



The Corps

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Soil-testing system earns geologist innovation award

By Clem Gaines

U.S. Army Corps of Engineers Baltimore District

Engineering acumen and creative problem solving earned Ethan Weikel the 2015 U.S. Army Corps of Engineers Innovation of the Year Award. The Baltimore District geologist developed and implemented an innovative soil testing system that is smaller and 75 percent less expensive than commercially available products — but comparable in effectiveness.

The tool determines how effective ground-sourced heat pumps can be at a project site. Using ground-source heating reduces building energy costs and provides a more efficient heating and cooling system.

“This is like a typical heat pump for heating and cooling in a home except the transfer of energy occurs below ground instead of in the air,” Weikel said. Heat exchanging fluid is circulated through the ground in piping that is part of the building’s heating/cooling system.

“Ethan has been a leader in the geothermal field for the district,” said Ron Maj, chief of Baltimore District’s Engineering Division. “After being approached by the project manager for Letterkenny Army Depot [Pennsylvania] about installing geothermal wells on the installation, Ethan was eager to explore a new mission area for the district.”

Creativity and necessity motivated Weikel to develop the test unit.

“Our customer needed site-specific information for a ground-source geothermal heating/cooling feasibility study,” Weikel said. “We didn’t have the time or money to buy a commercial unit to support the customer needs, so I suggested we build it, but cheaper, smaller and more portable.”

And that is just what he did.

“My experience in the field gave me enough familiarity and expertise with this type of test system to build one on my own,” he explained. “I’m definitely a tinkerer, whether it’s mechanical, electrical or both. I love it.”

Weikel’s innovation and experience have led to other opportunities to benefit the Corps of Engineers beyond Baltimore District. “Upon the successful



Baltimore District geologist Ethan Weikel points to the miniature heater in the ground-source heat pump system he developed. Weikel’s system, housed in a portable ice chest, gives engineers a more mobile and less costly way to measure the heat transfer capabilities in the earth. (Photo by Jhi Scott)

completion of this project, Ethan presented the results at the annual geomaterials community of practice meeting,” Maj said. “His presentation generated quite a bit of interest, and he ended up building a geothermal test system for the Savannah District.”

Weikel’s knowledge of drilling equipment also is aiding the district’s Engineering Division in the dam safety program. Drilling at dams is critical to understanding the foundation materials, troubleshooting issues and having instruments to calculate water levels and pressures. Soil investigations around a dam are sometimes on a flat surface, but not always. Weikel is helping Baltimore District purchase a specialized tilt-bed drill to accomplish work on the steep slopes of the agency’s vast portfolio of dams.

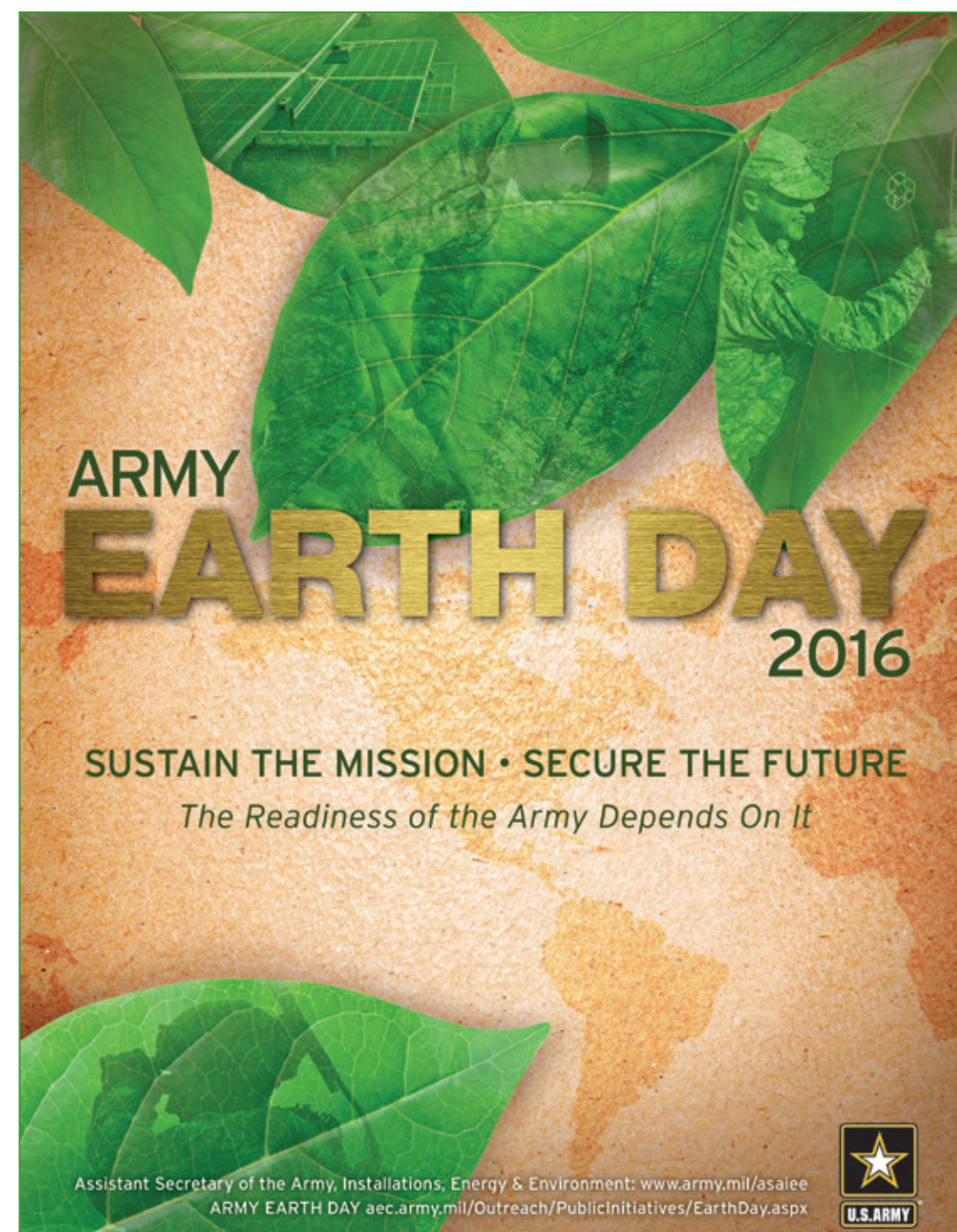
“Geologists are all about the subsurface,” he said, “and here, we work on dams and levees, environmental contamination, water supply, foundation issues, surface geophysics for munitions investigations, wetlands and just about anything else involving the subsurface.”

Weikel graduated from the College of William and Mary in 2002 with a bachelor’s degree in structural geology. He later completed graduate coursework in subsurface hydrology, geotechnics and engineering geology at the University of Missouri-Rolla. He has seven years of experience with the U.S. Army Corps of Engineers and currently works in the Engineering Division’s geology and investigations section. He is also a member of the USACE Headquarters minerals extraction team and certified by the ground-source heat pump industry association as an installer.

His award, signed by Steven Cary, the deputy director for Research and Development for the U.S. Army Corps of Engineers, attests to Weikel’s “exceptional innovation, creativity and effectiveness, with applications and substantial benefits for the Army and the Department of Defense.”

“Baltimore District took a calculated risk in my test system, but it has paid dividends,” Weikel said. “We now have an effective and less costly way to calculate the project requirements and positive impacts of using ground-source geothermal capabilities at a project.”

In addition, Weikel said the Missouri University of Science and Technology (formerly University of Missouri-Rolla) is using his presentation on ground-source geothermal theory and practice in its graduate subsurface hydrology course. ☞



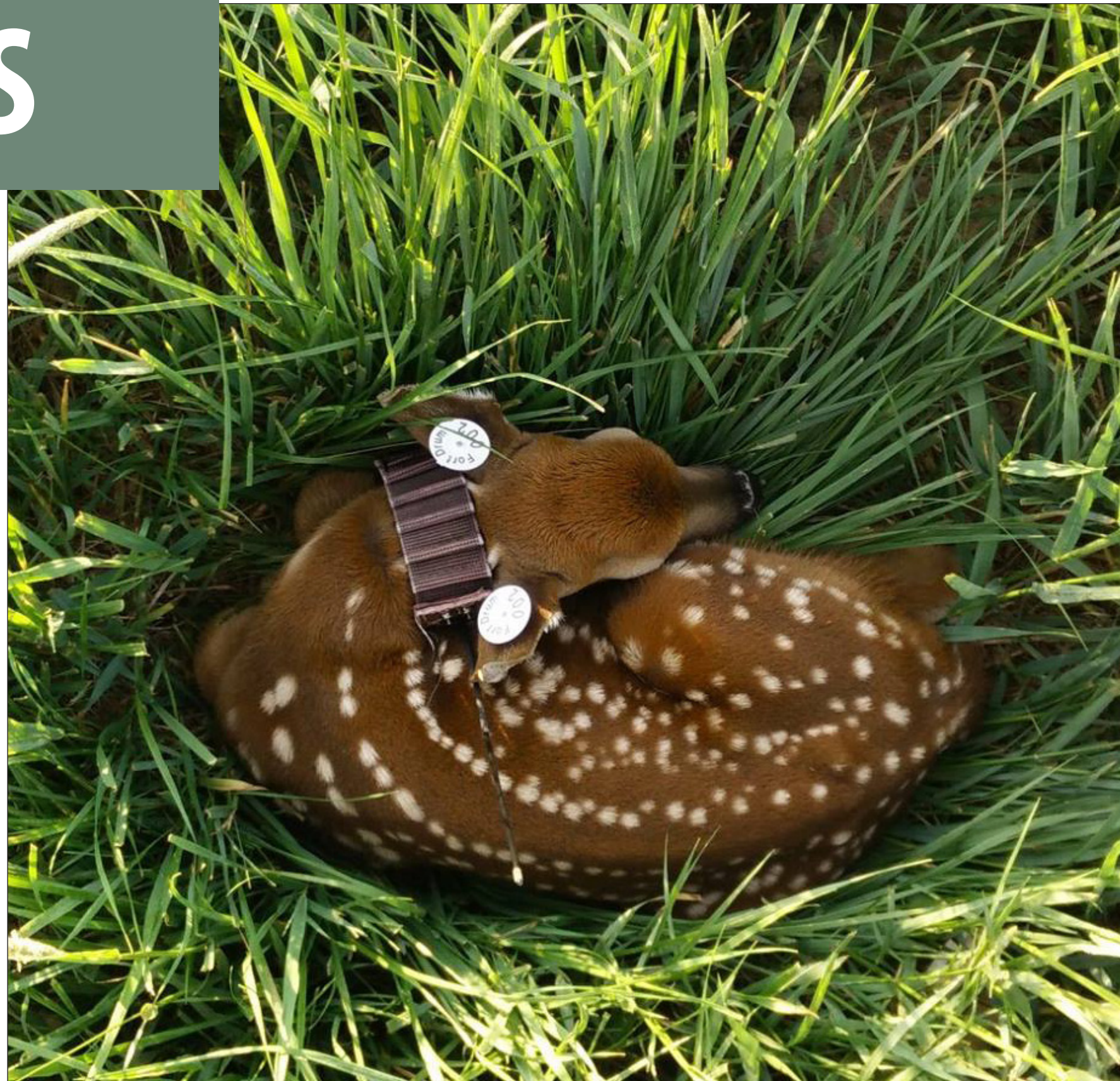
Secretary of the Army recognizes environmental program efforts

Five Army installations, three teams and one joint program office earned recognition from Army leaders in the fiscal year 2015 Secretary of the Army Environmental Awards Program. Winners represented the Army in the Secretary of Defense Environmental Awards Program and three earned awards: West Virginia Army National Guard’s Camp Dawson; Fort McCoy, Wisconsin; and White Sands Missile Range, New Mexico. See the DOD winners at www.denix.osd.mil/awards/2016SECDEF.cfm.

Read about all of the awards on [Pages 6-13](#)

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A fawn survival study by the Fort Drum, New York, Fish and Wildlife Management Program staff and Cornell University that began in spring 2015 is moving into its second year. The project to study the survival of white-tailed deer fawns in the Fort Drum cantonment area began field work in May 2015, capturing the first cohort of fawns through the summer. Thirteen of the first cohort of 21 fawns were still alive at the end of January. In February the project began a new phase that focuses on capturing pregnant females. Adult females that are pregnant are immobilized and fitted with a radio collar around their neck as well as an implanted transmitter that will be expelled at the time they give birth in the spring. Researchers will track the adult females into spring. When the adult females give birth in late May to early June, researchers will be able to detect the implanted transmitter to determine the birthing site. Because fawns won't move far during the first eight hours after birth, staff will be able to find and radio-collar the fawns. This method should increase the number of fawns that can be tracked this summer. More importantly, this method will allow researchers to get a better understanding about what happens to fawns in their first few days of life when they are most vulnerable. Follow the Fort Drum Natural Resources staff at www.facebook.com/FortDrumNaturalResources/. (Courtesy photo)



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with the 53rd Chief of Engineers and Commanding General, U.S. Army Corps of Engineers Lt. Gen. Thomas P. Bostick



1. During your time as commander, what did you learn about the USACE environmental program that you might not have known prior to command?

First, I learned how seriously the Army Corps of Engineers takes the environmental mission and aggressively pursues the program. I always knew the environmental mission was important, but it is a part of every mission and project, and it is an equal part of how we move forward in the Corps whether it is construction or inland waterways or water resource management. The environmental mission plays an important part in everything we do. That was good to see.

The other major learning point for me was in my first engagement with the command at the senior leaders' conference. I remember one of the points I made during the conference was about the Environmental Operating Principles and how we rolled that out during my first engagement with our leaders. It was refreshing to know our organization cared enough about our environmental mission that we rolled out the Environmental Operating Principles at the strategic level. Finally, when I visited our districts, it was clear the Environmental Operating Principles were being executed as I saw this guidance on their bulletin boards and disseminated throughout the command. The Environmental Operating Principles are part of the daily lives of planners, engineers and others in the districts.

It took some time for them to really take hold, but it is clear that everyone in the command takes the environmental program very seriously and they are doing their best with the Environmental Operating Principles program.

Also important are the environmental program contributions to resiliency and sustainability. When you think about the environment and sustainability, and when you think about what we do in terms of resiliency, they go hand-in-hand. We talk about resiliency in terms of four key areas: prepare, absorb, recover and adapt. The environmental program fits into each of these areas. Our environment is constantly being pressured — whether by climate change, where and how people build, or environmental spills such as the Deepwater Horizon oil spill

in the Gulf. Disasters will happen, however our coastlines must be resilient, so we prepare for the threat of disasters, absorb the impact, recover and then adapt to become stronger.

The environmental program goes hand-in-hand with all that we are doing in the infrastructure and water resource management parts of our mission. It also directly enables our military mission. On average, we deliver 60 to 70 percent of the Army's cleanup and environmental quality programs annually, and about 50 percent of the Air Force's program. Those programs not only make our installations healthier places for our military personnel, family members and civilian employees to live and work, they also ensure that installations comply with environmental regulations in a manner that reduces restrictions on how the military can use its land for training and conducting its mission.

2. What are the biggest accomplishments in the environmental program that you have observed during your time as the commander?

Well, there are several. There are a lot of folks involved in our environmental programs. Sometimes it seems like there are a "thousand flowers blooming" with many people involved in different areas, not only in USACE but also outside of USACE.

One area we worked on with Assistant Secretary of the Army for Installations, Energy and Environment Katherine Hammack was to bring the Army's Regional Environmental and Energy Offices (REEOs) from working for Secretary Hammack to working for the Corps. I think that was a big change after realizing that much of what they were doing aligned with the Corps mission. Secretary Hammack and I spoke and we realized the right place for REEOs was not at the Department of the

Army level but within the Army Corps of Engineers.

The REEO transition was one change we were able to execute, and this was a move in the right direction. I've had a chance to meet and talk with the REEOs, and I think the vision that Secretary Hammack and I both had regarding how the REEOs would work in the Corps is playing out in a positive way and it will be even stronger in the future.

Another area that I have been very happy with is the Environmental Advisory Board (EAB). The Environmental Advisory Board includes a number of members from academic institutions — those who have worked at the state and federal level; those who have great interest in the environment; and those who have great interest in working hand-in-hand with the Corps of Engineers in areas where they can assist with this important part of our mission.

The EAB members have been absolute heroes, and I have really enjoyed working with this team. The Environmental Operating Principles resulted from the work they did.

They also reviewed dams that no longer serve their original purpose and made recommendations for the removal of these dams. The EAB has helped us with STEM and outreach, and provided recommendations that would allow the Corps can be an even greater advocate for STEM.

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USACE Environmental Operating Principles

- ✓ Foster sustainability as a way of life throughout the organization.
- ✓ Proactively consider environmental consequences of all Corps 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 actions in a collaborative manner.
- ✓ Employ an open, transparent process that respects views of individuals and groups interested in Corps activities.



Continued

The Sustainable Rivers project, a partnership between USACE, The Nature Conservancy and academia, is another important area where the EAB assisted the Corps, by advocating for this partnership. The EAB has done a tremendous job and made a real difference for USACE and the Nation.

USACE has done a wonderful job working with our installations and the construction of LEED Silver certifications and in some cases LEED Gold improvements paid for by the contractors. Our Huntsville Center has been recognized as a leader in the federal government in terms of energy savings performance contracting. We have not only helped Army get closer to its targets, we are supporting Department of Energy in its support to the interagency effort. We've also helped the Army achieve significant savings through our metering expertise. I'm very proud of what the team has done.

I have also been honored to join Assistant Secretary of the Army for Civil Works Jo-Ellen Darcy on three occasions in the White House to have our folks recognized for GreenGov Presidential Awards. In 2013, Jeanette Fiess of Northwest Division received the Sustainability Hero award for her leadership at both the division and USACE wide. Dr. Kate White and other interagency team members also received the Climate Champion GreenGov award that year based on their efforts in creating the Sea Level Rise Calculator, which has helped us conduct our vulnerability assessments at many of our coastal project areas.

Bill Goran of the Engineer Research and Development Center received the 2014 Climate Champion Award for his work getting agencies to integrate consideration of the

impacts and risks of climate change into their planning process.

And then this past year, it was nice to see the Detroit District recognized for their efforts with energy savings on fuel. The district won the 2015 President's Lean, Clean and Green Award for their Flex Fuel Program that decreased gasoline use in flex fuel vehicles by 20 percent by getting drivers to choose an alternative ethanol blend fuel.

These are all significant achievements and demonstrate that we are not just talking about the environment, we're making a difference in this particular area.

I remember asking our Civil Works team to look at the energy savings performance contracts (ESPCs) that were almost exclusively on military installations, and see if there

was a way we could bring them into the Civil Works program. The Corps successfully initiated the first Civil Works ESPC awarded by Huntsville Center to improve infrastructure along the Tennessee-Tombigbee Waterway, primarily lighting at its 10 locks and dams. The \$2.8 million contract is projected to save the Corps more than \$5 million over the next two decades, so that's a huge movement in the right direction and we're trying to do more of that.

In essence, these are Public Private Partnerships (P3).

We have been trying to use P3s to address the aging infrastructure in this country since we do not have enough money to accomplish the work necessary on all of the projects. The federal government cannot fix the aging infrastructure alone.



Lt. Gen. Thomas Bostick visits the Everglades as part of the Environmental Advisory Board Dec. 1, 2015.

This year, we were successful in funding our first flood risk management P3. Fargo Morehead is going to be funded out of the work plan and that is a major step forward. The whole notion of P3s is something the Corps and our Army have been doing on military installations for a long time and the Army has been successful with it, but P3s in Civil Works is something new.

To give you an idea of the magnitude of the challenge we face concerning inland waterways aging infrastructure issues, when I testified before Congress this last set of hearings, I said that in order to finish the projects we are currently funding in the Corps of Engineers — to finish just those, not the ones we are not funding in the backlog — we would need \$19.7 billion and we receive about \$1 billion in construction per year. So, it would take almost 20 years to finish these projects and that is just too long. Congress is not going to provide the Corps with \$19 billion and we should not expect that from the American taxpayers.

I believe there is a way to make Public Private Partnerships work for our inland waterways, our ports and our harbors. The backbone of our economy is really on the water and when you think about the \$1.7 trillion of imports/exports that pass through Corps of Engineers waterways, our work is essential to the economic security of the country. If we can execute P3 Civil Works projects as successfully as we have for energy savings performance contracts — which has been widely recognized across the Army and DOD for our execution ability and contributions to energy efficiency — and similar to what is done on military installations, then this will make a significant impact for our nation.

3. What do you believe are the biggest challenges facing the environmental program now and in the future?

I think there is always a natural but a healthy bit of tension between the different purposes of our water resources management mission, whether it is the focus on infrastructure, the use and storage of water, or the concern for environmental issues. Leaders at every level need to balance the different purposes and stakeholder concerns, and ultimately serve the American people.

The job of balancing the various purposes within our water resources management mission is not an easy one and I think the challenge will continue to become greater in the future.

I'll give you an example. When I was the XO to the Chief of Engineers, Lt. Gen. Arthur Williams, in 1994, we had earlier completed the Kissimmee River project. In order to better reduce the risk of flooding, the Corps built a project that was basically a concrete canal because that is what the American people wanted. We did not originate the idea

of a concrete channel; it was a project desired by the local population for flood risk management, and it was ultimately authorized and appropriated by the Congress. The Corps completed the Kissimmee River project. Now, as the Chief of Engineers, we're on schedule to again complete the Kissimmee project in FY 2020, but the interesting thing is we're putting the bends back in the river. We've removed water control structures, filled in portions of the canal and carved out new portions to create approximately 44 miles of continuous river and associated floodplain because the American people are now more interested in the environment and ecosystem restoration. The Army Corps serves the American people and attitudes can change over time. We have seen this particularly in the area of environment and ecosystem restoration.

The types of concerns in the Kissimmee River example are always going to create a healthy tension among various stakeholders. There will be times, however, when you are in an extreme situation and leaders will have to come together and make decisions on priorities. And those extremes could be floods or could be droughts that cause leaders to make decisions on the environment versus other types of decisions that are of interest to other stakeholders. I think the extremes of the weather conditions we have seen and the repetition of these extremes in shorter intervals of time are going to put demands on our environmental program that we may not have seen in the past.

Ultimately, we must always balance the environmental concerns with those in other areas, but I suspect there will be more and more challenging decisions ahead as we work to serve the many concerns of the American people.

The other area we wrestle with is the significant cost of the environmental program. If you look at a project like the Savannah Harbor Expansion Project, it is about a \$700 million project and about 45 percent of that is environmental mitigation. So what we do in the environmental program is not inexpensive. It is very costly and, again, there will always be tension between those who want to execute construction missions and those concerned with the environment and ecosystem restoration.

The good news is that most leaders appreciate the importance of both areas. The answer is we must work together and find common ground.

I think the challenge with resources will continue to cause tension between various interests, but leaders in the Corps can be very helpful in bringing diverse interests together. I am confident we can continue to work together and reach general agreement in these challenging areas.

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leaders can make a decision that allows progress to be made for the difficult decisions ahead. If we do not have a forum where these difficult decisions can be discussed, and ultimately decisions made, we will significantly delay our overall progress. I believe we need a decision authority across the federal government to resolve some of our most contentious issues.

I am not advocating the following example as a solution, but it demonstrates similar concerns in other countries and how they are dealing with it. In the Netherlands, the Minister of Infrastructure and Environment is now the Minister of Water Resources and the Minister of Transportation and the Minister of the Environment.

Continued

I do not think we could ever make choices such that it is one or the other; we must do both. The question is more about balance and how we pay for the variety of interests in our local communities.

4. What thoughts would you like to leave behind for the USACE team about the importance of the environmental mission and their role in it?

It goes back to what I was saying earlier. Leaders should not make choices such that it is either the infrastructure or the environment — it is always both. These areas go hand in hand and we can never forget that society will always have a strong interest in the environment and ecosystem restoration.

I just returned from Germany and spent a good part of the trip looking at the Rhine Ordnance Barracks Medical Center, a significant project for the Corps and one of the most important that we are doing in Europe. I spent a good part of the morning looking at pods that they created for frogs to hatch their eggs and for lizards to grow in certain areas, and for wildcats to maneuver because it is important to the Germans. I can remember arriving in Germany in the '70s and I do not recall this level of environmental consciousness. It was good to see.

My point is that the concern for the environment is not just in the United States, but in other countries, as well. The international community is concerned about our environment. I believe the concern is valid and our leaders must appreciate how we work together and how do we combine our efforts and ensure that as we perform our infrastructure mission, that we are always balancing the needs of the environment.

I do think we need a mechanism or a forum where

They removed the stovepipes and gave accountability and authority to make decisions to one Minister. Again, I am not advocating that we make a similar change in the United States. I am not saying that we bring Fish and Wildlife, EPA, NOAA and others under one organization. However, I believe we must continue to work to become more efficient and timely in our decision-making process.

What I would offer is that we need a mechanism to bring closure to very hard decisions where there may be disagreement in how we proceed so we make timely progress in challenging areas. Each agency has their own priorities, they have their own goals and objectives, they have their own agendas, and I think that we do very well working together. However, at the extreme, I think we will always see much greater tension. It is at those extremes points of dialogue that we need a mechanism by which organizations can disagree, but agree to move forward in a way that takes into account the concerns of everyone at the table and still moves the country forward.

5. What message would you like to pass on to the American public about the environmental role of the USACE and why it is important to them?

I often say the Corps is the Nation's Engineers. And I do not say that to indicate there are no other engineering organizations at the national level. However, the Corps is as old as the nation itself. In fact the Corps is older than the nation with the first Chief of Engineers named June 16, 1775. We are two days younger than the Army itself. The Corps helped to build this nation, to ensure that the inland waterways allowed for transportation of goods, it helped to map the West, and it helped NASA in its program to put a man on the moon and to develop its space program.

As we have continued to evolve, we have fully



Lalit Wadhwa, Europe District programs branch chief, explains environmental compensation measures and relocation of animal species, such as frogs and lizards, to the Honorable Jo-Ellen Darcy and Lt. Gen. Thomas Bostick during a visit to the project site of a new combined U.S. military medical facility on Rhine Ordnance Barracks, Germany. LEFT: A close-up of frog eggs at one of the pods, or optimized ponds. (Photos by Jennifer Aldridge)

understood the importance of the voice of the American people, and that voice is promulgated through the members of Congress who authorize and appropriate our projects. A big part of the people's voice is now in the environmental arena. I would just want to assure the public that while the Corps sometimes has a reputation for building hard infrastructure such as dams, levees and other

physical projects, we also have a great interest in and work very hard on the environmental part of those missions.

As I mentioned in the earlier examples, there are many projects for which the environmental restoration part of the project is as significant as the infrastructure.

The Army Corps provides expertise in the environmental arena. We make ourselves available at the federal, regional, state and local levels, but we also work in the international community. We were just with the Minister of Water Resources in China and they asked questions about our environmental work. Minister Chen Lei came to the United States and visited the work following Superstorm Sandy and the Hurricane and Storm Damage Risk Reduction project in New Orleans. He then closed out his trip with a

requested visit to the Everglades to see the work we are doing. Environmental concerns are becoming more and more important to the Chinese people.

The Corps is in 110 countries, we are international partners when it comes to engineering and the environmental expertise that we provide. We look forward to continuing our environmental focus for the American people.

6. Do you have any final thoughts from your time in command and the importance of your role in the environmental mission?

The Corps is all about our people. It is not about what we build and how we build it, it is about the people on our team and how they execute our mission. People are fundamental to our success.

I visited the equivalent of our Institute for Water Resources in Brazil, and the president of Brazil's ANA (National Water Agency) said to me, "You know, General Bostick, the Corps of Engineers has been around for 240 years and the ANA has only been around for 13 years." He said it was his hope that when his organization has been around for a long time like the Corps, that his people will be as proud of the ANA as the employees of the Corps of Engineers are of the Corps.

I am sure the ANA President made that statement based on a number of engagements he has had with our technical experts who have visited Brazil. To demonstrate we truly care about the environment, it takes people like those who visited the ANA in Brazil. We are all ambassadors for the Army Corps and our passion for the environment and for our organization will always fall on the shoulders of individual teammates who make a difference in these important areas each and every day — at home and abroad. ☺

Camp Blanding restores mining lands to thriving ecosystem

By Cathy Kropp
U.S. Army Environmental Command

Restoring a wasteland to create a Florida-type ecosystem gained recognition for the Camp Blanding Environmental Restoration Team in the 2015 Secretary of the Army Environmental Awards Program.

In the 1950s, nearly two decades before adoption of regulations to protect the environment and well before its 1993 transfer to the Florida Army National Guard, approximately 500 acres of Camp Blanding's western area supported titanium dioxide mining. That land developed 30- to 40-foot-deep pockets of well-drained sands with virtually no organic material or nutrients to support plant life.

Along with its inability to support vegetation, the land was useless in supporting the Guard's training mission.

To bring the former mining lands back to life and create an area that can enable readiness in the future, Camp Blanding's environmental restoration team came up with a plan to remediate these sites by reintroducing organic material.

Unfortunately, this is a slow process, taking five to 10 years to produce viable soil, but the team found an opportunity to shorten that time to less than six years. The key to success was partnerships.

First Camp Blanding partnered with local



Vegetation sprouting in the project footprint contrasts with sparse wildflowers struggling in the sand beyond the current forward extent. The project is well on track to achieving its dual goals: remediation of the watershed landscape to prevent swale dirt from entering the river and establishment of a Florida-type ecosystem on the former mine sites that support vegetation and fire management. Last year, the first round of new tree plantings was completed at the mine site and, based upon early surveys, they are thriving with a remarkable survival rate of around 80 percent. (Courtesy photo)

counties that needed help disposing of organic debris resulting from hurricanes to use as mulch. Restoration staff members collected organic material spreading it as mulch over the land and then tilling the top layer as the mulch broke down, driving nutrients below the surface to turn the sand into functional soil.

On another part of the installation, an effort to remediate 88 miles of swales to help protect the St. Johns River and watershed was ongoing. The swales capture runoff soils during heavy rains and can increase turbidity in the river if

they are swept into the water.

In addition, these swales contain nitrogen and phosphorous from agriculture operations, which can also cause algae in the river, harming water quality and wildlife.

additional 15 acres.

The team will continue scaling up planting goals over the next three years to ensure the site continues to support vegetation at the anticipated levels. As the initial plantings take hold, the restoration staff is also managing for invasive or exotic species that may emerge, preventing those species from taking root.

Water and soil sampling at the mining site have shown no contaminants or adverse effects from the sand reclamation.

Environmental Restoration — Installation

To address Camp Blanding's potential storm water impacts, the soils near the river needed to be removed, but instead of conventional remediation, which would involve disposing of the soil, the team arranged to relocate it to the mining restoration site where it was tilled

into the sand. The richness of this sand-soil combination shortened the wait time and longleaf pine trees were planted on 2 acres in 2014 as a test to see if they could survive.

The team partnered with the Florida Department of Environmental Protection to gain approval for the simultaneous solution to both mining and swale remediation. And the results for both are proving successful.

Realizing an 80 percent survival rate for the longleaf pine, planting was accelerated in 2015 and the planting of pines expanded to an

swale remediation allotment well ahead of Florida Department of Environmental Protection timelines, and in a mutually beneficial and virtually cost-free way.

Though it may take 12 to 15 years for the new forests to take hold, and 15 to 30 years before a fully functional ecosystem emerges, it will emerge from what was a virtual wasteland. Once forested, this previously unusable land can be opened up to new training activities.

The revitalized land also is making an opportunity for new partnerships. In the future the staff plans on working through the Youth ChalleNGe program to enlist students in the program that provides environmental projects and education to at-risk youth, to help bring these restored areas back to flourishing ecosystems. ☺

FY15 Secretary of the Army Environmental Awards Program Runners Up

Natural Resources Conservation
Michigan Army National Guard's Fort Custer

Cultural Resources Management
Missouri Army National Guard

Environmental Quality, Non-industrial Installation
Maine Army National Guard

Sustainability, Industrial Installation
North Carolina Army National Guard

Natural Resources Conservation Team
White Sands Missile Range, New Mexico

Environmental Quality Team
Kentucky Army National Guard

Environmental Restoration, Individual
John Keiser, U.S. Army Corps of Engineers Jacksonville District

Base implements aggressive, innovative expansion program in compliance with Korean Environmental Governing Standards

By Cathy Kropp
U.S. Army Environmental Command

As the United States consolidates its military footprint in Korea, closing U.S. bases in and north of Seoul, the more than \$10 billion expansion of Camp Humphreys presents some unique environmental challenges. Due to its innovation in meeting those challenges, the environmental quality team at the U.S. Army Garrison Humphreys is a winner in the 2015 Secretary of the Army Environmental Awards Program.

Transforming Camp Humphreys into the Army's major South Korea hub involves construction of more than 600 new facilities and demolition of more than 250 buildings. Each project requires the appropriate staff to identify environmental issues during the planning stage, prepare preconstruction surveys, conduct environmental reviews of every construction and demolition project and ensure compliance with all Korean Environmental Governing Standards.

As a result of the transformation, the current military and civilian workforce (excluding family members) will rise from 7,300 to an estimated 28,800 personnel in an area that expanded from 1,210 acres to 3,623 acres. With this tremendous growth, the garrison relies on its fully implemented environmental management system to maintain environmental compliance.

Using a cross-functional team, the installation sets and achieves goals for energy and fuel consumption, fuel spills, waste generation, water consumption and hazardous material use. The Environmental Division's approach focuses on the importance of being environmentally involved throughout the installation to ensure resources, recyclables and other wastes are properly collected, segregated, recycled and or disposed of in accordance with applicable policies, regulations and laws.

The garrison exceeded its energy reduction target by installing solar domestic water systems, converting heating fuel to lower cost natural gas, implementing the Army metering program to identify and monitor buildings with high electrical utility use, installing a system to use daylight instead of electrical lighting in vehicle and aircraft maintenance facilities, and replacing metal halide perimeter lights with more energy efficient lights installation-wide. It also met the fuel consumption target by acquiring electric plug-in vehicles and promoting their use.

Fuel spills were reduced by 28 percent last year through formal classroom bilingual training on handling of hazardous material and hazardous waste, development and implementation of hazardous waste accumulation point standard operating procedures, hands-on unit-based training and staff assistance visits. This resulted in fewer hazardous substance spill emergencies and saved costs for spill cleanup labor, as well as costs from special packing and handling to dispose of the waste.

The USAG Humphreys team also exceeded its target for non-hazardous solid waste generation, achieving a 62 percent diversion rate last year. In addition, they increased their diversion rate for construction and demolition waste from 59 to 65 percent in one year by expanding the reuse program of crushed concrete demolition debris in the construction phase.

The garrison exceeded its water conservation goals by installing low-flow shower heads, waterless urinals, sensor controlled sinks and better building management practices.

In addition to their conservation efforts, the team also worked

to mitigate impacts from several construction projects on natural and cultural resources. To protect the Central Wetland, which covers a little less than 12 acres of USAG Humphreys, the environmental team developed a Central Wetland enhancement project.

The wetlands is home to aquatic bed, palustrine emergent and palustrine scrub shrub plant communities and provides habitat for heron, mallard, toad, carp and snakehead. The project increased the ecological function of the wetlands, enhanced the wetland buffer and increased plant diversity and habitat structure, all while providing an aesthetic recreational area for the Soldiers, civilians and Families who live and work on the installation.

As soon as 11 grave sites were discovered during construction, the team coordinated with the Republic of Korea Ministry of National Defense to relocate the grave sites off-post. In addition, the garrison coordinated with the Cultural Properties Protection Subcommittee in conducting several surveys to identify potential buried cultural property areas.

The environmental team also provides educational activities throughout the



The Humphreys Environmental Division coordinated with the Republic of Korea Ministry of National Defense through U.S. Forces - Korea to properly relocate 11 grave sites that were discovered during excavation, while preparing for construction projects on the newly granted land. (Courtesy photo)

Environmental Quality — Team

year to educate stakeholders on the importance of environmental protection, stewardship and management.

The garrison holds a monthlong Earth Day celebration including a 5K family fun run, essay contest, Earth-friendly tip of the day announced on American Forces Network radio, and an Earth Day fair for its more than 1,000 community members. Each year the Environmental Division conducts a tree-planting project with the Cub and Daisy scouts, allowing each of them to plant a tree to honor Earth Day.

Despite the various environmental challenges generated by the Army's largest repositioning transformation project, USAG Humphreys environmental team led the Army in enhancing environmental quality while enabling readiness and supporting the Army mission. 🌱

Washington installation recognized for innovative adaptations

By Cathy Kropp
U.S. Army Environmental Command

Only four of the more than 180 environmental remediation sites physically investigated as part of the Joint Base Lewis-McChord, Washington, Installation Restoration Program remain open. The program's success in identifying and addressing the potential environmental impacts from past practices earned the installation's environmental restoration team recognition in the 2015 Secretary of the Army Environmental Awards for its expert management of cleanup activities.

Environmental Restoration — Team

JBLM's installation restoration program is almost finished, with all site restoration already determined, implemented and either underway or completed. Only the Logistics Center closed landfill (known as LF-2) and the American Lake Garden Tract, which are both on the National Priorities list (NPL); a Washington State Department of Ecology agreed order site (known as AOC 9-2); and a consent decree site on McChord Field (known as SS-34N) remain active. Innovative engineering projects converted active NPL site groundwater treatment processes into facilities promoting water and energy conservation and have resulted in considerable savings at those sites during a period of austere budgets.

Three pump and treat systems address the Logistics Center groundwater remediation and another remediates groundwater at the American Lake Garden Tract. The systems pump groundwater from contaminated aquifers, pass it through air strippers to remove the contamination and return it to the aquifer.

For the American Lake Garden Tract NPL site, the groundwater passes through activated carbon before its return to the aquifer.

At the Fort Lewis agreed order site AOC 9-2, an air sparge/soil vapor extraction system is in place to alleviate gasoline and gasoline vapors in groundwater and soil.

The Site SS-34N remedial action consisted of injecting a non-toxic oxidant into groundwater to chemically break

contamination down into harmless products.

Installation restoration program progress at these sites minimizes staffing requirements and resulted in conclusion of the costly scientific studies required as part of site investigations. The remediation team's current focus is optimizing long-term monitoring to further reduce operating costs.

In addition to the cost savings for the remediation program, the three pump and treat systems at the Logistics Center also serve as clean water sources supporting JBLM heating and cooling systems and contribute to the installation's net zero water conservation goals.

The sea-level-aquifer pump and treat system meets the water supply needs of the Madigan Army Medical Center's heating, ventilation and air-conditioning system. It also supports a recent hospital expansion, eliminating the need for a separate water supply system for cooling that facility.

Reconfiguration of one treatment system provides water for ground source heat pumps for two buildings recently constructed on the installation. The heat pumps use 62 percent less energy annually than conventional HVAC systems. This reconfiguration eliminated the need for separate groundwater supply wells and a water delivery system for the new facilities.

The final landfill pump and treat system was reconfigured in 2014 to provide water for ground source heat pumps for an Army Reserve Center constructed nearby.

The three pump and treat systems also serve as a learning tool for others. Observations of the systems, which mitigate contamination resulting from a closed landfill, are part of a Department of Energy pump and treat closure study conducted by Pacific Northwest National Laboratory and completed in 2015. The report provides resources and guidance on conducting assessments of other pump and treat systems.

JBLM's installation restoration team also collaborated with a design engineer to include an air sparge and soil vapor extraction system as part of the construction of a restaurant and bank. This in situ remediation of gasoline-contaminated soil and groundwater enabled building new facilities on a brownfield site currently undergoing remediation, without risk to building occupants or customers. ☞

Depot develops project review program to ensure sustainability component of future construction

By Cathy Kropp
U.S. Army Environmental Command

Tobyhanna Army Depot credits use of a focused environmental review program to ensure environmental sustainability is integrated into future construction and renovation projects for their recent win in the Secretary of the Army Environmental Awards Program.

The environmental staff at the depot understands that successful environmental programs are developed over time through a shared vision and continuous improvement. Individual program managers within the depot's environmental branch develop aggressive program goals and meet weekly to ensure development of a team approach with cross-program strategies to meet those goals.

A cross-functional master planning design team allows the depot to apply best management practices from multiple disciplines to all phases of project development. The environmental staff evaluates 35 functional areas for each proposed project, in compliance with the National Environmental Policy Act. Suggestions for environmental improvements include installation of hybrid daylight/LED lighting systems, sustainable flooring surfaces, increased-efficiency natural gas heating systems and noise isolating panels.

Updating of the wastewater treatment plant to add a water reclamation system is one example of the types of projects resulting in Tobyhanna's recognition. It enabled the depot to reduce potable water usage by 90 percent, replacing it with treated/disinfected water. Future enhancements are expected to increase the quality of the water to enable reuse in lawn watering and construction activities. Reducing potable water use also means reducing the chemicals needed to treat that water, saving dollars and decreasing hazardous material use.

The depot's energy conservation measures include installing heat recovery coils for a new paint booth, replacing steam coils with direct gas-fired duct

burners, installing more efficient fans and including direct expansion cooling to help maintain the indoor temperature in material storage. Energy initiatives like these save 7.5 percent of the depot's total energy usage for an annual saving of more than \$350,000.

Tobyhanna also sustains the largest mass transit program of all federal government facilities outside of Washington, District of Columbia. During the award period, the percentage of rider participation increased by 8 percent, equating to a reduction of more than 340 tons of carbon monoxide, 13,000 tons of total greenhouse gas emissions, and an annual fuel savings of approximately 1.3 million gallons. Energy savings mean decreased operating costs; a boon for weapon systems program managers. In addition, the installation is increasing energy efficiency, which also reduces maintenance costs, by replacing all exterior lighting with LED lighting. The new lights eliminated the waste stream of sodium vapor lights and reduced the fluorescent bulb universal waste stream by 2,250 pounds, saving \$6,300 annually.

Sustainability — Industrial Installation

Another key sustainability effort at Tobyhanna is its robust recycling program. The depot recycled 1.5 million pounds in fiscal year 2014 and 2.1 million pounds in FY15, resulting in sales of more than \$700,000 and cost avoidance of more than \$195,000.

Tobyhanna Army Depot continues to reduce the environmental impact of its operations by reducing waste and air emissions, conserving water and energy, and recycling up to 80 percent of its solid waste stream.

Region III of the U.S. Environmental Protection Agency recognized the depot for these efforts, as well as its conversion from a central coal-fired heat plant to natural gas plant, installation of more than 100,000 square feet of vegetative roof, and other sustainability efforts across the installation. ☞

Tactical vehicle working group ensures environmentally acceptable design

By Kristina Curley
U.S. Army Environmental Command

The next generation of Army and Marine Corps tactical vehicles will meet important safety and environmental standards thanks to the work of the Joint Light Tactical Vehicle (JLTV) Environmental, Safety and Occupational Health (ESOH) Working Group.

Chartered in lieu of the traditional System Safety Working Group, the ESOH Working Group serves as a technically qualified advisory group to ensure safe and environmentally acceptable design, production, fielding, operation and mission effectiveness of the JLTV. Successful accomplishment of the team's mission through the award of the contract for the first JLTVs, which are now entering low rate

initial production, earned the group the 2015 Secretary of the Army Environmental Award for Environmental Excellence in Weapon Systems Acquisition.

This working group's responsibilities include ESOH risk management and hazard tracking, developing ESOH design requirements, preparing the Programmatic

Environmental Excellence in Weapon Systems Acquisition — Large Program

Environmental, Safety and Occupational Health Evaluation (PESHE) and National Environmental Policy Act documentation, coordinating ESOH risk acceptance, providing regulatory guidance, tracking hazardous materials and keeping the responsible program management office aware of any ESOH related program risks during life cycle management of the JLTV.

The Joint Light Tactical Vehicle Program is an Army-led, joint modernization program designed to replace a portion of Army and Marine Corps' light tactical wheeled vehicle fleets while closing an existing gap in the fleet's balance of payload capacity, mobility performance and protection. The family of vehicles will be capable of performing multiple mission roles while providing protected, sustained, and networked mobility for personnel and payloads across the full range of military operations.

By formally establishing the ESOH working group, the JLTV Program fully integrated ESOH into the systems engineering process. The group is responsible for managing the overall day-to-day ESOH efforts for the JLTV program including development of ESOH design requirements.

The Army and Marine Corps successfully transitioned the JLTV Program into production on budget and on schedule after a competitive engineering and manufacturing development acquisition phase that ended in early 2015, following rigorous testing of prototypes from three competing vendors.

In August 2015, the Army awarded a single low-rate initial production contract to Oshkosh Defense, and the services expect delivery of the first production test vehicles later in 2016. Low rate initial production will continue through

2018 with a ramp up to full rate production in 2019.

The ESOH WG updated the JLTV PESHE throughout the EMD phase and finalized it in support of moving into the production and deployment phase. The PESHE includes a NEPA compliance schedule and provides a planning tool for the development of the JLTV Programmatic Environmental Assessment, completed before contract award.

As part of its overall risk reduction strategy, the JLTV ESOH Working Group continues working to reduce the use of hazardous materials and integrating pollution prevention into the overall program. They use a closed-loop hazard management process for the identification, tracking and management of ESOH hazards and their respective risks throughout the life of the system.

Thanks to the ESOH Working Group, the new JLTVs will include several features to effectively minimize air, soil, noise and water pollution and reduces hazardous materials usage and generation.

The efforts of the working group will reduce safety and occupational health risk to the operator and maintainer; environmental risk and liability; volume of generated hazardous wastes; and life cycle cost of the vehicle. At the same time, their work means improved sustainability and reduced environmental burdens on installations where the vehicles are fielded, with minimal effect on mission effectiveness and program cost.

JLTV fielding locations have not yet been defined, but once they are, the ESOH Working Group will work with the JLTV Material Fielding Team to ensure the installations receive all they require to meet their NEPA requirements. ☞



Oshkosh Defense worked with the Joint Light Tactical Vehicle Environment, Safety and Occupational Health Working Group to support the program's pollution prevention initiatives, including hazardous materials minimization and improved fuel efficiency. The P2 efforts will result in reduced environmental risk and liability and improved sustainability. (Courtesy photo)

Innovative partnerships protect Fort McCoy resources

By Cathy Kropp
U.S. Army Environmental Command

Fort McCoy cites partnerships and collaboration as the essential elements in its Fiscal Year 2015 Secretary of the Army Environmental Awards Program Natural Resources Conservation Team win.

The Wisconsin installation's Natural Resources Team used an interagency agreement with U.S. Fish and Wildlife and the Wisconsin Department of Natural Resources to establish the first ever, eight-way partnership involving the Habelman Cranberry Marsh, Colorado State University, U.S. Geological Survey, U.S. Army, U.S. Fish and Wildlife Service, Wisconsin Department of Natural Resources, and local volunteers and school groups to complete fish barrier removal and stream habitat improvement on the installation.

This effort focused on Stillwell Creek, which has flow problems in its highly degraded channel. Collectively, the

partners improved nearly 2,000 feet of stream habitat in 2014, which proved successful in 2015 with the discovery of several cold water-intolerant species.

The garrison also leveraged partnerships with the U.S. Army Corps of Engineers and the Cooperative Ecosystem Studies Unit to develop new and update previous monitoring plans for the Mound Prairie Sacred Area, Gypsy Moth, Emerald Ash Borer, Karner Blue Butterfly and Gray Wolf, as well as general endangered species and invasive species management plans.

Partnering with the Wisconsin Department of Natural Resources enabled the team to successfully remove the Alderwood Lake Dam and reroute a road to avoid a range's surface danger zone. This involved mitigation of 6.5 acres of wetlands that benefitted the military by eliminating surface danger zone concerns, improving traffic movement, adding a low-water crossing, and eliminating weight limitations on an aging dam structure over the La Crosse River.

Fort McCoy's Natural Resources Conservation Team also partnered with the Wisconsin National Guard to cut and remove debris from the north impact area firebreak, helping minimize the threat of wildfire. In addition to the 9 miles cleared, another 7 miles of brush mowing, tree removal and erosion control improved the installation boundary firebreak. Maintaining boundaries will keep fire from escaping Fort McCoy, protecting private property and delineating the installation boundary to prevent trespass.

The team also coordinated with multiple agencies for an aerial wildfire suppression training exercise at Fort McCoy. This collaborative training exercise was a win-win for all parties

with 20 pilots receiving valuable wildfire training. In addition, habitat was enhanced and fuel load reduced and the Fort McCoy Fire Department and Wisconsin Department of Natural Resources were trained in air/ground asset coordination.

Natural Resources Conservation — Team

The Fort McCoy Natural Resources Team worked closely with the Directorate of Plans, Training, Mobilization and Security to increase the amount of available maneuver acreage by reducing internal encroachments. As a result of this partnership, the installation reduced the environmental and safety restrictions on 34,562 acres without adding additional risk to the environment, personnel, property or training, while maintaining compliance with state and federal laws.

The team also spearheaded an installation-wide effort to improve watershed health by maintaining forested watersheds, adhering to strict erosion control, reducing storm water runoff and enhancing riparian uplands. Fort McCoy's integrated land management efforts minimized nutrient and sedimentation impacts to streams and resulted in water leaving the installation at a higher quality than when it entered.

Because Fort McCoy has met its conservation goals for the federally endangered Karner Blue Butterfly, the Fort McCoy Natural Resources Team developed an interagency agreement to mitigate incidental take for the endangered butterfly outside the installation. The agreement allows the Army to transfer funds to the Fish and Wildlife Service, which in turn partners with the Wisconsin Department



An excavator operator from a Wisconsin Department of Natural Resources crew reworks an embankment at Stillwell Creek on Fort McCoy's South Post. Stream biological monitoring, otherwise known as biomonitoring, was used to help determine where work needs to be done. (Photo by Scott T. Sturkol)



Six new piers at Fort McCoy improved angling and wildlife-watching opportunities for Soldiers, Families and members of the public with disabilities. Fort McCoy had two free fishing weekends that ran concurrent with the Wisconsin fishing season. (Courtesy photo)

of Natural Resources to create or enhance the butterfly's habitat on state property where conservation goals have not yet been met.

Off-installation mitigation significantly reduces the potential for future conflicts between military training and endangered species on Fort McCoy, helps the state meet its conservation goals, and assists in recovery of the Karner Blue Butterfly with the potential for the species to be delisted.

The team conducts frequent consultations with state and federal regulators for wetland mitigation, stream realignments, species of concern, and takes a proactive approach to help ensure success. The result is long-standing and productive relationships with local regulators that promote sustainability of Fort McCoy's operational training capabilities, help to maintain natural resource compliance, and prevent the loss of training days due to natural resource management issues. ☛

West Virginia Army National Guard recognized for conserving natural resources

By **Cathy Kropp**
U.S. Army Environmental Command

Limited funding does not limit the effectiveness of the West Virginia Army National Guard's natural resources program. Their success has won them the 2015 Secretary of the Army Environmental Award for Natural Resources Conservation. With the WVARNG's comprehensive ecosystem management approach, each project is analyzed to determine how it directly or indirectly supports goals of all other program areas.

For example, the natural resources staff developed an integrated invasive species eradication plan that uses species mapping and prioritization of effort to establish a five-year rotation for treatment.

West Virginia University interns helped plot the location of all invasive species that restricted access for Soldier training and compromised native wildlife on the training area. Security fence lines and motor pools requiring clearances were prioritized for invasive removal, followed by timber stands that are being overtaken.

Once invasive species are removed, native grass can be planted. Eliminating invasive trees and shrubs in favor of native grass enhances training opportunities while providing ecosystem restoration to more than 100 acres.

The natural resources team constantly looks for ways to maximize their limited resources so funding does not hamper mission

accomplishment. In an effort to create valuable habitat, the staff designed a pond that could serve as a fire suppression resource for range operations and included use of surplus excavated clay soil from other projects.

This design was incorporated into the scope of projects to remediate a demolition range and to provide stream bank stabilization. The pond serves the training mission while also providing enhanced wildlife habitat.

They also repeatedly take advantage of the annual two-week training schedule for the horizontal and vertical engineering schools, coordinating for the engineers' assistance in excavation, bank creation, sloping, grading and channeling springs to create the pond, construct a pavilion and run electrical lines to turn the pond into a complete morale, welfare and recreation asset.

Once the Camp Dawson natural resources team treats the turbidity of the pond water to clear suspended clay particles, they will establish a trout and bass/blue gill population to provide opportunities for recreational fishing.

To ensure best management practices are used to preserve habitat, the natural resources staff works with a local company that processes timber on leased WVANG lands and Camp Dawson's in-house fire-management program. Their efforts include a fire training program that allows Soldiers the opportunity to practice prescribed fire activities, avoiding the need/cost for contracted burn crews.



RIGHT: Camp Dawson's NRC manager holds a banded Golden-winged warbler prior to release. Blood samples of captured birds were analyzed for DNA that indicate hybridization with the closely related Blue-winged Warbler that competes for habitat on Camp Dawson's Pringle Training Area. NRC staff has continued warbler monitoring using protocol outlined by Cornell Lab of Ornithology and the Golden-winged Warbler Conservation Initiative. ABOVE: A close-up of the Golden-winged warbler. (Courtesy photos)



Natural Resources Conservation — Small Installation

In addition to reducing wildfire fuel loads, the program focuses on native grasslands using fire regime rotation to help grasses thrive and control invasive species. Volunteer firefighters from the community also assist on some burn events, along with trained university interns.

Camp Dawson's natural resources staff also completes habitat assessments, detailing vegetative cover and potential roost habitat before any projects involving timber removal.

The staff conducts annual catch-and-release surveys for

the state-listed Allegheny woodrat, marking individuals to track population health.

In partnership with the West Virginia Department of Natural Resources, the staff initiated a Golden-winged Warbler survey, taking DNA samples to track the hybridization of Golden-winged and Blue-winged Warblers.

The staff also uses cameras to survey golden eagles that stop at Camp Dawson bait stations during their winter migration and

adapted facial recognition software to identify individual birds from year to year.

The Natural Resources Team at Camp Dawson makes use of all the assets at their disposal to ensure they achieve natural resources conservation goals and minimize project impact on training and readiness. They prioritize projects that directly enhance training while concurrently seeking ways to improve ecosystems on the installation, sometimes with the added benefit of providing recreational opportunities to those who live and work there. ☺



Glenn Collier, Environmental Compliance Assessment Team assessor, explains best management practices for storing used and unused products to 2nd Lt. Neidy Hernandez and 2nd Lt. Steven Sloan, Environmental Compliance Officers for Regimental Engineer Squadron.

Community-wide commitment key to going green

Story and photo by Christine Luciano
Fort Hood, Texas

Fort Hood's Soldiers, civilians, contractors and Families are leading the way to a greener future. Their commitment to being environmental ambassadors of a better tomorrow for the installation, surrounding communities and environment was recognized with the Army's highest honor in the field of environmental science and sustainability.

"It is the collective effort of community stakeholders, who promote and support environmental stewardship, that makes Fort Hood's program the best in the Army," said Timi Dutchuk, chief of environmental programs for Fort Hood's Directorate of Public Works (DPW).

The Secretary of the Army Environmental Awards Program recognized Fort Hood as the Environmental Quality — Non-Industrial Installation of the Year.

"It's an honor for us to receive this prestigious award and a fitting recognition of the great efforts of our garrison team," said Brian Dosa, Fort Hood DPW director. "I am particularly proud of our Environmental Division and their many significant accomplishments."

Environmental Quality — Non-Industrial Installation

The environmental team is responsible for mission readiness and the environmental protection of more than 1,800 archeological sites, 18 endemic species and two endangered bird species on 218,823 acres. The team leverages pollution prevention opportunities, increases recycling efforts, enhances environmental awareness and community involvement and promotes long-term sustainability.

Environmental successes

Since Fiscal Year 2014, Fort Hood's environmental accomplishments include the Pollution Prevention Corner that collected 95,187 gallons of JP-8 fuel, 282,005 gallons of used oil and 50,071 gallons of antifreeze, generating \$186,628 and the Classification Unit that collected 46,211 pounds of household hazardous waste and reissued 23,900 pounds. In FY15, the Fort Hood Recycle Center collected 7,205 tons of recyclable materials, generating \$1.578 million and sponsoring \$135,000 in community events.

"The Pollution Prevention Corner, Classification Unit and Fort Hood Recycle Center are all aimed at providing services that make it easier for Soldiers to do their day-to-day duties and allow them to focus more readily on the mission," Dutchuk said.

The Pollution Prevention Corner also offers a mobile kitchen trailer and containerized kitchen wash bay and a tanker purge facility that prevents water from entering the sanitary sewer and saves Soldier man-hours. The Classification Unit, a multi-functional operation, offers a collection program for Department of Defense employees and their members to dispose of household hazardous and residential electronic waste for free.

The Fort Hood Recycle Center, the Army's largest recycle program, is upgrading its equipment to offer single stream recycling in summer 2016, making recycling easier.

Environmental Compliance Assessment Team — A commander's tool

"Through education, training and outreach efforts, the environmental team helps enhance and reinforce muscle memory of the installation's environmental services," Dutchuk said.

Helping to educate units is the Environmental Compliance Assessment Team (ECAT). The four-person team is the on-the-ground force that teaches, trains and assists Soldiers, civilians and contractors. ECAT goes through steps to help units identify and correct deficiencies, and then sets procedures and policies in place to prevent further occurrences. During the past two years, the team conducted 440 assessments and trained 8,644 individuals.

"As the environmental consultants for the installation, ECAT is one of the commander's tools to ensure compliance and help find solutions," said Randy Doyle, DPW environmental support team supervisor.

Leadership and team commitment

Fort Hood's success was also attributed to the involvement of senior leaders and the commitment of the environmental team.

"Fort Hood's senior leaders are committed to balancing training and combat readiness with taking care of our training lands and being good stewards of our post. They know that we can accomplish both, without sacrificing either of these priorities, and preserve our resources for future Soldiers and units to train on," Dosa said. "Also, the expertise, passion and commitment of our environmental staff, comprised of Army civilians, are second to none. They are fully committed to supporting the training of our Soldiers and balancing that with taking care of Fort Hood's vast training lands and infrastructure."

"Given the passion and efforts of our environmental staff and Soldiers, who approach environmental situations every day, this award is a testament to their professionalism and commitment to balance mission readiness and sustainability," said Col. Todd Fox, Fort Hood garrison commander. "The Secretary of Defense competition will be a great opportunity to show other communities and military installations what we are doing at Fort Hood and how the installation serves as a model for environmental responsibility." ☞

History receives recognition at White Sands Missile Range

By Cathy Kropp
U.S. Army Environmental Command

Although it is the birthplace of America's missile and space activity and one of the nation's most important Cold War era facilities, White Sands Missile Range's historical magnitude may not be widely known. Documenting and managing the New Mexico installation's history recently garnered recognition for its Cultural Resources Management Program in the 2015 Secretary of the Army Environmental Awards Program.

The Cultural Resources program staff manages 8,300 recorded archaeological sites,

several thousand facilities and structures, a historic main post district, and two national historic landmarks: the Trinity Site (the first atomic bomb test site) and the V-2 Launch Complex 33.

The built environment on the White Sands Missile Range is unusually extensive and includes structures and facilities over much of its 2.3 million acres. In the 1960s, at the height of the Cold War, the installation supported the most instrumented range in the world, containing hundreds of instrumentation sites with state-of-the-art tracking telescopes, cinetheodolites (photographic instruments that collect trajectory data), radars and

telemetry equipment.

With technological changes, many of these sites became obsolete and unused. In support of the Army's Facilities Reduction Program, more than 175 facilities were inventoried and evaluated for their historic significance. In addition, large scale military training exercises necessitated the inventory of 92,000 acres of land for historic properties in support of the Network Integration Evaluation program and future operational and test missions.

The cultural resources team earned praise from the New Mexico State Historic Preservation Division for the full inventory of more than 116 structures included in the Small

Missile Range Complex, considering it a model for similar recordings in the future.

To offset the loss of this resource, and to preserve its history for the community, the team is developing an interactive eBook for the Green River community to use for educational purposes, restoring a scale model of the Athena missile in a local park, and developing new interpretive signs for the missile.

The team also developed a project to digitize historic newspapers making them accessible on the Internet. Editions of the Wind and Sand newspaper, which became The Missile Ranger in 1969, were digitized from 1950 to 1969. The paper, still published today, has provided when-it-happened accounts of White Sands' rich history.

The collection was scanned into text and date searchable documents, with both high and low resolution downloadable files, and is viewable in an online magazine style format.

they have established with educational institutions. The University of Vermont's School of Engineering provided condition assessments and treatment recommendations on 13 historic ranches as part of a broad plan to stabilize and further preserve the existing historic ranches that remain largely intact on the installation.

WSMR's team has also worked closely with the New Mexico State University, including the Public History Program and the Anthropology Program. Opportunities have been provided for Public History student interns to assist in the creation of a digital archive for the thousands of facilities and structures at WSMR. Partnerships with the Anthropology Program have resulted in the first-ever field school conducted at White Sands Missile Range and support has been provided to three master's level students who have completed writing their theses on archaeological sites located on White Sands Missile Range.

In another partnership with the Cornerstone Community Partnerships in Santa Fe, the team has begun initial planning to stabilize and rehabilitate the McDonald Ranch house at the Trinity National Historic Landmark.

White Sands' Native American Coordinator and natural resources staff worked with the Mescalero Apache tribe members to identify and collect plants with traditional uses, in an effort to teach Mescalero youth about traditional Apache culture. They were able to collect Agave, Sumac, Banana Yucca and Sotol. They also partnered with the Tortugas Pueblo, a local non-federally recognized tribe, to collect Yucca stalks for a religious ceremony, known as the Our Lady of Guadalupe Festival.

The White Sands Missile Range cultural resources staff has continuously sought creative new ways to effectively identify, protect and preserve their cultural resources in a cost-effective manner. ☞



The White Sands Missile Range Cultural Resources Management Program staff partnered with the Mescalero Apache tribal members to identify and gather plants of traditional importance at WSMR, like this agave plant. (Courtesy photo)

Cultural Resources Management — Installation

The team also completed the inventory and evaluation of the Green River Test Site, an off-range 6,500-acre annex facility that supported the Advanced Ballistic Re-entry System test program and Pershing test firing in the '60s and '70s. No longer used, the facilities are targeted for demolition. In consultation with the Utah Division of State History, Green River Test Site was determined a National Register of Historic Places eligible Military Landscape.

The newspapers were old, but not as old as another project conducted that same year. The cultural resources staff contracted a multidisciplinary investigative team to document the trackways of Pleistocene mammals through archaeological and paleontological surveys around Lake Otero.

Although limited artifacts were found, a juvenile mastodon fossil was discovered. Mammoth fossils had previously been identified in the Tularosa Basin, but this represented the first finding of a mastodon.

The study produced significant data to provide insight into changes in the paleo-climate and paleo-hydrology of the area and will help identify high-probability areas for late Pleistocene-age archaeological sites.

The White Sands cultural resources staff also benefits from a number of partnerships

Compatible Use Buffers: partnerships for protection

By Jennifer Morris
U.S. Army Environmental Command

The noise, smoke and dust from military training can be an issue for communities bordering Army installations, while lights, lack of green space, restrictions on air corridors and radio frequency sharing can interrupt military training.

Local communities, along with conservation groups, state and county governments, and other federal agencies, partner with the Army to create buffers that enable training and protect habitats. The Army Compatible Use Buffer Program allows the Department of Defense to form agreements with non-federal governments and private organizations to limit encroachments and other constraints on military training, testing and operations by protecting land established as buffers around installations.

“ACUB benefits the Army and its partners and neighbors,” said Col. Robert C. Wittig, commander of the U.S. Army Environmental Command. “In many cases it also creates a safe environment for native flora and fauna, which sometimes includes endangered species.”

The U.S. Army Environmental Command provides operational oversight of the program and helps installations develop strategies and identify partnership opportunities.

The ACUB program is managed by the Office of the Assistant Chief of Staff for Installation Management, and executed by the Installation Management Command for active duty installations and the National Guard for their installations.

A prime example of how the program supports the Army’s triple bottom line — mission, environment and community — can be found at Fort Bragg, the installation that played a pivotal role in the formation of the program.

Located in the Sandhills region of North Carolina, Fort Bragg is home to the Army’s airborne and special operations forces. The installation also contains portions of the longleaf pine forest, a habitat for the endangered Red-cockaded Woodpecker.

To protect the woodpecker, the U.S. Fish and Wildlife Service imposed significant training restrictions on Fort Bragg in 1992, which hindered training by restricting access to huge tracts of land. Fort Bragg, working through the Private Lands Initiative, supported recovery of the endangered bird’s population, protecting not just the bird but also military readiness and the longleaf pine and wiregrass ecosystem. The Army joined with other organizations to form a regional partnership that resulted in more than 10,000 acres of longleaf pine habitat being preserved for the woodpecker population.

These efforts not only protected and began an effective recovery of the species, but also allowed for the training restrictions to be lifted. Approximately 3,000 acres of training land became unrestricted in 2009. In 2013 training restrictions and protective signs were removed from an additional 4,000 acres on Fort Bragg.

The easements set aside for bird habitat surrounding the installation also kept infrastructure away from the installation. This created a buffer zone between the community and the installation — keeping the noise, dust, dirt and distraction of ongoing training operations at Fort Bragg away from the surrounding communities.

“Through ACUB program initiatives, Fort Bragg has not only met our RCW recovery goals, but we have re-established a longleaf pine ecosystem that is good for our endangered species and preferred by our Soldiers to train on,” said Jon Chase, Fort Bragg’s ACUB coordinator.

“Our ACUB working groups also created more community green space and recreational areas,” Chase said.

Carver Creek State Park, adjacent to Fort Bragg, protects the installation boundary from incompatible growth pressures, Chase said, while giving the community the first state park in Cumberland County.

“It’s clearly a win-win-win,” he said.

Fort Bragg is not the only successful installation in the ACUB program. There are more than 20 installations working with local and federal partners to protect the Army’s ability to conduct military training and protect installation natural and cultural resources.

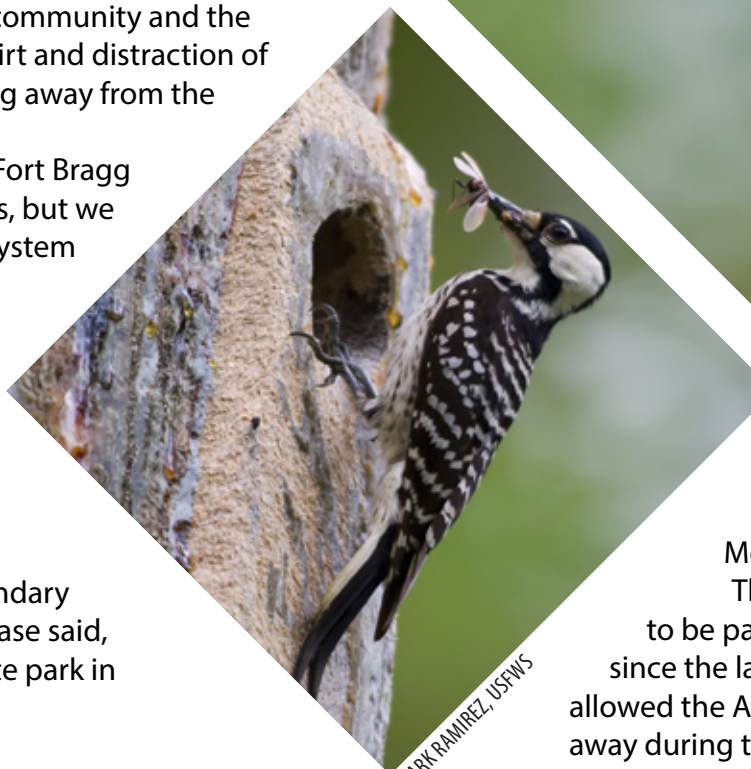
Camp Bullis, just outside the city limits of San Antonio, Texas, has also met the Army’s triple bottom line. Camp Bullis is the only field training installation for the 38,000 military personnel at San Antonio’s Fort Sam Houston, the home of all Department of Defense medic training, as well as training for some officer



RANDY BROWNING, USEFWS

COURTESY PHOTO

ABOVE: Golden-cheeked Warbler
BELOW: Red-cockaded Woodpecker



MARK RAMIREZ, USEFWS

medical specialties.

It is also home for the Golden-cheeked Warbler.

There are 28,000 acres on Bullis, and approximately one-fourth of that land is not suitable for most field training. With the addition of 12,000 personnel due to the Base Realignment and Closure Act of 2005, training in the already limited space was a challenge.

Through the ACUB program, the Army was able to partner with the local government and nature conservation organizations to obtain mitigation credits that allowed the clearing of cedar on about 2,600 acres, resulting in a 25 percent increase in unrestricted field training areas on post. This partnership also allowed for 6,000 acres off post to be placed under permanent management as a nesting site for the warblers.

“The ACUB program allowed us to protect similar quality habitat off-installation in perpetuity,” said Camp Bullis Natural Resources Manager Rustin Tabor.

“It provided greater opportunity and flexibility to work with more partners at the federal, state and local levels to achieve mutual goals.”

Moving the warbler habitat off the installation was made possible through the conservation and protection of the Bracken Bat Cave. As the largest bat cave and bat nursery in North America, it supports approximately 20 million adult bats that give birth and care for their young in the cave. Approximately 40 million bats migrate from this cave to Mexico for the winter.

The conservation and protection of the Bracken Bat Cave is eligible to be part of the ACUB program as it is considered “ecologically relevant” since the land surrounding the cave is also habitat for the warbler. This allowed the Army to clear cedar from training grounds when the birds were away during the winter. Keeping the habitat surrounding the bat cave allows them set up their nests there, instead of on the installation, minimizing the impact on training.

ACUB partnerships contribute to the overall well-being of the Army, the local community and the environment. The overall goal is the same — land use management and preservation of natural resources — whether it is to support the training mission, keep neighboring communities safe, or preserve threatened and endangered species. For more information about the ACUB program or other Army conservation efforts, visit <http://aec.army.mil/>.

Corps a leading federal ecosystem restoration agency in Lake Tahoe Basin

Story and photo by Luke Burns
U.S. Army Corps of Engineers Sacramento District

Sacramento District participated in the 2015 Lake Tahoe Summit Aug. 24, 2015, hosting an information booth and taking a boat tour to learn more about aquatic invasive species. The annual public event rotates between California and Nevada; the 2015 summit was at the Round Hill Pines Resort Beach and Marina, Nevada.

The U.S. Army Corps of Engineers is one of the leading federal ecosystem restoration agencies in the Lake Tahoe Basin that has worked with local, state and other federal partners since 1997 to preserve the lake's prized clarity by restoring natural inflows and controlling invasive species.

Corps involvement in the Lake Tahoe Basin is shaped by two programs — the Tahoe Partnership and Tahoe Section 108 programs.

The Tahoe Partnership program provides watershed planning and restoration as part of a multi-agency environmental improvement program to increase global climate change adaptation policy and improve stormwater models and tools.

A 1997 environmental summit on the shore of Lake Tahoe at Incline Village, Nevada, led to Executive Order 13057, which was the original basis for the partnership program and broadening the Corps' presence in the Lake Tahoe Basin. The program has consistently been included in the president's budget ever since.

The executive order:

- ◆ Directed federal departments and agencies to work together to establish close coordination between state, local and tribal partners to achieve a balance between the ecosystem and the economy by establishing the Lake Tahoe Federal Interagency Partnership.
- ◆ Supported an appropriate environmental improvement program that fostered the protection of water quality, air quality, habitat restoration, vegetation management and recreation.
- ◆ Outlined a series of 39 actions, or Presidential Commitments, to be taken to achieve the national objective of preserving the Lake Tahoe Basin.

One ongoing effort supported by the program is the Road Rapid Assessment Methodology, a collaborative partnership with the Environmental Protection Agency and State of Nevada's Division of Environmental Protection for reducing roadway pollutant loads and developing storm water monitoring efforts to help meet Tahoe's clarity challenge.

"The Corps' involvement in the basin is incredibly valuable due to their expertise in many areas and their regulatory authority," said Penny Stewart, supervising environmental planner for the Californian Tahoe Conservancy. "They not only have a knowledgeable local staff but can tap into staff at their research centers, like Vicksburg (USACE Engineer Research and Development Center), and provide information to the basin partners of efforts elsewhere, helping keep the basin engaged nationally on important topics and aware of new trends and technology."

The 2005 Consolidated Appropriations Act created the Tahoe Section 108 program, which provides assistance to non-federal interests in the Lake Tahoe Basin for environmental infrastructure projects. Assistance under this program may be in the form of

planning, design and construction assistance.

Although restoration projects at North Canyon Creek and the Angora Fire Watershed are fiscally compete, other projects still underway include environmental restoration of Blackwood Creek, Lake Forest and the Upper Truckee River.

"For over a decade the Sacramento District has assisted our Tahoe partners with large landscape environmental infrastructure projects within the Tahoe Basin," said Laura Whitney, Sacramento District project manager. "Our mission in the watershed is a unique and challenging one. We have specific capabilities as an organization like satellite imagery and hydrology data analysis that can help provide our partners with a framework to evaluate restoration priorities and the effectiveness of restoration efforts over time."

Each year, the Corps participates in the annual Lake Tahoe Summit hosted by an elected official from either California or Nevada, as the lake lies on the border between the two states. The summit is a vital gathering of federal, state and local leaders who are dedicated to preserving one of the nation's most beautiful natural settings — and an international tourist destination that hosts 3 million visitors each year.

This year's summit focused on aquatic invasive species control and management. Invasive species pose one of the most serious threats to Lake Tahoe and to nearby Fallen Leaf, Echo, Marlette and Cascade lakes.

However, the topic isn't new for the Corps.

The Corps was heavily involved in the establishment of the Lake Tahoe Boat Inspection Program used throughout the basin, and is working with the California Tahoe Conservancy on a management plan that identifies baseline characteristics of aquatic invasive species in the lake by conducting weed and fish surveys. The plan targets mudsnails, quagga mussels, milfoil, pondweed, bass and bluegill infestations.

According to the Tahoe Regional Planning Agency, a joint effort by California and Nevada and the nation's first multi-state agency focused on regional environmental planning, the environmental and economic impacts of these invasions could be substantial as they crowd out native populations, impair habitats and water quality and reduce recreational opportunities.

"The Corps provided critical and timely funding for the Lake Tahoe Aquatic Invasive Species Program during its infancy that allowed it to grow to the national model it is today," said Dennis Zabaglo, Tahoe Regional Planning Agency aquatic resources program manager. "The iconic Emerald Bay of Lake Tahoe, once infested with 6 acres of invasive aquatic weeds, has not had an invasive weed observed in over two years."

By continuing to support these projects in the Tahoe Basin, the Corps is solidifying its position as one of the nation's leaders in environmental protection. ☞

Fort Riley, partners construct permeable parking lot, outdoor school laboratory

By Chris Otto

Fort Riley, Kansas

The Assistant Secretary of the Army for Installations, Energy and Environment, Fort Riley and the Environmental Protection Agency (EPA) have been collaborating on innovative projects in support of the installation's Net Zero Water Efforts. In one exciting project, a Smart Permeable Parking Lot was constructed at Seitz Elementary School on Fort Riley, Kansas.

At first glance, the parking lot looks like any other normal asphalt parking lot except for one row of parking stalls lined with pavers. However, this is not a normal parking lot — it is a state-of-the-art permeable parking lot

surrounded by more than 40 monitoring wells with an elaborate monitoring system providing the EPA with information on water quality and hydrology under the lot. It also serves as an outdoor laboratory for the school district.

Construction began in November 2014 and was finished in August 2015. With construction funding provided by the Army, the lot was designed by the EPA's Office of Research and Development, which also paid for the monitoring equipment and weather station, and built by the U.S. Army Corps of Engineers' Kansas City District. All of this was done in close collaboration with Fort Riley's School District.

About 90 percent of the parking lot surface is non-permeable asphalt that directs storm water toward the row of permeable pavers

lying over a storage gallery. The pavers are designed to allow high volumes of water to infiltrate and have built-in spacers to keep them from shifting.

The 10-foot-deep gallery is filled with various sizes of gravel. Along the bottom is a sandy soil layer that allows water in the gallery to infiltrate into the groundwater. This helps prevent flooding and erosion issues associated with normal parking lots and also helps recharge groundwater levels.

Permeable parking lots are not new or unique, but what makes this one different is the amount of monitoring equipment and wells installed under and around the parking lot. In addition, this project is unique due to the partnership behind the development project.


The sensors in and under the parking lot send data to a weather station that was installed on the roof of the school. That station also collects weather data and then sends the information to the school's wireless network.

Seitz Elementary was already designed with water conservation in mind. The school collects rainwater for use in flushing toilets and cooling towers. However, the students and teachers do not know how much water their system collects. As part of this project, sensors were installed in the rainwater storage tanks that will provide information on how much water is collected during each storm event.

The EPA is going to be visiting the site several times per year to check on the monitoring equipment and collect water

samples from the monitoring wells. They will be using the data from the sensors along with water quality samples to see how the lot functions and how it impacts water quality. The EPA will be testing water samples for substances like salts and fuels to see how they interact with the groundwater. This is an important question for the EPA to answer as more and more permeable infrastructure is installed around the country and is somewhat of an unknown for the soils at Fort Riley.

The parking lot is also going to be used as a "Live Stormwater Laboratory" to help teach students at the school about weather, hydrology, groundwater and water conservation. The EPA is working with Kansas State University, the Kansas Association for Conservation and Environmental Education (KACEE), and the school district to develop curriculum to meet new state science standards using data from the parking lot, weather station and rainwater storage tanks. KACEE is also going to work with the teachers to train them how to use the new curriculum.

While it is usually hard to get excited about parking lots, this one is exciting because of all the benefits it is providing. The lot is meeting the parking needs of the school, providing critical information to the EPA, helping Fort Riley promote water conservation, and serving as a valuable learning opportunity. 



ABOVE: Shown under construction at Seitz Elementary School is the trench in which containers and sensors will sit. The containers will receive excess water from the parking lot. LEFT: Rain water will drain into this section of the parking lot, which features interlocking concrete pavement resembling bricks. (Courtesy photos)

Sonoran Pronghorn reintroduced to Yuma Proving Ground

Story and photo by Mark Schauer
Yuma Proving Ground, Arizona

They call it the prairie ghost. The sobriquet for the Sonoran Pronghorn, squat and reddish brown with white patches and dramatic horns, was originally coined to describe the creature's elusive nature and blazing speed — about 60 miles per hour at full trot across its favored desert flats.

But the nickname took on a grimmer connotation in 2002 when a severe drought decimated the pronghorn's already-fragile population. At its nadir, fewer than two dozen of the creatures remained in all of Arizona before rain and supplemental feedings stabilized their numbers.

"We were within a few weeks of losing these animals as well," recalled John Hervert, terrestrial program research manager for the Arizona Game and Fish Department. "The herd was slowly dying of starvation and it was a predictable thing: you could see them losing weight with each passing week."

Thanks to an intense effort by state and federal wildlife agencies, there are now more than 300 pronghorn in the state. Since 2011, officials have begun transferring the animals into historic habitat within the borders of the Kofa Wildlife Refuge and Yuma Proving Ground (YPG), Arizona.

As a natural laboratory for testing virtually every piece of equipment in the ground combat arsenal, YPG has a vested interest in responsible stewardship of the land. Despite being the busiest of the Army's six test centers and boasting the longest overland artillery range in the United States, a relatively small portion of the proving ground's vast ranges is subject to artillery impact on a given day. It is located in one of the nation's most extreme climates, but the proving ground is home to a vast diversity of wildlife, including desert tortoises and bighorn sheep.

Though it is an endangered species, the experimental nature of the transported population means the proving ground is subject to a legal designation that allows pronghorn to repopulate here without adding much in the way of regulatory hurdles to the YPG mission.

"If an animal is accidentally injured or killed as a result of our routine mission actions, it doesn't put us in violation of the law," explained Daniel Steward, YPG wildlife biologist. "The only requirement we have is to report a dead pronghorn within 24 hours of finding it and coordinating access to recover the carcass for study. If you were to find a dead one here, it was most likely killed by a predator, not any of YPG's activities."

YPG's wildlife biology program coordinates access for the Arizona Game and Fish Department to conduct regular monitoring of the sheep population, including semimonthly overflights of the range to track pronghorn equipped with GPS and telemetry collars.

"We build predictive habitat models from that data as well," said Larisa Harding, terrestrial program research manager for Arizona Game and Fish. "We want to know if there are areas that they could use across YPG or Kofa for future release purposes that they are not using now."

YPG and Arizona Game and Fish also utilize trail cameras at man-made water stations across the proving ground and the wildlife refuge to monitor pronghorn activities, and credit the construction of these low maintenance oases that capture rainwater from running washes as a critical factor in the pronghorn's progress toward recovery.

"In the past, the common thought was that pronghorn got all of their water needs filled by their food sources," Steward said. "We now know how important standing water is to pronghorn populations."

A raw, rainy desert winter day in January brought 60 individuals from multiple wildlife agencies and universities to prepare more than 20 pronghorn for release into the wild from their half-mile square breeding pen on the Kofa National Wildlife Refuge. To vaccinate and tag the animals prior to their release, they are drawn into a livestock enclosure called a boma that consists of three circular enclosures covered by shade cloth. As the animals migrate into the enclosure closest to the veterinary stations erected under pop-up tents just outside the boma, a crew files in through a sliding gate and uses a long net to capture each sheep. The walls of this last enclosure are padded in case the animal is able to jump prior to being subdued.

"Pronghorn are made for running, not jumping," Steward said. "They are very powerful and can jump very high, but their bodies can't handle it. To keep injuries to a minimum, our goal is to get them subdued before they get a chance to

jump."

Once subdued, the adult pronghorn are brought to the veterinary stations on stretchers with holes that accommodate the creatures' powerful legs. On this day, Steward's role was to monitor each animal's temperature as the veterinarians outfitted them with a telemetry collar and drew blood and scat samples. If the animal's temperature rose too high, it was doused with water to prevent fatality.

"One of the biggest challenges of handling wild animals is body temperature rising as a reaction to stress," Steward explained. "It is more acute with pronghorn: imagine taking a high-end sports car and holding its rear wheels off the ground while flooring the accelerator."

To minimize stress, the dozens of people in the crew work quickly in virtual silence, and the animal's head is covered. Young fawns who aren't ready to be released into the wild are attended to inside the boma while being held in the arms of a strong volunteer. It isn't easy work: even the young pronghorn have powerful legs, and the men's clothes begin to sport rips ridged with smears of blood as

After being decimated in a severe drought in 2002, Arizona's Sonoran Pronghorn population is recovering thanks to human interventions like a pronghorn capture recently conducted at Kofa National Wildlife Refuge with U.S. Army Yuma Proving Ground participation.



the day progresses.

Once they are vaccinated and collared, the animals meant for release spend several days in a holding pen adjacent to the breeding pen prior to being released, to ensure that any injuries or other after-effects of being handled have passed. After that, they are released into the wildlife refuge, with the potential to migrate into YPG.

"We are very hopeful that YPG is going to be a critical part of the recovery of this subspecies of pronghorn," Hervert said.

"There is a tremendous investment in every one of these pronghorn," Steward added. "We want to support them as much as we can." 🐾

Unique program cleans tribal lands, creates jobs in Alaska

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

For nearly 40 years, Wildwood Air Force Station's buildings 100 and 101 stood as abandoned relics of the Department of Defense. Now, the demolition of the facilities and other restorative projects on the same land are providing a local federally recognized native tribe with new opportunities.

During the summers of 2010 and 2011, the buildings, located about 4 miles north of Kenai, Alaska, were demolished and removed by the Kenaitze Indian Tribe. The Kenai Natives Association owns the property as a village corporation under the Alaska Native Claims Settlement Act. The U.S. Army Corps of Engineers Alaska District manages the federal program that funded the removal project, as well as other environmental cleanup activities situated on tribal lands throughout the state.

"Building 101 was a complete nuisance to the association ever since I could remember," said Gabe Juliussen, member of the Kenai Natives Association board of directors and project manager for the Kenaitze Indian Tribe. "It has been a popular hangout for teenagers, and there was a lot of vandalism. A lot of problems have transpired on our land because of that building."

The Native American Lands Environmental Mitigation Program provided the opportunity for the two buildings to be demolished. Since 1993, NALEMP performs the DOD mission to address tribes' environmental concerns per a qualifying criteria.

Environmental impacts must affect a federally recognized tribe; be on eligible lands such as ANCSA property or Native allotments; the damage attributed to past military activities, facilities or operations; and no other government program can fund the remediation for three years. The work is completed through cooperative agreements with the tribe.

"The program addresses environmental concerns that tribes have in a timely manner," said Andrea Elconin, NALEMP project manager for the Alaska District. "It is unique that the tribes drive the projects by deciding how the impact is cleaned up and perform the work."

Despite a limited budget for cleanup projects nationwide, Alaska Native communities are experiencing environmental and economic benefits nonetheless. Traditionally, about half of the nationally appropriated funds come to Alaska, totaling about \$6 million annually, Elconin said. There are 229 federally recognized

tribes in Alaska. Currently, the Corps manages about 30 cooperative agreements with 19 tribes across the state.

Between 1953 and 1972, the Wildwood buildings served the military's communication mission. Following Air Force Station's closure, the land and nonessential facilities were turned over to the Bureau of Land Management. In 1974, about 4,300 acres of the former Air Force station were conveyed to the Kenai Natives Association through ANCSA. Between 1996 and 1997, multiple restoration activities were conducted by the Corps' Formerly Used Defense Sites program; including the removal of above-ground fuel tanks, underground fuel tanks, and multiple drums, transformers and other sources of contamination.

Now, the tribe is working to excavate 13 concrete pillars, weighing an estimated 10,000 to 15,000 pounds each, near Wildwood's former military affiliate radio system site and dispose of about 640 cubic yards of diesel contaminated soil.

Throughout the Kenaitze Indian Tribe's participation in NALEMP, tribal members have gained valuable experience performing the work and fulfilling its mission to develop career skills, Juliussen said.

"There have been three guys on my crew that



During the summers of 2010 and 2011, the Kenaitze Indian Tribe work crew demolished Wildwood Air Force Station's Buildings 100 and 101. The project was made possible by the Native American Lands Environmental Mitigation Program and conducted through a cooperative agreement with the U.S. Army Corps of Engineers Alaska District. (Courtesy Photo)

have been here for five seasons and have received tremendous amounts of heavy equipment and soil cleanup experience," he said. "It has been really good for their skill sets to be able to market themselves."

One crew member is earning his process technology degree and is scheduled to graduate soon. Working at Wildwood in the summer and going to school in the winter will help him transition to the oil fields, where he will further his career, Juliussen said.

Meanwhile, the Corps values the rapport established with tribes while working on the project, Elconin said.

"One of the benefits of this program is the relationships that we develop," she said. "It helps us with projects in the Formerly Used Defense Sites and Civil Works missions and working across the state."

Overall, Juliussen said he is impressed with the program and experience of working with the Corps. In particular, he is no longer worried about the potential liability of owning a dilapidated building.

"Getting rid of that building has been a huge relief for the Kenai Natives Association," he said. "It gives us a prime piece of land to develop in the future. The road is already in place and is a good starting point." ☞

Post reducing footprint, facility maintenance costs

By Noelle Wiehe
Fort Benning, Georgia

Soldiers Plaza is being demolished as part of the Maneuver Center of Excellence's effort to reduce Fort Benning's footprint, said Tony Brown, space management specialist with the Directorate of Public Works.

"This is just the first step that we're doing to get down the World War II wood and all of the trailers," Brown said.

The Soldiers Plaza demolition project is being managed by the U.S. Army Corps of Engineers' Engineering and Support Center, Huntsville as part of a \$1.4 million contract that will ultimately remove 45 facilities totaling nearly 407,000 square feet of excess facilities from Fort Benning's real property inventory. Huntsville Center manages regional demolition contracts to support removal of excess facilities under its Facilities Reduction Program.

The demolition of Soldiers Plaza began two months before the first building came down, when the fence was placed around the area. The surveys were done and work began Feb. 15 when the old Army Continuing Education Services building came down. The area contains the last of the WWII wood on post.

Once the approximately two-month-long demolition is complete, Brown said the site will be restored back to green state — grass — and used for future Maneuver Center endeavors.

Brown said he was given a list from headquarters of specific category codes for facilities to be looked at and reduced and from that facilities are either demolished or converted for other uses.

"Currently, we're showing about 2.8 million in excess," Brown said. "We only had to look at reducing 1.7 million square feet between now and fiscal year 21."

The installation is currently only 100,000 square feet over before they reach the 1.7 million goal, he said.

"We're tearing down old, decrepit buildings that are not economical to fix up," said Randy Swindler, Master Planning Division chief.

The division is also reconstructing training barracks as a way of reutilizing existing facilities.

"We're getting rid of the worst so we can reduce the amount of money that the Army has to spend on maintaining facilities just for the sake of maintaining facilities — we have no particular use for them," Swindler said.

He added that the commanding general of Fort Benning approves all plans for demolition and restoration.

"The idea is, they were in hard-to-maintain, deteriorating buildings so we put them into permanent structures — a building that can be maintained and has historical significance," Swindler said. "We're making good use of existing facilities." ☞

Interagency program keeps public water clean — naturally

By JoAnne Castagna

U.S. Army Corps of Engineers New York District

When we see news stories about lead-contaminated water flowing out of faucets in Flint, Michigan, and see the troubles the city is having as a result, many of us become concerned about our own city's drinking water supply that we use every day to brush our teeth, take a shower and fill our dog's water bowl.

The U.S. Army Corps of Engineers has in place an interagency program — the New York City Watershed Environmental Assistance Program — that helps keep New York City's drinking water clean and safe.

The program assists in the creation of projects to protect the water quality of New York state's watersheds that provide drinking water to millions of New York City residents and businesses.

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 wanted, such as to supply a city.

You may be asking yourself — Isn't the water treated before it reaches our faucets? Yes, but minimally.

"New York City prides itself on its minimal filtration of its drinking water. 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 program came about," said Rifat Salim,

project manager, U.S. Army Corps of Engineers.

The New York City watershed region encompasses approximately 2,000 square miles and includes three watershed systems — the Catskill, Delaware and Croton systems — all located north of New York City in the counties of Greene, Schoharie, Ulster, Sullivan, Westchester, Putnam, Dutchess and Delaware.

One of the program's recent projects successfully completed in the Town of Walton, New York, is protecting drinking water and also sustaining this rural Delaware County community.

A while back, the town was devastated by a major flood that damaged many homes and businesses and resulted in approximately \$30 million in losses for the community.

Trees got uprooted, fell into the streams and were carried down the waterways clogging several bridges. The fast moving water had nowhere to flow but out onto the streets, flooding businesses and homes.

When stream banks start failing, all of the materials that used to be on the bank become potential contaminants to the water. This flood didn't cause water contamination, but future floods could.

"These slope failures can do a lot of damage

to the water," Salim said. "When the slopes or embankments get eroded, a lot of sediment and soil enters the stream. These sediments cause turbidity in the water. Turbidity is when the water is not clear. It then flows into the reservoir and eventually adversely affects New York City drinking water."

One of the streams that was severely eroded during this flood was the Third Brook. Third Brook flows into the West Branch Delaware River which in turn flows into the Cannonsville Reservoir. This reservoir provides 97 billion gallons of water to New York City's drinking water supply.

To keep this water safe, steps were taken to stabilize Third Brook. The agencies that worked together included the Army Corps' New York District, the New York State Department of Environmental Conservation, Delaware County Soil and Watershed Conservation District, the New York City Department of Environmental Protection, Village of Walton and the Town of Walton.

According to Graydon Dutcher, project manager and administrator of the Delaware County Soil and Water Conservation District, they

stabilized the toe of the failing stream banks with stacked rock walls or rock rip rap and provided protection to the streambed with the placement of in-stream structures such as boulder riffles.

"We had to use large rock to stabilize the toe of the banks and the stream bed itself because the stream has no floodplains," Dutcher said.

"All of the floods, large and small, are contained within the limited channel," he added. "This produces very rapid stream flow. Wherever it was possible, we buried the rocks and planted around them with native vegetation. This combination creates a more diverse and flood-resilient stream corridor.

"We also hydro-seeded all of the bare slopes and planted willow stakes and native trees along the floodplain, which provides for habitat and increases the streams' long-term stability."

The vegetation helps stabilize the slopes, Salim said. "The roots stabilize the soil and they can also absorb contaminants before they

reach the stream, providing us cleaner water."

Clean water is beneficial to fish and aquatic life. Sediments that get into the water may be composed of phosphorus and pathogens, or parasites. Algae in the water may feed off these nutrients and deplete the water's oxygen, adversely affecting water quality.

An added benefit to stabilizing the slopes is that it helps to protect from flooding and returns the stream corridor to a more esthetically pleasing and natural appearing embankment, some of which are in the backyards of homes.

The project is already showing success. "The landowners have expressed gratitude for completing the project," Dutcher said, adding that the project has already weathered a few high water events and the stream has responded favorably.

"Communities benefit from having a nice embankment and added safety to their property, and New York City residents benefit by having clean drinking water," Salim said. "It's a win-win situation." ☞



Third Brook today is now stabilized with large rock at the toe of the banks and native plant vegetation. (Photo by JoAnne Castagna)
LEFT: Third Brook in May 2014 highly susceptible to failure after a major flood. (Photo courtesy Delaware County Soil and Water Conservation District)

Jacksonville District recognized for efforts, expertise in regional sediment management

By Mark Ray

U.S. Army Corps of Engineers Jacksonville District

Sand, or better said, sediment, is money. Sand on beaches protects structures and shorelines from erosion, provides habitat for a wide variety of species, and supports beach-front community economies and the national economy through billions of tourist dollars.

The Corps of Engineers annually spends millions of dollars placing sand on beaches to provide coastal protection. Communities and states want more, but federal funding for such projects is becoming scarcer.

Sand and sediment are also a nuisance.

They shoal up and clog navigation channels, impeding water-borne commerce. The Corps of Engineers also spends millions on dredging navigation channels, but historically has disposed of sediments and sand through off-shore or on-shore placement in what are known as Dredge Material Management Areas.

Regional sediment management brings dredging and coastal protection together.

The concept is straightforward: use the sand or sediment (if it is of appropriate quality) that must be dredged from navigation channels and place it on or near shorelines in the area to renourish beaches and provide coastal protection.

Dredged sediments can also be used to rehabilitate degraded wetlands.

Regional sediment management provides a number of benefits:

- ◆ It mimics to a large degree natural regional flows of sediments that navigation features may have disrupted.
- ◆ It keeps valuable sediment in the system, with considerable environmental benefits.
- ◆ It leverages funded dredging projects to also support unfunded coastal protection or ecosystem projects.

While the concept is straightforward, and the benefits are immediate and considerable, the execution of regional sediment management projects can be difficult.

Jacksonville District has proven expertise in

gaining approval and execution of regional sediment management projects. In 2013, for example, the district leveraged well over 1 million cubic yards of sediments from \$22 million in navigation dredging projects to create an estimated \$27 million in flood risk management benefits on Florida beaches. The district's Water Resources Branch continuously seeks opportunities to leverage dredged sediment for shore protection and other suitable projects.

Recent examples of the district's efforts include:

- ◆ Using dredged material from Palm Beach Harbor for beach nourishment south of the inlet. The nourished beach helps protect the shoreline and creates habitat for sea turtle and shorebird nesting, and recreation.
- ◆ Placing dredged material from Tampa Harbor channels onto critically eroded Egmont Key shoreline to help protect the culturally significant island.
- ◆ Using dredged material from Jacksonville Harbor to protect the beach at U.S. Naval Station Mayport.

The district is preparing to use sediments from the project to improve navigation at Mile Point, on the St. Johns River, to restore a wetland near the project site.

In 2015, the Corps of Engineers recognized the district's efforts and expertise, and designated the Jacksonville District as a regional center of expertise for regional sediment management.

"It is a hard truth that shore protection projects have to compete with many other national priorities for funding," said Jackie Keiser, deputy chief of the Water Resources Branch and the district's champion for regional sediment management. "As the regional center of expertise, we want to educate stakeholders inside and outside of the Corps about the proven benefits of regional sediment management."

"Communication is a key element in our effort," Keiser said. "The Jacksonville District, as the regional center of expertise, can help with funding and budget issues, as well as with policy and guidance. We are also always willing to draw on our experience and successes to provide technical assistance."

Learn more at <http://rsm.usace.army.mil/>. 🐾

Invasive, threatened & endangered species: Who pays? Who cares?

By Courtney Chambers

U.S. Army Corps of Engineers

Invasive Species Leadership Team

Everyone knows the answer to the second question, the one paying cares a lot! Especially when the bill is to the tune of millions of dollars. The combined estimated cost of invasive, threatened and endangered species for fiscal year 2014 was \$375,625,475, roughly 7 percent of the U.S. Army Corps of Engineers' civil works budget. The first question is harder to answer. These activities are very much a part of Corps business, but they are so integrated in our civil works missions that they are hard to identify in our budgets and spending.

Rather than establishing a whole new accounting system or instituting another annual data call, business line managers added a few work category codes to the existing Corps financial databases for operations and maintenance to provide a way to account for these costs within each business line. If used, these categories will create a record of expenditures to aid work package development in future years and potentially shine a light on issues that need more attention or more cost effective solutions.

Money Matters

The USACE 2012 initiative organized Corps activities into business lines. Traditionally, work packages were submitted for each business line to determine budgets. As funds were executed in the Corps of Engineers Financial Management System (CEFMS), they were charged to unique work category codes identified by each business line manager. The challenge of this process resulted when business lines like navigation and flood control began incurring greater costs for threatened and endangered species compliance and invasive species management. Many of these peripheral or compliance-based efforts were charged to the environmental stewardship program as the care takers of Corps property, the ones applying many of the treatment or management activities. These costs were hard to extract and were only informed/estimated by questionnaires at the end of each year.

As a result, the stewardship business line was bearing costs that could reach hundreds of millions of dollars for these efforts and the true cost of the Corps' major business lines was blurred. Improved work cost categorization was needed to show the full cost of the Corps' major missions.



In FY14 the USACE stewardship program reported spending about \$84.5 million on endangered species, including endangered and threatened populations of Sockeye salmon in the northwestern U.S. The program spent another \$5 million on invasive species management.

Shared Responsibility

The improvement began with a clarification of responsibilities. Each business line has some responsibility for costs associated with invasive, threatened and endangered species. For example, removal of an invasive species from a boat ramp is a cost of doing business for the recreation business line. Zebra mussel removal from a dam or flood control structure is a flood risk management cost, and similarly a biological opinion that requires fish ladder at a dam is a cost of the primary business line: navigation, flood control or hydropower. This clarification of business line responsibilities became effective in FY15 and prompted the addition of four standardized work category codes in three existing Corps databases: Civil Works Integrated Funding database (CWIF), CEFMS, and the Program and Project Management system (P2). Each Corps business line received work category codes for invasive species, mitigation, threatened and endangered species, and cultural resources.

Now a project, regardless of business line, that encounters one of these responsibilities can charge labor, make a credit card purchase or set up a contract under the corresponding work category code, thus capturing the dollars spent. These codes will enable proper dispersal and accounting of these challenging, mission critical but peripheral costs.

Your Part

Submit budgets, set up resources in P2, and charge obligations and expenditures in the same systems you already do, but look for the new category codes. This relatively minor change to existing systems and processes has the ability to provide great value to Corps business management that affects all of us. As you spend dollars in these categories, use the codes! They have already been added for you. Use them in your work package submissions and your spending.

An annual listing of current work categories is published as part of the program development manuals and can be found in the documents list at <https://workplan.usace.army.mil/>. 🐾

First of remaining C-111 South Dade Everglades restoration projects underway

By Jenn Miller

U.S. Army Corps of Engineers Jacksonville District

The U.S. Army Corps of Engineers, alongside federal, state and local officials, celebrated the start of construction on one of the three remaining contracts for the C-111 South Dade project, an Everglades restoration project in Miami-Dade County in January.

The contract, known as Contract 8, involves constructing the North Detention Area, which will connect the C-111 South Dade project to the Modified Water Deliveries to Everglades National Park project. These projects are Foundation Projects, which the Comprehensive Everglades Restoration Plan (CERP) builds upon to deliver essential restoration benefits to America's Everglades.

"The Obama Administration has already invested \$2.2 billion in the restoration of the Everglades. This is the second groundbreaking in just two months," said Jo-Ellen Darcy, Assistant Secretary of the Army for Civil Works. "The C-111 South Dade project is critical to the overall efforts to restore the south Florida ecosystem. Together we are saving this system and preserving it for future generations."

Once completed, the project will work in concert with the Modified Water Deliveries project to create a hydraulic ridge that will reduce groundwater seeping out of eastern Everglades National Park. As a result, this will enable additional water flow into Everglades National Park and Florida Bay.

"When it comes to water, the entire Everglades ecosystem is interconnected," said Col. Jason Kirk, Jacksonville District commander. "The North Detention Area will connect infrastructure from the C-111 South Dade and Modified Water Deliveries projects together to help ensure that water goes where it needs to go. This is an important step toward getting all of the necessary infrastructure in place, which will enable more flexibility in our water operations."

The \$13.9 million construction contract for Contract 8 was awarded to the Polote

Corporation from Savannah, Georgia, in October 2015. Two construction contracts remain for the C-111 South Dade project and are scheduled to be awarded within the next two years.

"The project exemplifies the collaboration of multiple state and federal agencies, as well as local area stakeholders, to protect America's Everglades and the larger south Florida ecosystem," said Florida Department of Environmental Protection Deputy Secretary for Ecosystem Restoration Drew Bartlett. "I commend the Army Corps and the South Florida Water Management District on advancing this project."

The C-111 South Dade project is being constructed in partnership with the South Florida Water Management District (SFWMD), the local sponsor.

"The C-111 South Dade Project is critical to the ecology, economy and future of this beautiful area of southern Miami-Dade County. That is why our taxpayers have invested so much into this effort," said SFWMD Governing Board Member Jim Moran. "I am extremely happy to see the progress we have made enhancing flood protection for the South Dade region and restoring the freshwater wetlands in Everglades National Park and the rest of the region."

The completed project will restore natural hydrologic conditions in Northeast Shark River Slough, Taylor Slough and the eastern

panhandle of Everglades National Park.

"We appreciate the partnership we have with the Army Corps of Engineers and the state of Florida, which is so vital to restoring more natural water flows to Everglades National Park, while also maintaining appropriate flood protection and water supply requirements," said Pedro Ramos, superintendent of Everglades National Park. "This ground-breaking signals that our continuing interagency partnerships have led to meaningful progress toward meeting these goals."



ABOVE: The U.S. Army Corps of Engineers, alongside federal, state and local officials, celebrate the start of construction Jan. 7 on one of the three remaining contracts for the C-111 South Dade project, an Everglades restoration project in Miami-Dade County, Florida. (Photo by Ty Erickson)
LEFT: A birds-eye view of part of the C-111 South Dade project — a Foundation Project that the Comprehensive Everglades Restoration Plan builds upon to deliver essential restoration benefits to America's Everglades. (Photo by Mark Bias)

infrastructure needed to increase freshwater flows in the future and will improve hydrology in Taylor Slough. Audubon is proud to be part of the effort to win authorization and funding for more restoration projects."

Every restoration effort within the Everglades ecosystem directly or indirectly affects each other. Due to the interdependencies of these projects, the ultimate success of restoration efforts are dependent on the completion of others. In order for the southern portion of the Everglades ecosystem to be operated as effectively as possible, the necessary infrastructure needs to be in place, the necessary data to evaluate operational flexibility needs to be known, and the resulting Combined Operating Plan needs to be developed and implemented.

The completed C-111 South Dade and Modified Water Deliveries projects will provide this needed infrastructure and the ongoing G-3273 and S-356 Pump Station Field Test will provide the data needed to refine operations under the Combined Operating Plan. The plan will enable additional water to flow south into Everglades National Park and provide optimal restoration and operational benefits for the southern Everglades ecosystem.

"Completion of this project will begin a new era in water management in the southern Everglades, which is important to both ecosystem restoration and water sustainability," Ramos said. "This will improve the hydrologic conditions in the Taylor Slough headwaters, reduce groundwater seepage into the adjacent eastern agricultural areas, while sending additional freshwater into Florida Bay. It is a win-win for both the park and all our neighbors."

"We are very pleased to see this important component of the C-111 South Dade project moving forward into construction."

Learn more about the C-111 South Dade project at www.saj.usace.army.mil/Missions/Environmental/EcosystemRestoration/C111SouthDadeProject.aspx. 🐾

Recycling 'coyote' on loose at California installation

By Jonelle Kimbrough

U.S. Army Reserve Sustainability Programs

Anyone not properly recycling at Fort Hunter Liggett, California, should watch out — the recycling coyote is on the loose, and he may be coming for you.

The Fort Hunter Liggett Qualified Recycling Program's "QRP TV" revealed footage of the recycling coyote at the garrison's America Recycles Day, Safety Stand-Down and Organizational Day in November. In the footage, the recycling coyote stealthily appears when unsuspecting individuals either toss their recyclables into trash receptacles or deposit their trash into recycling bins. Sightings of the coyote, encouraging Soldiers and civilians to recycle right and recycle more, have been reported throughout the Installation.

Rick Bosch is Fort Hunter Liggett's appointed Qualified Recycling Program (QRP) manager and chief of the Community Recreation and Business Operations Division at the Directorate of Family and Morale, Welfare and Recreation. He said the coyote was born from a need to educate the community about proper recycling practices in a unique and different way.

"Recycling should be fun and dynamic, not rigid and regimented with force," Bosch said. Since the garrison mascot is a coyote, the creature was the perfect choice to also serve as an ambassador for the recycling program.

"At this remote and isolated Installation, there are actually more coyotes than people, so

we have a built-in watchdog force," he joked.

Bosch said the coyote has been well-received so far and that the QRP has been successful in leveraging champions in the community. The achievements of the program — which are rather incredible for such a new endeavor — can be attributed to the efforts of Soldiers, Families, civilians and contractors.

Fort Hunter Liggett established its QRP in 2013. By 2014, the QRP had recovered 207,000 pounds or 103 tons of recyclables.

In 2015, the QRP recovered almost four times that amount — 776,000 pounds or 388 tons. The QRP has not only diverted tons of recyclables from the landfill, though. It has also raised around \$500,000 in funds for numerous quality-of-life projects at the installation. In the past two years, the QRP has funded the Army Reserve birthday barbecue, occupational health and safety educational materials and signage, two organizational days, the annual holiday tree lighting and free internet access at the Cybrary.

Collaboration with the state of California has also enhanced success. The program has achieved Certified Community Service Program status. Their curbside recycling services in Army Family Housing gained Certified Curbside Recycling Program status, and they are a

Certified Oil Generator, for which they receive credit and state funding.

Although Fort Hunter Liggett has a 30 percent diversion rate, Bosch said, "We can't sit on our haunches and rest on our laurels." The installation is still chasing the Net Zero standard of a 50 percent diversion rate for municipal solid waste, and Bosch estimated that they would need to recycle about 300,000 additional pounds of materials this year to meet that goal.

To that end, Fort Hunter Liggett plans to continue educating its population about the benefits of recycling — with the help of that wily coyote, of course.

"We have turned a corner in changing behaviors and perceptions," Bosch said. The QRP "is something that helps us meet our Net Zero waste goal but allows us to have fun and benefit as a community. People are the heartbeat of this community, and the more opportunities we have to share time and smiles as an organization, the more prepared and passionate we are to support our mission daily."

For more information about Army Reserve sustainability efforts, visit usersustainability.com. Like us at <https://www.facebook.com/USARSustainability/> and follow us at <https://twitter.com/USARGoGreen>.



Rick Bosch, Fort Hunter Liggett's Qualified Recycling Program manager, tells viewers about the recycling coyote sightings on the California installation. Watch at <https://www.youtube.com/watch?v=AbkGRI63n3s>.

88th RSC protecting America's bats

By Jonelle Kimbrough, U.S. Army Reserve

Sustainability Programs and

Veronda Johnson, U.S. Army Reserve Command

A deadly disease is decimating populations of the northern long-eared bat (NLEB) in the Eastern and Midwestern United States, prompting the U.S. Fish and Wildlife Service (USFWS) to list the bat as a threatened species in May 2015 under the Endangered Species Act (ESA) of 1970.

As a federal entity, the Army Reserve is also tasked with their conservation — a responsibility the 88th Regional Support Command (RSC) is heeding to protect both the threatened bats and critical military operations.

The northern long-eared bat is one of the seven bat species impacted by white-nose syndrome, a fungal disease that has caused the deaths of millions of bats in the U.S. Some affected bat populations have declined up to 99 percent in the northeast, according to USFWS data. It is found in several Army Reserve regions, though primarily in the 88th RSC, which encompasses 19 northern states from the Ohio River to the Pacific Coast, and 99th RSC, which encompasses 13 states in the Northeast.

The presence of threatened and endangered species on military installations can potentially have major impacts on the environment and the mission. Species losses can cause devastating ecological imbalances, and "significant use restrictions could be applied by the USFWS and enforced under the ESA if the 88th RSC is not compliant with federal laws" surrounding these species, explained Marshal Braman, an environmental protection specialist and Versar contractor with the 88th RSC.

In an effort to prevent those restrictions, the 88th RSC completed an informal Section 7 consultation for Indiana bats with

the USFWS, which resulted in the 2013 preparation and approval of an Endangered Species Management Component (ESMC). In the ESMC, which was revised last year to include the NLEB, the Army Reserve determined and the USFWS concurred that military operations "may affect but are not likely to adversely affect" bat populations.

Military training, aircraft operations and recreation are covered for all locations. Other activities including the use of smoke or obscurants, forest management, prescribed burning, pest management and construction also continue but with the implementation of conservation measures that will prevent "take" of the NLEB, which is defined by the ESA as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect any endangered species."

Fortunately, bats and Soldiers have been living in harmony thus far.

"Most training activities are on different time schedules from the bats, so there is minimal potential interaction," Braman said. Bats are most active at dawn and dusk and during the night, but nearly all training normally occurs during the day.

In the event that a NLEB roost tree is encountered on a training area, Soldiers are to identify its location, immediately cease all activities within a 150-foot radius of the tree and report their observations to natural resources personnel, who will then provide direction regarding continued activities, use of the immediate area and subsequent actions.

"The 88th RSC will follow the established measures outlined in the ESMC to avoid potential impacts to the bats and maintain suitable habitat for their continued use," Braman said.

For more information about Army Reserve sustainability efforts, visit usersustainability.com. Like us on Facebook at <https://www.facebook.com/USARSustainability/> and follow us at <https://twitter.com/USARGoGreen>.

Ammunition plant implements innovative remediation enhancement

By Sara Clark

Lake City Army Ammunition Plant, Missouri

The U.S. Army Environmental Command (USAEC) and Lake City Army Ammunition Plant (LCAAP), with technical support from the U.S. Army Corps of Engineers Environmental and Munitions Center of Expertise (USACE) and Environmental Chemical Corporation (ECC), completed fieldwork for an innovative enhancement to ongoing remediation efforts at the Independence, Missouri, ammunition plant.

The LCAAP was placed on the National Priority List in 1987. Area 17B was the historical location of three waste disposal pits where approximately 2 million pounds of volatile organic compound (VOC) contaminants are present in the subsurface.

The ongoing remedy at Area 17B in the Northeast Corner Operable Unit (NECOU) at LCAAP, implemented in 2007, consists of Enhanced Reductive Dechlorination (ERD) by injecting organic amendments to generate In-Situ Reactive Zone (IRZ) barriers. The IRZ remedy controls migration of a dissolved VOC groundwater plume from a dense phase non-aqueous liquid source area.

The IRZ remedy has operated with periodic injections of molasses. However, the volume of injected amendments has historically been limited to 5 to 15 percent of the design volumes due to low permeability clays (as low as 2E-06 cm/sec) present in the IRZ treatment zone.

The enhanced remedy, implemented in 2015, consists of additional IRZ wells that contain hydraulically emplaced sand lenses to create secondary permeability in the subsurface and increase the volume of amendment that can be injected.

The original IRZ remedy consisted of 40 injection wells, configured in five IRZ lines that were installed perpendicular to groundwater flow.

Since 2007, efforts have been made to improve the amendment injection volumes including injection well redevelopment and optimization of injection pressures. Results indicated that injection volumes were slightly improved; however, optimization was limited due to frequent well seal failures and concerns over mobilizing contamination to deeper, uncontaminated zones.

USAEC, LCAAP and its support team recently implemented an enhancement to the secondary



Contractors install sand lenses using direct-push technology and a custom injection system. (Courtesy photo)

permeability of the Area 17B IRZs using hydraulically emplaced sand lenses.

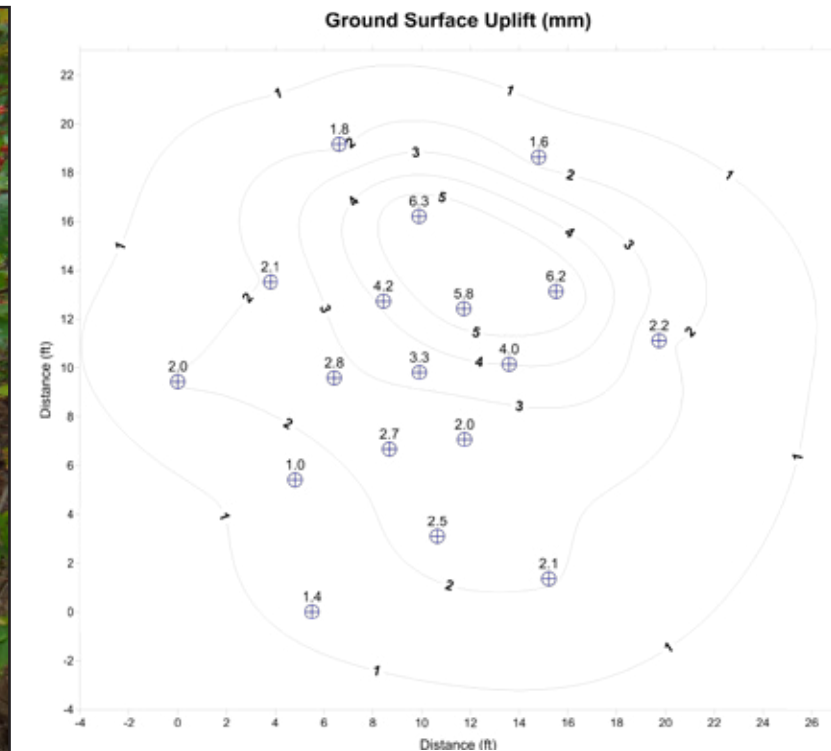
New injection wells with emplaced sand lenses offer several advantages to improve amendment distribution over traditional injection wells in low permeability clays. Compared to a traditional 2-inch injection wells, each high sand lens has a significantly larger surface area (21 square feet versus 1,414 square feet per sand lens) through which the amendments may penetrate the low permeability clay. Vertically stacking sand lenses over the thickness of the treatment zone further increases the injection surface area, which will improve amendment injection volumes, distribution across the contaminant plume and continuity of the IRZ barriers.

Working closely with Missouri and federal regulators,

two new IRZ barriers were installed in November 2015. Sand lenses were installed using direct-push technology (DPT) and a custom injection system. The DPT rods were driven to the target sand lens depth, where the tip of the rods was extracted. A down-hole notching tool was inserted to create a kerf in the formation at the target depth, which promoted horizontal sand propagation.

A proppant (guar gum) was used to create a gel-like liquid to suspend the sand, which was pumped through the DPT rods to create each lens. The tip of the rods were then retracted and the rods pushed to the next depth interval in order to stack the sand lenses within the injection well.

Once all the sand lenses were emplaced, residual sand within the DPT rods was cleaned out and an injection well was built through the rods. At Area 17B, a total of 37 sand



Uplift survey of ground surface change after sand lens emplacement (shown in millimeters) with radius of uplift to 15 feet.

lenses were emplaced in 10 injection wells across the two new IRZ barriers. A total of 55,000 pounds of sand was injected (approximately 1,500 pounds of sand per sand lens).

Pre- and post-injection ground surface topographic surveys were performed to verify the radius of influence for each sand lens. The measured uplift of the ground surface provided information on the lens geometry and distribution. The figure above presents typical contoured uplift data from one of the sand lenses. Analysis of the uplift data indicates the sand lenses were generally concentric, although not always symmetric. The data also indicated that the approximate center of the uplift is typically close to the injection location (generally within 6 feet), which further verifies that the sand lenses are horizontal to sub-horizontal.

The innovative sand lens emplacement technology applied at the LCAAP was designed to significantly increase the injected volume of amendments for the IRZ remedy. Results of the field program suggest that the secondary porosity was increased at the site. Amendment injection within the new injection wells will begin in April 2016. ☞

Planning study illustrates opportunities, benefits of coordinated river corridor

By Andrew Pack
Woolpert

When residents enjoy a community, want to stay and want to invest in its growth, that region tends to grow and prosper. This makes a region's ability to highlight its recreational opportunities and showcase amenities that can positively affect residents' quality of life important to that community's ultimate success.

The Great Miami River Corridor Planning Assistance Study evaluated riverfront sites and recreational opportunities along a 99-mile stretch of river from Sidney through Dayton in southwestern Ohio.

Conducted in 2015 by the Miami Conservancy District (MCD) and the U.S. Army Corps of Engineers Louisville District, with assistance from the Dayton-based architecture, engineering and geospatial firm Woolpert, the study intended to find out how existing amenities and opportunities could be maximized to improve the quality of life of residents in communities along the river corridor.

The MCD, which has spent years actively promoting recreation to foster quality of life of local residents in the Great Miami River watershed, and the Montgomery County Board of Commissioners requested Louisville District perform this study under the Planning Assistance to States (PAS) program.

The PAS program provides authority to the USACE to assist states, local governments, Native American tribes, and other non-federal entities with the preparation of comprehensive plans for the development and conservation of water and related land resources.

The Great Miami River Corridor has multiple recreational projects and sites at various locations along the river, and is host to a bikeway network that has been growing in popularity. These individual communities realized success with individual projects, including community parks, sports facilities, nature trails and conservation areas.

Five Rivers MetroParks, for example, is in the midst of implementing the \$4 million River Run project, which is a new navigable passage for kayakers and canoeists in the Great Miami River in Dayton. This project will be a draw for whitewater enthusiasts from hundreds of miles away,

leading to an impressive positive economic impact to the community.

This project is successful on its own, but many saw the potential in approaching the corridor as one connected, regional asset, with the possibility that a cohesive effort could spur further economic development.

Research supported this theory, and showed that as trails, parks and other amenities grow, cities and private investors build housing, office buildings, retail sites and entertainment venues that are adjacent to these opportunities.

The Great Miami River Corridor Planning Assistance Study was commissioned to provide an asset inventory of what was along the corridor and what plans were in place, according to MCD Watershed Partnerships Manager Sarah Hippensteel Hall.

"The study helped us understand a complete inventory of current and planned assets and amenities in the corridor," Hall said. "When we looked at all of these in a single list, we were just blown away by the amount of things to do and see in the corridor. The study helped us visualize what the corridor would look like as a whole when the current and future plans were completed."

To find out what the corridor had to offer, public forums were conducted and input collected to determine the best use of the natural resources and the existing parks and river access points. Activity hubs and connections were discussed, as were current historic and cultural resources, flood protection, recreation resources, water quality and general quality of life. In addition to direct observations and evaluations along the corridor, multiple case studies from elsewhere in the U.S. were obtained and reviewed. These case studies were used to compare against the Great Miami River Corridor's existing and planned future condition, as a type of gap analysis.

"We used some benchmarking; highlighting what other communities were doing to make the most of



Deeds Point MetroPark in downtown Dayton, Ohio, is one of the featured sites along the Great Miami River Corridor. It provides the most picturesque landscape and view of the city of Dayton from a west to southwest viewing angle. LEFT: RiverScape MetroPark, along the Great Miami River Corridor, hosts a full range of activities, including free summer weekend concerts, parent and preschooler programs, and major community festivals. (Photos courtesy of Woolpert)

their riverfront amenities," said Joe DiMisa, Woolpert environmental planner. "The Carolina Thread Trail was a great example. That project illustrates how a cohesive plan can tie a community together, and how these kinds of projects can be funded."

Hall said this comparative process showed what the Great Miami River Corridor had to offer.

"One of the things identified is that we have amazing assets, and our corridor rivals many across the country," Hall said. "It shined a light on how clean and healthy the Great Miami River is; it is one of the healthiest rivers in the state."

When the yearlong study was complete, communities throughout the region knew what amenities were available and that the region was on the right track, offering an extensive network of bikeways and water trails, a variety of riverfront parks with diverse activities, historic and cultural resources, and a growing interest in private investment along the corridor.

The study also noted challenges, such as gaps in the Great Miami River Recreational Bike Trail; low-head dams that negatively impact navigability, safety and water quality; lack of facilities that serve as activity hubs; levees that create visual and physical barriers to the river; the need for more lodging for overnight stays; and general park

improvements.

The entities involved also learned that there was a need for a unified identity for the corridor. Hall said the study spurred 18 communities to partner and provide funds to hire a marketing and communication firm to develop a brand and implement a placemaking project.

"The first step is to promote this region as a destination," Hall said. "We kicked off the placemaking project in January and expect the branding process to take four to five months."

Since its completion, the study is seen as a building block for communities, municipalities and agencies. Stakeholders plan to use this report as an important first step to promote the region, as base material for more localized and specific studies, and to present to their city councils or funding sources to help sell investment in river corridor projects.

"Everyone can take the report and use it to find out what could work for them," DiMisa said. "Other projects are coming out of it, and communities are working together. It provides a living document for these groups."

Hall said the corridor itself became the real amenity.

"As a comprehensive, connected set, this coordinated 99 miles is at the heart of our assets," she said. ☞

Corps removes grenades from Rock Island Arsenal housing area

By **Todd Hornback**
U.S. Army Corps of Engineers Louisville District

A partnership among federal agencies and contractors has cleared property of explosives at a housing project at Rock Island Arsenal, Illinois. The Arsenal contacted the U.S. Army Corps of Engineers, Louisville District, after discovering a 40mm grenade during a preliminary sweep within a housing development.

"Since it is a housing area, we decided to do a full clearance of the site to a depth of 2 feet," said Nicholas Stolte, project manager for the Military Munitions Design Center (MMDC) at the Engineering and Support Center, Huntsville, Alabama, adding safety was a priority for the removal. "The 40mms are one of the most sensitive unexploded ordnance items that we encounter. The slightest movement can cause a detonation."

The U.S. Army Environmental Command (USAEC) requested the Corps to execute a removal action with the objective to have the 4.12 acres cleared by Dec. 23, 2015. The Corps received funds Oct. 1 and awarded the contract by Nov. 19. To facilitate the project schedule, the Huntsville Military Munitions Design Center prepared the Explosive Safety Submission, known as an ESS, and staffed it for signature by the Department of Defense Explosive Safety Board in Washington, District of Columbia, while the team worked on the procurement. HydroGeoLogic Inc., the contractor, prepared work and safety plans. The team held biweekly project delivery team conference calls in the first two weeks of December and approved the contractor to perform the removal action Dec. 11 with approved work plans and ESS.

"The process normally takes three to four months, but all parties worked together to meet the client's objective," said Brooks Evens, a Louisville District geologist and technical manager.

The team cleared more than four acres, investigated more than 5,300 metal objects referred to as anomalies, and safely disposed of two M406 40 mm high explosive grenades. The contractor completed the removal action 32 days ahead of the 60-day required work schedule starting Nov. 23 with completion Dec. 21, 2015.

The Louisville District project team; Military Munitions Design Center representatives from the U.S. Army Engineering and Support Center, Huntsville, with support from the Baltimore District MMDC, USAEC, Rock Island Arsenal and HydroGeoLogic, worked in unison to detect and remove the ordnance.

The removal required coordination with the installation to close one of the installation's primary roadways and evacuate non-essential personnel from adjacent buildings. Wintry weather conditions, frozen ground, underground utilities and safety requirements served as some of the obstacles the team overcame leading to a successful removal with no health or safety incidents.

The work minimized impacts to the installation, opened the road earlier than scheduled and garnered the contractor the 2015 Excellence Award for Environmental Services from the Society of American Engineers, Kentuckiana Post.

"We were able to accomplish the removal for the customer and the Army," said Evens. He added, knowing the importance of minimizing impacts to Rock Island Arsenal, everyone responded immediately to what was needed to accomplish the mission.

It is not uncommon for an installation to have unexploded ordnance, Evens said, but it is unknown why munitions hid below the surface at the Army Housing Site 2 when historical records did not document any munitions-related activity. One theory is that soil containing the grenades was brought in from an outside location as fill material. ☞

Contractors scan property at Rock Island Arsenal, Illinois, to detect metal objects up to a 2-foot depth. In the thorough scan of more than 4 acres, contractors found two grenades, including the M406 40mm grenade pictured below. (Photos by HydroGeoLogic)

