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Earth Day Message Building Green

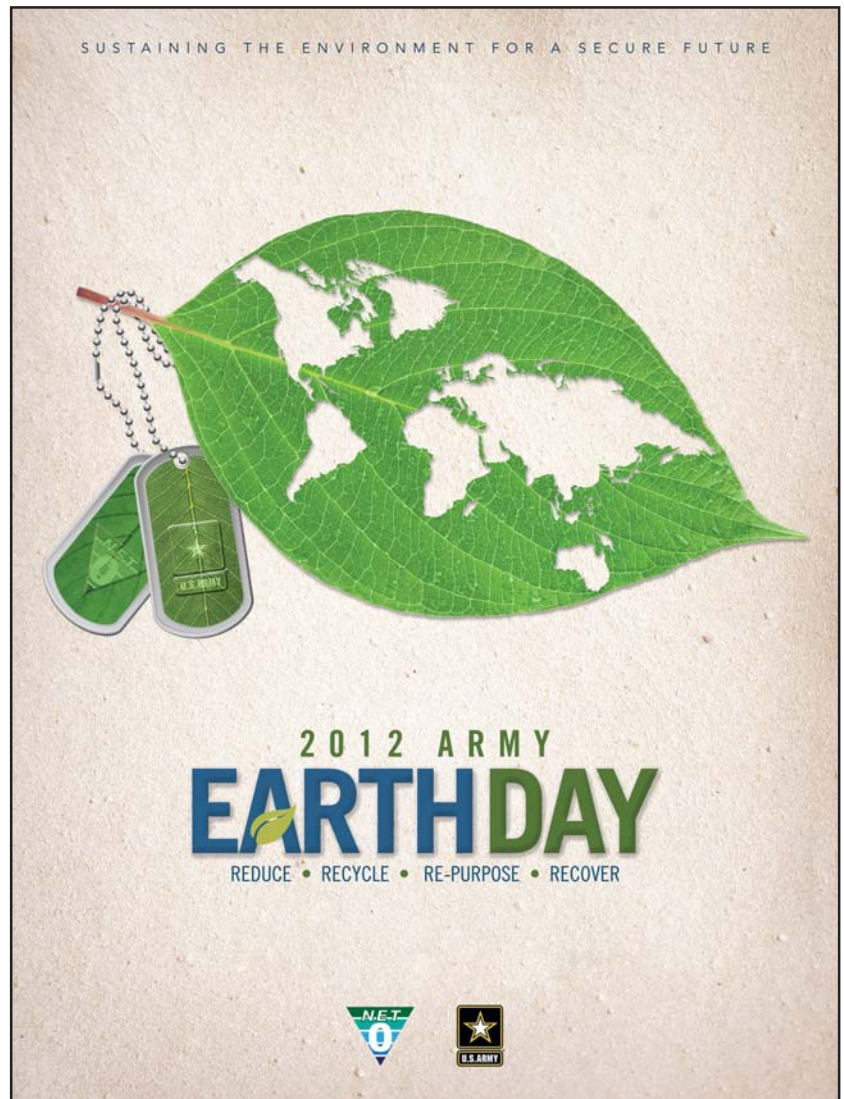
By Maj. Gen. Merdith W.B. (Bo) Temple
*Acting Chief of Engineers and
Commanding General of the U.S. Army Corps of Engineers*

As we approach Earth Day 2012, it affords us the opportunity to look back on the recent gains the Corps of Engineers has made in its environmental sustainability and stewardship efforts. As the Nation's Environmental Engineer, we manage one of the largest federal environmental missions in the United States, touching the lives of nearly every American. The challenges facing the Corps are enormous, everything from sustainable design and energy security to ecosystem restoration.

In light of the increasingly constrained fiscal environment, it is even more important to find ways to reduce the cost of operating our facilities and executing our missions – and help our customers do the same. We've spent the past two years focused on supporting national priorities for energy security and reducing the cost of operating our government, conserving natural resources, and helping to create jobs by investing in energy and water efficiency at Corps facilities.

In his recent State of the Union address, the President restated his challenge to make our government more cost effective and energy efficient, and he specifically challenged the Department of Defense to develop new clean energy sources on public lands. As we look forward to developing the fiscal year 2014 budget, I see these challenges as new opportunities for the Corps of Engineers to apply its diverse talents to accelerate progress on Sustainability and Energy Security goals, while simultaneously reducing the burden that vehicles and facility energy have on our operations and maintenance funding.

We are positioned to leverage the full scope of the talents and capabilities housed at Huntsville and the Engineer Research and Development Center to take the Corps forward as a facility owner/operator, and to advance our customers' Sustainability goals as well. With the contracting



The U.S. Army Earth Day poster. (Illustration by U.S. Army Environmental Command)

and technical abilities at HNC and ERDC, and the newly established Energy, Sustainable Design and Life Cycle Costs Centers of Expertise that are standing up Corps-wide, I think we have all the necessary tools at our disposal to take the Corps forward.

Sustainability and stewardship go hand-in-hand – we must be good stewards of both our financial resources and our natural resources. The Corps manages almost 12 million acres of public lands and waters in 43 states, an area equivalent to the size of Vermont and New Hampshire combined. These public lands and waters are homes to

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No shell games in Corps beach project

By JoAnne Castagna
New York District

Several years ago, Howard Ruben and a team of fellow biologists with the U.S. Army Corps of Engineers New York District were performing environmental work along a New Jersey beach that had been newly restored by the Corps.

"An onlooker approached us and said he had seen a baby sea turtle in the water," said Ruben. "We didn't find anything and went back to our work. Just before we left for the day, I saw something in the seaweed along the shore. When I parted the weeds and looked down I saw a plastic baby turtle, but one of those that's very realistic. I laughed out loud."

This may seem funny, but the Corps takes the protection of endangered sea turtles and all marine life seriously. When performing beach replenishment projects, there is a small risk that sea turtles can be injured or killed.

When the Corps begins a beach replenishment project, it complies with environmental policies established by the National Marine Fisheries Service (NMFS). Recently these measures were activated for the Monmouth Beach Replenishment Project, in Monmouth County, N.J.

In the fall, the Corps began the Mon-

mouth Beach Replenishment Project in partnership with the New Jersey State Department of Environmental Protection and dredging contractor, Weeks Marine of Cranford, N.J.

"This area of the New Jersey shoreline is in serious need of sand replenishment," said Roy Messaros, a coastal and hydraulic engineer with the New York District. "There hasn't

been a beach here in several years, just a seawall.

"Building a beach provides protection to the shoreline that is vulnerable to storms and protects infrastructures and homes. A beach will also draw visitors to area stores and restaurants, which can stimulate the local economy," he said.

"Building a beach is also good for the environment. Beaches are essential for sea turtles to reproduce, which are an integral part of our ecosystem," said Messaros.

To replenish sand on Monmouth Beach, the Corps is dredging 800,000 cubic yards of sand from an area of the ocean 2 miles off of the shore. The dredges take the sand to the beach where it pumped onto the shore and graded.

"These dredges are like under water vacuum cleaners," Ruben said. "They suck up sand from the bottom of the ocean. Unfortunately, they can also take marine life with it."

These NMFS regulations require the Corps to perform its dredging during the



Crew members keep watch over marine life and work to protect endangered sea turtles during beach replenishment operations. (Courtesy photo)

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More articles available online

Internet exclusive articles for this issue can be found at https://environment.usace.army.mil/corps_environment/ and include:

- Deep soil mixing with steam injection cleans up soils

- Corps discusses benefits of restoration at annual Everglades Coalition Conference
- Center supports recycling program in Afghanistan



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EnviroPoints: Goals focused on sustainability

By Christine Godfrey
Environmental Division Deputy Chief

Now that my 14-month tenure as the acting chief of the U.S. Army Corps of Engineers Environmental Division has come to an end and Dr. Christine Altendorf has taken over, I want to provide a quick update on some of the steps the Corps is taking to achieve our sustainability goals under Executive Order 13514: *Federal Leadership in Environment, Energy and Economic Performance*.

Included among these ongoing initiatives are:

- Establishing Energy and Sustainability Regional Centers of Expertise;
- Updating Military Construction Standard Designs to incorporate sustainability and energy efficiencies;
- Updating our master planning training with a focus on sustainability principles; and
- Setting up a climate change steering committee and its activities.

We have found it is essential that our divisions and districts maintain certain basic energy and sustainable design capabilities in-house in addition to reaching out to USACE-wide centers of expertise for knowledge, guidance and lessons learned. In November, USACE began establishing Energy, Sustainable Design and Life Cycle Cost Analysis Regional Centers of Expertise – each a virtual network of experts, led by one MSC/district, that takes the lead for developing and gathering knowledge about specific areas and sharing that knowledge with other MSC/districts.

The team identified 11 “immediate focus areas” and an MSC to lead a center for each: 1) water/grey water; 2) energy modeling; 3) charettes/conceptual modeling; 4) life cycle cost analysis; 5) lighting (including daylighting and electrical lighting); 6) building

envelop/air tightness; 7) hydrology/low impact development; 8) major renovations; 9) enhanced commissioning; 10) district energy; and 11) waste.

Six renewable focus areas also have been identified: 1) waste water; 2) solid waste; 3) solar photovoltaic; 4) ground source heat pumps; 5) solar thermal; and 6) thermal comfort/ventilation. The team is now marrying up an MSC with each of these.

An online collaborative environment is being established for the new centers as well as a set of operating processes. More to come.

USACE’s Military Construction

program as a whole, including the work of the Centers of Standardization, has embarked on a multifaceted effort to evolve the energy performance of Army facilities. In partnership with the Department of Energy, our labs and others are working to identify design practices and technologies that are ready to implement into our standard processes. These are measures that are cost effective, produce significant savings, and

are reliably supported in the marketplace.

USACE has led the DoD Master Planning Community in integrating sustainability principles into DoD master planning practices. We have been championing changes in DoD and components master planning policies to adopt sustainable, energy efficient practices. These principles include walkability; transit-oriented development; compact, in-fill and mixed use development; and narrow buildings using natural lighting and ventilation as well as district energy efficient infrastructure practices – all key practices that must be used.

To understand these practices, USACE has established a DoD Master Planning Institute providing holistic training in the practices of sustainable planning. More than 10 courses represent the curriculum with sustainability principles imbedded into the



Christine Godfrey,
Environmental Division
Deputy Chief

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Restoring wetlands balance key for district

By Mary Markos
Saint Louis District

People around the world gathered Feb. 2 to celebrate the importance wetlands play in sustaining the environment.

The day marked the 15th anniversary of the signing of the Convention on Wetlands.

This year's theme, "Wetlands and Tourism— A Great Experience," highlights the significance U.S. Army Corps of Engineers projects have on both the environment and the local economy, like the St. Louis District's Calhoun Point Habitat Restoration and Enhancement Project.

"Under the Upper Mississippi River Restoration Environmental Management Program, the Corps of Engineers, with our partners, have worked to restore Calhoun Point so that it, like the Mississippi River, can serve

as a resource for the community and animals that flock to it," Col. Chris Hall, St. Louis District commander, said at the Calhoun Point dedication ceremony in November. "Enhancements made through the project will bring balance and ecological sustainability to the natural environment."

Located at the confluence of the Mississippi and Illinois rivers, the Calhoun Point project and other local outdoor recreation opportunities add approximately \$389 million in economic activity. The area is more than 2,000 acres of diverse wetlands and habitats for fish, waterfowl and migratory birds.

The project was designed to improve and enhance wetland habitat quality through constructing a riverside berm, selective dredging, installing water control structures and implementing a forest management plan. It was the first project of its kind to fully embrace the use of historic topographic features to improve habitat while reducing cost and meeting the customer's needs.

The project also helped meet the needs of migratory wildlife by providing a vital habitat link for the seasonal movements along the Mississippi River Flyway.

"Wetlands are an essential component for many species that rely on them at some point in time in their lives," said Brian Johnson, environmental restoration business line

manager for the Mississippi Valley Division. "From north to south, migratory birds have to have wetlands for feeding, resting, breeding and rearing their young. They need wetland habitat from where they nest in the north to where they overwinter in the south, and at all points in between during their migration."

Johnson said wetlands like those at Calhoun Point do just as much for the people residing near them as they do for animals that rely on them and the waterfowl flying over them.

"Wetlands have an amazing ability to filter water," he said. "They are like nature's water treatment centers. Wetlands are one of the keys to a healthy human environment and are among the most critical ecosystems in the world."

Often found where rivers, lakes and oceans meet land, wetlands provide a rich mix of nutrients and produce high levels of oxygen. Additionally, they filter chemicals out of

water, reduce flooding and erosion and recharge groundwater.

Pollutants such as metals, viruses, oils, excess nutrients, and sediment are processed and filtered out as water moves through wetland areas, forests, and riparian (streambank vegetation) zones. This purification process provides clean drinking water and water suitable

for industrial uses, recreation and wildlife habitat. One acre of wetlands filters 7.3 million gallons of water a year.

"To use an analogy, relate it to the human body, wetlands are like our liver – they help filter some of the harmful or excessive elements out of the ecosystem, just as the liver does in your body. What they do helps provide us clean water and helps maintain a balanced, healthy environment," Johnson said.

Wetlands also provide a balance to the physical and ecological environment by serving as a resource or home to more than a third of all federally listed rare and endangered species, functioning much like a sponge and storing water and protecting coastal areas and providing recreation opportunities for countless visitors each year.

"Wetlands play a crucial role in many of the things we value," Johnson said. "We need to have an environment that meets the needs of humans and of wildlife, and honestly that can't be accomplished without healthy, functioning wetlands."



Waterfowl rise from the wetlands at the confluence of the Mississippi and Illinois rivers. (Photo by U.S. Army Corps of Engineers)



Pacific States Marine Fisheries Commission biologist Casey Campos looks for evidence of salmon spawning in the Yuba River below Englebright Dam near Smartsville, Calif. (Photo by Chris Gray-Garcia)

Habitat program shows encouraging signs

By Chris Gray-Garcia
Sacramento District

A U.S. Army Corps of Engineers Sacramento District program to improve salmon habitat by placing spawning gravel in the Yuba River is working, say researchers evaluating the program.

Biologists with the Pacific States Marine Fisheries Commission found in underwater surveys from September 2011 through January 2012 that Chinook salmon have created dozens of nests, or redds, with gravel the Corps placed in the river below Englebright Dam.

The gravel project is also intended to provide spawning habitat for Central Valley steelhead trout. Both species are listed as threatened by the National Marine Fisheries Service.

Completed in 1941 to trap sediment from upstream hydraulic mining, Englebright Dam also blocks gravel in the Sierra Nevada from traveling downstream to become spawning habitat. A biological opinion issued by the National Marine Fisheries Service in 2007 called for gravel placement as part of a broader plan to improve habitat near Englebright and Daguerre Point dams, both operated by the district.

The district placed 500 tons of gravel in the river in 2007 as a pilot project, and finished placing another 5,000 tons in January 2011. The program was designed by Dr. Gregory Pasternack, hydrology professor at the University of California - Davis.

“One of the effects of dams is to block the natural supply of gravel that would come out of the mountains,” Pasternack said. “So we then have to augment that and provide that material for [fish] below the dam.

“Once we identified that the section of the river

immediately below Englebright Dam was the most important for helping the run that’s most at risk, the spring run of Chinook salmon, we had the reach that we wanted to focus on,” he said.

After an initial survey of the river canyon, Pasternack identified where in the river the gravel should be placed, and has been working to map where that gravel has moved to help determine where future injections would provide the most benefit. Stitching together photos of the river canyon, his research team is creating a virtual 3-D model of the reach to better predict how water flow will move the gravel.

Pasternack’s research and the model will guide placement of another 5,000 tons of gravel in the river later this year, as funding becomes available. The plan calls for a total of 15,000 tons.

Meanwhile, PSMFC biologists continue to study how fish are using the gravel. Snorkeling the river, they inventory redd locations with GPS coordinates, accurate to within half a centimeter. Though it’s early to make any judgments about the overall effectiveness of the program, PSMFC program manager Duane Massa said, “As far as we can tell, those gravels are being utilized by Chinook salmon.”

Englebright Dam manager Doug Grothe said he’s encouraged by the results.

“It’s really exciting to see this,” Grothe said. “The Corps of Engineers has historically been flood control, debris management, navigation programs.

“The Corps is now stepping into a phase of environmental stewardship. It’s very important to all of us,” he said. “And it’s just a really neat thing to be able to help a species...maybe not be an endangered species anymore.”

Team plans for net-zero energy goals

By Jennifer Aldridge
Europe District

Representatives from Sembach Kaserne, the U.S. Army Corps of Engineers Europe District and Parsons architecture and engineering firm met late last year to kick off an energy-based master planning process aimed at achieving net zero energy installation status by 2025.

A net zero energy installation, as defined by the Army, is an installation that produces as much energy as it uses on site, over the course of a year. Sembach is focused on and dedicated to reducing energy consumption throughout the entire base.

“We have about \$31 million in energy costs per year. We need to decrease this number,” said Paul Lindemer, the Kaiserslautern Directorate of Public Works chief of engineering. “Right now, the Army is allocating funds for energy-savings projects. We want to be in the game and get funds allocated to Sembach.”

The installation recruited the Corps to develop a “playbook,” identifying energy-savings projects that can be submitted for funding and integrated into the installation master plan.

“We are launching the first energy master plan in Sembach,” said Philip Cohen, the Europe District Installation Support Branch planning section chief.

The Sembach project team is taking a unique approach to net zero planning – assessing the installation’s current and future development and incorporating energy, sustainable and low-impact development, health and quality-of-life considerations into the installation master plan.

“We want to look at the installation as a whole, that’s the key,” said Cohen. “We can’t look at buildings or utilities individually. That’s a great start, but it’s only piecemeal. We have to look at the entire installation.”

For six months, the project team is conducting a thorough assessment of the installation, beginning with a review of and update to the area development plan.

“We will take the development plan for Sembach under the master plan for Kaiserslautern and ask the planners to give us a vision of what the garrison will look like by 2025,”



Project team representatives perform an inspection of the mechanical systems at Sembach Kaserne as part of an extensive energy audit being managed by the U.S. Army Corps of Engineers Europe District. The Sembach installation audit is being conducted as part of an energy master planning project aimed at achieving net-zero energy installation status by 2025. (Photo by Philip Cohen)

Cohen said. “Instead of looking at the installation in terms of unlimited growth we want to look at it just the opposite. An energy master plan is predicated on consolidated, intelligent growth.”

The review is intended to uncover and correct developmental planning inefficiencies. Once inefficiencies are identified the project team can recommend strategies – installing solar panels, insulation and low-energy lighting in buildings, capturing and reusing lost heat, consolidating parking and increasing pedestrian only zones, and installing traffic roundabouts rather than traffic lights – to reduce energy consumption.

The net-zero analysis will also include an extensive energy audit of existing buildings, looking at all areas of consumption and indentifying energy deficiencies.

“What we are most interested in is determining our energy drains at Sembach,” Lindemer said.

The project team will assess all enduring buildings on base, pinpointing the facilities and utilities that consume the most energy.

“Currently, they have no real way of quantifying their [energy] consumption,” said Rich Gifaldi, Europe District’s sustainable engineering program manager. “We are trying to

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Dredge Potter crew assembles flexible floating dredge pipe. As part of a pilot project during this year's dredging season, the St. Louis District, U.S. Army Corps of Engineers reused dredged material to create sandbars and island habitats for endangered species. (Photo by U.S. Army Corps of Engineers)

District teaches old dredge new tricks

By Romanda Walker
St. Louis District

The endangered interior least tern (*Sterna antillarum*) may have a new island to call home on the Mississippi River thanks to the U.S. Army Corps of Engineers St. Louis District, the Dredge Potter and a flexible, floating dredge pipe.

Historically, the interior least tern nested on sandbars along the Mississippi River. The establishment of navigational pools, repeated flooding and an increase in recreational activities along the river has led to the decline of the population.

As part of a pilot project during this year's dredging season, the St. Louis District reused dredged material to build small islands using a flexible floating dredge pipe.

"The flexible floating dredge pipe provides the St. Louis District opportunities to create a diversity of aquatic habitats such as sand islands and shallow water habitats in areas where it may not be possible without the use of dredged material," said Brian Johnson, a St. Louis District biologist.

Each year the Corps performs dredging on the Mississippi River in order to keep it open to the Congressionally-

mandated depth for river traffic. Historically, dredged material placement locations and options have been limited by both equipment constraints and cost.

When feasible, dredged material is recycled for beneficial uses within the river. Reuse is the Corps of Engineers preferred approach, and the St. Louis District is always seeking out innovative and creative ways to accomplish this task.

"Our partners and stakeholders have challenged us to find more ways to reuse dredged material in an environmentally friendly way," Johnson said.

The Potter crew spent most of the off season prepping the dredge for the use of the flexible floating dredge pipe.

"It took a lot of planning ahead and creative ideas to make this happen," said Lance Engle, a St. Louis District dredge manager.

Traditionally, the use of standard dredging practices limited the opportunity to reuse dredged material as sandbar or island habitat because of the physical limits of the rigid metal disposal pipe that is used.

"Normally dredged material is side-cast along the main

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Unmanned aerial vehicle scans waterways

Levees, invasives monitored from above

Story and photos by John H. Campbell
Jacksonville District

“All right guys, going into take-off mode. You are hot!” Everyone aboard the airboat grows quiet. It’s the moment they’ve been anticipating after hours of prep work that started shortly after dawn on this late November day. Jon Morton, a biologist with the US Army Corps of Engineers Jacksonville District, has been leading the team through pre-operational checks.

“Three...two...one...launch!”

The pilot flips a switch on a remote control. Suddenly, the sound of a high-speed propeller fills the air around Eagle Bay at Lake Okeechobee. A small airplane that looks like a toy is thrown skyward. Only this airplane is no toy; it’s an important piece of equipment that helps Morton and other biologists track the effectiveness of their efforts on invasive plants.

The NOVA Unmanned Aerial Vehicle (UAV) offers the Corps of Engineers a unique method of obtaining high resolution pictures from the air that can be used for a wide variety of applications from management decisions to map making. The Jacksonville District currently has three UAVs, which are registered with the Federal Aviation Administration under the name NOVA.

“The NOVA has been developed to provide a technological edge for us,” said Larry Taylor, NOVA UAV program manager with the Jacksonville District. “Its specialty is detecting and monitoring change over time. We have used it for levee monitoring; we have detected anomalies in the levees that weren’t detected by ground observation.”

In addition to the levee monitoring the NOVA has also been used for wildlife surveys, regulatory permit reconnaissance, invasive species contract assessments and invasive species acreage estimation.

On this day, the NOVA is flying over hundreds of acres at Eagle Bay, gathering information for the Invasive Species program.

“We do a lot of invasive aquatic plant work,” said Morton. “Eagle Bay is one of the areas we have to manage more intensely and work with other agencies because this area is a high priority for the endangered Everglades Snail Kite. We wanted to get a snapshot view of what it looked like at this time of year.”

The pilot smoothly guides the UAV upward. Morton checks a computer. “Altitude 18, air speed 11, battery 18-6,” he says, pleased that the aircraft is picking up speed and altitude.



Jon Morton, a biologist with the Jacksonville District, looks up from his ground station to track the NOVA UAV as it flies over his boat.

Morton said he likes the detailed photography the UAV provides.

“We’re trying to get 2 ½-centimeter resolution which will allow us to map out and tell exactly what species of plants are growing in the area,” Morton said. “Before the NOVA was available, we just had to take imagery that was obtained through USDA (US Dept of Agriculture), USGS (United States Geological Survey), or hire a private contractor. We didn’t get nearly the resolution that we can with the NOVA. We’re able to fly more rapidly; we’re able to fly cheaper. We can deploy it from an airboat; we’ve used it from a swamp buggy; we can launch it from the back of a truck.”

The NOVA makes a pass in the sky overhead. However it quickly becomes a small speck as it flies toward its next turning point, more than a mile away from the controllers on the ground.

“Turning to the north,” Morton says, “increasing the air speed to 16 meters per second.”

The NOVA weighs 11 pounds, which includes its payload of a high-resolution camera, its on-board computer, and a GPS navigation system. The pilot uses a remote control to guide the plane during takeoff and landing. When in the air, the plane flies a route according to the instructions that were programmed on the ground station computer prior to takeoff.

“We’re taking steps to use some of the technology that’s available to us today, that people are only familiar with in military terms,” Morton said. “This is an actual civilian application for unmanned systems.”

“It’s not a tactical tool,” said Taylor, “it’s not designed

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Aerial

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for the fighting Soldier to loft it and see if there are bad guys over the hill. The payload we carry is high-resolution, versus low-resolution, with on-board data storage because the mass of data that we gather cannot easily be transported in real time back to our ground station. It's more of a precision-mapping tool."

Development of the NOVA was a joint venture between the Corps of Engineers and aerospace engineers from the University of Florida. The NOVA is made of hybrid fiber-glass and a carbon-fiber composite. Rechargeable lithium-polymer batteries supply power to the electric motor that operates the propeller.

"One of the key things about the development of this tool, since the CERP (Comprehensive Everglades Restoration Plan) program was one of the initial targets for it, it had to be developed as a waterproof tool," Taylor said. "It works extremely well in wet environments. It can land safely on the water, and it can take off and land in very small areas."

The pilot resumes control of the NOVA and begins guiding it in circles toward its final descent. As it emerges into view, it seems to hang in the air for a moment, as the pilot works the controls to slow it down and guide it toward a soft landing on the water.

"Altitude 13," Morton says. All grows quiet again, except

for Morton's status updates and the occasional sound of the NOVA motor as the pilot keeps it in the air as long as possible, as he guides the plane as close as possible to the airboat. The NOVA finally splashes gently into the lake, the motor of the airboat cranks up, and the crew quickly retrieves the plane.

"Its primary mission started off as being a CERP resource," Taylor said. "We have since found that it is applicable to many other Corps activities like invasive-species monitoring and construction monitoring and Regulatory reconnaissance. We're in the process of expanding its use for beach re-nourishment projects, and we're getting inquiries from other Corps districts for various activities." He also pointed out the financial benefits from the information.

"We've detected invasive species change, and the effectiveness of treatments on the invasive plants, Taylor said, "That helps us save taxpayer dollars because we can actually monitor contract effectiveness to determine if the monies are being spent in the right place and if the treatments are effective or not."

The mission complete, the the coordinates of the flight have been stored in the computer.

"We can fly over the exact same course with a great degree of precision, which is one of the things that allow us to detect change over time," Taylor said.



With a mighty heave, Damon Wolfe, a geodesist with the Jacksonville District, launches the NOVA UAV on a flight over Lake Okeechobee. The Corps used photos from the UAV to track the progress of various plant species at the lake.

Earth Day

Continued from page 1

incredibly diverse habitats, and in some cases to species found nowhere else in the world. In carrying out our Regulatory mission, USACE must carefully balance decisions to protect our nation's aquatic resources, ensuring no net loss of wetlands while issuing about 90,000 permits to the American public each year.

Perhaps one of the greatest environmental legacies that the Corps and Nation can leave for future generations is ecosystem restoration. Across the country we are working with multiple Federal and non-Federal agencies and organizations in system-wide efforts to leverage the national investment in the interest of ecosystem restoration.

The Administration has named five high-priority ecosystems for restoration, and it is stunning to realize the landscape and natural resources that existed when these areas were inhabited by native tribes and explored by early settlers...

Of the *Chesapeake Bay*, Captain John Smith recorded in his journal, "Heaven and earth have never agreed better to frame a place for man's habitation," and described oyster reefs that lay as thick as stone.

Before it became known as the *Everglades*, a complex system of interdependent ecosystems that include cypress swamps, the estuarine mangrove forests of the Ten Thousand Islands, tropical hardwood hammocks, pine rockland, and the marine environment of Florida Bay, the Seminoles called it Pa-hay-okee, meaning "Grassy Water."

The Gulf Coast, which stretches from Southern Texas to the Western Florida panhandle, became a part of the United States in the early 19th century through the Louisiana Purchase and the Texas Revolution, and has been subject to the most devastating hurricanes to ever come ashore.

The California Bay Delta, also known as the Sacramento-San Joaquin River Delta, is an example of an inverted river delta, one of only a few worldwide. The fan-like area of the delta moves downstream, as the two rivers are forced to exit the Central Valley through the Coast Range via the narrow channel known as the Carquinez Strait, which leads to the

San Francisco Bay and the Pacific Ocean.

Early European settlers were astounded by both the variety (some 150 species) and quantity of fish in *the Great Lakes*, the largest group of freshwater lakes on Earth.

During the settlement of America, these lakes and their rivers were the only practical way of moving people and freight.

These are diverse ecosystems that are different from each other in a number of ways, including the maturity of interagency activities already under way, nature of the issues and varying level of existing Corps investment. The goal is to restore degraded ecosystem structure, function and dynamic processes to a more natural condition.

Ecosystem restoration also provides economic benefits through construction projects, and perhaps more importantly,

improves the quality of life for all of those in the watershed, offering recreational opportunities, restored habitat for wildlife and new green space in urban areas. Community and school groups often have a hands-on way to get involved in smaller-scale efforts, from wetland planting to oyster reef creation to learning opportunities at Corps projects.

The breadth and depth of skills found within the Corps' workforce gives us the ability to seek the best solution to the environmental challenges that we deal with on a daily basis: sustainability, climate change, endangered species, environmental cleanup, ecosystem restoration and more.

It is only by working together with federal, state and local partners, academia, private industry and non-governmental organizations that we will be able to "turn the tide" after centuries of degradation and neglect of our natural resources. We owe it to future generations to restore the delicate ecosystems that have been lost, and ensure that the Corps' and the Army's activities leave the smallest environmental footprint possible.

Thank you for all you do to support our Environmental efforts...we are not just **BUILDING STRONG®**, but **BUILDING GREEN!**



At Fort Carson, Colo., the Army partnered with a local energy provider to build this photovoltaic solar array on top of a closed landfill. A similar project at White Sands Missile Range in New Mexico, was awarded by the Corps in December and will provide 4.44-megawatts of installed photovoltaic capacity saving 10 million kilowatt hours of electricity and \$930,000 annually. The White Sands project will be the largest renewable energy project in the Army, at more than double the size of this array at Fort Carson. (Courtesy photo.)

Helping units meet reduction requirements

Army, Navy team up for energy savings

By James Campbell

U.S. Army Engineering and Support Center, Huntsville

The U.S. Navy's Space and Naval Warfare Systems Command Systems Center Pacific has a new partner in saving energy, and in the space of just a year, they are looking at a reduction in overall energy and annual water consumption.

The U.S. Army Engineering and Support Center, Huntsville, awarded a \$12 million Energy Savings Performance Contract for the SPAWAR unit in January 2011, and with work completed in February, they are starting



This aerial view of Naval Warfare Systems Command Systems Center in San Diego, Calif., shows the diversity of building types addressed through an Energy Savings Performance Contract awarded and managed through the U.S. Army Corps of Engineers. (Photo by U.S. Navy)

to reap the benefits, said Will Irby, project manager from Huntsville Center's Energy Division.

Located in San Diego, Calif., SPAWAR Systems Center Pacific is a research, development, test and evaluation laboratory for command, control, communications, computers, intelligence, surveillance, and reconnaissance, or C4ISR.

Huntsville Center offered an opportunity, through ESPC, for the unit to replace older systems and meet energy savings requirements over a 19-year term. The energy service company AECOM Technical Services Inc., provided a way to have the up-front refit costs paid back over time by the energy savings. The total expected energy cost savings is \$23 million during the term of the contract, Irby said.

Highlights of the work include lighting upgrades, water conservation measures, chilled water air conditioning upgrades, a heating and hot water retrofit, upgraded air handlers, rooftop and ground mount photovoltaic systems, and electronic control systems, Irby said.

Workers in the facility have noticed a more reliable and maintained air conditioning temperature and better controls in the lab spaces, said Randy Peacock, head of SPAWAR Systems Center Pacific Facilities Operations and Energy Manager.

SPAWAR Systems Center Pacific is a military campus consisting of 225 buildings with a combined workspace exceeding 3 million square feet, adding to the complexity of the challenge. Having someone replace or upgrade environmental systems and fixtures inside facilities doing sensitive work sounds like a challenge, but Peacock said they were pleasantly surprised.

"I was very impressed with the rapid response of the USACE staff on issues that arose during the contracting phase and construction phase of the project," Peacock said.

Another unique facet of the work was the fact that the ESPC customer was Navy – most ESPC work at Huntsville Center is done for Army customers.

"We'd like to do more work with the Navy. The relationship has been really good," said Irby.

"The speed with which this project was conceived, engineered and implemented is an example of how successful an ESPC can be when the site, the energy service company and the Huntsville team work together toward a common purpose," said Darcy Immerman,

AECOM senior vice president, Energy.

He said projects like this help the nation move away from fossil fuel dependency and meet the requirements of the Energy Independence and Security Act.

"There was top to bottom acceptance and excitement within the command – that really helped us," said Anthony Roner, AECOM project manager and vice president, Energy Efficiency and Carbon Management.

An internal blog was created for the project so that employees knew the work schedules and what to expect. Roner said having this level of communication allowed the team to stay on schedule and complete the project while minimizing disruptions to the sensitive work at SPAWAR's labs.

AECOM was the prime contractor and performed energy audits, completed life-cycle cost analyses, identified renewable energy projects like solar photovoltaic and solar thermal, and designed and implemented facility-wide energy, renewable power and water conservation upgrades.

Landmark project nets LEED ‘Gold’

By Chris Gardner
New York District

The U.S. Green Building Council has certified the \$1.03 billion Washington Headquarters Office Complex at the Mark Center in Alexandria, Va., as Leadership in Energy and Environmental Design Gold certification following the vetting of the completed project’s sustainability features — making it one of the federal government’s largest projects to reach the coveted certification.

The U.S. Army Corps of Engineers New York District managed the construction of the facility, which was designed to consolidate more than 6,400 Department of Defense employees working out of commercially leased office spaces in and around Washington D.C.

The Base Realignment and Closure Act project included building two office towers, one 15 stories and one 17 stories,

The LEED Gold certification was a result of sustainable construction practices as well as incorporating green features into the final product.

During construction, more than 90 percent of construction waste was recycled, preventing approximately 6 million pounds of waste from going to landfills.

The building itself will use 30 percent less energy than a traditional building due to a high efficiency central chiller plant using green refrigerants, demand controlled (rather than automatic) ventilation, energy efficient lighting including LED fixtures and occupancy sensors that turn lights off when a room is empty and a dedicated outdoor air system with energy recovery mechanisms.

The project also purchased 54 million kilowatt-hours of renewable energy to reduce fossil fuel consumption by 40 percent for the next four years. This represents a reduction

of 60.5 million pounds of CO2 emissions.

The complex is also designed for a 45 percent reduction in water use, which should ultimately lead to an annual reduction of 4.5 million gallons. This was accomplished through low flow faucets, shower heads and other plumbing fixtures, use of native, drought resistant plants on the grounds requiring zero irrigation and storm water designs that focus on both the quantity and quality of the water.

Several visible green elements were also incorporated into the



A nighttime view of the \$1 billion Department of Defense Office Complex project at the Mark Center.

(Photo illustration by Marc Barnes)

two parking structures with room for more than 3,700 cars, a visitor center, an area for shuttles and buses, a remote inspection facility and a remote delivery facility.

“It’s truly an accomplishment that the Corps of Engineers and our partners were able to earn LEED Gold on this important BRAC project,” said New York District Commander Col. John R. Boulé.

“This project was a massive undertaking, even by Corps of Engineers’ standards, and had to be delivered on a tight timeline. But the team was able to deliver the complex under budget and ahead of schedule while deliberately incorporating significant sustainability features to earn this prestigious environmental ranking,” he said.

complex, including green roof designs on the Visitor Center and Remote Inspection Facility to reduce radiant heat, bio-swale for natural filtering of storm water runoff and green screens with native plants surrounding the north parking garage.

The project was a result of recommendation 133 of the Base Realignment and Closure Commission’s 2005 report, hence the nickname BRAC 133.

The Corps’ general contractor for the project was Duke Realty headquartered in Indianapolis with offices in Alexandria, the prime construction contractor was Clark Construction Group, headquartered in Bethesda, Md., and the lead design contractor was HKS Inc., of Dallas, Texas.



This aerial photo shows an innovative soil sorter used at the Painesville site near Cleveland. The equipment minimizes the amount of material transported for off-site disposal. (Courtesy photo.)

Team tackles uncertainty with QMS-ISO process

By Andrew A. Kornacki
Buffalo District

The Formerly Utilized Sites Remedial Action Program was initiated in 1974 to identify, investigate and clean up or control sites that were part of the Nation's early atomic energy and weapons programs.

All of the FUSRAP sites were originally under the control of different government agencies prior to being turned over to the U.S. Army Corps of Engineers for investigation or remedial action.

Given the sensitive nature of the materials located on these sites, along with the element of uncertainty stemming from not knowing what exactly was buried or where, the cost to clean up these sites is difficult to estimate accurately. Too often, the inaccuracy of estimates leads to unrealistic project costs and schedules.

The U.S. Army Corps of Engineers Buffalo District's FUSRAP site in Painesville, Ohio, faced the same uncertainties as other FUSRAP projects, except this time something was different. Buffalo District's Environmental Branch leadership recognized that there was not a standard procedure in place to account for the project's inherent uncertainties. In order to accurately estimate project costs and schedules one would be needed.

International Organization for Standardization concepts were used to identify the root cause of the problem. Using a Preventive Action for Continuous Quality Improvement approach, Project Manager Stephen Buechi and chief of

the Environmental Engineering Team David Frothingham worked together with Todd Kufel and Jim Wryk of the Cost and Project Engineering Team and Fred Boglione, chief of the Environmental Branch, to adapt an existing process called Cost & Schedule Risk Analysis. They were then successful in applying it to multiple FUSRAP projects in the Remediation Phase. This revised process is currently awaiting publication in the Quality Management System.

The CSRA defines the process along with roles and responsibilities for estimating and communicating costs to complete Hazardous, Toxic and Radioactive Waste projects. "The process allows us to quantify the uncertainty and apply it to our yearly budget and schedule estimates," said Frothingham.

Now that the process is in place and has been successfully executed, three other FUSRAP sites in the Buffalo District and other FUSRAP sites across the U.S. Army Corps of Engineers Great Lakes and Ohio River Division could potentially benefit from it. "The intent is to apply this process to all [division] FUSRAP sites during the Remediation Phase," said Buechi. "It also serves as an effective communication tool when submitting budgets to Corps Headquarters."

The CSRA team successfully modeled the effectiveness of the QMS-ISO system by identifying an issue, coming up with a solution, implementing it and ultimately showing how the process not only benefits a single project, but how it can be expanded and applied to multiple projects.

Dredge

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channel border in a linear fashion, resulting in a long, narrow disposal bar that is limited in size, elevation, and location,” Engle explained.

A St. Louis District experiment with flexible floating dredge pipe in 2005 led to the idea of using it to create islands and sandbars on the Middle Mississippi River. Demonstration projects by the New Orleans and Mobile districts helped develop the idea and prepare the dredge crew for the new challenge.

The pipe’s flexibility allows the Dredge Potter to place

dredged material in a specific location as it moves. This allows material to build up to create sandbars and island habitats in various shapes, sizes and elevations in the Middle Mississippi River while maintaining the navigation channel.

These types of habitats are essential for the nesting and spawning of various fish and wildlife species such as the interior least tern.

“The new method allows creation of more diverse environments for wildlife than traditional dredging methods,” Johnson added. “These islands are often remote, providing protection from predators, boats and humans.”

The flexible floating dredge pipe allows the St. Louis District to keep the river safe and open for navigation in an environmentally sensitive way.

“In the future, we hope this will be the way we do business,” Johnson said. “Eventually we hope to use the Dredge Potter not only for navigational purposes but for environmental management purposes as well.”



Sandbars and island habitats are created in various shapes and sizes (Photo by U.S. Army Corps of Engineers)

Plan

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identify how much energy the installation is actually using.”

The Corps and Parsons will identify consumption levels for each building by reviewing utility bills, confirming operating schedules, assessing mechanical and electrical systems, and checking building roof and wall envelopes for energy leaks.

“We’re not trying to generate just a pretty picture,” Cohen said. “The team must identify the baseline consumption level. How much energy is being used now? What are the bills? Are there obsolete buildings that should be demolished? This will establish a baseline we can work from.”

Once the Sembach consumption baseline is established, the team can suggest opportunities to conserve and generate energy.

“The architecture and engineering firm will come up

with a minimum of 50 projects – installing a white roof and solar panels, capturing and recycling lost heat, utilizing wind turbines – to try to generate renewable energy,” Cohen said.

The assessment findings are scheduled to be presented to the customer in June. As a result of this study, Lindemer said he expects project recommendations with cost estimates.

“We use the Corps as our expert and trustworthy consultant,” he said. “The Corps is very good at doing analysis and studies.”

This exercise in energy master planning should generate a laundry list of projects for the installation, both repair and renovation work in the near-term and military construction in the longer-term, Cohen added.

Once the analysis is presented, “we can start choosing where to invest our money first,” Lindemer said. “We will consider what the future of Sembach should look like. We need to have an integrated energy approach.”

EnviroPoints

Continued from page 3

entire curriculum and applied through a series of applied instruction exercises, lectures and field assessments. It is the only accredited planning program in the Federal Government. USACE has been approved to offer American Institute of Certified Planners and American Institute of Architects continuing education units. Our program was recognized for excellence in sustainable training by both the American Planning Association and the Center for Environmental Innovation and Leadership as the winner of the 2011 Workforce Development through Training award. Professionals interested in attending these courses can go to www.dodmpi.org or contact the USACE Learning Center.

Only a small portion of EO 13514 refers to climate change adaptation; the bulk of its sustainability efforts address climate change mitigation (energy conservation, reducing greenhouse gases).

For USACE Military Programs, DoD will direct adaptation measures. However, for the Civil Works program, climate change adaptation is a very large undertaking; all of its water resources missions and operations are impacted

by climate change and variability. As a result, the Civil Works program has a robust adaptation program, and has been working with water resources partners to analyze these impacts and lay out options for adaptation since 2007. In 2009, USACE released guidance for sea-level change, which was updated in 2011.

Later that year, Civil Works technical experts began assisting working groups of the Interagency Climate Change Adaptation Task Force, co-chaired by the Council on Environmental Quality, the Office of Science and Technology Policy, and the National Oceanic and Atmospheric Administration. These efforts, which continue today, have resulted in a number of interagency reports, including the National Action Plan: Priorities for Managing Freshwater Resources in a Changing Climate, the Draft National Ocean Policy Draft Implementation Plan, and the Draft Fish, Wildlife, and Plants Adaptation Strategy.

In 2011, USACE released its Adaptation Policy (<http://www.corpsclimate.us/>) with activities detailed in an Adaptation Plan and Report.

Also in 2011, a special collection

of journal papers on the topic of nonstationarity was released. These papers form the basis for policy supporting inland project adaptation. A multidisciplinary team of agency, interagency, academic, and private sector experts, including experts from the UK, is preparing sea-level change adaptation guidance, expected late this year.

Also this year, the USACE Adaptation Steering Committee was chartered and began operation under the leadership of Engineering and Construction Chief James C. Dalton. The Steering Committee will oversee and coordinate agency-wide climate change adaptation planning and implementation in accordance with the USACE Climate Change Adaptation Policy Statement.

In addition to these initiatives, we are developing a green building policy for Civil Works, a green acquisition policy for USACE as a whole, and an energy manager career field and training program.

The journey is going to be tough, but the payoff is a truly sustainable Corps of Engineers. As we celebrate Earth Day, let's keep our focus on the road ahead. **Essayons!**

Turtles

Continued from page 2

winter when sea turtles are not expected to be in the northeast. If dredging has to occur during the warmer months, the Corps must take measures to prevent harm to sea turtles, like having a NMFS certified Sea Turtle Observer onboard the dredges around the clock.

The observer is a trained and certified independent contractor who goes out with the crew to observe and document the dredging activity, includes documenting if any marine life is harmed.

If observers spot a marine animal swimming near the boat, they inform the crew so that the dredge can avoid it. If an observer sees a marine animal get injured they halt the dredging operation, document the incident and contact the proper authorities. Observers submit their daily reports to the

District and this information is eventually entered into the Corps' national sea turtle data base.

"The NMFS sets strict limits for how many sea turtles can be 'taken' during dredging procedures each year and if this limit is reached we must cease our dredging operations," said Ruben. "For the past 20 years, the District has been very successful when it comes to sea turtle protection. We have documentation of only one possible sea turtle mortality," said Ruben.

The need for sea turtle protection is increasing, Ruben said. The Corps has worked with the NMFS to develop dredging methods and equipment that minimizes the harm to sea turtles. An increase in the awareness of the plight of endangered sea turtles has also led to the creation of commercial fishing gear that is more turtle friendly.

Green Notes:

Environmental Operating Principles

- 1** Strive to achieve environmental sustainability. An environment maintained in a healthy, diverse and sustainable condition is necessary to support life.
- 2** Recognize the interdependence of life and the physical environment. Proactively consider environmental consequences of Corps programs and act accordingly in all appropriate circumstances.
- 3** Seek balance and synergy among human development activities and natural systems by designing economic and environmental solutions that support and reinforce one another.
- 4** Continue to accept corporate responsibility and accountability under the law for activities and decisions under our control that impact human health and welfare and the continued viability of natural systems.
- 5** Seeks ways and means to assess and mitigate cumulative impacts to the environment; bring systems approaches to the full life cycle of our processes and work.
- 6** Build and share an integrated scientific, economic, and social knowledge base that supports a greater understanding of the environment and impacts of our work.
- 7** Respect the views of individuals and groups interested in Corps activities, listen to them actively, and learn from their perspective in the search to find innovative win-win solutions to the nation's problems that also protect and enhance the environment.

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