once used as a practice target, the lighthouse is searched for evidence of munitions by the diver using a metal detector.

Brancato added that the Corps recommended no further action because no unacceptable risk was found at Waugoshance Point, Temperance Island, Waugoshance Island or the old Waugoshance Lighthouse.

Completing the remedial investigation did not come easy. It took time, effort, patience and expertise.

"The biggest challenge was the marine environment and weather. Collecting geophysical data underwater is always difficult, but it was especially difficult in this part of the country," Stolte said. "In the Mackinaw Straight, we frequently encountered high winds and waves that made data collection tedious and sometimes impossible."

Brancato said the team not only had to adjust and delay investigations because of lake conditions but also had to consider the possible impacts with seasonal boaters.

Still, the project is tracking an early completion.

"The success of this project is due to the teamwork and coordination between the district, the Military Munitions Design Center, the contractor, Michigan Department of Natural Resources, and the Michigan Department of Environmental Quality, Great Lakes and Energy," Stolte said.

3 Rules to Remember

Recognize – when you may have come across a munition, and that munitions are dangerous

Retreat – do not approach, touch, move, or disturb it, but carefully leave the area

Report – immediately what you saw and where you saw it to local law enforcement, call 911

Streambank management projects protect New York's drinking water

By JoAnne Castagna, Ed.D.
USACE, New York District

Drinking water safety has been in the news. A few years ago, the community of Flint, Michigan, struggled with lead contamination in its fresh water supply and more recently, residents of Newark, New Jersey experienced the same.

What doesn't always make the headlines are the good things that are occurring concerning the public's drinking water.

Recently, employees from the U.S. Army Corps of Engineers, New York District completed four streambank management projects in Delaware County, New York, that are helping to protect the quality of New York City's drinking water.

Ensuring that stream banks are fortified is important. If a streambank is eroding, soil and stormwater runoff — that may contain contaminates from nearby streets and land — can easily flow into the stream and adversely affect the water quality. These streams may eventually flow into reservoirs that supply fresh drinking water to the public.

In New York state, the Cannonsville and Pepacton reservoirs are two of several reservoirs that provide billions of gallons of water to New York City.

Several streams that flow into these reservoirs were eroding until the Corps restored them under its New York City Watershed Environmental Assistance Program.

"This program funds projects that are protecting the water quality of New York state's watersheds that provide drinking water to millions of New York City residents and businesses," said Rifat Salim, project manager, U.S. Army Corps of Engineers, New York District.

A watershed is an area of land that catches rain and snow that drains or seeps into a marsh, stream, river, lake or groundwater. This water eventually gets stored in reservoirs, a place where water is collected and kept for use when needed, such as to supply a city.

To perform this work, several agencies collaborated with the Corps, including the Delaware County Soil and Watershed Conservation District, New York State Department of Environmental Conservation, New York City Department of Environmental Protection, town of Andes, town of Roxbury, town of Walton and the village of Walton.

Floodplain Reclamation Project

In the town of Walton, the West Branch Delaware River flows near the village streets.

Bordering this river are 13 acres of floodplain. This floodplain helps keep the river clean and gives it space to spread out and slow down during big storm events.

Over the years, the floodplain was filled with 10 feet of fill. This raised and hardened the land, killed natural vegetation, caused invasive plant species to flourish, and eroded the river's edge causing soil and trees to fall into the water.

As a result, when the river floods, the water that would naturally be absorbed, filtered and transported by the floodplain is unable to, so floodwaters back up and stay trapped on the village streets, flooding homes and businesses.

When this high volume of stormwater runoff floods the streets, it can sweep up contaminates and carry them to the West Branch Delaware River that flows into the Cannonsville Reservoir.

"Today, the floodplain is on its way to becoming healthy," said Graydon Dutcher, stream program coordinator with the Delaware County Soil and Water Conservation District. "The fill was removed and recycled."

Dutcher, who is also a Walton resident, added, "The residents of Walton were so happy about this work that they took it further. They used their own time and resources to remove the overgrown invasive plants, such as Knot Weed."

The village and town also mowed and graded the land to the correct elevation and slope to allow water to spread out onto the floodplain, instead of overtopping the banks and flooding nearby businesses.

Afterwards, grass was planted on the floodplain and native vegetation and shrubs were planted along the river including a mix of maple and ash trees.

Dutcher said, "Now flood waters will drain from the town's streets, building rooftops and parking lots and filter through the vegetation before entering the river."

The vegetation traps and absorbs sediment and pollutants, like harmful phosphorus and nitrogen particles, from entering the river. The plants' roots also stabilize the soil and prevent it from running into the river.

An added benefit of this project is that it will lessen the damages of flooding.

It will provide flood reductions for a 100-year storm event. This is a flood whose strength and water height are predicted to occur, on average, about once in 100 years. The project will also be useful for storms that happen more frequently.

Dutcher said, "The village is ecstatic. We have a clean slate here."

He said that the village's plans for the land are to create a small pocket park for the community that will include trails, walkways, athletic fields and a boat launch.

See **STREAMBANK**, page 39

The Walton floodplain project was completed in late 2019. (Photo by JoAnne Castagna)

STREAMBANK

continued from page 38

South Street Bank Restoration

If you're standing on the restored Walton floodplain that was just discussed, and look across to the other side of the West Branch Delaware River, you'll see South Street. The street sits high up on a bank that overlooks the river. This is where the South Street Bank Restoration Project is located.

Over the years, South Street, which is lined with a few houses, has been slowly eroding down into the river.

This has caused the river's edge to erode, causing trees and soil to fall into the water and has created tension cracks in the street's asphalt.

"Under South Street there are water, sewer and gas lines," said Dutcher. "Under a flood condition, if the street continues to crack and shift down into the river, it could break the sewer line and the sewer would discharge into the river underground, contaminating the water and we wouldn't even know it."

To stabilize the river's banks and prevent the street from continuing to shift down, 40-foot steel sheet pile was installed along the bank that extends 30 feet below ground.

Dutcher said, "If we didn't perform the sheet pile work, this whole area would have cleaved off. We really had to stabilize this bank using hard armoring, which is something we don't typically do, but in this case it was really needed."

To further stabilize the bank and control streambank erosion, loose stone was placed at the edge of the river. The stones slow down the stream along the sheet pile and reduce potential damages downstream.

Native vegetation was also planted near these stones and at the bottom area of the sheet pile. "We also plan on growing creeping vines along the top of the sheet pile, so it looks more natural when grown out," said Dutcher.

Stormwater runoff will filter through the vegetation before it enters the river. The vegetation will trap and absorb sediment and pollutants, like harmful phosphorus and nitrogen particles, from entering the river. Plant roots also stabilize the soil and prevent the soil from running into the river.

Recently, employees from the Corps were visiting South Street with Dutcher when a resident and former president of the Chamber of Commerce conveyed her thanks and appreciation.

Close Hollow Streambed and Bank Restoration & Hardscrabble Streambank Stabilization Projects

These two streambank management projects have streams that provide water to the Pepacton Reservoir that supplies water to the New York City water supply.

These streams were eroding, causing trees and soil to fall into the water.

To stabilize the streambanks, the slopes along sides of the streams were cleared of falling trees and debris and the bottom of the slopes and bed of the stream were reinforced with rock. The bare slopes were then hydro-seeded and planted with willow stakes and native trees.

While the plants are taking root, a thick coconut geo mesh fabric was laid along the banks to protect the growing plants and to prevent soil from running into the streams.

Dutcher said, "The trees will eventually grow full size through the rock reinforcements and will enhance the bank's stability." The plants' roots will stabilize the soil and prevent the soil from running into the river.

Stormwater runoff will filter through the vegetation before it enters the river. The vegetation will trap and absorb sediment and pollutants before they enter the stream.

While visiting the Hardscrabble project with the Corps, Dutcher said, "The stream's water is bubbling as it moves along the streambed's rocks. It looks great. Before, mud was running down the stream."

These four streambank management projects may be completed, but the Corps' New York City Watershed Environmental Assistance Program continues to support efforts that will protect the quality of New York City's drinking water supply.

New York City Watershed System

The New York City watershed region encompasses approximately 2,000 square miles of land north of New York City.

The land includes three watershed systems: the Catskill, Delaware, and Croton systems that are located in the counties of Greene, Schoharie, Ulster, Sullivan, Westchester, Putnam, Dutchess and Delaware.

The New York City Watershed System provides more than 90% of New York City's water supply. This comes to approximately 9.5 million people.

New York City makes sure that this water is safe by treating it at the source rather than building a costly filtration plant. The source is the land that surrounds the streams, rivers, lakes and reservoirs.

"In 1996, all of the municipalities in the New York City watershed region came to an agreement. They wanted to avoid the creation of a huge filtration plant. Instead of a plant, they agreed to have small projects throughout the region to provide the public with clean water with minimal filtration.

"This is how our New York City Watershed Environmental Assistance Program came about," said Rifat Salim, project manager, U.S. Army Corps of Engineers, New York District.

The Hardscrabble Streambank Stabilization Project in the town of Roxbury was completed in late 2019.
(Photo courtesy of DCSWCD)

Multi-agency partnership to expedite cleanup of former Nansemond Ordnance Depot

By Sher Zaman
USACE, Baltimore District

Partnership is key to the success of any project, particularly when there are multiple stakeholders.

It's particularly important to the Former Nansemond Ordnance Depot in Suffolk, Virginia, where the U.S. Army Corps of Engineers is working closely with multiple partners and stakeholders to perform investigation and cleanup activities under the Formerly Used Defense Sites program.

That's why in December 2019, a memorandum of understanding (MOU) was entered into between the Environmental Protection Agency, U.S. Army Corps of Engineers, Virginia Department of Environmental Quality, and the Tidewater Community College Real Estate Foundation, one of the major landowners at the site.

The purpose of the memorandum is to increase coordination and cooperation among the parties; develop a joint process and schedule to expeditiously address risks to human health and the environment from past Department of Defense activities on Tidewater Community College Real Estate Foundation-owned land located on Former Nansemond Ordnance Depot; and facilitate prompt productive reuse and redevelopment of the land by the Tidewater Community College Real Estate Foundation.

The Former Nansemond Ordnance Depot consists of approximately 975.3 acres. It is the largest undeveloped parcel of coastal land in the Hampton Roads, Virginia, area. The depot was constructed between November 1917 and December 1918 to support the Port of Embarkation at Newport News, Virginia, and was originally known as Pig Point Ordnance Depot.

The depot functioned as a storage and distribution center and performed reconditioning of munitions. Captured enemy munitions were also processed at this location. The depot remained active between World Wars I and II, and in 1929 its name was officially changed to Nansemond Ordnance Depot.

During World War II, the depot was instrumental in supporting operations at the Hampton Roads Port of Embarkation.

Matthew Baumgarten with the Tidewater Community College Real Estate Foundation (front) signs the memorandum of understanding for the Former Nansemond Ordnance Depot alongside (from left to right) Kurt Kochan, Virginia Department of Environmental Quality; Brian Poe, Environmental Protection Agency; Hamid Rafiee, Tom Colozza and Sher Zaman with the U.S. Army Corps of Engineers. (Photo by Patrick Bloodgood)

This support included the temporary storage and transshipment of various types of ammunition overseas.

Toward the end of the war, the mission of the depot was changed to distribution depot and included the reconditioning of ammunition.

The Former Nansemond Ordnance Depot also received captured enemy munitions for processing and shipment to U .S. military facilities for technical examination.

Numerous historical documents state that tens of thousands of tons of many types of conventional ordnance and chemical warfare munitions were stored and shipped from the Former Nansemond Ordnance Depot.

In 1950, the depot was transferred to the Department of the Navy and named the Marine Corps Supply Forwarding Annex. In 1960, the depot was declared excess.

The Former Nansemond Ordnance Depot came to the attention of the U.S. Army Corps of Engineers in 1984 when evidence of munitions and explosives of concern, also known as MEC, was discovered.

The 1984 discovery of "bulk explosives, small arms munitions, and other ordnance items, both spent and unexploded" and a slab of crystalline 2,4,6-trinitrotoluene in the so-called "TNT Area" weighing several tons prompted the EPA to investigate the Former Nansemond Ordnance Depot.

A Remedial Investigation conducted by the EPA resulted in the removal of MEC and contaminated soil from the site. EPA Region III issued a Final Hazard Ranking System package in January 1999 and listed the Former Nansemond Ordnance Depot on the National Priorities List.

To date, the Corps has performed a total of 14 interim removal actions to address the most highly contaminated areas, and is continuing with activities to address the remaining sites. About 141 acres, or about 15% of the total 975 acres, have investigation or cleanup work remaining to be done.

The recently executed MOU is an important framework for a continuing open dialogue between the parties to work collaboratively under the Comprehensive Environmental Response, Compensation, and Liability Act, or CERCLA, to address and resolve technical and policy challenges and facilitate the reuse of the Tidewater Community College Real Estate Foundation property.

The parties expect to involve the community throughout the process through formal means, such as Restoration Advisory Board meetings, and through community announcements of significant achievements.

ERDC research titan retires after 40 years

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

A noteworthy but humble figure exited the U.S. Army Engineer Research and Development Center's Environmental Laboratory for the last time, Feb. 28, 2020.

Dr. Alfred Cofrancesco, Jr. retired from his position as senior scientific technical manager and director of the civil works environmental research area for the U.S. Army Corps of Engineers.

The magnitude of the research programs developed under his leadership and the breadth of environmental research that ERDC is doing are likely his greatest legacies. Cofrancesco's career illustrates how marrying technical expertise with relationship-building skills can bring success for the individual, the team and the organization.

"The biggest challenges I tackled in civil works are the annual budget funding cycles and building relationships to help you out with that," he explained. "If I had to put it all into one perspective, I think I'm most proud of the relationships I helped to build between the ERDC, USACE Headquarters and the scientific community at large."

Cofrancesco oversaw several research programs during his 13-year tenure in the ERDC's Environmental Laboratory technical director's office, including the Water Operations Technical Support program as well as the Aquatic Nuisance Species Research Program, the Aquatic Plant Control Research Program, the Recreation Management Support Program, the Wetlands Regulatory Assistance Program and the Ecosystem Management and Restoration Program.

One of the best ways to convey how these initiatives flourished under his direction is to describe how much their funding increased.

"EMRRP was about $900,000 — it's about $6.5 million now; ANSRRP started at $1 million, and this year we have $16 million in the program," he said. "APCRP is always zeroed out in the initial budget, but we have a lot of congressional support, and we're at $5 million there — that's all building relationships, working for sponsors, working for people and having them support us, and we're supporting what they need."

At his retirement ceremony, Dr. Beth Fleming, ERDC deputy director and former Environmental Laboratory director said there was a point when the APCRP was really suffering. She described Cofrancesco as having a tireless work ethic to turn the program around, coming into her office every day to strategize when she was director.

"Every bit of his success involved doing whatever it took to make it happen; sometimes it was working over the weekend, sometimes staying until late at night," Fleming said. "He would say it wasn't him, though."

Dr. David Pittman, ERDC director described Cofrancesco as world-class, saying, "I don't know how you did it all, man."

Cofrancesco pointed to his wife, Debbie, and said simply, "Support."

The former entomologist found a lot to be inspired about at ERDC. Going back to his research on the bench, he said that working with biocontrol agents amazed him at first.

"The flea beetle that controlled invasive alligator weed by bringing natural pressures to bear on the weed devastated it, and that was 'an aha moment'," he said.

Cofrancesco also felt the researchers have an energy when they do their work that he was able to see in the products being developed.

He was intrigued recently by the concept one team advanced that there are quantifiable goods and services derived from the ecosystem, and there needed to be a rigorous methodology to effectively account for them.

"We are on the cusp right now of having the Corps take the framework this team built and integrating it into the planning process," he said. "Once that happens, the Corps is going to be able to justify ecosystem restoration activities in a much clearer way."

When asked what he will miss most about his work, Cofrancesco said that it would likely be interacting with the ecosystem restoration and invasive species researchers throughout the world. He predicted it was unlikely that he would interact with researchers "in New Zealand, Europe, or wherever else" on as much a regular basis as he currently does.

"I chair the U.S. Department of Agriculture's working group for Biological Control Agents of Weeds," he noted. "And I've been with that organization since 1987 and have seen it under various names at various stages, and every biocontrol agent that is released in the U.S. goes through that organization's review process, and you build up a very good camaraderie with the community, and I'll miss that."

(Photo by Oscar Reihsmann)

Dr. Alfred Cofrancesco, Jr. retired from his position as senior scientific technical manager and director of the civil works environmental research area for the Corps on Feb. 28, 2020.

Opportunities made Corps a compelling career choice

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

Looking back on her 35-year career, the U.S. Army Engineer Research and Development Center's Dr. Linda Nelson thinks the opportunities were so plentiful, she couldn't resist staying with the U.S. Army Corps of Engineers.

The associate technical director for Civil Works, Environmental Engineering and Sciences, wore three hats until she retired, Feb. 28, 2020, serving also as program manager for the Aquatic Nuisance Species Research and the Aquatic Plant Control Research programs.

"You know, when I started in the ERDC's Environmental Laboratory in '85, I thought, 'I'll get some experience, and I'll be on my way,' and lo and behold, it turned into a permanent position, and I really enjoyed the work," she said.

Nelson began her career as a contract employee on an intergovernmental personnel agreement through Iowa State University. After becoming a permanent employee in 1989, she worked as a plant physiologist on the Chemical Control and Physiological Processes Team in the Environmental Laboratory's Environmental Processes Branch.

"It was always exciting, there were new projects all the time, and I loved the team I was working on, and what I also enjoyed was working nationally," she said. "I didn't just run experiments in the lab, I went out in the field and worked with USACE district partners and other agencies, doing field studies in Washington, Florida and Puerto Rico."

Nelson conducted research to identify and evaluate chemical techniques for managing invasive aquatic, wetland and terrestrial vegetation. She documented her research in 20 scientific papers in peer-reviewed journals and more than 25 ERDC reports on aquatic and wetland invasive plant management.

"That was so much fun; I worked on military installations and on Corps projects," she said. "To be able to see and understand the variety of invasive plant problems in the field was key to finding appropriate solutions for management — it was great."

In 2009, she had the opportunity to manage the ANSRP, and in 2010 she accepted the associate technical director position.

"I was fortunate that after working for many years as a research scientist, I was able to apply for the ATD (associate technical director) position and continue to do program management. I feel like that was the next step for me in my career," she said.

In 2010, she also shouldered the program manager responsibilities for the APCRP.

Nelson felt that stepping into managing research programs enabled her to interact a lot more with districts and use her skills from both the research and programmatic perspectives to try to solve invasive species problems.

(Photo by Jeff Schardt)

Dr. Cody Gray presents Dr. Linda Nelson with the President's Award from the Aquatic Plant Management Society for her career dedication to the organization. Nelson retired from the U.S. Army Engineer Research and Development Center's Environmental Laboratory, Feb. 28, 2020.

"I was able to use my skills to build partnerships with districts and divisions and ERDC, and I'm very proud of that," she said.

"I worked with the Chicago District on the Great Lakes and Mississippi River Interbasin Study Technology Team; served on the Corps' Invasive Species Leadership Team and formed a team with the Buffalo District to eradicate invasive hydrilla in the Erie Canal," she said, citing examples of projects she thought were particularly fulfilling.

Dr. Beth Fleming, ERDC deputy director, said that Nelson's professional approach to her work has been an example for others, and has had widespread and enduring impacts for the Department of the Army.

"She has an incredible work ethic that makes others' job easier — just the leader you want in charge of a team or on your team," Fleming said.

Wearing three hats has become a lot more complex in recent years because of increases in funding for the two programs Nelson managed and the increased congressional interest in invasive species.

"The ANSRP has been in the president's budget for these last few years for approximately $675,000, but we had supplemental funding this year up to $16 million in that program, so that's a substantial increase," she said. "And the APCRP also received $5 million in congressional supplemental funding this year. So now, that's someone who manages $21 million, plus serves as ATD."

As a result, her single position has split into two separate ones.

Upon her retirement, Nelson reflects fondly on her co-workers in the Corps and at the ERDC.

"It was great working with Dr. Al Cofrancesco in so many aspects — I just got to see another side of the Corps completely," the South Dakota native said. "Yeah, it was a great career, that's what kept me here. Vicksburg, Mississippi, wasn't my home; I was the furthest one from home in my family."

Nelson offers some advice for researchers starting their careers.

"Take advantage of everything that is offered within the Corps and at ERDC," she said. "We have so many opportunities: participating in interagency committees, detail assignments, emergency operations, long-term training, leadership programs — there are so many opportunities. I took advantage of several of them, and I wish I would have done more."

Geologist's career spans through tunnels, reservoirs

Story & photo by Vanessa Villarreal
USACE, Chicago District

Joe Kissane, a senior geologist with USACE, Chicago District, inspects the foundation to ensure the stability of the McCook Reservoir's main tunnel connection.

Understanding the nature of earth materials from soils and rock that are part of an excavation wall or used in embankments is pretty much imbedded in the mind of Joe Kissane, senior geologist at the U.S. Army Corps of Engineers, Chicago District. His 40-year career has taken him from tunnels around Niagara Falls in Ontario to the Chicago shoreline project.

Nineteen years ago, Kissane came to the Chicago District from Harza Engineering where he worked on tunnel projects that were connected with the Metropolitan Water Reclamation District's Tunnel and Reservoir Plan; a tunnel at Fermilab for the Nutrinos at the Main Injector (aka NuMI) project; a tunnel in Ontario around Niagara Falls; and other tunnels in New York, California and Turkey.

"When I came to the Chicago District, I became immersed in the TARP/McCook reservoir project and also picked up on the Chicago shoreline work," he said. "And those two made up more than two-thirds of my work for the next 15 years or so."

He started working for USACE in 1980 in the St. Louis District's Construction Branch as a grouting and foundation prep geologist at Clarence Cannon Dam. Between 1982 and 1994, he worked in its Geotechnical Branch where his work included projects for other Corps districts and federal agencies across the country.

"Although I spent about seven years in the private sector between my time in the St. Louis District and my joining Chicago District, I still think of my career as almost entirely Corps-related," he said. "I applied the experiences of St. Louis District to my work as an environmental and geotechnical consultant in the private sector, and then applied the experiences in the private sector to my work here at the Corps in Chicago."

Kissane has a bachelor's degree from Montana State University and a master's degree in geological engineering from University of Missouri, Rolla (now Missouri University of Science and Technology).

He said when it came time choosing a university, his criteria were focused on the ability to see "geology" out the windows of the place, and places where he could easily go out into the mountains at a moment's notice.

"At Montana State University, I could ride a bike for 10 minutes and be in the mountains or at a trout stream," Kissane said. "And Yellowstone National Park was a little over an hour away by car."

His interest in geology began when he was four years old. While on vacation in Idaho to visit his grandparents, his father told him he could look for agates. So over the next few hours he combed the mountainside — and was broken-hearted to learn that there wasn't room in the station wagon for his collection.

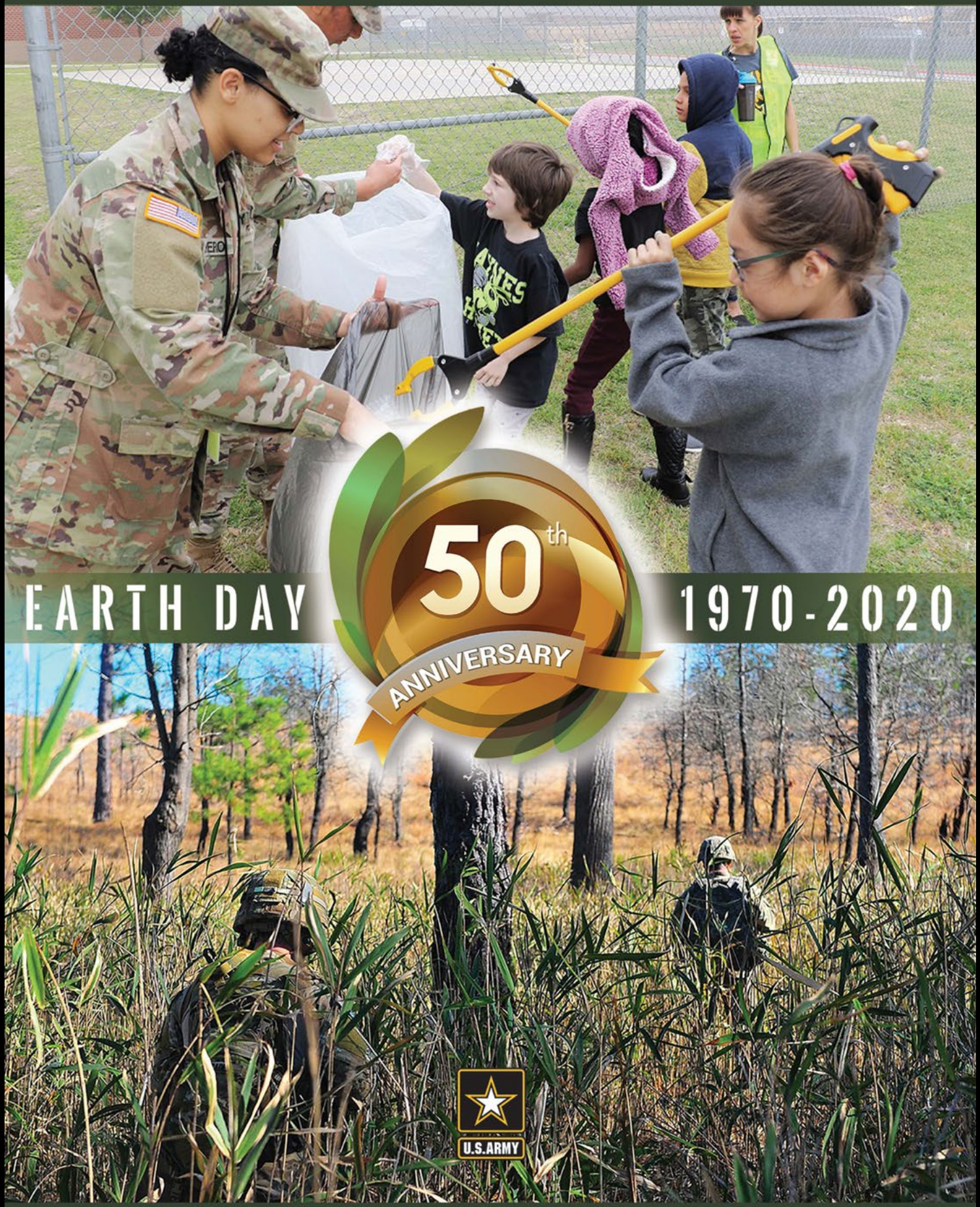
"We used to go on long stereotypical 1960s summer vacations in a station wagon driving all over the western United States, and the manner in which geology impacted not only the physical landscape but the cultural landscape fascinated me," he said. "After my initial experience with rock collecting, I learned that photography offered me a means of documenting geology without the burden of hundreds of pounds of samples, and for some time I was a rarity among my peers for the minimalist approach to rock collecting."

He is currently involved in the design of a tunnel for the Louisville District at Rough River Dam in Kentucky, and emergency repairs to the Chicago shoreline at Morgan Shoal.

He explained that the tunnels and reservoirs in Chicago are excavated into rock, and understanding geology and hydrogeology (i.e. the interaction between groundwater and rock/soils) are essential parts of that. The characteristics of earth materials from soils that are part of an excavation wall or are used in embankments impact the design of projects that use these materials.

"Every project we build has a foundation and those foundations are soil and/or rock," Kissane said. "Understanding the properties of different types of rock and the impacts those properties have on the strength and stability or instability of these materials allows us to design things more efficiently."

SUSTAIN THE ENVIRONMENT



SECURE THE MISSION