The Corps
Environment
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Helping preserve North Carolina's nesting seabirds

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The Corps
Environment

Within a few weeks, juvenile brown pelicans leave the nest and gather into small groups known as pods to forage on their own. (Photo by Hank Heusinkveld)

Cover story

22 Wilmington District helps preserve seabird habitats

On what was once a placement island for dredged material, the Corps of Engineers, Wilmington District, works with Audubon biologists to develop the last nesting habitat for seabirds in southeastern North Carolina.

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The Corps
Environment

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

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

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Your Call to Action:

Living our Environmental Operating Principles

As Chief of the Environmental Division for the U.S. Army Corps of Engineers, I find the most common question I receive lately is, "How are the changes in Washington impacting your mission?"

It is an understandable question given the headlines. On the surface, news of the rescission of executive orders on environmental processes and discussions on regulatory reform seem to signal an overhaul of our processes. However, I can report to you with the utmost confidence that the environmental mission of the Corps is strong and demand for our capabilities is high.

First and foremost, everywhere I go, people want to tell me about the technical competency and professionalism of our team. Our team members work on complex issues, often having to balance competing interests among a variety of stakeholders. Time and time again, you are asked to be the honest brokers, providing the best environmental solutions, based on sound science and engineering, and you always deliver.

Because of our talented and dedicated team, we continue to be the service provider of choice for our partners. The majority of environmental programs I oversee are funded on a reimbursable basis. Even during these times of constrained budgets, our program dollars have remained steady and have even increased in some areas. As our partners experience budgetary constraints of their own, they are turning to our expertise to help support their mission. This is a true testament to our focus on delivering quality and timely environmental solutions.

Our capabilities also nicely align with the nation's priorities. For example, we provide technical assistance to nationwide programs, such as the U.S. Environmental Protection Agency's Superfund program. The EPA has identified this program as their number one priority and we support EPA on a reimbursable basis at approximately 200 Superfund sites across the country. This program is one of the many ways that we foster collaboration in delivering environmental solutions to the nation and one of the many ways we continue to advance our environmental mission.

In addition, as the administration focuses on upgrading our nation's infrastructure, it is acknowledged that infrastructure needs are broad. These needs include improvements to drinking water and wastewater infrastructure. Accelerating infrastructure improvements will also require a focus on cleaning up contaminated land.

In times of great change, it is important to remember our enduring mission and our guiding principles. The bottom line is even with the dynamic nature of all that surrounds us, our environmental mission touches the lives of nearly every American.

It is through our efforts that we restore, protect, and enhance environmental conditions and provide ecological and economic benefits across the nation. We will continue to march forward in these vital endeavors by living the Environmental Operating Principles, incorporating them into all that we do, across all mission areas.

Consider this your call to action: You need to personalize the EOPs, make them your own. The Detroit District has provided an insightful assessment of how they are living the EOPs on page 12, and I encourage you all to perform a similar exercise within your areas of operation.

USACE first adopted the EOPs in 1992. During that time, we were acutely aware of the impact of our activities on the environment. Much of the original narrative talked about balance and awareness. One thing that has evolved, that I try to stress every day, is that we now recognize that environmental considerations can also be an *enabler*. It is about ensuring Soldiers and other service members have the air, water and land they need to train. It is about cleaning sites to a level that allows us to revitalize and develop infrastructure. It is recognizing that protecting an ecosystem may have economic benefits. And it is about learning how to use natural approaches as we continue to build infrastructure the nation needs.

If you look at the first four principles within the EOPs, they identify the actions needed to find that balance and enable future opportunities. I tend to think of them as the "what" principles, because they describe what we must do. They are as follows:

Fostering sustainability as a way of life throughout the organization. Sustainability is not just a consideration in the work that we do – it is embedded in our DNA. Every choice we make sets conditions for a better tomorrow. Our sustainability scorecard aims to set these conditions by measuring our progress in achieving the goals outlined in the standing sustainability executive orders. We will continue to advance these goals by using renewable energy, reducing energy intensity, constructing green buildings, and reducing petroleum use in our vehicle fleet.

Proactively considering environmental consequences of all Corps activities and acting accordingly. Before every action we take, we consider any potential environmental effects. If our assessments indicate that we can do better, then we adjust accordingly in order to deliver sound and sustainable solutions. This is accomplished through our formal environmental review processes under the National Environmental Policy Act assessments, Base Realignment and Closure Act environmental initiatives, and in all military conservation, compliance and pollution prevention efforts.

Creating mutually supporting economic and environmentally sustainable solutions. The engineering solutions we provide are not the result of unilateral endeavors. They are the result of collaboration and open communication with federal, state, local agencies, academia, stakeholders and the public. Our Chief of Engineers Environmental Advisory Board serves as one of the many forums we lead to enhance mutual understanding and support mutually agreed-upon solutions to some of the nation's toughest environmental challenges.

Continuing to meet our corporate responsibility and accountability under the law for activities undertaken by the Corps, which may impact human and natural environments. Just as we hold others accountable for environmental impacts under our regulatory processes, we also have an obligation to adhere to all federal laws and regulations. Through our environmental quality program, we assess environmental compliance, environmental conservation, and pollution protection in partnership with multiple commands within the Army, Navy and Marines.

Now that we have identified the actions needed to find that balance and enable future opportunities, we need to identify "how" we implement these actions. This is outlined in the final four EOPs:

Considering the environment in employing a risk management and systems approach throughout the life cycles of projects and programs. Environmental impacts are considered at the forefront of the decision-making process. This starts in the planning phase and is monitored and assessed throughout project implementation. Adaptive management serves as a prime example of successful lifecycle management at the project and program level across our mission areas. Through active monitoring programs, we possess the ability to monitor our success and make adjustments, when necessary, to ensure we are achieving our goals.

Leveraging scientific, economic and social knowledge to understand the environmental context and effects of Corps actions in a collaborative manner. Collaboration is key. Not just internally amongst our dedicated professionals, but across federal, state and local agencies. This is one of the many reasons we publish our environmental assessments, decision documents, five-year monitoring plans and other technical reports. We have all learned lessons and we need to share them across disciplines. Because at the end of the day, the more situationally aware we all are, the more resilient we are, organizationally and holistically. We need to look beyond our stovepipes and actively seek that knowledge. Think about it – if you have a project in your area of operation, do you reach out to the labs or to other districts to see if others have addressed similar challenges?

Karen J. Baker
Chief, Environmental Division
U.S. Army Corps of Engineers

Employing an open, transparent process that respects views of individuals and groups interested in Corps activities. Effective communication serves as the foundation for strong relationships. Providing public engagement opportunities, soliciting public comments and sharing information in a timely manner are a few of the many ways we maintain effective communication. Furthermore, it is through our open and transparent processes that we will share our accomplishments in living the EOPs and continue to lead the way.

Setting conditions for a sustainable future starts with what we are doing today. Integrating environmental considerations in daily project decisions is essential. All decisions, across all programs, need to be viewed through the EOP lens to not only ensure that our actions consider the environment, but also ensure that our actions are sustainable now — and in the future.

If you have an example of how your organization is living the EOPs, we'd love to hear from you. Please send your story to **CEHNC-PA@usace.army.mil** and you may see it featured in a future issue of ***The Corps Environment***.

Additional information on our Environmental Operating Principles is available at: **http://www.usace.army.mil/Missions/Environmental/EnvironmentalOperatingPrinciples.aspx.**

The U.S. Pacific Command and the Alaska National Guard hosted the seventh annual Pacific Environmental Security Forum in Anchorage, Alaska, May 9-12, where participants discussed environmental security in a military context. (Photo by 2nd Lt. Marisa Lindsay)

Alaska National Guard hosts Pacific Environmental Security Forum

Each day of the forum featured guest speakers from different countries, who spoke on a variety of warranted topics and concerns.

By Lt. Col. Candis Olmstead
Alaska National Guard Public Affairs

JOINT BASE ELMENDORF-RICHARDSON, Alaska - The Alaska National Guard, in conjunction with U.S. Pacific Command, hosted the 2017 Pacific Environmental Security Forum in Anchorage, May 9-12, welcoming more than 100 civilian and military representatives from 24 nations in the Indo-Asia-Pacific region.

The four-day event provided participants an opportunity to discuss environmental security considerations in a military context.

Topics included climate change, water security, waste, energy and biodiversity protection. The 2017 PESF also provided an open venue for militaries in the Indo-Asia-Pacific region to work with their civilian counterparts on enhancing environmental security, protection and management in the region.

Chris Sholes, the environmental program manager for USPACOM and PESF event director, said a key objective of the forum was to build environmental security awareness and technical procedures in the region that would help ensure sustainable environmental management.

"PESF is a priority because, increasingly, the Indo-Asia-Pacific region is under threat from environmental security issues; be it man-made or natural disasters, or accumulated problems such as waste management," said Sholes. "I would like for participants to trust that there's a larger community that cares about what they face, to understand that there is help available of a collaborative nature."

Justin Pummell, a geographer with the U.S. Army Corps of Engineers Institute for Water Resources, and a PESF event coordinator, said the intent of the forum was not only to increase awareness among nations in the region, but to discuss best practices, learn from each other, and identify opportunities for militaries in the region to support ongoing and future environmental programs.

"PESF is important because it provides a formidable opportunity to connect with our partners on a topic that isn't often discussed between civil and military audiences," said Pummell. "This is the seventh year that PACOM has led the environmental security charge in the Indo-Asia-Pacific area and every year it's gotten more comprehensive and more action-oriented, so we've really moved from a community of discussion to a community of action."

PESF included subject matter expert presentations, panel discussions and group activities. The event fostered collaboration among participating nations to help gauge successes and gaps in current methods, determine opportunities for process improvement and identify real-world projects to address priority concerns.

Each day of the forum featured guest speakers from different countries, who spoke on a variety of warranted topics and concerns.

Speakers included Brig. Gen. Aziz Mohammed, deputy commander, Republic of Fiji Military Forces; Capt. Pujitha Thushara Sugathadasa, commander, Sri Lanka Navy Dakshina Naval Base; a project team leader from the Nepalese Army; and an engineering officer from Timor L'este, a Southeast Asian nation that occupies half of the island of Timor, which is between Indonesia and Australia.

See FORUM, page 30

Energy Action Month

Energy Resilience Enables Army Readiness

By J.E. "Jack" Surash, P.E.
Acting Deputy Assistant Secretary of the Army Energy and Sustainability

Energy Action Month provides a great opportunity to reaffirm that secure and reliable access to energy, water and land resources is required for the Army to perform its mission and support global operations.

Each October, Army leadership in all components – active, Guard and Reserve – reminds Soldiers, civilians and family members that we all need to do what we can to reduce energy consumption and improve energy resilience.

This year, our theme is "Energy Resilience Enables Army Readiness." "Resilience has been defined as the ability to anticipate, prepare for and adapt to changing conditions and to withstand, respond to, and rapidly recover from disruptions."

Greater energy resilience enables the Army to respond quickly to disruptions in the availability of land, water and energy resources.

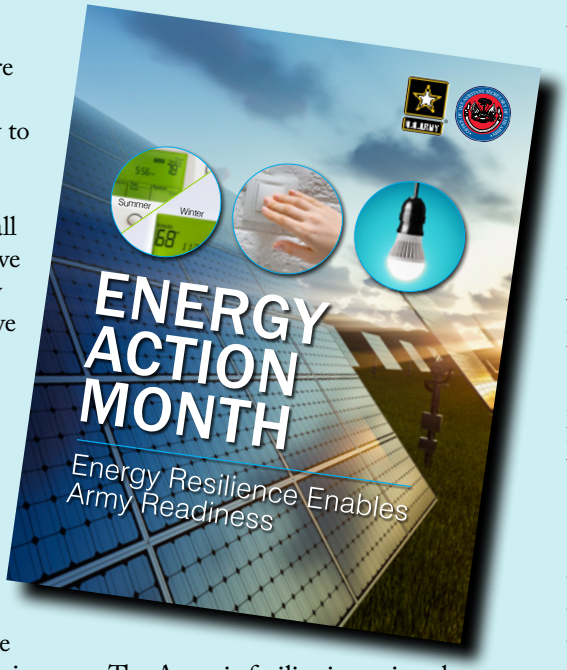
Resilience is essential for a responsive Army force posture and an effective network of installations and capabilities at home and abroad to protect U.S. interests and those of our allies. In a rapidly changing world, maintaining our mission readiness requires adaptive management of energy, water and land resources.

The Army remains the largest consumer of electricity in the federal government.

Although the Army has reduced its energy use by 25 percent since 2003, energy costs have risen by about 35 percent during that same period.

In 2016 alone, the Army spent more than $1.1 billion on facilities energy. This figure underscores the need for constant attentiveness to the Army's operational and installation energy requirements.

In recent years, the Army has made substantial progress toward reducing energy consumption. Army Directive 2017-07 established the requirement that the Army prioritize energy and water security to ensure available, reliable, and quality power and water to sustain critical missions. The directive also requires Army installations to reduce risk to critical missions by being capable of providing necessary energy and water for a minimum of 14 days.



The Army is facilitating privately financed projects to increase the supply of resilient energy resources on or near its installations, often in the form of renewable and alternative energy developments.

Most recently, the Army marked the commencement of commercial operations for a 65-megawatt wind and solar hybrid project at Fort Hood, Texas – the largest renewable energy project in Army history.

The Fort Hood project will save the Army approximately $2 million per year in energy costs, and is projected to reduce costs by $100 million over the life of the contract.

Through projects of this kind, the Army is enhancing the resilience of its installations with energy that is more diverse, affordable and sustainable.

The Army's operational energy efforts involve the energy and associated systems, information and processes required to train, move and sustain forces and systems for military operations. The Army's Operational Energy Program provides advantages in the form of extended range, endurance, flexibility and resilience as well as enhanced mobility and freedom of action.

The Army's energy-cost-saving initiatives have already led to substantial progress.

In 2017, the Army reached $2.6 billion in private investment in energy saving projects under the Energy Savings Performance Contracting and Utility Energy Services Contracting programs.

Investments in ESPCs and UESCs allow the Army to install modern energy and water-efficient equipment that is more reliable and requires less maintenance. The Army uses the resulting savings to pay for these projects and, once the costs have been paid, retains all subsequent savings.

In addition to highlighting these top-level initiatives, during Energy Action Month we are publishing energy-saving tips that remind individuals of the steps they can take to help.

Measures as simple as turning off unneeded lights when leaving a room, unplugging electrical items when not using them and using a fan instead of air conditioning to stay cool in the warmer months, can make a significant impact on the Army's drive toward energy resilience.

Attentiveness to energy-saving practices can help cut costs in your own home as well. Wash clothes in cold water, seal window and door frames, install a programmable thermostat and switch to energy efficient light bulbs. Taken together, small steps like these can have a substantial effect on your personal finances and reduce your environmental footprint.

I encourage all readers of *The Corps Environment* to take some time this October, and throughout the year, to contribute to the Army's Energy Action Month initiatives.

If you need a place to start, my office's website is a useful repository of information about programs, policies and events relating to energy in the Army.

That site can be found here: **http://www.asaie.army.mil/Public/ES/**.

Energy Action Month is a time to inform, educate and encourage each Soldier, Army civilian and family member to help enable Army readiness through energy resilience. I hope you will join the effort to achieve this worthy goal.

USACE, Nashville District Water Management Center is passing water through Cheatham Dam on the Cumberland River in Ashland City, Tennessee, at a rate exceeding 90,000 cubic feet per second.
(Photo by Mark Rankin)

Corps works to manage Hurricane Harvey runoff

By Leon Roberts
USACE, Nashville District

NASHVILLE, Tennessee – The U.S. Army Corps of Engineers, Nashville District's Water Management Center is working to manage runoff from heavy rainfall from remnants of Hurricane Harvey down the Cumberland River through Cheatham Dam in Ashland City, Tennessee, and Barkley Dam in Grand Rivers, Kentucky.

Six to nine inches of rain fell into the uncontrolled watershed between Old Hickory Dam and Cheatham Dam, the metro Nashville area, and particularly areas to the north and west of Nashville.

Uncontrolled streams and rivers such as Mill Creek, Browns Creek, Richland Creek, Whites Creek, Harpeth River, Sycamore Creek and the Red River all experienced significant rainfall and a corresponding increase in flow. These creeks and rivers all drain into the Cumberland River and have either crested or will crest soon.

The Corps of Engineers' water management team continues to monitor conditions and manage releases throughout the Cumberland River Basin.

At this time, no significant flooding is being forecast for the Cumberland River, but water is being passed through Cheatham Dam at a rate exceeding 90,000 cubic feet per second.

"That is a lot of water being passed through the dam and the lock is closed. Navigation will not be allowed to pass through the navigation lock at Cheatham Dam because of the very strong currents," said Chris Atkins, Operations Division Technical Services Branch chief. "The lock will reopen when the water flow sufficiently decreases in a day or two. We will continue to monitor the flows and update the public."

Lt. Col. Cullen Jones, Nashville District commander, praised the operators at the dams on the Cumberland River for their work overnight as the waters rose, especially at Cheatham Dam where gate changes were being made throughout the early evening and into the early morning.

"Senior mechanic Terry Hudgins worked tirelessly to make the necessary gate changes at Cheatham as the water runoff began making its way downstream on the Cumberland River and to the dam," Jones said. "His efforts were exemplary and I commend everyone on the team who supported our response last night at Old Hickory, Cheatham and Barkley dams."

The Corps is also discharging over 30,000 cfs at Old Hickory Dam and at this time expects to maintain the river stage through Nashville below the action stage of 30 feet. The Lake Barkley pool will remain elevated for the next several days as water is moved downstream through Barkley Dam.

The National Weather Service is currently forecasting the Cumberland River at Nashville to stay below action stage of 30 feet, and is forecasting the Cumberland River at Clarksville, Tennessee, to crest at a stage of 45.5 feet, just below the flood stage of 46 feet.

Corps officials continue to communicate with federal, state and local partners and stakeholders, including the Tennessee Valley Authority, regarding the pool elevations at Kentucky Lake and Lake Barkley where lake levels have to be kept in sync for the unregulated canal that connects the two waterways.

For current conditions of the Cumberland River Basin projects go to the Nashville District website at http://www.lrn-wc.usace.army.mil/.

All necessary news and information regarding water management and flood operations will be made available on the district's website at www.lrn.usace.army.mil, or on Facebook at http://www.facebook.com/nashvillecorps, and on Twitter at http://www.twitter.com/nashvillecorps.

For more information about the Memphis District, go to http://www.mvm.usace.army.mil/.

For more information about the Louisville District, go to http://www.lrl.usace.army.mil/.

Corps researchers model Hurricane Harvey flooding

By Michael Petersen
USACE, Engineer Research & Development Center

As forecasts tracked Hurricane Harvey's course toward Houston, researchers in Vicksburg, Mississippi, were already calculating the flooding impacts from the storm to better inform the U.S. Army Corps of Engineers' Emergency Operations team.

A team of researchers from the U.S. Army Engineer Research and Development Center forecasted inundation depths in and around Houston up to five days in advance using technology developed at ERDC.

The team modeling Harvey's impacts includes experts and assets from the Coastal and Hydraulics Laboratory and supercomputing resources from the Information Technology Laboratory. Aaron Byrd, research civil engineer in CHL, has been leading the ERDC effort.

"We're constantly running models based on new forecasts looking three to five days out," Byrd said. "It takes a lot of effort. Right now, 18-hour days are not uncommon."

Using one of two supercomputers at ERDC's Vicksburg campus, Byrd and his fellow researchers are modeling inundation depths in Houston along Buffalo, Brays and White Oak bayous, around Addicks and Barker dams, as well as the upstream areas of the dams where rainfall feeds into the river system.

The models were initially based off earlier efforts examining flooding from Tropical Storm Allison that hit Houston in June 2001, but needed updating to meet the urgent needs of disaster preparedness and response.

"We'd done a test case for Tropical Storm Allison a few years ago," Byrd said.

He noted that, while they had something to start from, a wealth of new data and drastically different flood conditions meant almost completely rebuilding the model from the ground up.

Byrd and the ERDC team have been constantly running and refining simulations using the Gridded Surface Subsurface Hydrologic Analysis modeling technology developed at ERDC to simulate the watershed. GSSHA is a multidimensional modeling engine that tightly couples overland, surface, and subsurface flow to accurately simulate watershed physics. Its models have been used by researchers in CHL to study the effects of storm surge and sea-level change on coastal military facilities and cities.

In October 2012, the Corps of Engineers used GSSHA to model the inland effects of the combined high storm surge, modeled by CHL's Chris Massey, and the rainfall from Superstorm Sandy on New York City and Long Island. Mayor Michael Bloomberg used this information to evacuate coastal and low-lying areas in New York City and plan for the coming disaster.

Information from the models – as well as data from modeling teams led by Massey at ERDC and Robert Simrall of the USACE Modeling, Mapping and Consequences Production Center at the Vicksburg District office – is provided to the USACE Operations Center in Washington, District of Columbia, to keep first responders and decision makers safe and informed.

The U.S. Army Engineer Research and Development Center is the research organization of the U.S. Army Corps of Engineers. ERDC conducts research and development in support of the Soldier, military installations and civil works projects as well as for other federal agencies, state and municipal authorities, and with U.S. industry through innovative work agreements. ERDC research develops innovative solutions for a safer, better world.

Aaron Byrd, civil research engineer in ERDC's Coastal Hydraulics Laboratory, works on inundation maps for the Houston area during Hurricane Harvey August 29. (Photo by Marisol Byrd)

Environmental Operating Principles

Detroit District fosters sustainability with economic, environmental solutions

By 1st Lt. Erica Mitchell
USACE, Detroit District

Spanning 82,000 square acres and 4,000 miles of Great Lakes shoreline, the Detroit District is committed to incorporating the Environmental Operating Principles in projects as often as possible.

With a workforce of approximately 400, each employee is encouraged to find ways to incorporate these principles in their projects.

Fostering sustainability is a way of life throughout the organization. Through upgrades, using E85, or flex fuel in its government vehicles more than 75 percent of the time, the district is able to exceed this goal. Because of this, the district received the 2015 GreenGov Presidential Award for the Flex Fuel Program.

Proactively considering environmental consequences of all Corps activities, while also creating mutually supportive economic and environmentally sustainable solutions, is at the forefront of every district project.

Prior to initiating the Boardman River Restoration Project in Traverse City, Michigan, the district carefully considered the environmental consequences of modifying the river. It was decided that removing three dams and reconfiguring the river would support the economy and be environmentally sustainable to the area by reconnecting and restoring Great Lakes tributary habitat and restoring the natural balance between fish species.

The district met corporate responsibility and accountability under the law for activities which may impact human and natural environments during the permit review process of the Enbridge Line 5 oil pipeline national maintenance permit. The district considered comments by several public organizations and per their request conducted government-to-government consultation with five Native American tribes.

At the Detroit District, it is a top priority to consider the environment in employing a risk management and systems approach throughout life cycles of projects and programs. The restoration of Cat Island has been an exemplary example for the district.

In 2014, the district won the Chief of Engineers Awards of Excellence Program with the Environmental Merit Award for the Cat Island Dredged Material Disposal Facility project. The project continues to be a success through carefully timed dredge material placement that allows nearly extinct birds to nest and come back to the area.

The Detroit District prides itself on its open, transparent process that respects views of individuals and groups interested in Corps activities and leverages scientific, economic and social knowledge gathered in these activities to understand the environmental context and effects of Corps actions in a collaborative manner.

Annual regulatory roadshows provide individuals and groups information on the Corps' regulatory program. The district also facilitates the International Joint Committee, a collaboration of the United States and Canada in regards to water level regulation in Lake Superior.

Prior to undertaking the restoration project, the Detroit District assessed whether removing three dams and reconfiguring the Boardman River would support the economy and be environmentally sustainable.

(Photo by Leanne Bledsoe)

The 40-kilowatt solar array was constructed to offset the energy used to heat and dehumidify the Beltzville Lake and Dam intake tower.

USACE announces 2017 Sustainability Awards

By Arleen Kreusch
USACE, Buffalo District

The U.S. Army Corps of Engineers is a growing world-class sustainability leader committed to fostering sustainability as a way of life throughout the organization.

The 2017 sustainability awards recognize and reward exceptional performance by USACE individuals and teams demonstrating extraordinary achievement and leading by example toward a clean-energy economy.

Lt. Gen. Todd Semonite, commanding general, and Command Sgt. Maj. Bradley Houston, U.S. Army Corps of Engineers, present the 2017 Sustainability Hero Award to Jennifer Rameriz in Washington, Aug. 1. *(Photo by Josh Dinko)*

The award recipients demonstrate the significant achievement in implementing energy efficiency and sustainable solutions, to reduce impact to the environment and surrounding communities, and preserve the quality of the nation's natural resources.

The 2017 award recipients are:

Sustainability Hero Award - Jennifer Ramirez, manager, Sustainable Engineering Program, USACE, Japan District. The award recognizes Ramirez as a sustainability champion and agent of change within the organization, instrumental in improving design quality and reducing project costs to provide products that meet USACE customer's requirements.

Ramirez oversees sustainability for all USACE construction projects in Japan and the results of her actions made a significant impact and improvement on design and construction work within the Japan District.

Through her efforts, the district is now at 100-percent compliance with sustainability reporting requirements and has quantifiable data on its sustainability execution.

Lean, Clean, and Green Award - Beltzville Lake and Dam Solar Array Project near Leighton, Pennsylvania.

During 2016, the Philadelphia District project delivery team completed the installation of a 40-kilowatt solar array to offset the energy used to heat and dehumidify the dam intake tower. The project demonstrated a combination of measurable energy efficiency and increased use of renewable energy to reduce greenhouse gas emissions.

Conditioning the tower space to allow for safe, effective operation of the hydraulic pumps and to maintain humidity levels that are protective of the concrete structure requires a substantial amount of energy. The solar array was sized to offset 25 percent of the energy used by the dam intake tower so as not to burden the utility grid with excess power. Team members included Monica Chasten, project manager; George Sauls, Northern Area engineer; Joshua Dinko, head dam operator; Patrick Cannon, dam operator; Alison Simone, administrative assistant; and William Wilcox, district counsel.

See SUSTAINMENT, page 30

BAMC garners award for environmental sustainability efforts

Graciela Pena loads paper and magazines into a large shredder at Brooke Army Medical Center. BAMC recycles an average of 12,000 pounds of cardboard and shredded paper a month. *(Photo by Robert Shields)*

By Lori Newman
Brooke Army Medical Center

JOINT BASE SAN ANTONIO-FORT SAM HOUSTON, Texas — Brooke Army Medical Center received the 2017 Greenhealth Partner for Change award May 18 during a ceremony in Minneapolis, Minnesota. This award recognizes medical facilities with superior performance in environmental sustainability.

"We have made great strides over the past year with many of our sustainability efforts," said Army Col. Gerald Dallmann, chief of Logistics at BAMC. "This award shows the commitment of our staff and leadership. I'm sure we will continue to strive for environmental excellence in the future."

Current Initiatives

When the new consolidated tower was being built, an underground spring was struck and water continued to flow up through an emergency elevator shaft. Until recently, the water was being diverted into the storm drain.

To rectify that, "we were probably pumping a million gallons a month into the storm drain," Dallmann said. "It wasn't being used for anything."

We installed a pipe to divert the water into our two reclamation ponds by the highway. And an irrigation system was added so that water is used to maintain the lawns around the facility."

Kevin Edward, chief of the Environmental Services Branch at BAMC, said many other initiatives have already been implemented. The paper curtains that were used in several areas throughout the facility are now being changed to cloth, and the paper curtains are being recycled.

> *"This award shows the commitment of our staff and leadership. I'm sure we will continue to strive for environmental excellence in the future."*
>
> Col. Gerald Dallmann
> BAMC chief of Logistics

"By going to the cloth curtains, washing them and reusing them, we are saving approximately $1 million annually," Edwards said.

Another cost saving measure is the repurposing of white towels that become old or dingy. They are dyed brown and used in other areas of the facility or donated to the veterinary clinic on post.

The Culinary and Hospitality Branch has taken several steps to eliminate food waste by more closely tracking the amount of pre-made sandwiches and salads sold at the "Grab-and-Go's." They were able to save about $3,600 a month and avoid food waste.

Patient meals are prepared on-demand and food production in the dining facility is being more closely tracked to reduce leftovers and discarded foods.

"We would like people who are planning to eat in the dining room to ask for a plate rather than a takeout container," said Lt. Col. Julie Rylander, chief of the Culinary and Hospitality Branch. "This would greatly help in our cost containment efforts."

The takeout containers are made from recycled materials, but the facility currently does not have the ability to recycle them again once they have been used.

"In the kitchen we use mostly fresh or frozen vegetables," Rylander said. "We don't use a lot of canned food items, but we do recycle the cans we do use."

All paper placed in blue recycle bins is collected and shredded before disposal.

"We average about 12,000 pounds of cardboard and shredded paper a month," Edwards said. "All paper should be placed in a blue recycle bin, not just sensitive material."

See EXCELLENCE, page 30

District works to battle beach erosion at oldest East Coast summer resort

Story & photo by Sara Corbett
USACE, Charleston District

Approximately 2.7 miles of shoreline and 110,000 dump trucks of sand are how much of Pawleys Island's beach needs to be renourished.

Pawleys Island, one of the oldest summer resorts on the East Coast, was in good shape, until it was hit by Hurricanes Joaquin and Matthew.

While both storms did damage, Hurricane Matthew resulted in more dramatic beach and dune erosion with some areas of the beach showing more than 80 feet of recession, a complete loss of dunes and 80,000 cubic yards of sand lost. All this loss would require a renourishment to bring the beach back to normal conditions.

The Charleston District has held several roles in helping Pawleys Island renourish its beach, most recently reviewing the permit application to renourish 2.7 miles of beach and place 1.1 million cubic yards of sand.

"The Town of Pawleys Island submitted their application for renourishment in early February," said Tommy Fennel, regulatory chief, Northeast Branch. "However, immediately after Hurricane Matthew, we authorized emergency work under a regional general permit to allow them to temporarily stabilize the beach and dune system."

The emergency work consisted of scraping sand from the beach to build up the dunes to prevent more erosion, protect existing infrastructure and restore habitat that is critical for endangered and threatened species.

While the regulatory division has been the most recent Corps branch to help, the Civil Works Division has a long history of assisting Pawleys Island in its battle against erosion. The Civil Works Division prepared Pawleys Island's first beach erosion study in 1949 in response to damaging northeasters and has since done several studies for them.

One such study the Corps recently conducted found two potential borrow areas with beach-compatible material, which Pawleys Island has indicated in the permit application it will use for renourishment. Borrow Area A comprises a 319-acre area with 1.1 million cubic yards of sand approximately 1-mile offshore of the southern end of Pawleys Island. Borrow Area B would be the primary borrow area as it is an 832-acre area containing an estimated 2.5 million cubic yards of sand 3 miles offshore.

The Town of Pawleys Island has renourished two other times, in 1990 and 1999, and since then the beach has been relatively stable with erosion rates at less than 2 feet per year.

"Prior to the two hurricanes, the overall beach condition in July 2016 was healthier than it was in 1997, largely due to the success of a 1999 renourishment project," said Fennel. "We like to see long-term success rates like that, but if there is erosion due to a storm, the district is equipped to assist with emergency authorizations while simultaneously working with the applicant to reach a long-term solution.

Public notice on the permit application ended March 14 and project managers are reviewing comments and coordinating with state and federal agencies to ensure the work authorized will be effective while protecting the environment. It is anticipated that the permit will be issued later this year.

A portion of a walkway to the beach was swept away during Hurricane Matthew, showcasing how much of the beach has eroded.

Ecosystem restoration reverses 160 years of habitat decline

Lynde Dodd and her team of biologists assess plant and wildlife along the shoreline before re-introducing missing or scarce native plants.

Story & photo by Jim Frisinger
USACE, Fort Worth District

Lynde Dodd, a research biologist for the Environmental Laboratory, U.S. Army Engineer Research and Development Center, still recalls her summer hike three years ago. She walked drainages between subdivisions in Frisco, a booming suburb, conducting a pre-construction vegetation survey.

The first settlers to the Peters Colony 160 years ago encountered bison and a vibrant prairie. It spread across rolling hills that overlook rich North Texas riparian bottomlands. This Blackland Prairie "once exploded with a riot of colorful wildflowers and grasses," wrote Matt White, author of *Prairie Time*. "From flowers that bloom barely above the ground to others 10 feet or more in height, the variety of plant life that existed within just a few feet was remarkable."

Dodd took note that many species once common 160 years ago were missing: blackjack oaks, red oaks, pecans, bur oaks and red mulberries. Their fruits and nuts sustain wildlife in a healthy, diverse ecosystem.

Her team found only small patches of Blackland Prairie species, big and little bluestem, black-eyed Susans, side oats gramma and snow on the prairie. Powerful invasive species Johnsongrass, giant ragweed and cheatgrass had moved into the area as ecological disturbances occurred, replacing many of the Texas natives.

Settlers and ranchers share some of the blame by clearing lands and building log homes.

The Corps of Engineers impounded the Elm Fork to create Lewisville Lake for water supply and to reduce flood risk.

Dodd said the surviving trees were "disturbance specialists," cedar elm, green ash and sugarberry, that can survive lake flooding.

With little quality wetland acreage available, migratory waterbirds were few.

Jim Giocomo of the American Bird Conservancy said habitat loss throughout the Central Flyway hurt bird breeding. But rather than just charting decline, Dodd and her colleagues were the vanguard for a turnaround.

The City of Frisco and USACE, Fort Worth District staged an environmental revival along more than 200 acres of Stewart and Hackberry creeks in partnership under Section 1135 of the Continuing Authorities Program. The national program helps habitat recover from the impact of Corps of Engineers projects, such as Lewisville Lake.

For George Purefoy, Frisco city manager, the project would take a slice of suburban environment back to its past glory.

For the first time, the city could connect to outdoor recreation at Lewisville Lake. It would help achieve Frisco's vision to have a natural greenway cutting across the city from the northeast to the southwest.

See ECOSYSTEM, page 33

‘PRIDE of the Cumberland’

Corps vessel back in stride clearing debris, trash from lake

Story & photos by Mark Rankin
USACE, Nashville District

SOMERSET, Kentucky – The “PRIDE of the Cumberland,” a vessel operated by the U.S. Army Corps of Engineers, is back hard at work today keeping Lake Cumberland’s waterways and shorelines clean and free of logs, debris and trash.

After two months of repairs to the vessel’s rudder, props, shaft, hull plate, and other upgrades, the PRIDE of the Cumberland is again making rounds on Lake Cumberland.

The vessel is based at the Waitsboro Recreation Area and has been called upon more recently due to the heavy logs and debris in the lake.

The PRIDE of the Cumberland’s crew of three people, Rodney Koger, the PRIDE master tender, Christian Stringer and Daniel Peyton, both general maintenance workers, work daily to remove miles of logs, debris and trash from Lake Cumberland making it safer and more enjoyable for visitors.

“This is a full-time job, and we really wonder where some of these items come from,” said Koger. “We pick up everything from old refrigerators, wheels and tires, docks, oil drums, coolers, grills, shoes, buckets, propane tanks and other debris that people leave behind or dispose,” said Koger.

The PRIDE of the Cumberland consists of two 60-foot-long barges pushed by the PRIDE, a 26-foot-long tow boat. The starboard-side barge has a mechanical knuckle boom material handler with attachments for lifting heavy logs and large debris from the water or shore and skimming debris from the water. The port-side barge holds a roll-off dumpster for debris collection and a wood chipper to mulch wood of all sizes.

Koger said the problem with debris has improved from what it was months ago due to water levels being high from recent heavy rains. The rain caused an unusual amount of logs and wood to float south into the curves and bends of the Waitsboro Recreation Area.

After the rain, the summer heat caused the water to recede, leaving logs and debris perched on shoreline banks and placed around hard-to-reach areas behind trees.

Since coming back online, the PRIDE of the Cumberland’s crew works eight hours a day scanning shorelines retrieving logs and debris. They all agree, it seems they never catch up.

Koger said the Waitsboro Recreation Area near the Highway 90 bridge usually gets congested very quickly. He said early in the camping season it caused the boat ramps to close because of debris, and the Corps waived the $5 ramp fee.

“I wouldn’t have believed it until I saw it for myself,” said Koger, “but we cleared the entire shoreline, from the Waitsboro boat launch ramp to the bend, and within two hours, logs and debris floated in and blocked the ramp.

See PRIDE, page 20

Rodney Koger, the PRIDE master tender guides the "PRIDE of the Cumberland," a vessel operated by the Corps of Engineers, closely alongside the Lake Cumberland shoreline. The vessel is used to keep the lake and shorelines clean and free of logs, debris and trash.

PRIDE

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"A lot of debris has been pushed up on the shorelines as the lake level rose up over 700 feet above sea level over the last few months, and is gradually settling down," said Koger.

Judy Daulton, a USACE park ranger, said 4.5 million people visited Lake Cumberland last year. It's the ninth largest lake in the nation, and this year's vacation season has been busier than most.

The Corps estimates Lake Cumberland's 50,000 square miles of shoreline are polluted with at least 200 tons of trash.

"If boaters and people that use the lake and recreation areas would just bring a small garbage bag and take it with them when they leave, it would help," said Daulton. "The crew can't pick up every piece of trash and scan the shores so we need everyone's help to keep our lake clean."

Koger said the PRIDE compliments the thousands of volunteers who already take "personal responsibility" by caring for the lake.

Lake Cumberland is one of the largest man-made lakes in the nation, and each year millions of visitors travel from all over the United States to come enjoy the beauty of its 63,000 surface acres and 1,255 miles of wooded shoreline.

Jan and Earl Owens bought a house on the lake three years ago to be near their grandchildren. They spend almost every weekend on the lake and see firsthand the eyesores from their dock near Burnside, Kentucky.

"When the water is up, you're liable to see anything," Owens said. "I've seen tires, propane tanks, coolers, plastic pop containers and antifreeze jugs.

"We are happy to see the PRIDE back at work again and removing the logs and debris from the lake," he said. "A log could tear up a boat real good and get someone hurt if they are not paying attention. It sure does make us feel better knowing we have less chance of hitting one with them out here cleaning these things up."

Koger said that the Corps receives requests mostly to remove dead trees and moves around to various marinas and locations where either complaints or requests have been made.

"Lake Cumberland is too large and presents too many hazards for just the PRIDE to get it all so it's an all-volunteer effort," said Koger.

Daulton said all that waste has a dramatic impact on integrity of southeastern Kentucky's environment. Cigarette butts and fishing line threaten wildlife and aquatic animals that mistake them for food.

The cigarette butt filters block their digestive tract, and the animals become ill or starve. Animals will also ingest hazardous compounds of cadmium, arsenic, lead and nicotine that are absorbed by the filters.

Lake Cumberland accumulates tons of human-imposed debris every season. The metals and plastic leach chemicals into the water and threaten the habitat for aquatic species and birds in Kentucky and beyond.

According to Daulton, cleaner campsites and shorelines will improve habitat and water quality, reduce mosquito breeding and populations of scavenger species (crows, squirrels, pigeons, rats) and provide more enjoyable recreation for all.

James and Faye Bowles, from Florida, own a boat and spend their summers at Lake Cumberland camping.

"We love this lake, the friendly people, and really care about keeping it clean," said Faye Bowles. "We know pollution has a negative impact on the lake's wildlife so we do all we can to pick up our trash and often encourage others too."

Manuvering the PRIDE against the shoreline for the knuckle mechanical handler to grab a loose 12-foot-by-8-foot boat dock perched on shore, Koger said, "is the type of thing we often see and try to keep out of the path of boaters, water skiers and jet skis."

Koger said he is happy the PRIDE is back on Lake Cumberland and the Corps is always ready and willing to assist any area that needs help. "Our job is to help the public enjoy their visit here and be safe."

Information gathered at the dam will be used in a larger study that will help conservation efforts on the timber rattlesnake throughout the state of Pennsylvania.

Students study snake population

Biological research to help state conservation efforts

Story & photo by Steve Rochette
USACE, Philadelphia District

WHITE HAVEN, Pennsylvania – A group of graduate students from East Stroudsburg University partnered with the staff at the Francis E. Walter Dam as part of thesis work on rattlesnakes.

The biological research involves measuring, tagging, determining the sex of the snakes and whether the females are carrying eggs. Information gathered at the dam will be used in a larger study that will help conservation efforts on the timber rattlesnake throughout the state of Pennsylvania.

The F.E. Walter Dam, constructed in 1961, has prevented more than $212 million in flood damages to the Lehigh River Valley. The property includes approximately 1,800 acres, some of which is considered suitable habitat for rattlesnakes.

"There are denning locations all over the Pocono Plateau," said Dave Williams, hydrologic technician and acting Northern Area manager. "At F.E. Walter, the draw is open cliff faces and fractured rock within the southerly facing tree line area, which make prime denning habitat for rattlesnakes."

The partnership developed in the fall of 2016 when Tom LaDuke, an associate professor of biology at East Stroudsburg University, approached the staff at the F.E. Walter Dam. LaDuke and his students were hoping to find rattlesnakes returning to denning areas for winter hibernation.

Williams and the team at the Francis E. Walter Dam were familiar with the denning locations on the property so they escorted the students to the sites for observation.

In April 2017, the students returned to the denning locations when the snakes were emerging from hibernation. At that point, the students, who are trained in safe handling techniques, captured snakes and began data collection.

See SNAKES, page 32

Wilmington District helps preserve seabird habitats

Story & photos by Hank Heusinkveld
USACE, Wilmington District

If you're on the ferry heading from Fort Fisher to Southport in late June through July, it's hard not to notice a flurry of activity on an island located just downriver in the middle of the Cape Fear River.

It's called South Pelican Island, and it provides a home to thousands of nesting seabirds and their young.

What was once just a typical U.S. Army Corps of Engineers dredged material placement island roughly three decades ago has become some of the last nesting habitats for seabirds in southeastern North Carolina.

"We have several different species of waterbirds and several species of shorebirds that nest here," explained North Carolina Audubon biologist Lindsay Addison. "We have brown pelicans, royal and sandwich terns, and laughing gulls which all nest in the island habitats. We also have American oyster catchers, which are a large shorebird, and willets, which also breed here."

Illustrating the importance of preserving these habitats, Addison said South Pelican Island, together with Ferry Slip Island, support about 20 percent of North Carolina's royal and sandwich tern breeding populations. These two islands are the only suitable nesting sites for those species between Cape Romaine, South Carolina, and Cape Lookout, North Carolina.

"The islands in the Lower Cape Fear River also support about 20 to 25 percent of North Carolina's brown pelican population," she said. "Both islands are absolutely essential to them and essential to their recovery in this state."

The island is divided by various habitats. Pelicans prefer grassy, sandy areas while terns prefer just sand. When the right kind of sand is available from dredging, the Wilmington District works with Audubon North Carolina to coordinate placing it on South Pelican or Ferry Slip Island to maintain the proper habitat. On average that happens every seven years.

"The quality of the material, coarse-grained sand free of large shells and debris, is essential to these birds," said Wilmington District biologist Keleigh Cox. "Fine-grained material is nearly unusable for nesting, due to the small grain size being washed away by incoming and outgoing tides."

The island is off limits to the public during the nesting season (April 1 to August 31) to lessen stress on foraging birds. And because it is an island, Cox said it is harder for mammalian predators to be able to disturb the nesting colonies, ensuring that seabirds will be able to continue nesting in southeastern North Carolina uninhibited.

"Sea and shorebirds are a major component of our beach's ecosystem and a familiar site to any beachgoer," she said. "Though most people won't see these bird islands, they can still appreciate the aesthetic aspect that these iconic birds bring to our beaches.

See **SEABIRDS**, page 25

Gauging who does what

USACE, NOAA measuring Great Lakes' water levels

By Dr. Michael Izard-Carroll
USACE, Buffalo District

Flooding along Lake Ontario in the spring and summer of 2017 garnered considerable media and community interest about how water levels in the Great Lakes are monitored, who does the monitoring, and how often the monitoring is done.

Monitoring lake levels provides leaders with critical information to decide what their communities may need to protect their public and private assets from high waters and destructive wave action.

Celebrating a 242-year history of service to the country, the Corps has kept lake mean-water-level records of the Great Lakes dating as far back as 1860 and the binational coordinated data set since 1918.

This year makes a century of binational coordinated data sets used in managing the international forecast for the Great Lakes, past, present and future.

These lake-wide mean water levels are published daily by the Detroit District office. USACE, however, does not own and maintain the Great Lakes water gauges. That role is filled by the National Oceanic and Atmospheric Administration National Ocean Service Center for Operational Oceanographic Products and Services office in Silver Spring, Maryland. USACE and Environment Canada use the data NOAA and the Canadian Hydrographic Service collect and then provide jointly the levels to be internationally forecasted. The data is communicated to the Lake Ontario – St. Lawrence River Board, which is a binational board created by the International Joint Commission, and who manages the water levels for Lake Ontario.

"The Corps of Engineers, Buffalo District, has a technical advisory role with the Lake Ontario – St. Lawrence River Board," said Keith Koralewski, chief, Hydrology and Hydraulics and Water Management, Buffalo District. "Based on the mean data we've analyzed, we make recommendations to the board and provide projections."

To collect that data, the U.S. operates 53 water level gauge stations through NOAA, along the Great Lakes extending from Lake Superior to the St. Lawrence River, and there are over 34 gauges on the Canadian side, operated by the Canadian Hydrographic Service.

The gauge station sumps are typically 6 feet in diameter with an 8-by-8 foot brick and block structure, which houses the electronic water-level measuring equipment.

The sumps or stilling wells have 6-inch intake pipes with varying lengths from 10 feet to 1,900 feet in length, which enable the constant measuring of water levels in both extreme high and low levels. The intakes are valve-controlled, removing wave action, and afford accurate measure of water-level elevations. Each station operates dual-shaft angle encoders with a primary and a redundant sensor.

These encoders with optical sensors are absolute, ensuring that even when the power goes out they remain on datum, storing the water level elevations in the data collection platforms, retrievable by Geostationary Operational Environmental Satellite or phone line.

Perhaps surprising is the fact that the majority of the Great Lakes brick-block gauge stations are on land, with the longest intake shaft reaching nearly 2,000 feet out into Lake Erie.

It's important that the encoder is in a stilled water environment to get a true surface elevation at that location, said Keith Kompoltowicz, chief, Watershed Hydrology, Detroit District.

In addition to wave action, the harsh northern winter conditions as experienced in the region may hamper the collection of accurate readings.

"The ice that forms on the Great Lakes poses significant challenges for properly measuring water levels," said Jeff Oyler of NOAA, a 44-year veteran in the field of hydraulics and hydrology. Subsequently, each water gauge station is equipped with an electrical power source that provides sump lighting and heat lamps to ensure the water in the wells does not freeze.

Oyler said that the majority of the gauge stations are over 50 years old and new stations each cost approximately $500,000. Eight of those stations have been constructed since 1970.

The stations are outfitted with meteorological sensors that transmit data to a number of reporting agencies wirelessly via satellite.

Like many operations that are technology dependent, redundancy of sensory equipment provides a backup for data collection. There are even redundant satellites used to transmit data should a satellite become inoperable.

Transmission of data is near real-time, transmitted at six-minute intervals. There is also a secondary, backup sensor, at all of the Great Lakes stations, Oyler said.

There are five stations on Lake Superior, six on Lake Michigan and Lake Huron, four on Lake Erie and six on Lake Ontario that are used for computing lake-wide average reporting.

The Detroit District office obtains the raw daily mean water level for all of the gauges on the Great Lakes, and they are primarily interested in the data from the coordinated gauge network for each lake.

The coordinating committee on Great Lakes Basic Hydraulics and Hydrology Data decides which gauges will be used for determining the mean average for a particular lake, said Kompoltowicz.

"On a daily basis, our servers go out and grab the daily means from the prior day from both the Canadian gauges and the U.S. gauges and then our systems average those daily gauge means into a lake-wide mean," said Kompoltowicz.

On Lake Erie, for example, there are four gauges that are used in the coordinated gauge network, two in the United States and two in Canada. They are at Toledo, Ohio; Cleveland, Ohio; and Port Stanley and Port Colborne in Ontario, and those gauges averaged together make up the lake-wide mean water level.

The Detroit District office publishes average daily mean water levels, but for those interested in the raw data for lake levels, they can be found on NOAA's "**Tides & Currents**" website, as well as the Canadian Hydrographic Service website.

SEABIRDS

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Wilmington District biologist Keleigh Cox, left, listens as North Carolina Audubon biologist Lindsey Addison explains brown pelican habitat during a media day on North Pelican Island in the Cape Fear River near Wilmington.

Newly hatched chicks are pink, but within 4-14 days turn gray or black. Six to nine weeks later, they leave the nest and gather into small groups known as pods.

Signs warn the public to keep off the island during the nesting season (April 1 to August 31) to lessen stress on foraging birds.

According to North Carolina Audubon biologist Lindsey Addison, the islands in the Lower Cape Fear River support about 20 to 25 percent of North Carolina's brown pelican population.

District completes Bird Island restoration project

The historic Bird Island Lighthouse overlooks the island's restoration efforts. *(Photos by Adam Burnett)*

By Ann Marie R. Harvie
USACE, New England District

The New England District team recently completed a restoration project on an island in Buzzards Bay, Massachusetts, that not only saved a valuable habitat for an endangered bird, but also restored a tidal marsh and reopened a tidal creek at a nearby location.

The Bird Island Restoration Project completion ceremony took place at the Marion Natural History Museum in Marion, Massachusetts, June 21.

Larry Oliver, chief, Evaluation Branch; Adam Burnett, project manager; and team member Judi Johnson represented the district. They joined the town of Marion, the Massachusetts Executive Office of Environmental Affairs, and the Massachusetts Department of Fish and Game.

Oliver praised the partnership between the agencies in getting the project done.

"This is truly a collaborative effort and this vital restoration project would not be possible without the talents and dedication of all the individuals, agencies and groups who supported this effort, especially the local sponsor, the Massachusetts Department of Fish and Game, Division of Fisheries and Wildlife," he said.

Bird Island is a small island, owned by the town of Marion, in Buzzard's Bay at the mouth of Sippican Harbor. It is less than a mile off the coast of Marion and is one of three significant breeding sites that support a majority of the population of federally protected and endangered roseate tern.

"Bird Island alone supports 30 percent of the endangered northeastern population of roseate terns breeding and nesting each year," said Johnson.

According to Burnett, the roseate tern habitat on Bird Island has been deteriorating significantly due to beach erosion and submergence during storm events.

Also in danger is a still-operating historic lighthouse. Storm damage has deteriotated a 1,100-foot revetment constructed in the mid-1800's, including a 625-foot-long section that has been reduced to piles of rubble.

"The centuries-old rock wall built to help protect the island and lighthouse was in poor condition, and coastal storms had been eroding away the vegetation and sand that roseate terns need for nesting," said Burnett.

Work to restore Bird Island consisted of constructing a new 1,100-foot boulder revetment extending 9.5 feet above mean lower low water using approximately 14,000 tons of armor stone.

Work also included using 9,000 tons of specially formulated bird habitat fill, composed of sand, gravel and cobbles, and revegetating the island with over 12,000 native plants to restore nesting grounds.

Restoration of the island will also protect the historic lighthouse.

Because wetlands were filled on Bird Island as part of the restoration process, the project required mitigation work. There was not sufficient space to replace the salt marsh on the island, so the project team selected a nearby alternative location.

The project at the Apponagansett Bay in Dartmouth, Massachusetts, involved restoring a tidal marsh and reopening a tidal channel.

"This restoration work was completed in 2016 by the Corps, involving the excavation and removal of old roadbed fill across tidal marsh and planting of native marsh grass," said Burnett.

"The project involved reopening the historic tidal channel, returning tidal flushing to the marsh, and then restoring the salt marsh resource area," said Johnson.

According to Burnett, the tidal channel opening will restore both the intertidal and sub-tidal channel habitats in the upper portion of the basin.

The Bird Island Restoration Project took about a decade to complete.

According to Oliver, the Corps joined the study in 2002 at the request of the Massachusetts Executive Office of Environmental Affairs.

In 2006, the district completed a feasibility study under the Corps' Section 206 Aquatic Ecosystem Restoration Program that recommended a plan to restore and protect roseate tern nesting habitat. Through a detailed project report and environmental assessment, the agency recommended reconstructing the revetment around the island and restoring substrates over the island surface for tern nesting.

Members of the Bird Island restoration team review and discuss progress made at the Apponagansett Bay Restoration Project at Dartmouth, Massachusetts.

"The Corps and the Massachusetts Department of Fish and Game executed a project partnership agreement on June 30, 2011, to complete the design and construction," he said.

In 2015, the district completed the project designs and then awarded a construction contract in September 2015. Construction on the island started in December 2015. Cashman Dredging and Marine Contracting Co., LLC of Quincy, Massachusetts, received the award for the $3.6 million construction contract.

The entire project cost $5.1 million, which was cost-shared between the district and the sponsor. The federal government contributed 65 percent of the project costs and oversaw the contract. The Commonwealth of Massachusetts contributed 35 percent of total project costs.

The work on Bird Island is already seeing results.

"Now in June of 2017, after two construction seasons, we accomplished the goal of a restored and protected island habitat for both roseate terns and common terns," said Burnett. "As of this spring, we are seeing thousands of terns re-establishing the breeding and nesting habitat on Bird Island, with chicks already emerging.

"It's not often that we are able to see the benefits of a project so quickly after completing construction," he added. "The habitat restoration should continue to benefit this endangered species long into the future."

The reactor pressure vessel from the STURGIS is carefully loaded onto a transport vehicle inside a specially designed shielded shipping container.

STURGIS decommissioning hits major milestone with removal of nuclear reactor

By Chris Gardner
USACE, Baltimore District

After years of planning and overcoming significant implementation challenges, the STURGIS project team has successfully removed the reactor pressure vessel — a major component of the Army's MH-1A reactor aboard the STURGIS, a nuclear barge.

The reactor pressure vessel, which previously held the nuclear fuel during operations, was secured in a shielded shipping container within the barge's containment area. Once secured, it was lifted from the STURGIS onto a transport vehicle where it was then shipped to the Waste Control Specialists in Andrews County, Texas, for disposal.

"The reactor pressure vessel was the primary source of the radioactivity remaining on the STURGIS," said Brenda Barber, project manager, Baltimore District. "The safe removal of the reactor pressure vessel and its safe transport to the disposal facility is a huge milestone for our team. It means we have now removed approximately 98 percent of the radioactivity from the STURGIS and a total of 850,000 pounds of radioactive waste."

A unique history and a lot of dedication and hard work have led up to this significant milestone.

The STURGIS started out as a World War II liberty ship, but in the 1960s it was converted into a floating nuclear power plant, home to the MH-1A reactor. It was used to provide power generation in remote locations for the Army, spending most of its time in service in Gatun Lake providing power to the Panama Canal Zone from 1968 to 1976.

Deactivated in 1977, the STURGIS was defueled, decontaminated for long-term storage, sealed and except for periodic maintenance, was stored until recent years.

In 2012, its formal decommissioning effort began as part of a broader effort to rid the Army of its retired nuclear reactors through the Army Deactivated Nuclear Power Plant Program.

After years of planning and coordination with partnering agencies, government officials and other stakeholders, an environmental assessment of multiple potential sites for the decommissioning work was completed in 2014.

Once a contract was awarded, the STURGIS was towed 1,750 nautical miles from where she had been stored in the James River Reserve Fleet in Virginia to Galveston, Texas, in April 2015 for her final decommissioning.

Baltimore District, home to the Corps of Engineers' Environmental and Munitions Design Center and North Atlantic Division Radiological Health Physics Regional Center of Expertise, manages the project overall, but the execution is carried out in close coordination and partnership with the Corps' Galveston District.

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"This decommissioning effort for the STURGIS is a complex project, and we could not have done it without our partners in the Galveston District," said Col. Ed Chamberlayne, commander, Baltimore District. "It's also been done in close partnership with the U.S. Army Corps of Engineers Headquarters and the Army Reactor Office."

Since her arrival in Galveston, crews have been carrying out the complex work of dismantling portions of the vessel to gain access to the reactor components to allow for their safe removal.

"When the liberty ship was converted into a floating nuclear reactor back in the 1960's, they never intended for it to be taken apart," Barber said. "It was built to house a nuclear reactor with thick elements of steel, lead and concrete barriers which provided protection for the workers and the public during her operations. These well-engineered elements have been taken apart by our team section-by-section over the past two years in Galveston."

After setting up the project site in April 2015, crews began the painstaking work of systematically taking the vessel apart.

First, the team constructed two secure access hatches on the STURGIS' top deck to allow all of the waste to be removed safely. Then the team began to remove waste from the reactor containment area floor-by-floor. The first radiological waste shipment occurred in October 2015 and has been ongoing since that time.

While the work took longer than anticipated due to the complexities of the project, crews continued working to remove each of the elements of the reactor, properly packaging and shipping them to the disposal facility.

By June 2016, the team was able to remove another major component — the 35-ton former spent fuel storage tank.

"The work on the STURGIS has been difficult, but the crews working down here in Galveston have done a tremendous job communicating the risks associated with each task and worked together as a team to mitigate each of these risks," said Hans Honerlah, RCX program manager, Baltimore District, who has provided on-site radiological oversight for most of the effort.

The next big challenge was how to gain access to the reactor containment vessel.

Removal of the reactor pressure vessel resulted in the largest single reduction in residual radioactivity since the removal of radiological waste began in 2015.

"The reactor containment vessel is what we often refer to as 'the egg,'" Barber said. "It's a thick, 350-ton steel spheroid that contains all the main reactor components, including the reactor pressure vessel. The major reactor components were the items where the team had to be prepared to handle a majority of the radioactivity remaining on the STURGIS."

In August 2016, crews were able to remove the first of several sections of the canopy on top of the reactor containment vessel.

By January 2017, the crews had removed the canopy and began to cut the reactor containment vessel to gain access to the reactor components.

During the process of dismantling portions of the STURGIS to gain access to and remove radioactive components, the team has been able to safely recycle approximately 600,000 pounds of lead.

By March 2017, the team had begun the process of removing the large components from the RCV, including the steam generator, pressurizer, coolant pumps, refueling shield tank, ductwork and reactor head dolly. Their removal provided the team access to remove the RPV that historically has the highest amount of residual radioactivity.

RPVs are thick steel containers that hold nuclear fuel and that provide one of several barriers that keep radioactive fuel contained and out of the environment.

During the reactor's operation, subatomic particles, called neutrons, are generated. Some of these neutrons hit atoms in the steel as they leave the core and subsequently make the steel radioactive.

All nuclear fuel was removed from the vessel when it was shut down in the late 1970's and the residual radioactivity remaining was within the stainless steel of the reactor pressure vessel.

While the bulk of the radioactivity has been safely removed from the STURGIS, there is still a great deal of work required to complete the decommissioning project.

Over the next several months, the team will remove the remaining contaminated items, package and transport them to the disposal facility.

After all of the radioactive materials have been removed, the team will access the very small spaces within the hull bottom tanks to complete the required surveys before releasing the STURGIS for shipbreaking.

The team anticipates some challenges with the hull bottom tanks to include confined space entries, heat stress, lead-based paint issues, and the approach to cleaning the metal surfaces. These are risks the team is actively managing for this upcoming work.

SUSTAINMENT

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Building the Future Award - Davis Barracks Project Delivery Team. The team met the challenge to design and construct the Davis Barracks at the U.S. Military Academy in West Point, New York, to the highest level of quality and sustainability. Members of the project delivery team include: Matthew Ludwig, chief of construction; Catherine Scott, team leader; Jefferey Friese, technical manager; Timothy Pillsworth, project engineer; and Anthony Jara, project engineer, all from the New York District, and Patricia Donohue, regional sustainability program manager, North Atlantic Division. The Davis Barracks will provide first-class housing to 650 cadets when completed. It includes high-efficiency systems to meet the academy's Net Zero goals, radiant heating and cooling, dedicated outdoor air systems, heat recovery systems, solar thermal and aggressive building infiltration measures. Additional sustainable features developed include rain and grey water harvesting to lessen the impact on the wastewater treatment plant and additional solar thermal provisions.

The dedication and commitment of these individuals is a great example of fulfilling the USACE commitment to meeting and exceeding federal goals and targets for energy and sustainability and integrating its environmental operating principles into all projects.

EXCELLENCE

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Additionally, more can and plastic recycle bins have been placed throughout the facility to encourage people to recycle cans and plastic bottles.

"We are trying to make it easier for everyone to recycle, but they need to do their part," Edwards said. "Take those few extra steps to put your can or plastic in a recycling bin."

New shredders with balers are being purchased. This will help with disposal because the bales will be more compact and easier to handle.

Another area that is being evaluated is regulated medical waste. "We pay more than $100,000 a year to dispose of regulated medical waste," Edwards said.

Edwards said they are looking into more efficient ways to dispose of regulated medical waste. There is a significant cost difference between regular trash disposal and regulated medical waste disposal.

"We are looking at trash compactors instead of the regular roll-off dumpsters we currently use," Dallmann said. "The compactors would alert the disposal company when they are full. The containers we currently use get picked up on a schedule whether they are full or not.

"There is a huge spectrum of opportunity here at BAMC for savings and sustainability," Dallmann said.

FORUM

continued from page 6

There were also speakers from South Korea, Mongolia, Vietnam, Malaysia and China, in addition to several guests from U.S. agencies and other countries.

The subject matter experts described concerns, challenges and examples of solutions regarding ocean acidification, changing wildlife habitats, oil spill response, mangrove restoration, high-elevation glacial melt and negative effects of the resulting glacial lake.

Guest presenters also spoke about efforts to counter wildlife trafficking, improve groundwater resources and storage, and the secondary positive outcomes of ensuring clean drinking water.

Three top environmental concerns are resilience to natural disasters, water security and waste management, said Sholes.

"The negative impact of flooding in Bangladesh has gone from thousands dying during and after a flood event to fewer than a dozen dying, in part due to collaborative efforts to improve disaster response," said Sholes. "Clean water and access to water is another big issue that takes a multinational approach to solve."

The forum included biodiversity work group activities and site visits that enforce PESF themes and demonstrate military roles. The forum featured an environmental project concept development assembly, allowing various countries to identify key projects or topics where the military may be able to collaborate with civilian agencies and other nations to solve problems.

Participants toured several facilities on Joint Base Elmendorf-Richardson, including the Anchorage Methane Power Plant. Decomposing garbage from the Anchorage Regional Landfill creates methane gas, which is funneled to the power plant through a 6,000-foot pipeline and used to produce electricity.

"Pulling that off-gas that clearly contributes to greenhouse gas emissions — because methane is a very toxic petro chemical for the environment and atmosphere — is a huge success story and very encouraging for a lot of the countries," said Sholes. "Waste and managing 21st century waste for a lot of these societies, including our own, is a real big problem and so whether it's a waste to energy solution or recycling remedy, or minimizing your waste footprint, we need to find solutions and do what we can to help others do the same."

Ultimately, PESF exists to address relevant and important concerns, and allows nations who share the same region of the world to learn from each other and help each other, said Sholes. He said the hope is that the forum will help establish priorities for countries in the region and provide USPACOM with "bona fide real-world environmental security projects that will help others in the region build capacity."

"Whether it's techniques and procedures on how to get through scenarios or building their military's capacity to deal with environmental matters of a material and training nature, we hope to accomplish this while also supporting the civil communities," said Sholes.

"We aren't able to take millions of dollars to solve some of these problems, but we can begin the conversation to use our engineers to help design solutions with them, and then with various (non-government organizations) throughout the world and magnanimous groups that have more money than the U.S. can part with, hopefully we will begin a conversation that others can help end with positive results," said Sholes.

Seattle District scientist earns DOD environmental program research grants

Story & photo by A. Scott Lawrence
USACE, Seattle District

Competing against hundreds of researchers vying for limited funding, a local U.S. Army Corps of Engineers scientist had not one, but two research proposals selected, securing more than $2 million in 2017 grants.

Each year, scientists from federal organizations, universities and private industry submit research proposals to the highly competitive Environmental Security Technology Certification Program.

Thirty-six new projects were funded by the Department of Defense environmental research program in 2017, including two led by Seattle District's own Dr. Mandy Michalsen.

"Hundreds of projects were in the running for grant funding, so it was exciting to learn that we competed successfully and had two projects selected," said Michalsen, principal investigator for both projects.

Competition for funding is a months-long tiered process beginning with initial proposals for consideration. If selected to proceed to the next round, researchers submit a more extensive proposal including funding requirements and study details that they must defend in front of a scientific panel.

Both Seattle District studies are related to environmental cleanup efforts at contaminated DOD sites and each is expected to be completed in three years.

One project aims to standardize "passive" porewater sampling methods for measuring the amount of freely dissolved organic contaminants present in sediment porewater – the water that fills pores between grains of the sediment.

Historically, sediment characterization involved using chemicals to extract organic contaminants from bulk sediment samples. However, this bulk extraction approach doesn't necessarily tell you how much contamination sediment-dwelling organisms are actually exposed to. That's where direct porewater measures come in.

Researchers have already adapted existing laboratory technologies to concentrate organic contaminants in water samples, called solid-phase microextraction.

The process involves using small fibers coated with a polymer that absorbs contaminants. When extracted, the organic contaminants are concentrated, allowing scientists to quantify very low concentrations. Taking the research a step further, scientists are using this process to measure porewater concentrations by deploying these fibers directly into sediment.

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Dr. Mandy Michalsen secured two research grants to study environmental cleanup efforts at contaminated Department of Defense sites.

SCIENTIST

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The technology is relatively well established within academic and research circles but it isn't standardized nor commercially available "off the shelf." That's where Michalsen's project comes in.

"We are collaborating with seven commercial laboratories and three universities to establish a standard method for preparing, deploying and extracting these samplers," Michalsen said.

"By the end of this project we will have seriously accelerated acceptance of this technology. We'll have a standard method others can utilize and seven labs able to offer that service. Also, the universities will produce tutorial videos so anyone who is interested in getting these methods up and running in their lab can do so."

Although excited about porewater sampling technology, Michalsen says it's not as cutting edge as the second project receiving funding. "This one is really scientifically juicy and has the potential to make a significant scientific impact," she said.

Under the umbrella of bioremediation, where organisms are used to degrade contaminants, the proteomics project aims to demonstrate how measurement of proteins can help track microbial activity in environmental samples.

"A special type of bacteria has the capability to use chlorinated solvents like we use air," Michalsen explained. "They gain energy converting these solvents into non-toxic end products, much like we inhale oxygen and exhale carbon dioxide, gaining energy in the process. So oxygen is to us, as these contaminants are to the bacteria. We often call them halorespiring bacteria"

"Cleaning up tens of thousands of TCE-contaminated groundwater sites is a really expensive, long-term challenge for DOD. If we can develop technologies that can get the government out of the cleanup business cheaper, better and faster, that's a good thing."

Dr. Mandy Michalsen
USACE, Seattle District

In bioremediation remedies at DOD sites, where contaminated groundwater from chlorinated solvents like trichloroethylene, or TCE, is prevalent, scientists measure the number of genes, or DNA, associated with halorespiring bacteria to decide if enough bacteria are present and can be stimulated to treat groundwater. It's not an exact science, however, since DNA measurements indicate bacteria are present, but not if they are active.

"For example, you may detect DNA of halorespiring bacteria, but DNA alone doesn't tell you if the cell is actively expressing proteins and actively degrading TCE," Michalsen said. "In other words, DNA provides only a measure of activity potential because the DNA-carrying cells could be inactive."

This research goes to the next level, measuring proteins expressed by bacteria carrying out the detoxifying activity.

"Protein measurements are directly linked to activity because it's the proteins that mediate the detoxification activity we care about – and only active cells produce these proteins," Michalsen explained.

By demonstrating a link between protein measurements and the rate of detoxifying activity, scientists have a more compelling relationship that could allow for better predictions and decision making at contaminated sites.

"Cleaning up tens of thousands of TCE-contaminated groundwater sites is a really expensive, long-term challenge for DOD," she said. "If we can develop technologies that can get the government out of the cleanup business cheaper, better and faster, that's a good thing."

SNAKES

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Students measured the snakes, determined the sex (by counting the subcaudal scales), tagged the snakes and then released them in the same general area. Rattlesnakes typically return to the same denning location as their birth, so it's important to release them nearby.

The student research involves various subjects, such as population size estimation, the effects of habitat change on population size and habitat preferences of gestating female timber rattlesnakes. These studies are part of a larger study on population monitoring that is currently underway by LaDuke in cooperation with the Pennsylvania Fish and Boat Commission.

"It's been an interesting process to watch, and the students have been appreciative of having the opportunity to access these locations for their research," said Williams who added that he has a "healthy respect" for rattlesnakes.

The partnership is one of several environmental stewardship initiatives taken on by the staff at the Francis E. Walter Dam.

One example includes a partnership with the American Chestnut Society to help restore the high-value native tree species on F.E. Walter Dam property.

Over the years, the F.E. Walter team has planted native warm season grasses, removed invasive plant species when possible, and worked on forest management initiatives to allow the canopy to expand along with the understory to thrive and provide suitable habitat for wildlife.

In 2017, more than 800 pounds of seed will be planted for habitat on USACE property at the Francis E. Walter, Prompton and Beltzville dams.

"I feel this is all part of our job," said Williams. "We've got 1,800 acres to manage here and if you don't try to manage it properly, then it's not going to be viable as wildlife habitat and for the public to enjoy."

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To get there, the Corps team designed six ponds to capture enough runoff to create six wetland plant communities at the heart of the project. Its Frisco partners worked with subdivision developers to obtain sufficient land adjacent to Corps-controlled floodplains. An excavation contractor built berms and water control structures. Biologists actively re-introduced missing or scarce native plants. But when the earthmovers moved in, there were some who were alarmed.

"They were used to that view of the bottomland hardwood forest so the disturbance this construction created caused a little bit of an uproar," said Jon Loxley, CAP program manager. "We took great care to limit our area of disturbance to maintain as much of the remaining, valuable edge habitat area as possible.

"The city worked face-to-face with the neighbors to help them understand that this was part of the construction process, which would look better over time," he said.

It worked. Neighbors brought the crew tea. Another used her garden hose to water newly planted trees. Three miles of trails are already getting regular use.

"The ability to have an urban neighborhood so close to a very naturalized area is what the project was all about," said Rick Wieland, Frisco assistant director of Parks and Recreation. "It gave us a great opportunity to partner with the Corps of Engineers and to be able to provide something that our residents have always desired."

Twenty-one different aquatic species make these wetlands far more diverse than typical willow-cattail wetlands nearby.

All wetlands retain water during flooding and improve water quality by naturally filtering sediments and pollutants from runoff.

Nesting boxes went up to attract wood ducks and mergansers. Berms were seeded with 5 dozen grassland species. Old field habitat was planted with 25 different trees, shrubs and vine species.

Reforestation creates a diverse seedbank that will benefit adjacent tree savanna and riparian forest for future generations.

Loxley said great credit is due to Dodd and other talented research biologists at the Corps' nearby Lewisville Aquatic Ecosystem Research Facility. Its nursery and staff raised all 4,000 plants placed so far and will help Frisco learn how to maintain the biodiversity that is the soul of ecosystem restoration.

It's already off to a good start. Eastern screech owls occupied one nesting box. Mallards and American wigeons made migratory pit stops in February.

Post-project habitat assessments using Habitat Evaluation Procedure analysis can measure indicator species: ducks, barred owls, Carolina chickadees, eastern meadowlarks, fox squirrels, raccoons, eastern cottontails and red-tailed hawks.

Jayce Proctor, a graduate student at the University of North Texas, is collecting migratory waterfowl numbers here for a master's thesis.

TRAINING OPPORTUNITY

Hazardous waste management, disposal training offered

Do you need to know about hazardous waste management and manifesting? If yes, this course is for you. This 36-hour course provides initial training regarding regulatory requirements of the Hazardous Materials Transportation Act and the Resource Conservation and Recovery Act as it applies to the generation, transportation and disposal of hazardous material, focusing upon hazardous waste.

It enables employer certification in accordance with 49 CFR 172 Subpart H, that their employees have been trained and tested on general awareness and function specific elements. In addition, this is an ISEERB and Department of Defense approved course as per DOD 4500.9-ER. It has been reviewed by subject matter experts from DOD components and found to be suitable for more than one agency. This course consists of a review of the technical application of selected environmental requirements pertinent to compliance issues.

Topics include:

- **Hazardous Waste Manifest**
- **Understanding Resource Conservation and Recovery Act**
- **Generator Requirements**
- **Land Disposal Restrictions**
- **Standards for Owners and Operators of Permitted Treatment, Storage and Disposal Facilities**
- **Exercise on Treatment, Storage and Disposal Facility Standards**
- **Recyclable Materials Management Exercises**
- **Manifesting Hazardous Waste Exercise**
- **Requirements for Shipping Documents Exercise**
- **Workshop – Shipping Descriptions**
- **Special Requirements for Asbestos and PCBs**
- **Packaging Requirements Exercise**
- **Marking Requirements Exercise**
- **Placarding Requirements Exercise**
- **Department of Transportation Emergency and Security Requirements Exercise**
- **Workshop – DOT Exercises**
- **Workshop – Manifest Package**

Course 223 - Session 1802 has 16 seats available. This course is scheduled for June 4-8, 2018, in St. Paul, Minnesota.

For more details, visit the USACE Learning Center's FY2018 Purple Book at http://ulc.usace.army.mil/.

U.S., Sri Lanka partnership increases oil spill preparedness

By Justin Pummell
USACE, Pacific Ocean Division

COLOMBO, Sri Lanka — On behalf of the U.S. Pacific Command, the U.S. Army Corps of Engineers collaborated with the Sri Lanka Navy and the Marine Environment Protection Authority to develop the first environmental mapping resource for coastal regions between the Port of Colombo and Negombo Lagoon in Sri Lanka.

Rounding out the team of experts, who completed the project Aug. 23, were representatives from the National Aquatic Resources Research and Development Agency, Coast Conservation and Coastal Resource Management Department, Central Environmental Authority and other local government entities.

The environmental resource base, which is also referred to as Environmental Sensitivity Index maps, provides a concise summary of coastal resources that are at risk if an oil spill occurs.

Examples of at-risk resources include biological resources, such as birds and fish; sensitive shorelines, such as marshes and mangroves; and human-use resources, such as subsistence gathering or fish processing.

According to the U.S. National Oceanic and Atmospheric Administration, ESI maps can help responders meet one of the main response objectives: reducing the environmental consequences of a spill and the cleanup efforts. Additionally, ESI maps can be used by planners — before a spill happens — to identify vulnerable locations, establish protection priorities and identify cleanup strategies.

This was the first ESI project for Sri Lanka, and was well received by its participants.

"The ESI project is a great step for Sri Lanka," said Lt. Cmdr. KA Nuwarapaksha, Sri Lanka Navy Marine Conservation staff officer. "The Sri Lanka Navy was privileged to be the focal point, and we are grateful for the support provided by USPACOM, USACE and local stakeholders.

"Undoubtedly, I believe this ESI will enhance the oil spill response capabilities of responsible entities in Sri Lanka," he said.

The ESI project commenced in June 2016 and took approximately a year to complete.

The project was orchestrated in three phases, with an initial scoping effort followed by field work and technical delivery. The result is a comprehensive atlas and Geographic Information System database designed to prioritize oil spill response, recognize vulnerability and assist with critical decision-making.

Project deliverables also include standard templates that can be used to develop additional ESI resources that can be applied to other locations in Sri Lanka, such as Galle or Trincomalee.

LLRB de Silva, a GIS specialist with MEPA, recalled participating in a challenging oil spill cleanup and now looks to the Sri Lanka's future response capabilities with optimism.

According to de Silva, in 2012, a ship named MV Thermopylae Sierra sank and an oil spill occurred between Panadura and Negombo.

"At that time, there were no ESI products available, and the response was difficult," said de Silva. "Now, with detailed ESI maps available between Colombo and Negombo, it is a great achievement for Sri Lanka. I am hopeful that this preparation will advance our capabilities in the future, and we are able to apply the practical experience from this project to other regions of the country," added de Silva.

During the November 2016 field work, five groups of subject matter experts tackled the study area to complete the job. Each group consisted of a coastal engineer, biologist, hydrographic surveyor, Global Navigation Satellite System operator and a logistical specialist. The team collected data and photographs of shoreline characteristics, human-use patterns, coastal erosion, socio-economic data and biological resource presence. All of the participants, with the exception of USACE, were Sri Lankan government professionals who could be available to replicate future efforts.

In total, 221 kilometers of shoreline were analyzed and classified, with more than 4,000 individual features recorded.

The result is a robust database to support first responders and planners in making more effective and efficient decisions.

For example, first responders can now visualize ranked sensitivity and prepare response measures accordingly. Additionally, first responders can easily use GIS to analyze potential "what if" scenarios, and practice communication and response measures.

USACE, Pacific Ocean Division is responsible for carrying out the Corps mission in the Indo-Asia-Pacific region in support of USPACOM. This project was worked through the division's Honolulu District and U.S. Army Institute for Water Resources.

According to Benton Ching, USACE, Honolulu District's GIS specialist, the effort provides a unique snapshot in time of the project area, including thousands of field photographs.

"Comparing aerial photography of the 1960's through the present, it is amazing how much change has taken place, especially in Negombo Lagoon," Ching said. "It will be interesting to see how modern planning, biological management and land development affect the shoreline, land use and biological resources in the future."

The Colombo-Negombo area was chosen as the project study area because of its diverse range in ecosystems and population, as well as current ship traffic patterns to and from the Port of Colombo and its related onshore/offshore petroleum facilities.

"For future ESI efforts in Sri Lanka, it is recommended the southern coastline have a similar ESI product prepared," said Commodore Kalana Jinadasa, who is the director Naval Operations, Sri Lanka Navy.

Sri Lanka's southern coastline is one of the busiest shipping lanes in the world, with many oil tankers passing between the Middle East, Africa and Asia.

Representatives from the Sri Lanka Navy, Marine Environmental Protection Authority, Coast Conservation and Coastal Resource Management Department, National Aquatic Resources Research and Development Agency, and others collect environmental mapping data near the Port of Colombo. (Photo by PSS Premadasa, Sri Lanka Navy)

Army Reserve pilots rainwater harvesting initiatives

Poet Henry Wadsworth Longfellow once said, "Into each life, some rain must fall."

For the U.S. Army Reserve, the mission is life, and rain is an opportunity to be an agile, innovative force in the Department of Defense.

The Army Reserve Water Security Implementation Strategy guides the command's efforts to conserve mission-critical water assets.

Goal Three of the strategy is "Utilize Alternative Water Sources," or sustainable sources of water that reduce the demand for fresh surface water and groundwater.

One alternative water source is rainwater.

Rainwater harvesting can save the Army Reserve's natural resources and bolster its water security for the future. To that end, the Army Reserve Installation Management Directorate and Pacific Northwest National Laboratory have implemented rainwater harvesting at vehicle wash facilities in the 63rd and 81st Regional Support Commands.

Susan Loper, an analyst with PNNL, said that rainwater harvesting for vehicle wash is a particularly viable initiative for the Army Reserve.

"Vehicle wash is more common at Army Reserve sites, compared to other non-potable water applications such as irrigation," she explained.

More than 460 Army Reserve Centers across the country have vehicle maintenance facilities.

To identify potential sites for rainwater harvesting, a team from the Army Reserve Installation Management Directorate and PNNL conducted a strategic geospatial study. The study examined factors such as rainfall, water use, water demand and watershed vulnerability, which indicates an area where the potable water supply is or will be threatened. About 42 percent of Army Reserve facilities are in "vulnerable" areas.

With the results of the study, the team identified over 300 facilities in the Southeast, Northeast and Midwest regions of the continental United States as suitable candidates for rainwater harvesting.

Ultimately, they selected the Army Reserve Center in Grand Prairie, Texas, and Harry Milton Kandel Army Reserve Center in Savannah, Georgia, as pilot sites.

According to Loper, the Grand Prairie and Harry Milton Kandel Army Reserve Centers have relatively high demands for vehicle wash. Rainwater harvesting can fulfill most, if not all, of those demands. Equally significant, Grand Prairie and Savannah are in vulnerable watersheds due to numerous environmental, economic and social factors.

Rainwater harvesting will conserve valuable potable water resources for the Army Reserve. Potentially, the Grand Prairie site will supply 140,000 gallons and the Savannah site some 200,000 gallons of rainwater each year.

The projects will also support the command's efforts to reach federal water use reduction goals.

As a federal entity, the Army Reserve must reduce its water use intensity by 2 percent annually – for a total reduction of 36 percent – by 2025, compared to a 2007 baseline. The Army Reserve has reduced water use intensity across the enterprise by 44 percent since 2007, far exceeding the goal.

Furthermore, rainwater harvesting will leverage partnerships between the Army Reserve and its stakeholders.

Contractors installed the pilot systems at the sites in February and March 2017. On-site professionals will operate and maintain the systems. The Army Reserve Installation Management Directorate and PNNL will monitor the systems during their first years of operation.

Finally, and importantly, rainwater harvesting will enhance the Army Reserve's mission readiness because it saves potable water for the enterprise's most valuable resource – its Soldiers.

"Water is absolutely necessary for us to train," said Trey Lewis, Army Reserve Water Program coordinator. As a former Soldier, Lewis personally understands water's vital role in the military's battle rhythm.

"We can train without internet access. We can train without electricity. For a limited time, we can even train without food," he said. "If we run out of water, we're done, and we're done right away. In a cantonment area, the toilets do not flush. The sinks do not flow. Everything shuts down.

"In a field environment, a water shortage can become a life or death situation, especially in hot summers when training is at its most intense," Lewis added. "Rainwater harvesting helps us avert situations that would delay or stop training, get in front of the curve during natural disasters, and help us become – in the event of an emergency – an asset that can provide assistance and security instead of a liability that needs assistance."

Lewis visited the Savannah site, and his impressions were favorable. He said that, so far, the personnel at the Army Reserve Center's vehicle wash facility are pleased with the rainwater harvesting system's performance.

"Overall, [the project] seems promising," he said.

The Army Reserve depends on water to sustain its warfighters, maintain its facilities and accomplish its missions. As the command strives to protect its resources, the Army Reserve Installation Management Directorate and PNNL are driving advanced solutions to water security.

Cutting-edge technologies such as rainwater harvesting will protect precious natural assets, support Soldiers and fully enable the nation's defense – now and in the future.

Article contributors include: Jonelle Kimbrough, strategic communicator, Army Reserve Sustainability Programs; Trey Lewis, Water Program coordinator, Army Reserve Sustainability Programs; Susan Loper, Pacific Northwest National Laboratory; and Kate McMordie Stoughton, Pacific Northwest National Laboratory.

Once upon a forest

Fort Buchanan protects endangered Palo de Rosa

By Jonelle Kimbrough
Army Reserve Sustainability Programs

Victor Rodriguez Cruz braved an imminent storm to reach the pinnacle of a limestone hill, where a Palo de Rosa emerged from the Earth.

Just beyond the tree, he peered at a valley where a bustling city on San Juan Bay had all but erased a once pristine, wild forest.

"When a tree is lost, it is lost forever," he said as he admired the Palo de Rosa's verdant, glistening leaves.

Rodriguez Cruz manages the Natural Resources Conservation Program at Fort Buchanan, an Army Reserve-funded installation near San Juan, Puerto Rico.

In his role with the Directorate of Public Works' Environmental Division, he leads the charge to protect the Palo de Rosa – one of the island's most endangered trees.

Named for the distinctive red hue of its heartwood, the Palo de Rosa is indigenous to the limestone hills, or "mogotes," of Puerto Rico and Hispaniola.

The U.S. Fish and Wildlife Service declared the Palo de Rosa to be endangered in March 1990, when only nine trees remained in the Puerto Rican forests.

Rodriguez Cruz pointed to a resilient tree.

"They grow only on the tops of these mogotes. Is that their preference, or are those populations the only populations that are left?" he asked.

Under the canopy, he chronicled the tree's rather somber history and unusual biology.

Its decline, he said, could be attributed to many factors.

Deforestation and urban encroachment have decimated the Palo de Rosa's natural habitat.

In addition, the Palo de Rosa's reproduction cycles are erratic, at best. Biological studies indicate that the tree may be a "mast flowering" species, or one that produces an abundance of fruits in some seasons but no fruits in other seasons.

Victor Rodriguez Cruz, manager, Natural Resources Conservation Program at Fort Buchanan, Puerto Rico, examines Palo de Rosa leaves on top of a limestone hill, or "mogote." (Photos by Heather Brown)

Seed dispersal is also a challenge for the Palo de Rosa. The Palo de Rosa may be an "outcrossing" species, requiring the cross pollination of individual trees. Since its populations are so limited, the pollination process could be very difficult. Furthermore, the fruits of the Palo de Rosa resemble the fruits of trees pollinated and dispersed by bats. Any absence of bats, or other pollinators, could have contributed to the tree's demise.

See PALO DE ROSA, page 38

PALO DE ROSA

continued from page 37

Fort Buchanan is one of the few places on Puerto Rico where the Palo de Rosa thrives today. Still, only 12 Palos de Rosa exist on the island installation.

According to Rodriguez Cruz, the trees on the post are some of the only trees currently producing viable seeds.

Fort Buchanan, the U.S. Fish and Wildlife Service and the Puerto Rico Department of Natural and Environmental Resources hope that these seeds are seeds of change.

In 2009, a memorandum of agreement between Fort Buchanan, the Fish and Wildlife Service and the Puerto Rico Department of Natural and Environmental Resources incorporated provisions for the protection of the Palo de Rosa into the installation's land use management plans.

The Fish and Wildlife Service uses Fort Buchanan's trees to collect seeds to propagate the Palo de Rosa, enhance the installation's population and introduce them to other viable areas of the island. The service also visits Fort Buchanan annually to monitor the health of the trees.

Fort Buchanan's Directorate of Public Works has implemented numerous conservation measures as well.

Reforestation has improved the environment for the Palo de Rosa and the post's other endangered species, the Puerto Rican boa.

The directorate restricts access to the Palo de Rosa's habitat, evidenced by prolific gold signs that relay a message of caution to Fort Buchanan's residents. If necessary, the installation limits the scope of military activity in those areas. They have eliminated the use of herbicides near the habitat.

In addition, Rodriguez Cruz and his colleagues consistently educate Soldiers, civilians and family members about their installation's unique tree.

Rodriguez Cruz crouched in the leaf litter to assess a tree's roots.

"Ultimately, we want to recover the populations of the Palo de Rosa so that the Fish and Wildlife Service can remove the tree from the Endangered Species List," he remarked.

The loss of any tree would impact the survival of the Palo de Rosa, but Rodriguez Cruz believes that the loss of the species could broadly impact the culture of Puerto Rico.

"The Palo de Rosa is endemic only to the Caribbean, so the tree is a significant part of our natural heritage in Puerto Rico," said Rodriguez Cruz. "Our natural heritage encourages tourism to our island, supports our economy and inspires our art.

"Our flora could benefit us," he continued, placing his hand on his chest. "Cures for cancers could be in these forests."

Rodriguez Cruz regarded the Palo de Rosa once more. Then, he descended the mogote with the company of hummingbirds and lizards.

He recounted Fort Buchanan's important role in the protection of Puerto Rico's special natural resources.

In his voice, hope resonated – the hope that the Palo de Rosa will flourish with the spirit of the past and the hope that the Army Reserve can contribute to its future.

A lizard finds a home on an endangered Palo de Rosa.

Video News Releases

Teams remove dam, restore stream waterway

A multi-organizational stream restoration effort removed Roaring River Dam in Jackson County, Tennessee. Breaching the at-risk dam reconnected aquatic species and made the waterway safer for public recreation. Work crews notched the dam July 31 to lower the water impounded upstream of the dam, and then began removing the structure Aug. 1. The project was completed Aug. 4, 2017.
(USACE video by Lee Roberts)

Engineer team cleans up Mojave Desert training site

Soldiers of the 223rd Engineer Battalion work to clean the Mojave Desert. The Environmental Control Team specializes in cleaning up hazardous waste spills, such as oil, to restore the environment after military training. Spc. Don Kazery brings us the story and interviews Sgt. 1st Class Jamie Peters and Spc. James Walker from the 289th Engineer Company.
(Video by Spc. Don Kazery, 102nd Mobile Public Affairs Detachment)

Environmental News...

District aids Nogales Wash flood fight

Dave Palmer, USACE, Los Angeles District, reports on the district's response to Nogales, Arizona, following heavy monsoonal rains that threatened homes and infrastructure.
http://www.spl.usace.army.mil/Media/News-Stories/Article/1290963/district-aids-nogales-wash-flood-fight/

Army, military officials outline hurricane relief efforts

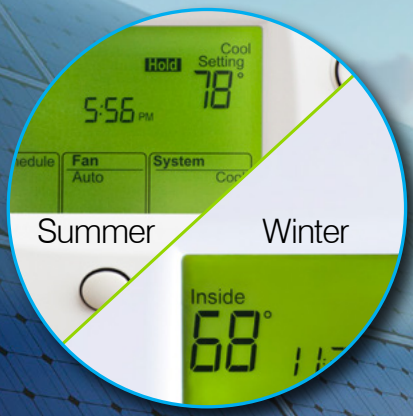
Terri Moon Cronk of the Defense Media Activity reports on how the military is organized to support hurricane recovery operations.
https://www.army.mil/article/194335/army_military_officials_outline_hurricane_relief_efforts

Army helping restore wetlands habitat on Chesapeake's Poplar Island

Stacy A. Ouellette and Devon Suits report on how USACE Baltimore District is leading an interagency project to help restore the ecosystem at Poplar Island.
https://www.army.mil/article/194078/army_helping_restore_wetlands_habitat_on_chesapeakes_poplar_island

Garrison kicks off Green Boot Program

In an effort to conserve energy and minimize impact on the environment, U.S. Army Garrison - Italy has implemented the Green Boot Program.
https://www.army.mil/article/187592/



ENERGY ACTION MONTH

Energy Resilience Enables Army Readiness