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Driving down fleet, fuel costs while keeping eye on mission

By Donald Johantges and Gregory Muilenburg
U.S. Army Corps of Engineers Great Lakes and Ohio River Division

The Great Lakes and Ohio River Division has been actively working to reduce costs in its non-tactical vehicle fleet, resulting in being recognized as a leader within the Army Corps of Engineers.

Division employees embraced the May 2011 Presidential Memorandum requirements to cut fuel usage relative to the division's 2005 baseline consumption and also Executive Order 13514 to increase the percentage of alternative fuel use. Thanks to an active command climate and the use of basic tools, the division has experienced a reduction of more than $575,000, or 10 percent, for its General Services Administration (GSA) vehicle lease expenses compared to just three years ago. The division also reduced fuel consumption by 16.7 percent, although mileage driven was reduced by only 14.6 percent, to approach the fiscal year 2014 Corps of Engineers goal of 18 percent. The division recently reached a milestone by recording 6.3 percent in alternative fuel usage versus the Corps of Engineers' overall goal of 5 percent.

The Great Lakes and Ohio River Division put a focus on reducing the number and size of its GSA-leased fleet in 2011, predominantly to reduce expenses. While its Corps of Engineers-owned vehicles have remained steady at 40, its GSA-leased vehicles dropped from 1,003 in 2011 to 873 by the end of 2014, an approximate 13 percent reduction in terms of number in the division's GSA-leased fleet. At the same time, the staff began "rightsizing" the vehicle fleet by downsizing the vehicles at replacement time. For example, the division has reduced heavy duty gas-guzzling vehicles from 61 in 2009 to seven in 2014, a greater than 88 percent reduction.

So how was the division able to chalk up these reductions while still accomplishing its mission? One tactic was the Project Share Program. With the ultimate focus on mission accomplishment, this program saves operating funds by sharing low utilization vehicles among nearby project sites. By analyzing utilization rates, the division has reduced the number of vehicles at each location, and by analyzing the vehicles' purposes it reduced the size of the type of vehicles that have been retained. For example, an F-150 pickup works just fine for team members working nearly entirely on paved roads, instead of an F-350 for hauling when the need to haul (especially off road) is very infrequent.

Another tactic was leasing more hybrid vehicles that would get more than 40 miles per gallon in a city or on the highway. Buy-in from the workforce was easy to obtain — explaining that dollars saved by not paying GSA leases and mileage fees could be used for maintaining projects within the districts, a way for the workforce to help speed along a few of the repairs. By applying these practices, Huntington District saved more than $100,000 in fiscal year 2014.

Rightsizing also includes increasing the use of Alternative Fuel Vehicles. Although nearly 50 percent of the division's leased vehicles are E85 flexible fuel vehicles, simply leasing these vehicles was not enough to realize the reductions in gasoline and the increased use of alternative fuels required by the Executive Order. It was necessary to provide the operators tools to assist them in reaching the division's goals.

In FY14, the division reported a 1.8 percent use of E85 fuel. Beginning in May 2014, the division deputy commander set a policy stating that E85 would be the fuel of choice for flex fuel vehicles and that missed opportunities, or times when E85 was available within five miles of a location where gasoline was used instead, would need to be explained to him by the deputy district commanders.

To assist the drivers in planning refueling as part of each trip, USACE Logistics Activity (ULA) employees placed E85 station location maps inside the log books of each vehicle. These maps show all E85 stations within 25 miles of the home location for that vehicle, so a driver can fill up at a location as she/he is passing the station instead of making a special trip. ULA also has placed dashboard signs to remind drivers of the requirement to use the domestically produced, carbon neutral alternative E85 fuel.

One aspect of the E85 program is the requirement for E85 stations to report transactions and usage through GSA. During a review process, division staff found that some of that reporting was not properly occurring; the diligent efforts of the ULA staff at the districts and the requirement to report non-usage of E85 helped identify those stations that were inaccurately reporting. When possible, the division has diverted employees from those stations and reported those locations to GSA in hopes that the stations will fix their problems so they can be used again. Another discovery was that many of the flex fuel vehicles were home based at locations without adequate supporting infrastructure (re-fueling points).

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Army publishes strategic roadmap to energy security, sustainability

By Dennis K. Bohannon
Office of the Assistant Secretary of the Army for Installations, Energy and Environment

The Army has published its strategic roadmap to future energy security and sustainability — the Energy Security and Sustainability (ES2) Strategy — to foster a more adaptable and resilient force, prepared for a future defined by complexity, uncertainty and rapid change.

"This strategy represents a turning point," Under Secretary of the Army Brad R. Carson and Army Vice Chief of Staff Gen. Daniel B. Allyn said in a letter to Army leaders.

"The Army is evolving from a historic framework that viewed resource considerations as constraints on operational effectiveness — to a perspective that considers the critical role of energy, water and land resources as mission enablers. Such an integrated perspective requires balanced decisions to achieve the greatest military benefit while keeping faith with civilian communities.

"We must be able to accomplish our missions in a world defined by uncertain, adverse and dynamic conditions. Maintaining our tactical and strategic edge heavily depends upon the wise use of our resources — energy, water and land — to preserve future choices through superior knowledge, technologies and execution," they said.

With this perspective in mind, the ES2 Strategy positions the Army to enhance its current and future capabilities, readiness and performance by building upon its ability to employ resources effectively to support all aspects of operations through effective system design and integration of resource considerations into behaviors and decision processes.

The strategy outlines five goals — Inform Decisions, Optimize Use, Assure Access, Build Resiliency and Drive Innovation — which will be achieved through steady progress across the Army enterprise with targeted measures and metrics as guides. The ES2 Strategy expands on and replaces the 2009 Army Energy Security Implementation Strategy by including operational energy and sustainability while strengthening the focus on resource management. The document complements the Office of the Assistant Secretary of the Army Installations, Energy and Environment Strategy 2025 and the Army Strategy for the Environment by emphasizing energy and including recognition of water and land as equally essential resources. Read the report at http://usarmy.vo.llnwd.net/e2/c/downloads/394128.pdf.

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The Newburyport Harbor north jetty in Salisbury, Massachusetts, and the south jetty in Newburyport, damaged during Hurricane Sandy are being repaired by Cashman Equipment Corporation, of Braintree, Massachusetts, under the terms of an $8.2 million contract awarded April 2 by the New England District. Work, which consists of repairing the north jetty in Salisbury and completing repairs to the remaining most seaward 140 feet of the south jetty in Newburyport, is scheduled to take about 12 months to complete. About 30,000 tons of armor stone will be used, including approximately 5,000 tons of 14- to-19-ton armor stone, according to Project Manager Jack Karalius, New England District Programs/Project Management Division. Funding is provided by the Disaster Relief Appropriations Act of 2013. The project will be managed by the New England District. For information on the project visit www.nae.usace.army.mil/Missions/CivilWorks/Navigation/Massachusetts/NewburyportHarbor.aspx***. (Courtesy photo)***

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

Delivering value to the nation

How do we build more resilient Army, civilian communities?

By James Dalton
U.S. Army Corps of Engineers
Chief of the Engineering and Construction Division and Lead for Climate Preparedness and Resilience

Many people are talking about resilience and climate preparedness these days, not just within the U.S. Army Corps of Engineers, but across the Army and the entire country.

Within the Army Corps of Engineers, folks are hearing about the USACE Resilience Strategy and the new Resilience program that we stood up this winter to help us better understand how we can best support the nation's movement toward more resilient communities. I believe the Corps of Engineers is well poised to further contribute to the nation's resilience in the face of climate change, disaster and other adverse events through our planning, engineering and design, construction, operations and maintenance, and research and development activities.

There are many definitions of resilience in use, but to those of us in the Corps of Engineers, we've categorized the essence of resilience into four actions: plan, absorb, recover and adapt. Taken together, these actions show how a project, a system or a community can be more resilient in the face of shocks or changes over time. The shocks and/or changes can come from man-made or natural occurrences — storms, dynamic coastlines, population changes, cyber threats, etc.

While the nation is focusing on resilience in this larger sense to save more lives and reduce resource losses, resilience is not a new concept for the Corps of Engineers. We have long incorporated it into our project design. We have numerous examples of projects, including the Mississippi River and Tributaries system, developed in the mid-1930s after the great flood of 1927. The decisions USACE made after the devastating 1927 flood were severely tested in 2011. However, the system performed exactly as envisioned — preventing more than $230 billion in flood damages.

Other examples of resilience can be found with the Hurricane Storm Damage Risk Reduction System in New Orleans and within the pages of the recently completed North Atlantic Coast Comprehensive Study, which looked at how systems operated during Hurricane Sandy and identified opportunities to help communities reduce risk and promote coastal resilience through both structural initiatives and natural features.


James Dalton

As we look at our examples of resilience, it is easy to see how climate change is a driving force for an increased focus on resilience. The world is experiencing more extreme and/or frequent natural disasters (flooding, droughts, fires, earthquakes), expanding urbanization and changing environmental conditions — all of which have resulted in severe and costly impacts to communities, including increasing risk to Army Corps of Engineers' operations, missions and infrastructure. We need to prepare ourselves for the uncertainty created by climate change.

We are incorporating climate preparedness through four strategies: Putting a focus on priority areas; engaging in external collaboration; improving our understanding of climate change impacts and vulnerabilities; and developing new policy and guidance to support adaptation implementation based on the best available and actionable science.

As part of this effort, we screened our Civil Works infrastructure to assess coastal vulnerability to climate change with the goal of designing appropriate measures to make them more resilient to change. We reviewed 5,545 projects, completed an initial vulnerability assessment on about 1,430 of them, and found that only about one-third were classified as vulnerable to changing sea level now or in the future. Of that one-third, only about 100 projects have very high or high vulnerability so our focus now is on further detailing that vulnerability and seeing where we can begin adapting them to make them more resilient.

But resilience is not just an engineering function. The future of resilience is in supporting community resilience. The Corps of Engineers is part of working groups of federal, academic, industry and non-governmental organizations to figure out how best to help communities, large and small, become more resilient. As we learn more about how to facilitate the dialogue on community resilience, we are looking at how best we can directly support a community's resilience efforts with tools, resources, data, technologies and technical expertise.

Intuitively, we understand that the communities have to define what community resilience means to them. The community has to ask tough questions, such as what critical facilities or systems have to recover first after a disaster? How can we inform our people when an emergency is occurring? How can we reduce the highest risks, and how do we address the residual risks? We must continue to remind stakeholders that risk can never be fully eliminated, and there is no 100 percent resilient project, system or community. The Corps of Engineers, other agencies and academia are working hard to develop tools ranging from the simple to the complex to help communities ask the tough questions and be able to assign precious resources to address risks and manage their critical assets.

An example of community resilience that we're actively exploring is on our military installations. We are working with Army installations to help them achieve Net Zero in energy, water and waste. By achieving Net Zero, our installations can more quickly recover from catastrophic events or minimize disruptions to mission operations. The Corps of Engineers is engaged in this effort as part of our responsibility to design and construct new facilities for the Army and to help them find alternative sources of energy. Military installation community resilience might be a great model for Anytown, USA, community resilience.

The Corps of Engineers plays an important part in the national dialogue at the local level where our infrastructure exists or when we are asked to consider a project in a community. We want to be able to help a community select a tool — whether our own or another accepted tool — it can use to help the community's population understand the risks and define their resilience needs. From there, we want to be able to use our resources, such as inundation mapping, to conduct "what if" analysis that will greatly aid in decision making.

Our goal is to further our contribution to resilience into the 21st century and to continue to deliver the greatest value to the nation that we can.

ENVIROPOINTS

Tiered partnerships pay dividends in complex cleanups

By Adriane Miller
Regional Environmental and Energy Office-Northern, U.S. Army Corps of Engineers Great Lakes and Ohio River Division
and Becky Shanks
Regional Environmental and Energy Office-Southern, U.S. Army Corps of Engineers South Atlantic Division

Protecting human health and the environment is part of every government agency's mission. But when cleanup and protection efforts involve many government agencies, nonprofits and community members, deciding who does what can get complicated.

Tiered partnering aims to streamline cleanup and remediation of challenging sites and make decisions easier for all involved. The Environmental Protection Agency's Regions 3 and 4 in the Mid Atlantic and Southeast have effectively used the tiered partnering approach since the early 1990s.

Tiered partnering cultivates communication and trust among participants; teams resolve problems faster, which saves time and taxpayer money, said Arthur Collins, EPA Region 4 Federal Facility Branch chief. "The Region 4 tiered partnering process has been one of the most successful processes since its inception into the cleanup efforts," he said. "There have been fewer formal disputes and more consensus on the cleanup approaches."

Participants say tiered partnerships are not low-maintenance — they require high degrees of commitment, patience and trust, and they can be fragile.

Fortunately, said Paul Leonard of EPA Region 3's Hazardous Site Cleanup Division, "there is a return on that investment. It keeps us talking about true, complex issues, rather than just throwing documents back and forth."

Breaking big issues into small pieces

Bringing all stakeholders together at once to "fix" complex problems is not always productive. Instead, EPA, state regulatory agencies and Department of Defense establish teams of like-minded people from each entity and group them in three tiers. The task of each tier is to break down the complex cleanup challenges contaminated sites present into smaller pieces, making them easier to resolve.

Generally, Tier I teams include scientific and technical staff at military installations who identify specific cleanup challenges and resolve as many as possible. Tier II teams consist of installation environmental managers and state regulatory agency project leaders who support Tier I teams by providing clarification and guidance, and raising policy conflicts to Tier III teams at the regional level. Tier III teams are senior staff at EPA regional headquarters, state agencies, and military service commands, who consider implications of the teams' decisions on national policy.

All teams begin with ample training in group dynamics, helping them find solutions respectful of others' positions with benefits for everyone.

The Army Regional Environmental and Energy Offices (REEOs) participate in and facilitate Tier II and III teams. Susan Gibson, director of REEO-Southern in Atlanta, co-chairs the Tier III team with EPA Region 4. She said bringing together the military services with EPA and the eight state environmental divisions helps them work through issues to avoid formal dispute resolution.

Tiered partnerships have helped resolve pivotal disputes among agencies, from how to prioritize the hundreds of cleanup project documents needing state review to deciding whether buried debris contains live munitions or harmless scrap.

Natural solutions

Until 2012, how to remediate a historic trichloroethylene (TCE) plume had been a concern for Fort Gordon installation staff, nearby Augusta, Georgia, residents, regulators at the Georgia Environmental Protection Division (GAEPD) and EPA Region 4. The plume had been traveling downhill toward a stream for decades, and while Fort Gordon removed TCE-contaminated soil at the remediation site in 2005, low levels of the toxin were still detected near the stream. The site was in a remote, mature forest with populations of endangered bird species.

For almost 10 years, Tier I and II Teams met to consider 40 remediation options. None of them were protective of the sensitive site and none were cost-effective. Nature handed the teams the 41st option, which was so simple it had been overlooked: an on-site artesian aquifer with upward flowing groundwater.

Starting on a small scale and with skeptical team members monitoring the work, Fort Gordon installed carbon-filled vessels below the land surface at the site. The pressure of the aquifer naturally forced the impacted groundwater into the vessels — "just like a big water filter," said Hagan Ratliff, the Fort Gordon contract restoration project manager. Carbon removed the TCE, and treated water discharged above gravel and into the flood plain.

The full-scale solution has been in use for nearly four years, requiring no external power source and no moving parts. Operation and monitoring are conducted regularly, with the carbon in each vessel expected to last up to seven years before it needs to be replaced.

Yet, Ratliff said the treatment option never would have been attempted if not for the deep sense of trust among Tier I and II partner members and the willingness of GAEPD to try a simple treatment for a complex problem.

Chemical weapons or scrap?

At the former Camp Sibert in northeast Alabama, buried chemical munitions containing phosgene and mustard agent from World War II presented the cleanup dilemma. Magnetometers indicated the location of more than 18,000 buried anomalies, but not what they were—munitions or scrap. Removing every anomaly would have been time consuming and costly.

Regulators from the Alabama Department of Environmental Management (ADEM) agreed to use a new advanced classification technique that could discriminate between scrap and munitions and help determine what needed to be removed. With coordination from nine separate government/contractor agencies, state and county emergency management agencies, ADEM, local businesses and residents, the U.S. Army Corps of Engineers Savannah District completed the removal action in 2013.

Julie Hiscox, USACE Formerly Used Defense Site program manager in Savannah, said the project was successful because of the effectiveness of the technology and the quality of the team members' relationships.

"We were all really focused on getting it done," she said. "We had the regulators with us on-site. They were as focused as we were on making progress, and did not view us as adversaries, but as part of the team."

The group met often, by teleconference and in-person, to review documents quickly and coordinate permits that needed to be signed at the same time to keep the project moving. She said the trust built by the partnering process and close sharing of field data convinced the regulators that the technology was effective and protective of property owners.

In the end, the regulators allowed 90 percent of the buried debris to remain where it was. That was significant, Hiscox said, as "Alabama regulators are a tough sell."

Everyone gets a 'win'

EPA Region 3's Leonard said tiered partnerships are not casual arrangements. "The nature of our partnering is that it is a very collaborative, nurturing atmosphere," he said. "But the teams themselves are held responsible for making progress at sites."

Leonard said a facilitator typically works with new teams to help everyone participate equally. The facilitator guides members to see where they have common ground, where they cannot bend and where they might have flexibility. Members learn how to negotiate so everyone gets a "win."

"When teams have personnel changes, it's imperative to get together," Leonard said. A well-established team can handle the lack of face-to-face meetings. But if the team is turning over, "it's important to meet, to have those sidebar conversations."

Laura Christ, CEO of communication firm Galen Driscol, who has facilitated tiered teams in Region 4 and other states, said members need to watch for mistrust that can creep into relationships when they aren't being nurtured.

"It is a commitment that requires buy-in and a willingness to cooperate," she added.

But the commitment does pay off. Jim Bateson, Superfund Section chief of the North Carolina Department of Natural Resources' Division of Waste Management, said the partnering process has been crucial in preventing small and large failures that could disrupt treatment, erode public confidence and jeopardize public safety.

"We benefit from long term relationships," he said. "Keeping those personal relationships is our number one priority in the face of change."

Climate Change Roadmap looks at water resources challenges

By Bryan Baker, Jeff Arnold and Kate White
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Climate Preparedness and Resilience Community of Practice

The U.S. Army Corps of Engineers is improving preparedness and resilience to climate change impacts according to its Climate Change Roadmap, by enhancing external collaboration, spurring development of actionable information for decision making about climate impacts to water resources and their adaptation, refining assessments of vulnerability, and developing policy and guidance. These efforts are described in the annual USACE Climate Change Adaptation Plan (www.corpsclimate.us/adaptationpolicy.cfm).

Climate Information

Effective climate preparedness and resilience decisions for water resources infrastructure require nationally consistent climate and hydrology data. Starting with funding under the American Recovery and Reinvestment Act of 2009 (PL 111–5), the Army Corps of Engineers joined with Climate Central, Lawrence Livermore National Laboratory (LLNL), the Bureau of Reclamation, the United States Geological Survey, Santa Clara University, Scripps Institution of Oceanography, Climate Analytics and the National Center for Atmospheric Research to create and maintain an archive of climate model outputs post-processed for ease of application to water-resources problems.

This archive, http://gdo-dcp.ucllnl.org/downscaled_cmip_projections/dcpInterface.html, contains climate model projections produced under the World Climate Research Program's Coupled Model Intercomparison Project (CMIP) experiments phase 3 and phase 5, downscaled to sub-continental domains for the contiguous United States and parts of Canada and Mexico using multiple standard statistical downscaling methods for temperature and precipitation. The archive also contains hydrologic projections driven by different subsets of those climate projections.

In 2013, the consortium developed downscaled outputs for the CMIP5 data set and has compared the results with the ones produced for CMIP3. Details from this ongoing project and results from applications of these model projections have been published and presented at well-attended sessions of the American Geophysical Union and other international venues. Consortium members continue to make progress on producing actionable climate and hydrology information. In 2015, we expect the release of additional climate hydrology that will enhance our understanding of potential future conditions.

Vulnerabilities

The watershed-scale screening-level Climate Change Vulnerability Assessment (VA) helps identify, assess, and rank climate change threats to the various authorized mission and operations of the USACE Civil Works program. The assessment is designed with modules so new information on the threats, their impacts, or on Army Corps of Engineers resilience can be easily incorporated in future iterations of the VA. This web-accessible, geospatially realized, indicator-based tool uses the climatology and hydrology projections from the common archive described above. New visualization techniques were developed for easier knowledge transfer and dissemination.

Based on business-line specific indicators, the VA has enabled the Corps of Engineers to identify the most vulnerable 20 percent of watersheds with Civil Works projects or program operations (flood risk reduction, navigation, ecosystem restoration, hydropower, recreation, regulatory, water supply, and emergency management). This information also can be used to support streamlined project planning in accordance with USACE Planning Modernization activities. Progressively more detailed assessments are planned in the future.

Climate Hydrology Guidance

Incorporating climate change considerations into hydrologic analyses is a priority action for the Corps of Engineers. Because there is no one-size-fits-all approach, this work is proceeding in stages.

The current Corps of Engineers guidance for considering climate change threats and impacts to inland hydrology is contained in Engineering and Construction Bulletin 2014-10, Guidance for Incorporating Climate Change Impacts to Inland Hydrology in Civil Works Studies, Design and Projects, published in May 2014. This bulletin establishes a formal procedure to perform a qualitative analysis of potential climate threats and impacts to Corps of Engineers hydrology-related projects and operations, and establishes the approach the agency is using now to develop its guidance for quantitative assessments of climate change threats and impacts to program, projects and operations.

In addition to considering numerical model projections of future climates, the Corps of Engineers continues to use information from the very distant past to help frame characteristics of flood possibilities.

Techniques for using this paleoflood information and caveats for interpreting it are described in Engineer Technical Letter 1100-2-1, Appropriate Application of Paleoflood Information for Hydrology and Hydraulics Decisions, published in October. This guidance includes how and where paleoflood hydrology methods are relevant and appropriate for use in Corps of Engineers design and operations, with examples of decisions such as estimating flood peak magnitudes, volumes and durations for flood damage assessments, or evaluating design criteria using the minimum essential guidelines. Other technical guidance and supporting tools also are being developed.

Way Ahead

James Dalton, chief, Engineering and Construction, is the lead for climate preparedness and resilience in the Corps. Recently he was named the Corps of Engineers lead on resilience, and has designated a resilience program manager to identify the broad spectrum of activities the Corps of Engineers engages in with respect to resilience. The program manager and supporting team are establishing a common operating picture on Corps of Engineers resilience efforts, effectively communicating the extent of those efforts, and will develop a long-term strategy to mainstream resilience into Corps of Engineers programs, policies and procedures.

Through these efforts, Corps of Engineers professionals are better able to take steps to ensure projects and infrastructure can be made more resilient.

Climate change considerations for INRMP updates

By Nicole Sikula
U.S. Army Environmental Command

When Fort A.P. Hill's staff needed to gauge the possible effects of climate change on the installation's most critical natural resources, they partnered with the U.S. Army Environmental Command (USAEC) to identify best practices that helped achieve the Virginia installation's objective and can assist installations Armywide.

The Department of Defense now requires military installations to consider climate change when updating their Integrated Natural Resource Plans.

In response, Fort A.P. Hill planned to update its INRMP with information about the potential climate change effects on the federally listed threatened swamp pink plant (*Helonias bullata*); and the oak-pine forests that define the habitat. Working with USAEC helped identify a number of resources that made their task less daunting.

One means of informing managers about the potential impacts of climate change on their natural resources is the Climate Change Vulnerability Assessment (CCVA) as described by National Wildlife Federation's Guide to Climate Change Vulnerability Assessment available online at http://bit.ly/1BKzoUk.

"The CCVA was our first step toward evaluating potential impacts of climate change to natural resources management," said Jason Applegate, natural resources program manager at Fort A.P. Hill.

"Over the years, cumulative habitat destruction from development, draining and filling of wetlands, and timbering and clearing activities significantly reduced the natural range available for Helonias," Applegate said. "While Fort A.P. Hill hasn't experienced that habitat destruction, altered hydrology is still the principal threat to Helonias. We need to know if climate change could alter hydrology, impacting Helonias sites."

At Fort A.P. Hill's request, USAEC developed a specific CCVA methodology by studying various climate change models and data sources to identify the most precise, up-to-date and user-friendly models available to installation managers. USAEC recommends the following for use in developing a CCVA.

The U.S. Geological Survey's National Climate Change Viewer (http://on.doi.gov/1fkrgQL) helps determine installation-level exposure to climate change variables. This service offers downscaled climate change projections from the latest global climate models.

NatureServe's Climate Change Vulnerability Index (http://bit.ly/17NfeQB) can help rank the relative sensitivity of species, especially for installations that do not plan to develop a full ranking of relative vulnerabilities of multiple species. This tool is a free download and considers every major aspect of species sensitivities. It uses threshold criteria to rate species based on extensive species-level research across the United States. The use of national criteria makes this tool very useful.

The ecosystem-level models USAEC reviewed were less informative. In the Fort A.P. Hill CCVA, USAEC used the U.S. Department of Agriculture's Forest Service Climate Change Tree Atlas, a multi-species-based model.

The Atlas maps result in a complex climate-change model that assesses the vulnerability of 134 eastern U.S. tree species. Predictions from this model are based on assumptions that do not consider actively managed forests, as on military installations. However, the results emphasize the importance of best management practices and may help inform or reprioritize INRMP objectives.

"Going forward, I think that CCVAs will need to be revisited every few years to be updated based on the latest model predictions," Applegate said.

Climate change adaptation is a process rather than an outcome. Adjusting the INRMP and associated management plans to align current goals with climate-informed goals, requires information gathering. CCVAs provide a starting point for INRMP updates by giving managers a data-driven, risk-based decision analysis.

Integrated Natural Resources Management Plans

Title 16 of the United States Code (USC) §670, commonly referred to as the Sikes Act, is a law requiring the Department of Defense to develop and implement Integrated Natural Resources Management Plans (INRMPs) when appropriate, for military installations across the United States. INRMPs are prepared in cooperation with the U.S. Fish and Wildlife Service, the National Oceanic and Atmospheric Administration, National Marine Fisheries Service, and state fish and wildlife agencies and should reflect the mutual agreement of the parties concerning conservation, protection and management of fish and wildlife resources.

The Army has 157 installations with significant natural resources, thus each installation is required to develop and implement an INRMP for the management and use of the lands on their installation.

Learn more about INRMPs on the U.S. Army Environmental Command website: http://aec.army.mil/Services/Conserve/NaturalResources/SikesAct.aspx.

Helonias bullata*, or swamp pink, is an obligate wetland species occurring along streams and seepage areas in freshwater swamps and other wetland habitats. Fort A.P. Hill's Integrated Natural Resource Plan addresses potential climate change effects on the swamp pink plant. For more about the endandered species, visit** www.fs.fed.us/wildflowers/Rare_Plants/profiles/TEP/helonias_bullata/index.shtml ***(Photos by Steve Croy, U.S. Forest Service website)

Fort Campbell forestry, food programs cultivate partnership

Story and photo by Amy Newcomb
Fort Campbell, Kentucky

As John Paul Hart opened the door to a walk-in cooler, he revealed thousands of saplings waiting to be planted. Approximately 18,000 trees would be planted on Fort Campbell, while 3,000 would be given to schools and Arbor Day participants April 24.

Hart, an installation forestry technician, may have been in a bind if not for the help of Roman Singleton, Installation Food Program manager, because the tree saplings had to be in a refrigerated environment prior to planting.

The previous year the Fort Campbell Directorate of Public Works environmental division used the Morale, Welfare and Recreation cooler, but because of renovations, that was not an option this year, Hart said.

John Paul Hart, installation forestry technician, holds two of the thousands of tree saplings set to be planted on post. The Environmental Division of the Directorate of Public Works recently acquired a walk-in cooler from the Installation Food Program, following the closure of several dining facilities across Fort Campbell. The Installation Food Program cooler will house the saplings, which need to be stored in a refrigerated environment, until Arbor Day.

"When you keep them in a cooler, the trees still think they are dormant," Hart said. "So, if we keep them in a cooler, we have a greater window to plant."

Without a cooler, the forestry section would have needed to plant the tree saplings within just a few days, and with the uncooperative spring weather, this could have posed serious issues, Hart said.

Luckily, after several Fort Campbell dining facilities closed, the Installation Food Program recovered four walk-in coolers, two of which were in excellent condition.

"One of them went to the Forestry [Division], and one we have on standby because we have a facility we think may need increased capability," Singleton said. The walk-in cooler was delivered to the forestry section, but until it was up and running Singleton let the forestry section store the saplings, along with 5,000 saplings that belong to the U.S. Forest Service, in another cooler he has on-hand to safeguard the supply. He said the forestry section supervisor Scott Osborne "called and told him he had some 26,000 trees that he needed to store.

"That's a lot of trees, so I definitely tried to help him as much as I could," Singleton said.

The storage unit repurposed for the forestry section cost approximately $27,000, with the average cost of the walk-in coolers being $30,000 each. Without finding another use for the coolers, they would have been turned into the Defense Logistics Agency disposition services to be auctioned for a fraction of the value or disposed of without profit.

"Fort Campbell is big on recycling, and rather than it going to DRMO — that was a no-brainer really," Singleton said. "We don't want to throw away something that is reusable."

The two units no longer capable of functioning as a liquid cooling system will be recycled for dry storage.

"Those were inoperable, and we had numerous maintenance issues with them," Singleton said. "We are going to repurpose them as storage units."

Singleton's actions encompass the Qualified Recycle Program's "Reduce, Reuse and Recycle" message.

"The Army is going to a new program — Net Zero — where whatever we get, we keep and don't waste it," said Rob Anderson, Fort Campbell's Qualified Recycle Program manager. "We are trying to reduce what we are throwing away and create a waste diversion."

The Army's Net Zero Initiative is a holistic strategy founded upon long-standing sustainable practices and incorporates emerging best practices to manage energy, water and waste at Army installations.

"These coolers were utilized at the mess halls for many years, and the military in a way got their money's worth out of it, and now they got moved to the cold storage facility to continue to be used here on the installation," Anderson said. "It was a concentrated effort from several different departments … everyone was willing to play because it was the right thing to do and everyone benefits."

Installation plants more than 23,000 seedlings this spring

By Amy Newcomb

In two weeks this spring the Directorate of Public Works Environmental Division's forestry section planted 18,000 shortleaf seedlings and 5,000 hardwood seedlings across Fort Campbell. While most of the trees were planted in training areas, some were placed in old fields or areas inaccessible for training that needed to be reforested. In addition, about 650 trees were planted in parks across Fort Campbell, said Scott Osborne, forestry section supervisor.

The forestry program supports the Integrated Natural Resources Management Plan, which sets the standard for the management of natural resources. The forestry's management plan is a sub plan of that program and is governed by the Sikes Act, which recognizes the importance and value of military lands to natural resources, according to Osborne. He said the shortleaf pine is a longer-lives species that has proven to be supportive of the region's native and endangered species.

"For instance, there are cases where Indiana Bats use shortleaf pine trees as roosting sites for their maternal colonies, so reintroducing these will at some point in the future provide habitat for species that are at risk or threatened or endangered," he said.

In addition, the shortleaf pine behaves much like oak in its natural processes. An oak and pine mix of shortleaf, is more suitable for military training because it allows for more even spacing which supports maneuver and training.

"That's what we are here for — we are here to support training. By planting a native species that stands up to training, that will help the mission."

The goal is to reforest 1,000 acres of Fort Campbell in shortleaf pine by 2025. Currently, the installation has loblolly pine, shortleaf pine and white pine, with shortleaf being the only native species to this region. The forestry section has already committed to 36,000 seedlings for next year, Osborne said.

Environmental scientist supports Ebola mission

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

Ask Jennifer McCarthy about Liberia and her face brightens as she talks about the children, the people she met, the progressive government she has seen in action, and the scenery. She is quick to share photographs. Only after she has talked about all that does the environmental scientist for the U.S. Army Corps of Engineers New England District mention Ebola.

Ebola, however, is the reason McCarthy deployed to Monrovia, Liberia's capital, as a member of the U.S. Army Corps of Engineers Europe District Forward Engineer Support Team-Advanced (FEST-A), which provided technical expertise to the organizations, military units and humanitarian workers supporting Operation United Assistance.

"We have had some wonderful opportunities to solve problems and influence how environmental challenges are addressed here," McCarthy said earlier this year in an email back to Headquarters.

"The Army is doing some innovative things with wastewater — from the Expeditionary Wastewater Recycling System that's been tested in my backyard (Fort Devens, Massachusetts) to the Force Provider Shower Water Reuse system that recycles/reuses about 80 percent of the gray water from showers, which has been one of the largest demands for bulk water and sources of wastewater. It's exciting to see these innovative technologies put into place here!

"Proper handling and disposal of medical waste is also extremely important in this environment, both because of the risks associated with Ebola and the lack of sophisticated waste management infrastructure in this contingency environment.

"I'm happy and honored to be able to work with AFRICOM and USACE, and move the ball down the field a bit in these areas," she wrote.

Now that she has returned from Monrovia, she has had some time to reflect on the mission. "It was a completely different and unique mission," McCarthy said. "It is so important for districts to support deployees. I know it was a burden for folks in New England District, but they were very supportive, and that is crucial."

> "We have had some wonderful opportunities to solve problems and influence how environmental challenges are addressed [in Liberia]. ... I would definitely do it again — it was challenging, difficult, frustrating, but incredibly rewarding."
>
> — Jennifer McCarthy
> New England District Environmental Scientist

While in Monrovia, the 13-member FEST unit did base camp planning, environmental surveys and real estate actions. From an engineering perspective, the emphasis was on on-site assessments for Ebola Treatment Units and lab sites, route reconnaissance, runway repairs, and solving generator malfunctions, drainage problems and plumbing issues.

Ebola killed more than 11,000 people in West Africa, 4,716 of them in Liberia. Liberia benefited from a fairly strong central government that made a huge effort to get the word out and educate its populace, McCarthy said. On May 9, the government of Liberia declared the country Ebola free.

"We found that people were so happy to see us," she said, even though the team did not have many opportunities to interact with the people of Liberia and was pretty much restricted to the task force base camp, Barclay Training Center, during its stay.

"It really was great, even though it was horrible in so many ways. We met the most wonderful people who were so happy we were there. It was great to be a part of mission like this.

"I would definitely do it again — it was challenging, difficult, frustrating, but incredibly rewarding," McCarthy said.

For the New England District regulatory chief, the mission to Monrovia was not her first deployment as part of the Corps of Engineers, but it was her first as part of the Environmental Support Team that provides trained environmental team members for FEST units. After all, she had only become an ENVST member last year and wasn't really expecting to be heading off so soon. However, when the opportunity came to be part of the FEST-A unit, she agreed to go.

"I see a growing role for environmental people to be part of these teams," she said. "There's a real need for environmental surveys and to identify the environmental challenges. There was a great deal of concern about drainage and a need for baseline soil and water testing, and a great deal of focus on waste management, especially medical waste.

"It behooves the Army and the United States to minimize harm to troops and the environment, and to reduce the cost of cleaning up afterwards. I kind of liken it to the doctor's oath, 'first do no harm.' That is what we need to do on these types of missions.

New England District Environmental Scientist Jennifer McCarthy in Liberia as a member of the U.S. Army Corps of Engineers Europe District Forward Engineer Support Team-Advanced that provided technical expertise to the organizations and military units supporting Operation United Assistance. (Courtesy photo)

"We want to try to help people, to make their conditions better. While it is important to accomplish the mission and protect our own troops, we have to be protective of the host nation's health and environment, as well.

"We can export our environmental values and lead by example, and we have to be careful to not do things that could leave conditions worse," McCarthy said.

The U.S. Army Corps of Engineers Transatlantic Division is hosting a deployment opportunities webinar July 30. Learn more at www.tad.usace.army.mil/careers/deployments.aspx.

Chicago District Commander Col. Chris Drew with the district's first compressed natural gas (CNG) vehicle leased from General Services Administration (GSA).

Vehicles

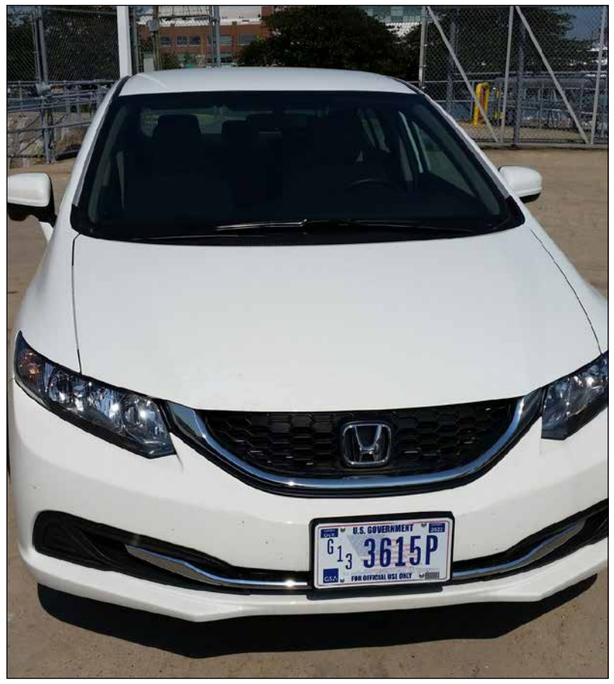
Continued from Page 1

When possible, those flex fuel vehicles have been swapped with gasoline only vehicles that were based in plentiful E85 locations.

In September 2014, Chicago District leased the first Compressed Natural Gas (CNG) vehicle in the USACE vehicle fleet, a sedan that is getting more than 40 miles to the gasoline gallon equivalent in a mostly urban environment. Feedback has been so positive that Chicago District now is pursuing the first CNG pickup for USACE, as well.

What is the result of all of these efforts? In fiscal year 2014, the division reduced gasoline consumption by 14.6 percent relative to the FY05 baseline compared with the 11 percent average reduction for the Corps of Engineers as a whole. In addition, in the first quarter of fiscal year 2015, alternative fuel usage within the division has increased to 6.3 percent, which exceeds the Corps of Engineers goal of 5 percent, while the average for the agency as a whole for alternative fuel usage has remained below 1 percent.

Chicago District first in USACE to put compressed natural gas vehicle into use



ABOVE: The district's Honda Civic with 4-cylinder CNG engine BELOW: A view of the CNG vehicle's unique refueling nozzle. (Photos courtesy Chicago District)

By Gregory Muilenburg
U.S. Army Corps of Engineers Great Lakes and Ohio River Division Regional Logistics Manager

With the Sept. 19 receipt of a compressed natural gas (CNG) vehicle, Chicago District laid claim to being the first district within the Army Corps of Engineers to acquire a CNG vehicle from the General Services Administration (GSA) in direct support of Executive Order 13514, which mandates the increased use of low greenhouse gas emitting vehicles including alternative fuel vehicles.

With emphasis from the Chief of Engineers, a marketing campaign took root at the Great Lakes and Ohio River Division Headquarters with the goal of acquiring a CNG vehicle from GSA for use at one of the division's district offices. Based upon data available through the U.S. Department of Energy's Alternative Fuels Data Center, fueling and maintenance locations, comparative fuel cost analysis and infrastructure within district locations, Chicago District agreed to pursue purchasing a CNG vehicle. The infrastructure in Chicago was found to be optimal and mature, equipped to support alternative vehicles, especially when the team found public gas stations providing compressed natural gas were located within 2 miles from the district office and a dealership that could provide maintenance was approximately 5 miles away.

To transition from a theoretical possibility to reality took education, cultural change, buy-in and command support at the district level and good staff work from Greg Muilenburg, the division's regional logistics manager; Jessica Kotleski, Chicago District logistics manager; and Eileen Grant, former USACE Logistics Activity transportation chief, all of whom were instrumental in early delivery of the vehicle. Although District Deputy Commander Lt. Col. Randal Lovell was initially skeptical, he soon became one of the biggest fans for the initiative, joining Don Johantges, the division's military integration division chief, who served as a division level cheerleader.

After months of work and research, the district received its new CNG vehicle, a Honda sedan, complete with modern features, including a camera activated when the right or left turn signal is on showing the distance of other vehicles/objects.

The first employees to drive the new CNG vehicle did have some trepidation, especially when it came to refueling, in part because of its fuel receptacle nozzle used for fueling natural gas. The CNG nozzle is firmly inserted into the vehicle fuel receptacle until locked and sealed before beginning the fueling process, which takes approximately four to five minutes. The fuel gauge is a little slower to move, but then again ... it's trying to register natural gas!

With 1,426 miles of city urban driving registered so far, the vehicle is getting approximately 48.5 miles per gallon of compressed natural gas.

While there is always a transition period with any new technology, with proper education, training and openness, the CNG sedan is being recognized as a successful transition from the norm. If mission requirements can be met with this sedan, a fleet of CNG vehicles and a greener environment may be in the not too distant future.

After several months in use, the initial verdict is in. Chicago District is not only excited to be on the cutting edge of the federal mandate to go green, but has also requested a CNG pickup for its fleet. The request is in the acquisition cycle.

Secretary of Defense recognizes Army environmental successes

By Cathryn Kropp
U.S. Army Environmental Command

The Army's investment in its environmental sustainability, acquisition and cultural resources programs recently reaped dividends with recognition in four categories of the Secretary of Defense Environmental Awards Program.

Camp Blanding Joint Training Center, Florida, earned the Natural Resources Conservation award in the large installation category. For details on the Center's environmental accomplishments, visit www.army.mil/article/144167/ and read their award nomination at www.denix.osd.mil/awards/upload/Camp-Blanding-Joint-Training-Center,-Florida-Army-National-Guard.pdf.

The Minnesota Army National Guard Sustainability team earned the team/individual Sustainability award. For more information on their efforts, click here www.army.mil/article/144261/ and see their award nomination at www.denix.osd.mil/awards/upload/Minnesota-Army-National-Guard-Sustainability-Team,-Minnesota.pdf.

U.S. Army Garrison Picatinny Arsenal, New Jersey, received the Cultural Resources Management award in the small installation category. The installation's program is described at www.army.mil/article/144092/ and view their award nomination by clicking on www.denix.osd.mil/awards/upload/U-S-Army-Garrison-Picatinny-Arsenal.pdf.

The Halon Extinguisher Replacement Program for Aviation Weapon System Integrated Process Team was awarded the small program Environmental Excellence in Weapon System Acquisition award. Read about their accomplishments at www.army.mil/article/144244/ and click on the following link to review their award nomination www.denix.osd.mil/awards/upload/Halon-Extinguisher-Replacement-Program,-Redstone-Arsenal,-Alabama.pdf.

The Secretary of Defense Environmental Awards also recognized the Air Force for Environmental Quality in the industrial installation category and for the individual category of Cultural Resources Management. The Marine Corps captured the Environmental Quality award for an overseas installation, the Sustainability award for a non-industrial installation and the installation Environmental Restoration award. More information on those awards is available at www.denix.osd.mil/awards/FY14SECDEF.cfm.

The Secretary of Defense Environmental Awards recognize individuals, teams and installations that distinguish themselves in supporting mission readiness through environmental acumen. "Their efforts strengthen the department's position as an environmental leader by integrating cost-effective environmental management with our national defense mission, thereby saving critical resources and helping to keep our country safe through sustained mission readiness," said Frank Kendall, undersecretary of defense for acquisition, technology and logistics.

Customer-focused transformation increases Army Environmental Command responsiveness

U.S. Army Environmental Command Public Affairs

The U.S. Army Environmental Command is transforming. A new regional support structure increases the staff's ability and agility, while enhancing technical capabilities. This allows the command to focus on customer priorities, new and changing laws and regulations, stationing actions, evolving weapon systems, budget realities and better business practices that drive its workload.

"As the Army and its installations' environmental needs change, USAEC must provide services and solutions to minimize the impacts the Army has on the environment and to minimize the impact environmental compliance has on Army training and operations now and in the future." said USAEC Commander Col. Rob Wittig.

Everyone in the command is involved in the restructure, designed to increase responsiveness to customer needs and facilitate improved communications. The focus is collaboration with internal and external Army Environmental Program partners and building organizational, as well as individual, relationships.

The commander considered input from USAEC customers, Army Environmental Program partners and higher headquarters in developing the redesign. Feedback from one-on-one meetings with USAEC team members and planning sessions with the division and branch supervisors, were considered along with the input from the command's Armywide customers.

The transition, which took effect Jan. 26, dedicates a significant portion of the staff to handling installation- or region-specific issues. It also maintains a team of functionally focused technical experts to provide installations with customized environmental support. USAEC is working with customers to identify areas for improved service and expects to fully integrate all changes by Oct. 1.

"We identified changes in our customers' needs and established an especially aggressive schedule to be responsive to their requirements," USAEC Command Sgt. Maj. Joe Ulloth said. "We're on track to meet that schedule."

The resulting organization comprises four Environmental Service and Support Divisions (ESSDs), three National Capital Region Environmental Service and Support Coordinators, an Environmental Solutions Division, Organizational Support Division, Office of Counsel, and Environmental Futures, Communications and Engagement Team.

Each Environmental Service and Support Division supports a geographical region. Team members provide a wide spectrum of environmental services and support to installations within their region. Environmental resources from USAEC, other Army partners, or contractor support, is used to meet the installation's environmental requirements. USAEC environmental services managers within the ESSDs work with one or more installations as the support desk or single point of contact for those installations.

National Capital Region Environmental Service and Support Coordinators provide key communication links with partners and customers supporting the Army Environmental Program. These individuals build relationships with their assigned partners or customers; obtaining important and immediate feedback through direct and frequent communications. They will coordinate work with the divisions and help prioritize USAEC services and support to their partners and customers to ensure USAEC is meeting customer needs.

"Though resources are limited throughout the Army, staying in close contact with our partners and customers makes the command more efficient and effective," Wittig said. "We are already seeing the benefits of the three coordinators working with our partners in the National Capital Region."

The Environmental Solutions Division provides the highly responsive central program management support and technical expertise for the command. The ESD is where technical experts on air, water, waste, natural resources, cultural resources, and pest management reside, along with National Environmental Policy Act practitioners. They are responsible for looking at regional and Army-wide environmental challenges to minimize or eliminate training impacts and environmental liabilities for the Army.

The Organizational Support Division provides management support functions, including operations and logistics; personnel, training and workforce development; and resource management. USAEC is designing and coordinating training for all IMCOM environmental professionals, as well as the continuous development of internal technical experts.

The Environmental Futures, Communications and Engagement Team leads the effort on strategic planning for the command and determining the best way to communicate current Army Environmental Program successes and goals to partners, customers and stakeholders.

While USAEC's staff has supported its customers since 1972, the command sees the redesign as an opportunity to position its team for the future and optimize the volume, speed and quality of its Armywide support. USAEC's goal is to be an innovative, value-added, customer-focused partner, providing environmental services and solutions to the Army through expertise, communications and partnering.

New strategy balances needs of military with needs of Northern Long-eared Bat

By Lucas Cooksey
U.S. Army Environmental Command

For the first time, the Army conducted regional programmatic endangered species conferences under Section 7(a)(4) for Army installations across 13 states with the U.S. Fish and Wildlife Service.

The U.S. Army's Assistant Chief of Staff for Installation Management (ACSIM) staff led an initiative to conduct programmatic Section 7 conferences for both U.S. Army Installation Management Command (IMCOM) and the Army National Guard installations across the known U.S. range of the Northern Long-eared Bat. The bat, known as NLEB and to biologists as *Myotis septentrionalis*, was listed as a federally threatened species May 4.

The regional programmatic approach was coordinated with Region 3 experts of the U.S. Fish and Wildlife Service (USFWS), as they are the species lead for the NLEB. The Army and USFWS worked together to develop a mutually agreed upon conference report. This cooperation results in simultaneous military mission accomplishment and conservation for the NLEB. The payoff of this cooperation is reduced time and manpower and increased cost savings for both federal agencies and ultimately the U.S. taxpayer.

When new species are listed under the Endangered Species Act of 1973, known as ESA, all federal agencies have an unwaiverable duty to ensure their actions do not threaten the long term recovery of that species. Typically federal agencies consult with the USFWS on individual projects and their locations under section 7(a)(2) of the ESA. This generates numerous individual actions that the agency prepares and USFWS reviews. When listed species have a localized range, this process is not a problem. When species are listed with an extensive range, the complexity of Section 7 consultation is exponential.

When the NLEB was listed by the USFWS as a threatened species under the ESA in May, the Army immediately recognized the impact this could have on operations. The NLEB has a historic range that covers all Canadian Provinces, 37 U.S. states and the District of Columbia.

In recent years the NLEB has seen up to a 99 percent population decline in surveys in the Northeast. Declines are attributed to white-nose syndrome caused by a fungus. Infected bats act strangely and arouse often while hibernating, using up valuable energy stores during the winter. Bat survival odds are greatly diminished due to this weakened state.

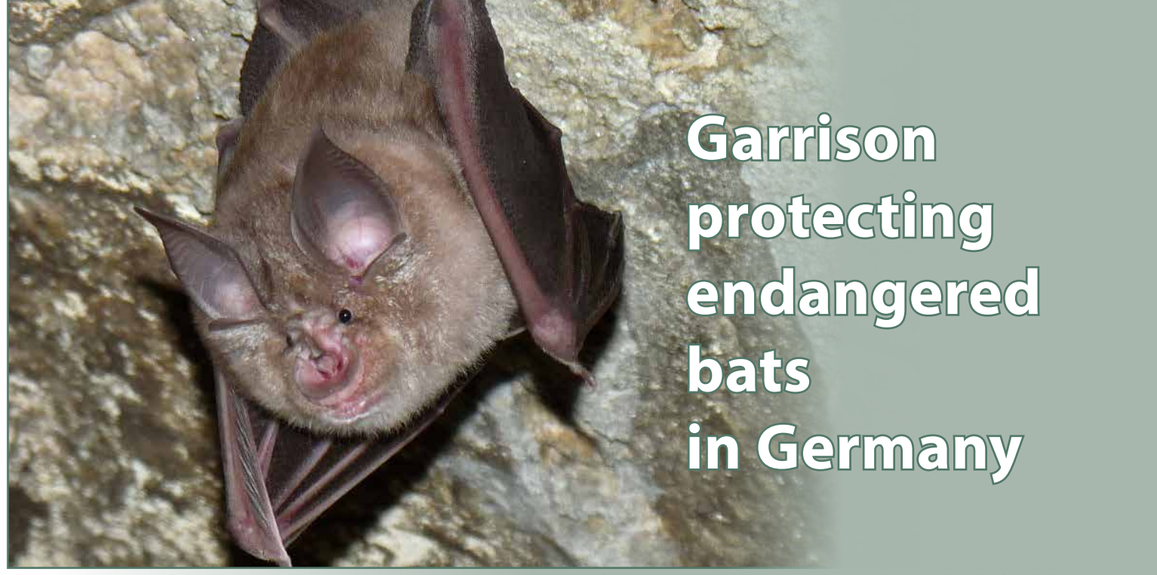
Twenty-five IMCOM installations comprising 809,000 acres, of which 453,000 are forested woodlands, are located in the NLEB's range. The listing of the NLEB creates the potential to either impact or cancel some mission essential activities to ensure ESA compliance. Given the range of these impacts across multiple installations a range-wide programmatic approach for this species was needed.

In a collaborative effort, members from ACSIM, USFWS, U.S. Army Environmental Command, IMCOM installation and headquarters staff, and the Army National Guard developed the IMCOM conference. The programmatic conference report was initiated, developed and concurred on in approximately 45 days, which is a testament to the dedication of all involved. It resulted in advisory measures to minimize or avoid jeopardizing the NLEB.

Military training, aircraft operations and recreation are covered without restriction for all locations through meeting a determination of "May affect, but not likely to adversely affect" coded as NLAA. NLAA is a keystone principle of the informal consultation process to ensure "take" of a threatened or endangered species does not occur, which would require formal consultation and much longer time frames. Other activities on installations such as use of smoke/obscurant, forest management, prescribed burning, construction and pest management also continue, but with the implementation of simple conservation measures. These measures include project timing and protective buffers; restrictions that can be reduced or eliminated through USFWS protocol surveys or local consultation between the installation and the USFWS field office.

The regional conference process initiated with the listing of the NLEB is new, but has proven both beneficial and efficient.

This programmatic conference report leads the way for follow-on consultations and/or revision as new information about the species or military missions emerge. Additionally, it can be used as an example in the future for other wide-range proposed species to ensure their protection in parallel with the conservation of lands that directly support the men and women who defend our freedom.



Garrison protecting endangered bats in Germany

Caves on Hohenfels Training Area provide a safe, quiet place for Greater Horseshoe Bats. (Photo Rudolf Leitl)

By Ron Grantham
U.S. Army Garrison Bavaria

More than 3,000 different species of flora and fauna thrive in the Hohenfels Training Area (HTA) in Germany, but for many people the most exciting creature here is the Greater Horseshoe Bat.

Named for its uniquely shaped nose "leaf" — which bats use to detect objects via reflected sound — the Greater Horseshoe Bat is protected through a coordinated effort by the U.S. military and German government.

While many people may have heard about this beautiful little bundle of fur, only a few may know that the species is extremely endangered in Europe. Therefore, the Greater Horseshoe Bat is the subject of widespread conservation activities by the Government of Bavaria, the Federal Forest Service and the U.S. Army Garrison Bavaria Environmental Division.

Under the guidance of renowned bat expert and project manager Rudolf Leitl, these three organizations partner to improve areas for the bats to breed, roost and hibernate, as well as find forage.

For example, in 1992 a nursery roost was found inside an old building in the nearby small town of Hohenburg. The building was repaired, with the nursery roost being further optimized in recent years, resulting in a growing bat population. Plus another nursery roost was made available on HTA, in the former village of Lutzmannstein.

Furthermore, recent renovations were made in cellars of several buildings in the former villages spread throughout HTA. These cellars are important as they provide uniformly cool places for bats to hibernate and to sleep during extremely hot summer days, and especially in autumn and spring.

Since 2012 there is an ongoing EU LIFE+ Project funded by the European Union, the Bavarian Nature Fund and the Hirschwald Nature Park. The U.S. Army and German Federal Forest (Bundesforst) also support this project, which covers 1,164 hectares (approximately 2,875 acres) on HTA. There the habitat has remained relatively unaltered and provides excellent conditions for the bat.

This is the first time an active military training area has been included as part of a LIFE+ Project in Germany. As part of the project, fruit trees have been planted as a joint effort to increase the amount of insects, which are the bats' main food source.

Also, grazing programs in cooperation with farmers from around Hohenburg were implemented. A breed of red cattle keep the meadows free from bushes and trees, ensuring a plethora of insects can thrive. Moreover, several dung beetle species, a favorite food source of horseshoe bats, are supported as they survive on the cattle's manure.

Oyster Restoration
Baltimore District, Maryland achieve key milestones

The U.S. Army Corps of Engineers, Baltimore District, places shell to restore oyster reefs in the Chesapeake Bay tributary of Harris Creek April 1. The shell comes from processing plants in the mid-Atlantic region and is permitted to be imported and placed in the river. (Photo by Sean Fritzges)

By Sarah Gross
U.S. Army Corps of Engineers Baltimore District

"We are committed to improving the health of the Chesapeake Bay through collaborative environmental efforts, including oyster restoration," said Col. Trey Jordan, commander of the U.S. Army Corps of Engineers Baltimore District. "The progress we have made — and continue to make — demonstrates the immeasurable value in working together to achieve a common goal."

In late April the Baltimore District, Maryland Department of Natural Resources (DNR), National Oceanic and Atmospheric Administration (NOAA) and the Oyster Recovery Partnership (ORP) began important oyster reef construction efforts in the Tred Avon River, just as restoration on 370 acres wraps up in Harris Creek. These efforts represent key parts of the statewide oyster restoration program that identifies the best tributaries in the Chesapeake Bay for restoration.

Work this spring in the Tred Avon River includes constructing up to 24 acres of reefs. In total, 147 acres are planned for restoration in this tributary.

Harris Creek will be the first tributary where restoration plans are completed. Through the interagency partnership, the State of Maryland has planted more than a billion oysters in Harris Creek since 2011. Areas that had less than one oyster per square meter now have upward of 25.

Successful oyster restoration requires leveraging funding and expertise from a number of agencies. NOAA, for example, maps the water bottom to tell the team the most suitable sites to place the reefs; these sites are then screened by the team to account for the location of navigational aids, docks and other potential navigational concerns. The Baltimore District and DNR provide funding and construction contracts to obtain the reef materials and construct the reefs. ORP plants baby oysters, or "spat-on-shell," on top of the reefs.

"Great progress is being made to restore the oyster population in the Chesapeake Bay, and great partnerships provide the path for success," said Angie Sowers, Baltimore District Integrated Water Resources management specialist. "This means not only inviting everyone to the table, but allowing for them to have a deeper involvement, especially those whose livelihoods depend on working in the Bay."

Government partnership serves as just one key element in the process. This spring, the district and its partners met with Maryland's Watermen Association several times to discuss a path forward for working more closely together throughout the planning and restoration processes. Following a series of meetings and visits to restoration sites, the team is modifying its initial plans and limiting the use of rock in the Tred Avon River for this construction effort. This change was made to minimize impacts to trotlining by crabbers. The remaining reef sites planned for this spring will consist of mixed shell that was initially to be placed at Harris Creek.

"To ensure we are truly being stewards of our taxpayers' dollars, we have to go above and beyond the outreach that is legally required of us," Jordan said. "It was invaluable to have the watermen with us on our vessels to see restoration at work, hold the actual reef materials in their hands and express to us their concerns."

Oyster populations in the Chesapeake Bay have declined considerably in the last century, due to several factors to include parasitic diseases and loss of habitat. Less than 1 percent remains of historic oyster populations. There is not sufficient natural shell available to restore oyster habitat in the bay; therefore, other materials like rock are used to construct reefs. For reefs constructed in Harris Creek and the Tred Avon, mixed-shell materials come from coastal processing plants, and the rock is quarried in Havre de Grace, Maryland. These alternate materials have proven to be successful at restoration sites, including Harris Creek.

Oyster restoration is critical for the health of the entire bay. Reef habitat provides a home not only for oysters but for animals like blue crabs and fish. Oysters are also filter feeders that improve water quality — a single adult oyster can filter up to 50 gallons of water in 24 hours. Oysters help with cycling nutrients, reducing sediment and storing carbon long-term to help mitigate global warming.

Although restoration only takes place in pre-existing sanctuaries, as established by Maryland DNR, the objective is for oysters to reproduce and settle not only within the sanctuary, but also on public shellfish fishery areas that watermen can access.

The goal, as laid out in Executive Order 13508, is to restore 10 tributaries by 2025 in both Maryland and Virginia. Thus far, partners have worked to restore three Maryland tributaries, including Harris Creek and the Tred Avon and Little Choptank rivers.

"In the end, we all want what is best for our bay, and this collaboration is creating a win-win situation," Jordan said.

For more information, visit http://bit.ly/NABoysters.

District, county enter partnership for Greens Bayou Flood Damage Reduction Project

U.S. Army Corps of Engineers Galveston District

The Galveston District and Harris County Flood Control District (HCFCD) are starting work on the Greens Bayou Flood Damage Reduction Project in north Harris County, Texas, this year due to $8 million in start-up funding allocated in the federal fiscal year 2015 budget for the Army Corps of Engineers' Civil Works program.

"The Greens Bayou Flood Damage Reduction Project includes approximately 3.7 miles of channel conveyance improvements from Cutten Road to Veterans Memorial Drive and approximately 108 acres of stormwater detention storage," said Shakhar Misir, USACE Galveston District project manager for the Greens Bayou project.

USACE is the lead agency on the $55 million project and expects to start construction later this year on the first phase of excavation of the stormwater detention basin located adjacent to Greens Bayou near Antoine Road and the Sam Houston Tollway. West Greens Drive bisects the basin, but it will function as a single flood damage reduction feature. Stormwater detention basins help to reduce flooding damages by safely storing excess stormwater during heavy rain events and slowly releasing it back into the bayou as water levels recede.

Misir said the district is preparing to enter into a Project Partnership Agreement with the Flood Control District for the estimated four- to five-year project construction period. That estimated schedule is contingent on funding by both the federal government and the HCFCD.

Under a Project Partnership Agreement, the district will manage, design and build the project; and, after construction is completed, will plant grass on disturbed areas of the bottom and sides of the channel and native trees where appropriate along the bayou's banks and on earthen benches constructed in the channel. Trees and grasses will be planted in and around the basin, with wetland plants placed in low areas as part of the landscaping. These features will create wildlife, water quality and recreation opportunity benefits. The HCFCD will buy land, easements and rights-of-way; relocate utilities and then operate and maintain the project after construction. The cost share will be approximately 75 percent federal and 25 percent local.

HCFCD Executive Director Michael D. Talbott said this is a prime example of what happens when USACE and HCFCD partner to reduce flooding risks.

"The Greens Bayou Flood Damage Reduction Project will bring much needed relief for nearby homes and businesses that have suffered flooding," Talbott said. "The district's strong partnership with the Corps allows us to leverage local tax dollars to achieve significant results."

Talbott thanked the Office of the Assistant Secretary of the Army for Civil Works for recognizing the need for this important project, and for its commitment to the Harris County region. He said the HCFCD would continue to work with its governing body, Harris County Commissioners Court, to allocate local funding needed to keep the project moving.

Grass Roots Efforts Reap Results

Supportive efforts by the Greens Bayou Corridor Coalition, which was formed out of a need to reduce flooding impacts in the 212-square-mile Greens Bayou watershed, played an important role in the Greens Bayou Flood Damage Reduction Project moving forward. In 2009, the Greens Bayou Corridor Coalition launched a strategic advocacy effort to help secure federal funding for the federal project.

"The approval of funding for the federal project is the culmination of many years of hard work," said Mike Castro, chair of the Greens Bayou Corridor Coalition's Public Policy Committee and a coalition board member. "The project demonstrates what can be accomplished when community volunteers, government stakeholders and concerned citizens focus their combined efforts on a worthy endeavor. The project will have a demonstrable positive impact on the quality of life for residents who live within the Greens Bayou watershed."

Regional Projects Complement the Federal Project

Since 1986, the HCFCD has acquired several regional stormwater detention basin sites in the Greens Bayou watershed, totaling 2,200 acres. To date, one basin has been completed and excavation has started on several others. The HCFCD will complete two more basins in the next few years with matching grant funding from the Federal Emergency Management Agency.

Galveston District recognized for employing environmental principles in engineering projects

U.S. Army Corps of Engineers Galveston District

Galveston District was selected as one of two Proving Grounds for the Army Corps of Engineers Engineering with Nature Program (EWN) for its efforts to manage engineering projects in a sustainable manner, one which leaves behind the smallest footprint, while collaborating with partners to identify ways to reduce, mitigate or eliminate potential negative impacts.

"The Galveston District is eager to partner with the broader Corps community on this pilot program," said Col. Richard Pannell, commander of the USACE Galveston District. "Leveraging the principles of Engineering With Nature will increase the value that our projects deliver by maximizing scarce resources and capitalizing on the latest science."

The program is structured on four fundamental elements:

1. Use natural processes to maximize benefits, thereby reducing demand on limited resources, minimizing the environmental footprint of projects and enhancing the quality of project benefits.

2. Use science and engineering to produce operational efficiencies supporting sustainable delivery of projects benefits.

3. Broaden and extend the base of benefits provided by projects to include substantiated economic, social and environmental benefits.

4. Use science-based collaborative processes to organize and focus interests, stakeholders and partners to reduce social friction, resistance and project delays, while producing more broadly acceptable projects.

The EWN team met with 40 members from the Galveston District, Southwestern Division, U.S. Army Engineer Research and Development Center, Institute for Water Resources and USACE Headquarters late last year to conduct a Proving Ground Implementation Workshop and gauge the district's capabilities. Following the workshop, the Galveston and Buffalo districts were selected to implement EWN principles and practices in their engineering programs and future projects.

EWN collaborating opportunities for the USACE Galveston District include: Dredging operations environmental research, regional sediment management, dredging operations technical support, ecosystem management and restoration research as well as flood risk management and coastal reconnaissance studies.

Learn more about EWN at http://el.erdc.usace.army.mil/ewn/. Read about Baltimore District's EWN efforts in the April issue of *The Corps Environment*.

Resource Efficiency Managers

Army's first REM workshop filled with passion for energy management

Story and photo by Julia Bobick
U.S. Army Corps of Engineers Engineering and Support Center, Huntsville

The Army's resource efficiency managers come with a variety of skill sets and experience, but one thing they all have in common is a passion for energy — energy efficiency, energy management, energy conservation, renewable energy and pretty much anything energy-related.

That passion ignited lively conversation and information exchange during the Army's first Resource Efficiency Manager (REM) Workshop April 15-17 on Redstone Arsenal, Alabama. The Engineering and Support Center, Huntsville, which manages the REM program, hosted the event to enhance the knowledge base of the growing network of REMs across the Army and Army Reserve.

"We have to be passionate every day about energy; if we are, we'll get our installations where they need to be on the path toward — and ultimately achieving — Net Zero," said Karen Moore, Huntsville Center's REM program manager for the past year and a half.

The workshop highlighted various tools in Huntsville Center's Energy Division toolbox, as well as the many other resources available within the Army Corps of Engineers, Department of Defense and the Department of Energy to help installations achieve federal energy reduction mandates.

"The Huntsville Center manages execution for various Army energy programs and has the unique perspective of seeing how these programs interplay and how to leverage them optimally – these programs are really synergistic," said Paul Robinson, Huntsville Center Energy Division chief. "I envision REMs as the 'tip of the spear' and as a critical set of eyes and ears in direct support of Army units and DPWs. It was our intended purpose to educate and empower REMs to understand the various energy programs and tools available and how to leverage them. Meeting the Army's challenging energy goals and getting to Net Zero will require a holistic and multi-dimensional approach."

Energy conservation isn't new to installations. However, to get installations to the next level of energy management, they must move past the initial "low-hanging fruit" projects that were easy to identify and complete, and tackle more impactful projects, according to Jeff Watts, energy planning and outreach branch chief in Huntsville Center's Energy Division. But it can be complicated to navigate through all the options to identify the best opportunities without a holistic approach to planning.

A big challenge for a new REM can be deciding where to begin. "You can't always start with the big, fun sexy projects like solar arrays," said Sean Svendsen, the REM since 2010 at Dugway Proving Ground, a U.S. Army Test and Evaluation Command installation southwest of Salt Lake City, Utah.

In his first eight months as a REM for the U.S. Army Aviation and Missile Research Development and Engineering Center (AMRDEC) at Redstone Arsenal, Steve Chaffin has been establishing the baseline steam and electricity consumption for the command's approximately 1.9 million square feet of facilities on Redstone Arsenal. "You can't do projects on what you can't measure," he said.

Chaffin, whose background is in utilities, said the command is defining several bundled energy upgrades for its facilities and implementing Utility Energy Services Contracting projects for three AMRDEC buildings expected to save about $106,000 a year. "This workshop has been a big help in developing a path forward for AMRDEC," Chaffin said.

"Every installation you go to is different, every energy challenge is different, and every energy program you walk into is all over the map," said Jeff Weissman, vice president of operations for M.C. Fuhrman and Associates (MCFA), one of the four companies in the REM program contract pool. A retired colonel, Weissman said he used every tool in Huntsville Center's Energy Division toolbox during his three years as a garrison commander. "Everything you can do to educate your commanders about the tools and resources available to them will better help you help them achieve their energy goals."

Networking is the key to getting things done, according to Svendsen.

"We've been very successful because of all the support we get and tapping into the resources available inside and outside our installation," Svendsen said. Being able to modernize aging infrastructure, implement renewable energy projects and bring it all together "has really been a ball, and I'm still learning new things we can do. I love this job."

Huntsville Center developed the workshop to not only share best practices among the REMs, but also to help them better understand the wide variety of tools available to assist them in achieving their goals. Workshop topics ran the gamut from third-party financing, utility cost reduction and energy audit programs to cost engineering, energy security, energy information management and measurement and verification. Presenters came from the Army Reserve, Army Materiel Command, Huntsville Center, Sacramento and Fort Worth Corps of Engineers districts, Fort Hunter Liggett, Pojoaque Pueblo Service, Idaho National Laboratory, and the Corps of Engineers Construction Engineering Research Laboratory.

Todd Dirmeyer, the energy manager at Fort Hunter Liggett, California, and the Army's 2014 Energy Manager of the Year, talks about his passion for the job and the importance of networking and using all available resources to help improve energy management.

About the REM program:

The Resource Efficiency Manager (REM) program provides a contracted subject matter expert who identifies best practices and programs to more effectively manage energy, water and waste and enhance energy security at federal installations. Huntsville Center has an Indefinite Delivery Indefinite Quantity Multiple Award Task Order Contract with a pool of four contract companies (Chadux/Tetra Tech JV, Erica Lane Enterprises Inc., M.C. Fuhrman and Associates (MCFA) and Sain Engineering Associates Inc.) available to any federal agency and the Army land-holding commands. Task orders are competed among the pool to ensure the most value to the agency. Providing a self-sustaining service, each contracted REM must identify savings opportunities that offset the cost of the service, and USACE districts monitor their performance to enhance quality assurance.

During fiscal year 2014, Huntsville Center nearly doubled the REM program — there are now more than 30 REMs in units and installations across the Army, Army Reserve and National Guard, as well as two REMs at Installation Management Command headquarters who provide support across continental U.S. Army garrisons.

Brutal Arctic Circle conditions no match for test well cleanup team

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

Since 2009, more than 7,800 tons of contaminated soil polluted the remote location of Test Well No. 9 near Umiat, a historic oil exploratory base camp. The conditions are harsh with the site located more than 100 miles from the nearest road system in the National Petroleum Reserve – Alaska. (Courtesy photo)

Numb fingertips and toes, frozen beards and eyelashes, and an ice road sound like something out of a major film. However, there were no video cameras rolling as the Alaska District conducted an environmental cleanup project in the foothills of the Brooks Range in the Arctic Circle.

Since 2009, more than 7,800 tons of contaminated soil polluted the remote location of Test Well No. 9 near Umiat, a historic oil exploratory base camp. The conditions are harsh with the site located more than 100 miles from the nearest road system in the National Petroleum Reserve - Alaska. Operations at the site officially completed this year.

Between 1944 and 1982, the U.S. Navy and U.S. Geological Survey drilled exploratory and scientific wells in the region formerly known as the Naval Petroleum Reserve No. 4. Umiat's base camp originated when the Navy investigated the area for its oil potential between 1944 and 1953. Eleven wells were drilled near the remote complex.

In 1952, the Navy broke ground on Test Well No. 9 and about 200 barrels of oil flowed daily for seven weeks. Unaware of the harmful traits, polychlorinated biphenyls (PCBs) were used as a tracer in the drilling fluid used to aid the rig and contaminated the surrounding ground surface.

"It was the only well that appears to have used PCBs as a tracer," said David Jadhon, project manager in the Formerly Used Defense Sites program of the Environmental and Special Projects Branch.

Test Well No. 9 is one of more than 500 identified properties in Alaska eligible as a formerly used defense site under the Department of Defense's Environmental Restoration Program.

"This remediation project is an example of the Corps' hardy expertise when it comes to environmental engineering in the Arctic," said Ken Andraschko, chief of the Formerly Used Defense Sites program in Alaska.

Before Congress banned PCBs in 1979, the harmful compounds could be found in common materials such as transformers, electrical equipment and cutting fluids for machine operations. Now, the chemicals are linked to cancer and other health concerns.

"Back then, we did not know they would be a challenge," Jadhon explained. "When you look at some of these [formerly used defense sites], go back in time and look at the work that was done. There wasn't necessarily a life-cycle mindset."

Alaska lacks disposal facilities for PCB-contaminated waste. The material removed from the project site was shipped to the Lower 48, adding another challenge to logistics. The Umiat camp is difficult to reach with access only by boat on the Colville River or airplane, Jadhon said. Many of Alaska's former defense sites entail long-distance trips, complicated terrain and an absence of general transportation amenities. Specifically, traveling to Test Well No. 9 is unforgiving because of the soft tundra surrounding the area.

Therefore, contractors built an ice road for heavy equipment to traverse over the arctic tundra. Authorized by the state, the new path required about 3,000 gallons of water from a nearby lake to build the 2-mile stretch of highway. Several long trains of snow-tracked machinery transported the material to the disposal staging area.

"Planning begins in the summer months with maintenance of our heavy equipment and camp units," said Bryan Lund, vice president of the Environmental and Construction Division for Marsh Creek LLC, the Anchorage-based company contracted to execute the work. "Every piece of equipment we use is specifically designed or modified to operate in arctic winter conditions."

The winter elements consistently brought darkness, blizzards and temperatures 40 degrees below zero. When spring neared, traveling overland was threatened because the ice road began to melt and the Colville River rose. Wildlife encounters and grizzly bear dens also were a concern.

"The trust and camaraderie that comes with safely operating together under such inclement conditions makes projects such as (Test Well No. 9) fun for all of us," Lund said.

For the remediation work at Umiat, Marsh Creek was recognized by the U.S. Small Business Association as its 2013 Region 10 Contractor of the Year.

In the interest of saving mobilization costs, the plugging of Test Well No. 9 occurred during the surface cleanup operations.

"The Corps worked collaboratively with the Bureau of Land Management and successfully accomplished the plugging of legacy wells No. 6, 7 and 9," Jadhon said. "The ice road was already there to make it happen."

Polk Swamp: An innovative learning environment

By Dudley Patrick
U.S. Army Corps of Engineers Charleston District

On a clear, cool day Charleston Charter School for Math and Science (CCSMS) seniors and teachers got a chance to spend a few hours visiting Polk Swamp near the Town of St. George in upper Dorchester County with several U.S. Army Corps of Engineers Charleston District engineers and scientists. The school's mission is to educate students for success in college and careers by providing an "innovative learning environment."

For a few hours that innovative learning environment was Polk Swamp.

Polk Swamp is part of the Edisto River watershed, the longest undammed blackwater river in the U.S. It also contains a large stand of bottomland hardwood trees, which are disappearing at a rapid rate in the swamps and wetlands of the southeastern U.S. These trees, with their unique knee-like roots that grow toward the sky, have been damaged and destroyed from decades of ice and wind storms, tree falls, poor logging practices and beaver infestations, which have also caused flooding from numerous obstructions to the swamp's natural flow.

The Polk Swamp aquatic ecosystem has been severely degraded by a substantial loss of bottomland hardwood forest habitat. The degradation has been attributed to the restriction of flow through the swamp's stream channels caused by a large number of trees being blown down by Hurricane Hugo in 1989. Another attribution to the degradation of the swamp is an influx of beaver activity. (Photo by Sara Corbett)

The students were invited to visit the swamp so they could learn how members of the Polk Swamp project delivery team were solving the problems at the swamp. Upon arriving at the site, they received an overview of the district's missions and the history of the Polk Swamp project. The class divided into two groups: one learned about the ecosystem and the other learned about hydraulic engineering. After 45 minutes the groups switched.

District biologists Jesse Helton and Mark Messersmith presented the ecosystem session, discussing the importance of wetlands and how to identify them. Students took soil samples using an auger to compare upland and wetland soils. They were also asked to compare adaptations of plant species found in uplands to those found in wetlands. Students were very eager and asked about the district's ongoing study in the swamp, as well as career opportunities with the Corps of Engineers.

"I really enjoyed going down to the swamp and learning how beavers' dams can cause a lot of damage to the ecosystem and how the dam can block off the water that the swamp needs," said Antavius Farr-Heyward, a student at CCSMS.

The hydraulic overview was presented by Sara Brown, a hydraulic engineer, and assisted by Anne McCartney, a civil engineer. Brown explained that the role of a hydraulic engineer is to predict flows from a watershed, compute water levels, consider the impacts to the floodplain, assess how to improve water levels and consider how to implement or construct a project that will improve the overall hydraulic, and in this case, environmental conditions in the watershed. Students were shown how district engineers prepare for field visits to Polk Swamp by gathering information such as maps, aerial photographs, land use and topographic data, past studies and rainfall data. Brown explained how all this data plus information gathered during the fieldwork would be used to develop a model of the hydraulic conditions in the swamp. Students were asked to consider what other types of information would be needed before alternatives could be developed to implement and construct a project that would restore the hydraulic conditions to a more normal state.

Before departing, several students walked to the edge of the swamp, broke off cattails and proceeded to "cover" the area with clouds of fluffy white cattail seeds, concluding their day in Polk Swamp's innovative learning environment.

New England District proposes permitting compensatory mitigation guidance revisions for impacts to aquatic resources

By Timothy Dugan
U.S. Army Corps of Engineers New England District

New England District is proposing compensatory mitigation guidance revisions for impacts to aquatic resources associated with Department of Army permits in New England. Both the Army Corps of Engineers and the U.S. Environmental Protection Agency have a national goal of no overall net loss of wetland functions.

This goal is achieved through mitigation of aquatic resource impacts. Mitigation includes a sequence of avoidance, minimization and finally compensation.

This proposal does not alter that sequencing in any way; however, the terms mitigation and compensation are used interchangeably to refer to compensatory mitigation.

New England District has periodically revised and updated its compensatory mitigation guidance, most recently in July 2010. These revisions are generally for a variety of reasons, including incorporating new national guidance and directives, improved methodologies and updated technical information. A combination of these has prompted this current revision.

There are several notable changes in the proposed guidance. It has been restructured so the overall compensatory mitigation guidance is the primary portion of the document and the mitigation plan checklist and checklist directions for each of the resource-specific modules are included in their own appendix.

The resource modules for vernal pools and streams have been improved and extended. Detailed methods for calculating appropriate compensatory mitigation for impacts to these resources are included. Some of the existing compensation ratios are proposed for change, particularly where only a range of ratios had been present. In addition, a number of smaller, mostly editorial changes have been made.

Preliminary review of the proposed compensatory mitigation guidance revisions indicates that: 1) no environmental impact statement will be required; 2) implementation will not affect any species listed as threatened or endangered under the Endangered Species Act of 1973; and 3) no cultural or historic resources considered eligible or potentially eligible for listing on the National Register of Historic Places will be affected.

The public notice with detailed information is available for review at www.nae.usace.army.mil/Missions/Regulatory/PublicNotices.aspx. Public comments were accepted through May 4.

Across the nation bald eagles are thriving; so why are they dying at Thurmond Lake?

By Chelsea Smith
U.S. Army Corps of Engineers Savannah District

Its origin is mysterious; its prevalence ubiquitous. The growing and invasive waterweed known as hydrilla beckons hungry waterfowl, known as coots, that fall prey to a lethal blue-green algae present on its leaves. In turn the American bald eagles that prey on the coots also become prey to the algae.

Monecious hydrilla, the reservoir's dominant aquatic plant, provides a substrate for algae carrying a toxin and also happens to be an irresistible food source for coots. The toxin is linked to a lethal neurological disease called avian vacuolar myelinopathy (AVM). Coots contracting AVM develop microscopic brain lesions crippling their movements rendering them easy prey for bald eagles, said Jeff Brooks, a Corps of Engineers wildlife biologist.

Army Corps of Engineers Biologist Ken Boyd examines a strand of hydrilla, an invasive aquatic weed first discovered at Thurmond Lake in 1995. The plant harbors an algae linked to deaths of bald eagles at the reservoir. (Photo by Rob Pavey, Augusta Chronicle)

Officials first discovered hydrilla at the J. Strom Thurmond Lake in South Carolina in 1995. In 1998 AVM claimed its first bald eagle. Since that time, 80 bald eagle deaths (29 confirmed from AVM) have occurred in the Thurmond area from 1998-2015 with four mortalities recorded this past winter, Brooks said.

"AVM cases peak November through February when blue-green algae becomes toxic," Brooks said. "But it's unclear what triggers the toxin as the seasons change."

In October 2010, a survey conducted by the Army Corps of Engineers, with assistance from the Georgia and South Carolina Departments of Natural Resources, reported that hydrilla occurs at varying densities on approximately 11,200 acres of Thurmond's 71,000 acres. A separate survey to determine densities indicated that the average hydrilla density is 44 percent, resulting in a total biomass estimate of 4,959 acres.

Hydrilla typically flourishes in shallow waters of 20 feet or less and can provide good habitat for some fish and waterfowl species. Throughout the years, the Army Corps of Engineers has used herbicides to minimize the impacts of hydrilla according to its Aquatic Plant Management Plan. Herbicide treatments temporarily control its growth in high-use areas such as boat ramps or swim beaches, but AVM-related eagle mortalities have prompted efforts to consider widespread and long-term treatment alternatives, Brooks said.

The Corps partners with federal and state agencies to evaluate biological, mechanical and chemical treatments that are cost-effective and ecologically sound, according to Brooks.

Following the results of a 2013 survey, distributed to approximately 3,000 stakeholders designed to gauge sentiment on hydrilla issues and potential treatments, USACE officials sent a letter to the U.S. Fish and Wildlife Service and the Georgia and South Carolina DNRs requesting their concurrence with an integrated plan using sterile grass carp and herbicide to control hydrilla. Survey results found that 74.3 percent of respondents were indifferent or in support of stocking sterile grass carp — the most controversial treatment method. Even more respondents, 84.5 percent, say they prefer less hydrilla or only native plants.

"With herbicide and algaecide we know where to apply it and what the impacts are," Brooks said. "If carp are stocked, aquatic vegetation including native plants would be consumed. We're also in the process of completing an updated hydrilla survey to get a better handle on total hydrilla coverage."

But Brooks warned that any alternative can potentially carry adverse impacts.

"Although stocked grass carp would require testing to determine that they are [infertile], there's an outside chance that fertile carp could be released," he said. "On the other hand, some herbicides can create problems for macroinvertebrates such as aquatic insects or crayfish and annual applications would be more costly than carp."

An Environmental Assessment (EA) is underway to evaluate treatment alternatives and potential impacts to the resource. The USFWS and Georgia and South Carolina DNRs have offered technical assistance, while Georgia DNR wanted the additional details regarding treatments and potential impacts further evaluated through the EA process, Brooks said.

USACE Avian Specialist Ellie Covington helms the EA/AVM management plan and said a draft was scheduled for the end of June. The final assessment and Finding of No Significant Impact is due in spring 2016.

In April, University of Georgia researchers attached transmitters to three bald eagle nestlings to determine if birds remain onsite and develop AVM or fly offsite to another location. They also sought funding from the U.S. Fish and Wildlife Service for an experimental stocking of grass carp that would allow a telemetry study on carp movement in several coves at the lake.

"We'd like a consensus with state agencies on treatment alternatives because they're involved with managing these resources as well," Brooks said.

According to a report by *Georgia Outdoor News*, Georgia DNR representatives documented 166 successful bald eagle nests in 2015, a record for the state. Since their removal from the endangered species list in 2007, eagle populations continue to thrive nationally.

Although AVM threatens bald eagles on or near Thurmond waters, it's largely a local issue isolated to Thurmond. However, AVM has affected several other lakes throughout the southeastern U.S., including DeGray Lake in Arkansas, which recorded the first confirmed AVM eagle death in 1994.

LEFT: Bald eagles perch at Thurmond Lake in South Carolina. (Courtesy photo) BELOW: Coots arrive at the lake in huge numbers each fall to feed on hydrilla, which harbors an algae fatal to waterfowl and larger birds. Eagles eat the coots. (Photo by Ken Boyd)

Garrison Commander Col. T.J. Edwards, Assistant Secretary of the Army (Installations, Energy and Environment) Katherine Hammack, U.S. Congressman Brett Guthrie, Installation Management Command G4 Director of Facilities and Logistics Gregory Kuhr, Kentucky Commission on Military Affairs Executive Director Dave Thompson, and Fort Knox Energy Manager R.J. Dyrdek unplug an LED ribbon. The Fort Knox side of the ribbon remained lit, signifying the post's ability to continue operations without reliance on an external utility source. (Photo by Renee Rhodes)

Fort Knox proves ability to operate without external power

By Ryan Brus
Fort Knox, Kentucky

During an Energy Security Project ribbon-cutting ceremony May 6, the Fort Knox energy team demonstrated the installation's capability to operate independently of external power sources using natural gas from beneath the post's surface — a first for a U.S. military installation.

The project was originally conceived to address mission readiness issues experienced in 2009 when an ice storm left Fort Knox and much of Kentucky without power for several consecutive days.

The harvesting of renewable methane gas on post in recent years and the installation's six new energy substations that include gas generators enable Fort Knox to continue 100 percent of its operations if power from the external utility provider is cut off. The post's 3.7 megawatts of solar arrays and 6 million square feet of building space that is heated and cooled using geothermal energy have reduced its dependency on using other power sources, such as gas.

"We're giving back gold to the taxpayers," said Garrison Commander Col. T.J. Edwards. "Our [Directorate of Public Works] estimates that we will save about $8 million per year from peak shaving."

Peak shaving describes another primary purpose of the Energy Security Project — switching to Fort Knox-produced power when energy demand strains the off-post energy utility, which is also when costs to purchase energy are at its highest. Combined with the savings achieved through geothermal heating and cooling, Fort Knox is projected to save about $18 million on its annual energy bill.

"Our energy team is special," Edwards said. "We've won nine consecutive Secretary of the Army energy awards. But we don't sit on our laurels. We're constantly getting after it, asking, 'How do we get better?'"

Assistant Secretary of the Army for Installations, Energy and Environment Katherine Hammack addressed the critical need for installations to maintain operating capability at all times.

"Energy security underwrites our unique ability to rapidly deploy, employ and sustain military forces around the globe," she said. "And it's for that reason the Army is moving toward building resilience into our installations."

Fort Knox's ability to achieve this resilience was credited by the secretary and garrison commander as a result of Fort Knox Directorate of Public Works, contracting command and legal officials working to establish partnerships with third parties whose expertise is in the energy field.

As an example, Edwards singled out Brandon Marcum, an engineer and Harshaw Trane subcontractor for Nolin Rural Electric Cooperative Corporation (RECC), as a central figure in creating and developing the concept that became the Energy Security Project.

"We have authorities to work with third parties, leveraging core competency, capability and funding to enable us to meet our mission," Hammack said. "The private sector partners have stepped up to help the Army in meeting our mission requirements."

Nolin RECC staff gave the audience of about 150 area and military leaders, Fort Knox employees and community members an inside look at its energy security bunker through a live video stream. Attendees were told how all of the systems function to achieve energy independence and peak shave. The built-in redundancies to prevent power failure — such as an off-site energy security bunker and the multiple, secured substations — were touted as well during the demonstration.

The formal celebration of the occasion involved a unique twist. Dignitaries and Army leaders didn't cut a ribbon, they instead unplugged a ribbon. The ribbon was an LED cord, and when it was unplugged in the middle, the side connected to the Fort Knox power source stayed lit, symbolizing Fort Knox's energy independence.

"Kentucky is very proud of the efforts here," said Dave Thompson, Kentucky Commission on Military Affairs executive director. "We see Fort Knox as a growing installation with undeniable potential for the future. Job well done."

Read more about Fort Knox's energy initiatives at http://bit.ly/1FY4MT5. To learn more about the Energy Security Project visit https://youtu.be/CxNH7m0cdfw.

District expedites Long Island Bridge demolition permit

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

The closed Long Island Bridge located in Boston Harbor in Quincy and Boston is no more. After intense coordination and cooperation from state and federal agencies, the U.S. Army Corps of Engineers New England District's Regulatory Division expedited a permit that allowed the city of Boston to temporarily drop bridge spans into Boston Harbor as part of a controlled demolition project.

The Long Island Bridge opened in August 1951 and connected Long Island and Moon Island in Boston Harbor.

The city of Boston conducted regular inspections of the Long Island Bridge. C&C Consulting Engineers, which performed a recent inspection of the bridge, determined that many of the vertical members of the trusses were rusted through and several floor beams were no longer supporting the deck above. The city closed the bridge for safety reasons Oct. 8, 2014.

Concerns soon arose that portions of the bridge could fall off and impact navigation. Under a section of the bridge is a non-federal navigation channel used by the Massachusetts Bay Transit Authority ferries. The decision was made that the bridge had to go.

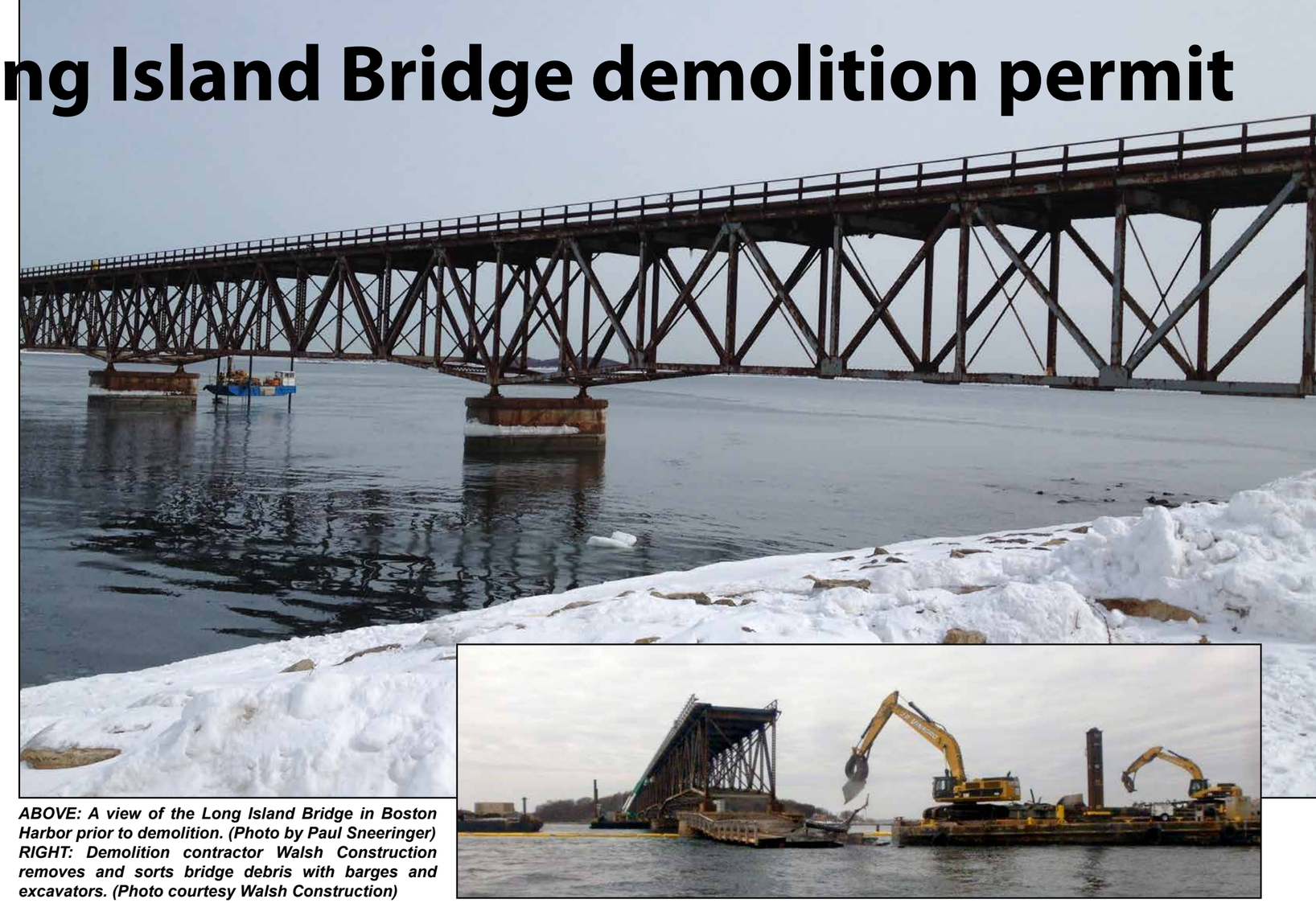
In January, the city of Boston filed a permit application with the New England District under Section 404 of the Clean Water Act to temporarily drop pieces of the Long Island Bridge into Boston Harbor as part of the controlled demolition. Section 404 regulates the discharge of fill material in U.S. waters including wetlands. The pieces of the demolished bridge sitting on the Boston Harbor substrate would have the effect of fill.

The city requested an expedited permit not only because of the bridge's safety issues, but also because it was interested in reopening activities at the homeless shelter, other social service facilities and Camp Harbor View on Long Island. The year-round social service facilities were closed in October when the Long Island Bridge was closed.

The city is considering providing ferry access to Long Island to allow Camp Harbor View to operate this summer.

Demolishing a bridge in Boston Harbor is not an easy task. Many state and federal agencies had to weigh in on the application. The U.S. Coast Guard issues permits for bridges over navigable water of the United States. Because the debris from the detonation would fall into Boston Harbor impacting aquatic plant and animal life, the National Marine Fishery Service and the Massachusetts Division of Marine Fisheries were involved. The Massachusetts Department of Environmental Protection issued a water quality certification under Section 404 of the Clean Water Act and the Massachusetts Office of Coastal Zone Management was involved with the federal coastal zone management consistency review.

"The permit was very complex because of the multiple jurisdictions," said Paul Sneeringer, New England District's permit manager for the project. "There were also concerns along the lines that this is one of the first major bridge detonation projects in Massachusetts."



ABOVE: A view of the Long Island Bridge in Boston Harbor prior to demolition. (Photo by Paul Sneeringer) RIGHT: Demolition contractor Walsh Construction removes and sorts bridge debris with barges and excavators. (Photo courtesy Walsh Construction)

Restoration of the sea bottom after the bridge came down was the major concern. Sneeringer coordinated with several state and federal agencies to develop a restoration plan. Prior to any demolition, the city was required to perform a pre-survey video of the ocean bottom to document what it looked like.

Once a section of the bridge was detonated, the large pieces would be removed by a barge mounted excavator. Then side sonar scanners would be used to find smaller pieces of debris that would be removed by divers.

Once cleanup was completed on this section of the bridge, another section of the bridge could be detonated. The sea bottom will be monitored for at least a year to ensure restoration is complete.

According to Sneeringer, coordination efforts on the permit that usually took months were completed in days and weeks.

"Everyone was very helpful trying to make the time line," he said. "People put a huge effort in working with the city to make this happen."

The permit for the demolition was issued March 10. Demolition of the bridge included detonating four 750-foot-long sections of the bridge at a time. The first detonation phase occurred March 23. Due to stability concerns, the final two phases were detonated April 23.

In addition to the demolition permit, the city of Boston applied for two other permits in relation to the Long Island Bridge. The first was to temporarily retain the 12 existing in-water bridge piers that could be used as part of a possible construction for a new bridge. The other is to install a water main, an electrical submarine cable and a telecom submarine cable from Moon Island to Long Island.

The utilities that once hung off the Long Island Bridge provided service to the Long Island facilities and some services to the nearby Spectacle Island.

The comment periods on both permits are over and the district's Regulatory Division is working to complete its review of these projects.

Garrison connects youth with native Hawaiian forests

By Celeste Hanley
U.S. Army Garrison Hawaii Directorate of Public Works
Oahu Army Natural Resources Program

High above the busy training areas at Schofield Barracks West Range is Ka‘ala, the highest point on the island of O‘ahu. At 4,025 feet in elevation, on a clear day, the mountain plateau is in plain sight of almost every community nestled around the Wai‘anae mountain range.

Despite its prominence in the O‘ahu landscape a relatively small percentage of people hike to the top of Ka‘ala, where a mountain bog hosts a diverse community of plants and animals. The hike, although short, is steep and requires the use of ropes. Getting to the trail head alone is a challenge, requiring a long, sunny walk on hot pavement in the back of a neighborhood in Wai‘anae Kai.

As a part of its mission to protect endangered species, the U.S. Army Garrison Hawaii’s O‘ahu Army Natural Resources Program (OANRP) is helping youth build a deeper connection with places like Ka‘ala and other native Hawaiian forest areas on the island through volunteer service trips.

A Different Type of Classroom

Dressed in rubber boots, long sleeves and rain gear, Ho‘ala School students followed outreach staff to a work site in the forest at Ka‘ala, far from their schoolyard in Wahiawā town. Along the way, the students learned about the natural resources around them, like the Wai‘anae amber snail, affectionately dubbed “snot in a hat” for the tiny shell that adorns its slimy body.

They saw the extraordinary display of flowers put on by the koli‘i (*Trematolobelia kaalae*), only found at Ka‘ala, whose curved flowers are pollinated by Hawaiian honeycreepers like the ‘apapane, which can also be heard singing in the area.

When the students finally reached the work site, the view was less novel. Invasive grasses and an incipient invasive iris plant were invading the area, replacing the diverse forest of the bog with a few aggressive plants that were attempting to overtake its unique environment.

The students learned about the threat these weeds and other invasive species pose to fragile Hawaiian ecosystems like Ka‘ala. With trowels in hand, the students worked to dig out the invasive weeds, playing an active role in the protection of an endangered species in the area by restoring their habitat.

On the other side of Ka‘ala in Mākaha Valley, Wai‘anae High School students continued to mālama the forest in their backyards, removing invasive weeds from one of the last remaining dry forests on the island.

The Hawaiian dry forest, known for its diverse plant life, is one of the most endangered ecosystems in the world. *Hesperomannia arbuscula* is one of the unique plants that lives in the dry forest at Mākaha, and with just seven plants left in the wild, it is highly at risk of extinction.

OANRP protects H.arbuscula on the Board of Water Supply land there, where invasive coffee — remnants of a failed plantation — threatens this endangered species and many others in the area.

Partnering with Ka‘ala Farms and the BWS, OANRP supports the Wai‘anae High School students’ efforts to remove the coffee from the area, where they also get a chance to explore the conservation field as a career.

Another Glimpse of Conservation

Working in the field in some of the most remote areas of O‘ahu is a full-day commitment, making the logistics of getting students out during the school day impossible for many schools. In cases where a volunteer day just won’t work for a class, OANRP will bring the forest to the schools through various outreach activities.

Career days, such as those hosted by Leilehua High and Intermediate School and Wheeler Middle School, have been venues for OANRP to share about the internship and work opportunities in natural resource conservation — and the steps to get there.

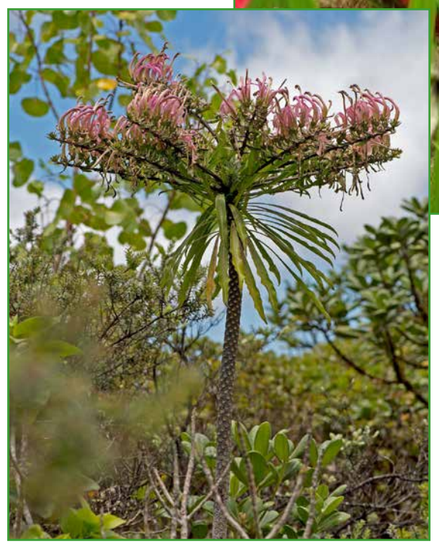
At Kahuku High School, OANRP has provided science fair project inspiration, with one individual moving to the State level for her experiment on koa seed germination. On top of developing a project based on natural resource management challenges, she used seed stock from OANRP’s Kahanahāiki management unit at Mākua Military Reservation.

Hale Kula Elementary, one of the schools on post at Schofield Barracks, recently learned about the conservation field through a visit to the program’s baseyard, where hundreds of endangered plants are cultivated in the rare plant nursery. A walking tour through the interpretive gardens, which represent native Hawaiian ecosystems, provided a glimpse into some of the extraordinary natural environments on O‘ahu.

Looking up into the Wai‘anae mountains in the distance, a dramatic backdrop for the garden area, students imagined what it would be like to have a job in the mountains, where OANRP staff actively manage more than 100 endangered species.

Whether it’s growing plants in the seed lab or nurseries, collecting fruit in the field, weeding in the forest, or building fences to protect forest resources from the threats of feral pigs and goats, OANRP plays an active role in the conservation of some of O‘ahu’s last remaining native forests.

Another major aspect of that role is bridging the relationships between the communities that dwell in areas surrounding the program’s management units to the resources, which it does through an active volunteer program. Reaching this next generation of conservationists will ensure that the Army’s effort to protect the environment will continue into the future. ☙



ABOVE: Elementary students at Hō‘ala learn how to dig out the invasive plant Crocosmia x crocosmiiflora, a hybrid iris that is beginning to threaten native ecosystems of O‘ahu. An incipient weed in the Wai‘anae mountains of O‘ahu, the hybrid species is also a threat in other island ecosystems. (Photo by Noweo Kai, AmeriCorps intern with the OANRP) LEFT: During the spring, it’s impossible to miss the elaborate display of flowers of the endemic koli‘i (Trematolobelia kaalae). Students are able to enjoy the koli‘i and other unique plants and animals of Ka‘ala on volunteer trips with the OANRP. (Photo by Roy Kikuta, OANRP Volunteer)