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Contractors speak to a Corps of Engineers representative (in white hardhat) at the bottom of an effluent detention basin under construction for a Leadership in Energy and Environmental Design project on Fort Huachuca, Ariz. Photo by Daniel J. Calderón. Page 34

This Issue:
Environment and Sustainability

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U.S. ARMY INSTALLATION MANAGEMENT COMMAND

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Sustainability within the U.S. Army Corps of Engineers

by Stacey K. Hirata

Within the past decade, there has been an increased focus on "sustainability," not just in the environmental arena but throughout all aspects of the U.S. Army.

For those of us within the U.S. Army Corps of Engineers, the sustainability ethic has been part of our daily business since we first adopted the *Environmental Operating Principles* in March 2002. The first principle — "Strive to achieve Environmental Sustainability. An environment maintained in a healthy, diverse and sustainable condition is necessary to support life" — sets the stage for all our work.

The principles provide us direction on how to better achieve stewardship of air, water and land resources, while demonstrating the connection between water resources, environmental health and the nation's security.

Today, the Army is looking to operationalize the concept of sustainability in support of the mission. The Corps is part of this evolving movement. We've been adapting to changing needs, practices and priorities to achieve sustainability in everything we do, from supporting the Soldier and the nation at home and abroad to:

- improving navigation;
- restoring damaged ecosystems;
- improving flood risk management;
- embracing low impact development;
- building green and buying green;
- supplying hydropower and recreation;
- protecting and managing the environment, including current and future wetlands; and
- considering how the Army's carbon footprint can be reduced through better designs and operating practices as well as the potential impacts of climate change on how we build and operate our facilities.

If you look at our *Campaign Plan*, you'll find evidence of our commitment to sustainability in Goal 3, "Deliver innovative, resilient, sustainable solutions to the Armed Forces and the Nation."

Stacey K. Hirata
Photo by F.T. Eyre

In fact, you'll find the word *sustainable* in a number of different places within the *Campaign Plan*, including Objective 2a, "Deliver integrated, sustainable, water resources solutions." We did that deliberately, because we know we have to ensure that quality resources are available both for today and tomorrow. Our actions today shouldn't negatively impact the future.

Sustainability means taking a look at the social, economic and environmental impacts of our actions. It's like the idea of an ecosystem, which has interchangeable, moving parts that affect one another. We must consider all these interchangeable parts before deciding what to do. Our decisions and actions will have an impact on the future, for generations to come.

Further evidence of the ways we've been incorporating sustainability ethic into our work can be found not only throughout the country but overseas as well. In Fallujah, Iraq, we are installing solar lighting as part of our infrastructure reconstruction work. Our use of the renewable energy source of the sun (solar lighting) balances the needs of the environment and our community by providing power, conserving our natural resources for other uses, improving air quality through reduced air emissions and reducing our logistics tail.

Our South Pacific Division is standing up a new Sustainable Engineering Center that will focus on renewable energy. Two renewable energy projects worth noting are a geothermal heating and cooling project at Fort Sill, Okla., that will save nearly 2,500 barrels of oil a year; and solar walls and rehabilitation shops at Fort Knox, Ky., which will save 2,400 barrels of oil a year. These two projects alone will have a lasting impact on our nation's economic and environmental health.

In the Military Construction world, embracing sustainability is somewhat easier when you're designing and building new facilities as we strive to meet the U.S. Green Building Council's Leadership in Energy and Environmental Design Silver standards. But what about measures that can be taken in existing workplaces?

That's where one part of the Seattle District's *Sustainability in Agency Projects and Business Practices* policy memo comes into play. The policy lays out nine goals, including specific targets such as supporting the sustainability goals of the district's customers, creating zero waste and providing regenerative design and construction products.

The district is currently engaged in providing a sustainable work place for all of its employees by 2015. It has transformed the entrance to its Engineering and Construction Division into a greener office space, using products certified by Greenguard Environmental Institute, including carpeting and office furniture and a reception area countertop made of recycled aluminum in an eco-friendly resin.

Although we're striving to be a leader of the sustainability movement in everything in we do, it takes more than just words. Our actions and deeds must reflect the commitment to sustainability. We're going from good to great by embracing sustainability today and tomorrow.

BUILDING STRONG

Stacey K. Hirata is acting director of the Environmental Community of Practice, U.S. Army Corps of Engineers.

Applying sustainability to the Army world

by Col. Maria R. Gervais

Sustainability — a word often misunderstood, because numerous definitions try to capture this elusive concept. The debate over what sustainability is — and more importantly, what it isn't — has raged for 10 years.

Many people believe sustainability includes only actions that protect the environment or reduce energy consumption. Both programs support sustainability efforts, but so do training, logistics and other mission areas. However, sustainability applies to much more.

Historically, military sustainability meant the ability to keep operating until the objective was achieved. From the environmental perspective, sustainability refers to meeting the needs of the present without compromising future resources. With the turn of the century and the publication of the 2004 *Strategy for the Environment*, the Army realized the two definitions were essentially the same.

To quote the strategy, "A sustainable Army simultaneously meets current as well as future mission requirements worldwide, safeguards human health, improves quality of life and enhances the natural environment." This definition fits with the Army's "Triple Bottom Line – Plus" of sustainability: *Mission, Environment and Community, plus Economic Benefit* and encompasses the systems thinking the Army is applying now to the concept of sustainability. Sustainability enables wise decision-making about our financial, human and natural capital resources today to ensure the Army can execute its mission 25-30 years from now.

Sound environmental stewardship remains a key component of Army sustainability. Experience shows how programs protecting natural resources are not only compatible but also beneficial to military readiness. We sustain the capabilities of our installations by implementing effective policies and practices

Acronyms and Abbreviations	
IMCOM	Installation Management Command
PCS	petroleum-contaminated soils
OACSIM	Office of the Assistant Chief of Staff for Installation Management
USAG	U.S. Army Garrison

Col. Maria R. Gervais
U.S. Army photo

to safeguard the environment. This assures Soldier readiness both today and in the future by stabilizing the foundation from which we execute our mission.

Meeting our worldwide commitments will continue to put pressure on our installations to provide facilities, training areas and a quality environment essential to housing and training our Soldiers, Families and civilian work force. Simultaneously, we will continue to be challenged by community development, environmental regulations and rising energy costs that will limit an installation's flexibility to provide these core functions.

The Army's Environmental Program has evolved and transformed to meet emerging environmental and readiness challenges and also to support sustainability. Although the mission of fighting and winning the nation's wars has remained unchanged, the challenges we face as an Army are always changing.

Not since the end of World War II has transformation happened on so many levels throughout the Army, nor at such a rapid pace. To successfully adapt requires that the choices we make today consider the impacts on the future.

In the past few decades, we learned some hard lessons about sustaining the environment. Now, the Army's culture is changing from one focused strictly on compliance to one of taking proactive steps to preserve natural and cultural resources.

Sustainability awareness now resides in every facet of our installation and unit operations. It is becoming fully integrated into planning efforts across all mission areas, from installation to unit operations, from industrial operations to live-fire training, and from housing areas to landfills.

The sustainability initiatives taking place at the installations are absolutely amazing. Sustainable designs for our barracks and Family housing as well as our schoolhouses, training and administration facilities, and ranges are improving the quality of life, quality of work and overall efficiency of our installation's operations for the future.

Following are a few examples of sustainable practices that enhance the Army's mission.

Fort Carson, Colo. – Fort Carson is building the largest solar array of its kind in the Army. The post also purchases Renewable Energy Certificates that offset about 28 percent of its electric purchases and financially support the generation of more renewable energy in the local community.

Fort Gordon, Ga., and Fort Polk, La. – These installations use geothermal heat exchange, which uses 30 to 60 percent less energy than conventional means, to boost air conditioning in the summer, provide heat in the winter and heat water throughout the year. Geothermal heat exchange is used in more than 310 Residential Community Initiative houses at Fort Gordon and more than 1,200 buildings at Fort Polk.

Fort Hood, Texas – The installation analyzed waste streams, and saved millions of gallons of water and recycled more than a million gallons of hazardous waste including oil, fuel and antifreeze.

Fort Bragg, N.C. – With its mission increasing and space at a premium, Fort Bragg carried out aggressive cleanup programs to reclaim land previously deemed unusable due to land-use controls and long-term monitoring requirements. Using performance-based acquisition, partnerships and alternative remediation technology, the installation realized millions in cost savings and returned acreage to the training mission. ➤

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Fort Lewis, Wash. – Through deconstruction, which conserves both resources and expensive landfill space, Fort Lewis diverted 100 percent of the nonhazardous waste generated by a 12-building demolition project.

U.S. Army Garrison Hawaii – Army Hawaii Family Housing uses solar power to reduce water and air pollution from fossil fuel. Extra power generated is smart-metered back to the grid to benefit all Families in the community. The project will be the world's largest solar-powered community, providing about 30 percent of the community's electrical needs through photovoltaic panels.

U.S. Army Garrison Bamberg, Germany – USAG Bamberg has taken recycling beyond the installation to the community so everyone can recycle. Through this program and others, the installation achieved a recycling rate of more than 43 percent.

U.S. Army Garrison Humphreys, South Korea – A contaminated soil bioremediation "land farm" facility was constructed at Camp Humphreys as a means to treat petroleum-contaminated soils for reuse. Initially, the land farm treated about 300 cubic meters of PCS. The facility grew about 500 percent to accommodate garrison expansion and the Military Construction projects underway. Cost savings average about $200,000 per year compared to traditional disposal practices.

Fort Lee, Va. – Pollution prevention is a top environmental priority at Fort Lee, where motor pool personnel recycle 100 percent of used oil, contaminated fuel and lubricants. This effort includes 17,000 gallons of contaminated fuel and 8,000 gallons of used antifreeze.

Sustainability initiatives like these are also being practiced in both theaters of operations, where units are proactively taking steps to preserve or clean up the environment. For example, units in Afghanistan and Iraq have established recycling programs, which have reduced the impact on the environment and improved the quality of life for our Soldiers and for the Afghani and Iraqi people. These actions are a true indicator that the Army fully understands its environmental stewardship responsibilities, whether on home soil or abroad.

The Army's sustainability progress is directly attributable to grassroots efforts at installations. The value of sustainability to mission enhancement has been proven, and the time has come to apply this concept throughout the Army. To take sustainability from a grassroots effort to the next level, the Army senior leadership initiated actions to operationalize sustainability.

In January, the Office of the Assistant Chief of Staff for Installation Management formed an integrated process team to draft a campaign plan to further define what sustainability means to the Army, specifically the warfighter, and to establish lines of operation with specific roles and responsibilities. The Installation Management Command's Plans Directorate and the U.S. Army Environmental Command are active participants on this team and are working with OACISM and IMCOM leadership to institutionalize sustainability within IMCOM's transformed structure.

The first step will be to develop command guidance and goals to provide a corporate direction for this effort. We will engage the garrisons throughout the entire process to obtain the field perspective and use your vast experience.

As leadership continues to operationalize sustainability, efforts to take care of the environment and communities must continue. Sustainability will always be part of everyone's job. It is our responsibility to use Army resources effectively and efficiently so future generations of Soldiers, their Families, the civilian work force and the community will benefit from the same or better conditions than we have today.

Land, air, water and community resources are vital to both our present and future mission. We must use these resources in a manner that reflects our devotion to duty and respect for the needs of tomorrow. We must do this because it is the right thing to do, is clearly part of Army values and is the only way we can ensure the future readiness of our Army.

Col. Maria R. Gervais is the commander, U.S. Army Environmental Command.

Be ready for LEED 3

by Joanne Qualey

The U.S. Green Building Council launched version 3 of its Leadership in Energy and Environmental Design for New Construction April 27, Projects will no longer be able to register with USGBC for execution under the current version 2.2 after June 25.

Version 3 includes a revamping of the LEED point structure with increased emphasis on energy and carbon dioxide reduction, updates to baseline criteria and introduction of new prerequisites. The Office of the Assistant Chief of Staff for Installation Management will evaluate the new rating tool and issue Army policy and funding guidance on it later this summer.

All Army fiscal year 2012 projects will need to be programmed based on this forthcoming guidance. Program managers should plan to use LEED-NC Version 3. Meanwhile, OACSIM has agreed to execute all FY 2009, 2010 and 2011 Army Military Construction projects that were budgeted under LEED-NC Version 2.2 using that rating tool.

This decision means these projects must all be registered under version 2.2 before USGBC's cutoff date. The U.S. Army Corps of Engineers is undertaking this task now.

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Acronyms and Abbreviations	
FY	fiscal year
LEED-NC	Leadership in Energy and Environmental Design for New Construction
OACSIM	Office of the Assistant Chief of Staff for Installation Management
USGBC	U.S. Green Building Council

Managing change: Army Environmental Programs business transformation

by Krishna Ganta

The Army Environmental Programs business transformation is an initiative that aligns people, process and technology more closely with the *Army Strategy for the Environment*, the *Army Environmental Programs Priorities* and the *Army Environmental Cleanup Strategy*. The Army Environmental Programs business transformation, as with any other transformation, is all about change.

Why transform?

Change is a very important part of a business model because it drives performance. Change involves a fundamental transformation in the way an organization operates. It requires defining business needs and translating those needs into current and future business processes that can be articulated through an automated tool such as Business Enterprise Architecture.

Ongoing organizational transformation may sometimes be unthinkable or may create organizational complexities. New technologies, like the Internet, and emerging Department of Defense and industry standards are making it possible to accomplish performance management by using information technology tools for situational awareness.

Although IT tools have been used widely in the Department of Defense for a number of decades, the proliferation of IT tools that were designed for a specific business application has resulted in a large number of systems lacking interoperability, including many present day Army environmental information management systems.

To prevent further proliferation of "stovepiped" systems, the Clinger-Cohen Act of 1996 and the National Defense Authorization Act of 2004-05 were passed by Congress. These legislations enable transformation of the current Army Environmental Programs enterprise from a fragmented, stovepiped set of programs, systems and data to an integrated enterprise that is results-based, performance-oriented, integrated and net-centric.

Acronyms and Abbreviations	
BEA	Business Enterprise Architecture
DoD	Department of Defense
FY	fiscal year
HQAES	Headquarters Army Environmental Systems
IT	information technology

Krishna Ganta
U.S. Army photo

What does transformation look like?

The Army Environmental Programs business governance is conducted under a model that consists of "Plan-Do-Check-Act" steps:

Plan – This policy step starts at Headquarters, Department of the Army where policy and strategy are translated into priorities (strategic plan) and program guidance. The priorities drive the resourcing for the Army Environmental Programs and development of a BEA that captures the current and future business process. The BEA is a blueprint for business requirements under established policies and priorities.

Do – This operational step consists of budget and program execution at Army command or installation level, or sometimes by a service provider. A key element is reporting the end result of an action, either in progress or at completion, and assessing operational status and performance against established metrics.

Check – This review step uses IT systems to collect and analyze data from the previous step to generate performance reports. These reports, along with program management reviews, will yield situational awareness and program performance assessments.

Act – This management control step employs program performance indicators or other audit results to develop corrective action measures or policy changes to steer course correction for program planning and execution.

Who contributed?

During FYs 2006 and 2007, the headquarters staffs and associated Army command stakeholders conducted business process reviews and identified gaps, overlaps and inconsistencies. All core lines of business, versus support initiatives, were identified to further refine and realign to the future environmental program business structure.

Examination and analysis of these business areas and the definition of the critical objectives and targets led to creation of success indicators — performance metrics — for each business area. The performance metrics are measurable indicators that will be used to assess progress. At the end of this effort, the *Army Environmental Programs Priorities* memorandum was issued to initiate the plan-do-check-act process.

The core lines of business, supporting initiatives and Army Environmental Programs priorities determined the business needs. Translating these business needs to a BEA established the master blueprint for Army Environmental Programs.

The Army Environmental Programs BEA was mapped in FY 2008 to meet current DoD BEA standards and can be used to develop future IT solutions consistent with other Army enterprise systems across various domains. The detailed activities for all business areas within the enterprise and quantitative, measurable criteria against those business areas were integrated into the BEA to support the business needs for transformation. ➤

Bulletin provides tools for making better training land decisions

by Heidi R. Howard

The Corps of Engineers issued a Public Works Technical Bulletin that describes methods by which the U.S. Army Engineer Research and Development Center's Construction Engineering Research Laboratory assessed and quantified amounts of soil erosion at Camp Atterbury, Ind., in 2006. This process developed into an investigation of alternative methods that would take into account environmental conditions, training loads and land maintenance costs.

Experience gained from this investigation is shared in PWTB 200-3-56, *Erosion Assessments: Training Load Optimization for Environmental and Economic Considerations*, available at *http://www.wbdg.org/ccb/ARMYCOE/PWTB/pwtb_200_3_56.pdf.*

Acronyms and Abbreviations	
CERL	Construction Engineering Research Laboratory
PWTB	Public Works Technical Bulletin
SWAT	Soil and Water Assessment Tool

PWTB 200-3-56 discusses the overall erosion assessment process conducted at Camp Atterbury and how that analysis led to modifying the Soil and Water Assessment Tool model for use on military lands. By combining the tools for erosion assessment with a genetic algorithm applied to SWAT, which uses the highest quality traits from an iteration of guesses to form the next iteration of guesses, a solution that also considers economic and environmental effects can be considered.

Techniques for linking soil erosion models with land impact models are explained, and a detailed description of interfacing SWAT with a genetic algorithm for advanced optimization and analysis is given. These tools give land managers the means to make more informed decisions concerning land improvement and the consequent economic and environmental effects.

CERL research assistant Daniel Gambill stands on a typical trail that exhibits erosion due to degradation and lack of vegetation at Camp Atterbury. Photo courtesy of Heidi Howard

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The future

The development of the BEA resulted in realignment and consolidation of dozens of business areas in the Environmental Cleanup Program Group and the Environmental Quality Program Group. This change will allow the program managers to report performance status routinely through the future Headquarters Army Environmental System.

HQAES will be the authoritative information management system of record for Army Environmental Program. Users at any level will be able to see and use their data in HQAES. The future enterprise system based on the BEA will use new technology with sufficient tools to support Army headquarters, commands and installation needs.

The data collected for reporting will be transparent and support interoperability. It is expected that the system will collect data once, and different enterprise systems and feeder systems will use the information.

The HQAES will be developed to replace the current legacy systems that were built to support individual lines of business with technologies that are now obsolete and use inconsistent methodologies. These legacy systems led to stovepiping and an inability to integrate useful environmental information present in numerous, different information systems.

Lessons learned

Breaking down core business lines, supporting initiatives and integrating business processes is the key to any similar effort. Eliminating organizational stovepipes and turf wars is essential to progress.

Diverging interests and individual interests must be channeled into a common vision. When stovepipes are merged and collaboration is embraced, productivity increases. Bureaucracy disappears, and e-mail strings are never more than three messages long.

Leadership is paramount for any business transformation; it takes time and cooperation from program proponents and stakeholders. To move forward, it is critical to conduct an "as-is" business analysis to determine the gaps, overlaps and inconsistencies in order to eliminate inefficiencies and vulnerabilities in managing programs. This analysis is an intensive work effort that requires serious commitment from all players.

The Army Environmental Programs business transformation is a work in progress. The effort has yielded many benefits in defining program boundaries and business needs, as well as creating a blueprint that can be modified to support future changes.

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Strategic Sustainability Assessment: modeling for regional growth

by Elisabeth Jenicek

The U.S. Army Engineer Research and Development Center pilot-tested a new process to assess the impacts of regional growth and to test strategies for minimizing adverse effects on the military mission. Strategic Sustainability Assessment uses existing data and tools in a sequential manner to help Army installations and regional partners work toward achieving regional sustainability.

SSA assesses the future sustainability of military installations in the context of their local regions. It combines forecasting and backcasting to give regional stakeholders a unique perspective on potential policy and investment choices.

Forecasting uses the dynamic spatial modeling techniques of the Land-use Evolution and impact Assessment Model, or LEAM, to project future urban transformations and their implications on the social, environmental and economic fabric of the region. Backcasting determines sets of strategic interventions designed to offset the projected impacts of growth and development, enabling the region to attain a sustainable future as defined by the desires and goals of local and regional stakeholders.

ERDC's Construction Engineering Research Laboratory applied SSA to the eight-county Fort Bragg, N.C., region to project the impacts of expected growth on regional resources critical to the installation. This pilot test was part of a larger effort, called the SSA Fall Line project, for the southeastern United States. The project includes Forts Benning, Ga., Gordon, Ga., Jackson, S.C., and Bragg; two Air Force bases; other federal facilities; and three large metropolitan areas.

Bragg is the largest Army installation by population. It will host 56,349 military and civilians by 2012. An additional 35,000 can be expected in the surrounding community by 2030, attracted in part by economic growth due to the military plus-up.

To simulate future land-use change in the Fall Line region, the study team documented existing land-use patterns and estimated future demand for land based on projected economic and demographic changes. Stakeholder feedback was collected at a regional workshop to answer these questions:

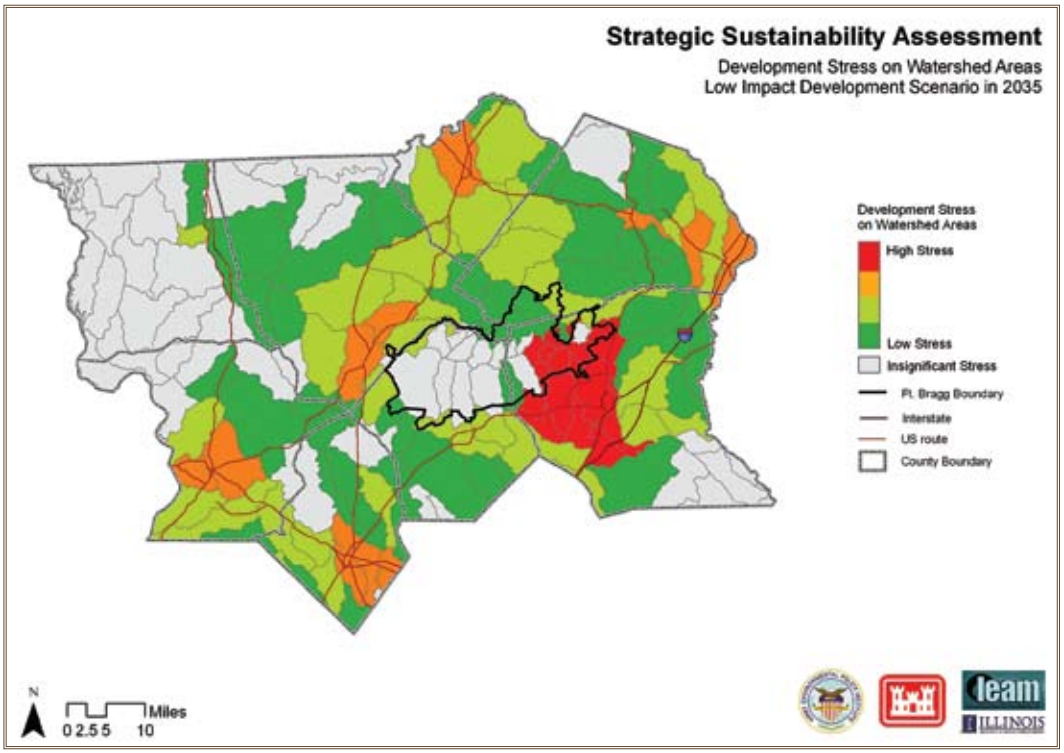
- How should we modify the drivers of land-use change to better describe future land use in the region?
- What drivers should be added to the model?
- What scenarios involving different future public investments and public policies should be developed?
- Should the current set of drivers be altered in some way to better describe the Fort Bragg region?
- What are the most important impacts of growth to consider in the region?

The outcome of the workshop was a set of regional scenarios to be modeled:

- Business as usual
- Low-impact development
- Transit-oriented development
- Closure of Bragg Boulevard
- Regional zoning
- Natural area suitability
- Residential, commercial and industrial suitability

Using 2000 as a baseline, data was collected and a model run conducted to create land-cover maps for each year of the run, 2000-2030. Comparison maps were ➤

Acronyms and Abbreviations	
CERL	Construction Engineering Research Laboratory
ERDC	Engineer Research and Development Center
SSA	Strategic Sustainability Assessment



This graphic shows the stress on watershed health that is possible under the low-impact development scenario. Graphic courtesy of ERDC

Army medicine heads for sustainability

by Mary M. Strickert

Pick up almost any magazine, watch TV or go shopping, and you'll see that the concept of sustainability is part of mainstream America. The country seems to have reached a tipping point, and now corporations, government agencies, nonprofits, rock stars and movie stars are stumbling over themselves to be the greenest of them all.

It's important to realize that sustainability isn't just about being green, although doing right by the environment is certainly part of sustainability. In fact, sustainability is much broader and also recognizes the need for an organization to accomplish its mission and be financially responsible while at the same time contributing to the community within which it operates.

Sustainability is most commonly defined as "the capacity to meet the needs of the present without compromising the ability of future generations to meet their own needs." The Army's mission is accomplished because America entrusts us with its most precious resources — its sons and daughters.

The mission of U.S. Army Medical Command — caring for our nation's warriors, their Families and the military alumni Family is especially critical. MEDCOM has an obligation to ensure that Soldiers of today — and Soldiers of the future — have the land, water and air resources they need to train and a healthy environment in which to live.

Acronyms and Abbreviations	
MEDCOM	U.S. Army Medical Command

Case for sustainable healthcare

Since the time of Hippocrates, the medical profession has pledged to "first, do no harm." The time has come for MEDCOM to extend that philosophy to facility operations, building design and purchasing choices. It must think green, think sustainably and protect the future success of its mission.

Applying sustainable practices will benefit the delivery of leading edge health services. For example:

- Purchasing items that have less environmental impact creates a healthier environment for Soldiers and military Family members.
- Reusing and recycling items reduces disposal costs.
- Using biodegradable dining hall containers provides a more sustainable alternative to plastics and plastic foam products.
- Cleaning with nontoxic products reduces exposure to chemicals by staff and patients.
- Conserving resources decreases utility, water and disposal costs.
- Using healthier building materials provides a more healing environment for patients.

Spc. Robert Moritz, a cytologist at Brooke Army Medical Center, Fort Sam Houston, Texas, uses a Vyleater to crush small vials and separate the contents, reducing the cost of product disposal, one of many MEDCOM sustainability measures. Photo by Jen D. Rodriguez, Brooke Army Medical Center Public Affairs

- Designing buildings to incorporate use of natural daylight and views of nature improves patient outcomes and helps patients heal faster.

Becoming sustainable means that ➤

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created to compare the results of two different scenarios.

The land-cover maps were also used as input to the impact models to compare the effect of land-use change on a number of sustainability issues. For the Fall Line project, impacts analyses were completed for training and testing, water supply and use, water quality, energy supply and use, air emissions and air quality, housing, school districts, environmental resource regional stress, and regional infrastructure demand and cost.

The final product of this study is the SSA Geo-Portal, a new capability that enables regional stakeholders to access study results, actively engage with each other and build on the work completed in the pilot test. The Geo-Portal is an online repository for the Fort Bragg area planning data and simulation results. It functions as a systematic approach to evaluating existing plans and assessing implications of various policy interventions.

Results of the preliminary project, *Strategic Sustainability Assessment Pilot Study: Fall Line Region of the Southeast*, ERDC/CERL TR-06-32, can be accessed at *http://www.cecer.army.mil/techreports/ERDC-CERL_TR-06-32/ERDC-CERL_TR-06-32.pdf.* The final report is due in September.

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Green procurement offers greatest opportunity to reduce impacts

by Richard S. Bell and Marcia Rapone

Defense Supply Center Philadelphia realized that its most significant environmental impacts are related to its procurement on behalf of its customers. So, the organization is now greening its procurement program.

Because DSCP is an office-based organization, supplies for internal use, energy and water use, recycling and fleet management were identified as regular activities that have the potential to affect the environment. However, in 2008 alone, DSCP procured more than $13.4 billion worth of goods and services for its customers, and that mission offers a far bigger opportunity to affect the environment.

DSCP is organized into four supply chains — Medical, Clothing and Textiles, Construction and Equipment, and Subsistence. These organizations specialize in acquisition and logistical support of an enormous variety of specialized commodities, supplying virtually every consumable DSCPs' customers need.

Like all other federal facilities, DSCP, part of the Defense Logistics Agency, is required to have an environmental management system. A cross-functional team was created to oversee the implementation of the EMS at DSCP. Using the International Organization for Standardization's 14001 guidance, the team is applying the Plan-Do-Check-Act cycle of improvement to identify opportunities, address weaknesses, evaluate suitability and tweak operations ➤

Acronyms and Abbreviations	
DSCP	Defense Supply Center Philadelphia
EMS	environmental management system

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MEDCOM will be able to fulfill its mission into the future by continuing to provide top-notch healthcare while being good stewards of the environment, the communities where it operates and the taxpayers' dollars.

MEDCOM Sustainability Strategy

MEDCOM is developing a strategy to promote more sustainable practices in the delivery of both Army healthcare and medical research and development. When implemented, the *MEDCOM Sustainability Strategy* will enable the command to maintain readiness, improve quality of life for patients and personnel, strengthen community relationships, better protect the environment and reduce the total costs of ownership. Furthermore, the strategy will provide a road map for partnering with the community and ensuring the future availability of the earth's resources.

Slated for completion in early 2010, the strategy will focus on —

- waste management practices, including reducing the amount of solid waste, regulated medical waste and hazardous waste generated; and recycling;
- energy use and conservation;
- water use and conservation;
- environmentally preferable purchasing, including life-cycle costing;
- training for healthcare providers and staff;
- impacts to on- and off-post communities, including noise, traffic and aesthetics;
- nutrition, food sources and mental health; and
- reduction of greenhouse gas emissions.

The Headquarters MEDCOM Sustainability Team will manage and guide sustainability within the command. Commissioned April 2, the team is an interdisciplinary board charged with establishing overarching sustainability goals and monitoring and reporting progress toward these goals. The team will develop policy changes that will drive specific sustainability initiatives for the individual MEDCOM medical treatment facilities.

The goals and metrics determined by the team will be documented in a *MEDCOM Sustainability Strategy Map*, which will be used to drive sustainability initiatives down to the individual facilities. To assist in developing the sustainability strategy and goals, MEDCOM will soon begin benchmarking industry standard practices in both civilian hospitals and medical treatment facilities of other military branches.

The team will also collect data on current sustainability practices at MEDCOM facilities. The data collected will be used to establish the base line for measuring progress toward sustainability goals.

Achieving a sustainable MEDCOM will involve many choices and will require a deep, personal and lasting commitment from every leader, every Soldier and every civilian. Working together will ensure the viability of the mission and enable MEDCOM to continue providing superior healthcare into the future.

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MEDCOM and Practice Greenhealth

MEDCOM is a member of Practice Greenhealth (*http://www.practicegreenhealth.org*). Practice Greenhealth's goal is to facilitate sustainability in the many facets of healthcare, including facilities management, design and construction, purchasing, waste management, energy and water use, chemical management and pest management.

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on an on-going basis.

The program is driven by 16 documented procedures that structure a management approach and ensure that environmental impacts are considered in business processes and decisions. The team documented procedures associated with staff roles, communication, training, documentation and record management.

DSCP is using the EMS program to:

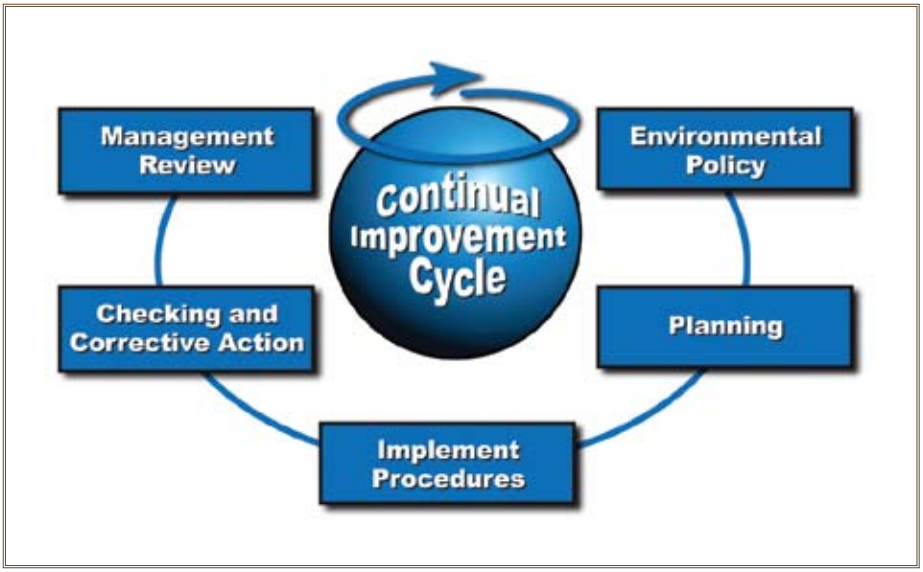
- document and manage a system in which goals and metrics are communicated and regularly reviewed;
- expand offerings of green products and services;
- encourage innovation within the commercial industry; and
- reduce the environmental impacts of use, storage and disposal of goods.

For example, the Construction and Equipment Supply Chain has been working to develop a commodity-specific green procurement program tailored to fit the unique needs of its customers. This supply chain is focusing its first efforts toward lighting and heating, ventilation and air conditioning items.

The intention is to increase green procurement practices throughout all divisions of the organization. Operating procedures and controls are documented so that employees are aware of green procurement requirements.

Examples of controls that the Construction and Equipment Supply Chain have implemented are:

- including appropriate Federal Acquisition Regulation green procurement-related clauses and provisions in contract solicitations;
- training employees about green procurement requirements;
- making available green alternatives to existing top selling items; and
- communicating the green procurement program to the workforce.



The EMS process is anchored by DSCP's *Environmental Policy Statement*, which documents an organizational commitment to preserving the natural environment. The statement links DSCP's mission, its EMS and its neighbors. DSCP encourages staff to be stewards of the environment both at work and at home.

Each employee is asked to make a "*P-A-C-T*" for the environment, meaning that they will:

- Prevent pollution;
- Abide by environmental regulations;
- Conserve resources; and
- Take steps to improve.

Following more than a year of planning and research, DSCP is successfully incorporating green procurement processes throughout the organization. Using the EMS, DSCP has begun to realize several benefits, which include: managing more than 3,800 products labeled with an Environmental Attribute Code that are cataloged in the Federal Logistics Information System and meeting the customers' needs for more green products.

DSCP works to minimize the environmental impacts of production, use and disposal of the products it procures, even though these actions do not actually occur at its Northeast Philadelphia compound. Vendors manufacture and supply the products, and customers use, store and dispose of them. DSCP does not control these activities, but it works to educate and advocate for greener alternatives that meet customer specifications and reduce environmental impacts.

DSCP will continue to build upon and enhance green procurement controls and metrics that will be used to monitor progress. From fruits and vegetables to medical equipment, tents and clothing to construction supplies, DSCP is positioned to supply options for its customers to remain ready, responsive and relevant in today's rapidly changing marketplace.

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Proper maintenance key to no-water urinal success

by Annette Stumpf

Solicitations for Military Construction and major repair projects starting with fiscal year 2010 must include language to implement the *Army Standard for Nonwater-Using Urinals*. The Installation Management Command will soon issue a Netcall, a commandwide message, directing all garrisons to implement the standard.

No-water urinals will save water in the millions of gallons each year at military installations. Their use will help the Army comply with Executive Order 13423, *Strengthening Federal Environmental, Energy and Transportation Management*. This EO requires federal agencies to reduce water consumption through life-cycle cost-effective measures by 2 percent each year from their 2007 baselines, or 16 percent by the end of FY 2015.

The water-saving realities of nonwater-using urinals have long been known in the Public Works community. So why hasn't everyone jumped on the bandwagon to take advantage of this green technology?

Lingering concerns appear to be based largely on misinformation and rumor. Following is clarification of some of these issues.

Issue: Water-free urinals stink

Installations having success with these urinals, such as Fort Huachuca, Ariz., report that, by following the manufacturers' instructions for cleaning, the fixtures are odor-free, and drainage pipes remain unclogged.

Typical units have a cartridge that needs replacement after about 7,000 uses. Pouring hot water into the drain at the time of cartridge replacement can eliminate buildup of organic matter. Janitorial service personnel need to be trained in the proper procedures to maintain the urinals.

Acronyms and Abbreviations	
CERL	Construction Engineering Research Laboratory
EO	executive order
FY	fiscal year

"If you don't do adequate cleaning of your urinals, they will smell, whether they are water or nonwater using," said Craig Hansen, engineering technician, Energy and Water Management Office, Fort Huachuca.

"I have also observed that if there are other issues in the building causing odor, the nonwater using urinals amplify it," Hansen said. "In one case, we used a smoke test to find that sewer gas was backing up into the building. There were three significant issues: a toilet in the women's restroom had a crack in the base, the restroom exhausts vented into the fresh air intakes, and none of the urinals were passing smoke back into the space."

Water-free urinals cost no more to install or maintain than flush urinals and avoid the expense of plumbing work for leaky pipes and valves. Photo courtesy of CERL

Issue: The urinals will cost more to install and maintain

First cost for nonwater using urinals is about the same as for flush models. Maintenance costs are roughly the same as for cleaning conventional urinals. In addition, the no-water fixtures avoid costly plumbing bills to repair nonworking flushers.

Issue: The technology is not ready for prime time

Water-free urinals have been widely used in countries outside the United States for many years, especially in water-short regions such as Australia, which is in its 17th year of drought. In the United States, as the units become more widely adopted to conserve water, more and more manufacturers are offering products that meet the Army's standard. While several excellent products are already available, the increasing competition among vendors provides an incentive to keep improving on the technology.

The Construction Engineering Research Laboratory developed a list comparing some of the commercially available products at the request of the Office of the Assistant Chief of Staff for Installation Management. Directorates of Public Works may access this official-use-only information using their Army Knowledge Online login at *https://eko.usace.army.mil/fa/water/technologies*.

Issue: Installing these units in hospitals or permanent barracks isn't a good idea

Hospital rooms, barracks rooms and trainee barracks sleeping areas never have urinals in the design. They are specified to have commodes.

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Put the 'LID' on storm-water pollution

by Harold Balbach

Easy, low-cost measures taken during the planning and construction of a facility can help an installation's environmental management efforts for decades to come.

Low-impact development, an emerging concept for storm-water management, offers an alternative to traditional techniques for managing storm-water runoff. In contrast to infrastructure-based storm-water management, LID techniques emphasize on-site treatment and storm-water harvesting.

The Corps of Engineers published Public Works Technical Bulletin 200-1-62, *Low-Impact Development for Sustainable Installations: Stormwater Design and Planning Guidance for Development within Army Training Areas*, to provide LID guidance. It is available at *http://www.wbdg.org/ccb/browse_cat.php?o=31&c=215*.

The Army faces many challenges in storm-water management. The problem is common to both populated, urbanized cantonment areas and open spaces like ranges and training areas. These areas contribute to compromised surface water quality, flooding, habitat degradation, stream bank erosion and, most importantly, to nonpoint source pollution.

These concerns stem mainly from large areas of impervious surfaces around building sites as well as a lack of management practices aimed at reducing peak flows and polluted runoff, especially in open, undeveloped areas.

The Environmental Protection Agency has identified NPS pollution as the single largest cause of storm-water pollution in the United States. The Energy Independence and Security Act of 2007 mandates that "federally funded development or redevelopment projects with a footprint that exceeds 5,000 square feet shall use strategies for the property to maintain or restore the predevelopment hydrology of the property."

Acronyms and Abbreviations	
BMP	best management practice
LID	low-impact development
NPS	nonpoint source

This conservation LID includes a driving surface aggregate, large stones to line the roadside ditch, new cross pipes and construction of plunge pools to slow down-hill, storm-water flow rate. Photo courtesy of the Iowa Natural Resources and Conservation Service, U.S. Department of Agriculture

What is LID?

LID seeks to control NPS pollutants nature's way through application of plant-soil-water mechanisms that maintain and protect the ecological and biological integrity of receiving waters and wetlands. LID practices use the green approach to reduce storm-water runoff and NPS pollutant transport while mimicking predevelopment hydrology.

The technology reduces infrastructure costs, increases groundwater recharge, reduces NPS pollution via biological uptake of pollutants, enhances esthetics and biodiversity, and improves surface water quality.

Best management practices

LID encompasses a variety of innovative BMPs that manage storm water close to its source by re-creating the site's predevelopment hydrology using design techniques that infiltrate, evapotranspire and reduce runoff. Source management is the key to reducing impacts on rivers, streams, lakes, coastal waters and groundwater.

Because LID techniques promote the use of natural systems, they can effectively remove nutrients, pathogens and metals from storm water. Cost savings are typically seen in reduced need for storm drainage infrastructure because the total volume of runoff to be managed is minimized through infiltration and evapotranspiration. By mimicking the natural water cycle, LID practices protect downstream resources from adverse pollutant and hydrologic impacts that can degrade stream channels and harm aquatic life.

LID practices include —

Conservation designs minimize runoff generation by preserving open space to reduce impervious surfaces. Reducing these surfaces in a planned development by limiting road widths, parking areas and sidewalks lessens storm peak flow and reduces volume of polluted storm-water runoff. Examples: reduced impervious area, clustered development, shared driveways, curb cuts and reduced setbacks.

Infiltration BMPs capture and infiltrate runoff on site with engineered structures or landscape features. The features can be used to reduce both the runoff volume and the infrastructure needed to convey, treat or control runoff and to recharge ground water. Examples: infiltration basins and trenches, porous pavement, disconnected downspouts, rain gardens and other vegetated treatment systems.

Runoff storage BMPs capture runoff from impervious surfaces and store it for reuse or gradually infiltrate, evaporate or use it to irrigate plants. These practices reduce the volume of runoff, lower the ➤

Validation team begins judging sustainable design success

by Richard Schneider and Annette Stumpf

The Army Sustainable Development and Design Validation Committee convened this spring to begin assessing newly built Military Construction for adherence to the SDD goals set at the projects' planning phase. The committee will continue its site visits through the summer.

This effort implements a requirement to validate the Army's self-certification process for sustainability scoring of MILCON projects. In addition, the team will facilitate third-party validation for 5 percent of Army buildings completed over the past year as mandated by the Energy Independence and Security Act of 2007.

Members of the validation committee represent the Office of the Assistant Chief of Staff for Installation Management (Construction, Base Realignment and Closure, Army Reserve, Facilities Policy, Army Environment and Army Housing divisions); Headquarters, Installation Management Command (Public Works); and ➤

This new brigade battalion headquarters at Fort Carson, Colo., which the validation committee used to field test the certification process, is the Army's first LEED Gold certified project. Photo courtesy of USACE

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peak flow hydrograph and provide esthetics, such as landscape islands, tree boxes and rain gardens. Examples: parking lot, street and sidewalk storage; rain barrels and cisterns; storage in landscape-island, tree, shrub or turf depressions; and green roofs.

Runoff conveyance BMPs route excess runoff from large storms through and off the site. In LID designs, conveyance systems can be used to slow velocities, lengthen the runoff time of concentration and delay peak flows. A common goal is to retain runoff on site for 95 to 98 percent of typical storm events so that only the largest storms generate any offsite runoff. Examples: grassed swales and grass-lined channels, roughened surfaces, long flow paths over landscape, and use of terraces and check dams.

Filtration BMPs provide pollutant removal through media by physical filtration of solids and/or cation exchange of dissolved pollutants. Filtration practices offer many of the same benefits as infiltration, such as reduced runoff and groundwater recharge. Examples: bioretention or rain gardens, vegetated swales, vegetated filter strips and streamside buffers.

Low-impact functional landscape BMPs reduce impervious areas and improve infiltration through careful selection of plant species. Properly amending soils and selecting species adapted to site conditions promote plant establishment and growth. This practice stabilizes the soil, allowing for biological uptake of pollutants. Examples: landscape with native species, converting turf areas to shrubs and trees, reforestation, mowing less frequently and amending soil to improve infiltration.

Compliance incentives

The benefits of LID controls are usually site-specific and vary depending on the LID technology and the local biophysical conditions such as topography, soil types and precipitation. Many states recognize the positive benefits that LID techniques offer, such as reduced impact on wetlands.

Some states offer regulatory compliance credits and other incentives similar to those offered for other green practices. For example, in Maryland the volume required for a runoff catchment can be reduced if rainwater runoff is infiltrated on site using LID. Army environmental managers may want to take advantage of similar incentives, if available in their respective states.

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the U.S. Army Corps of Engineers (Headquarters, Engineer Research and Development Center's Construction Engineering Research Laboratory, and three Leadership in Energy and Environmental Design-accredited professionals from districts.)

Selection criteria

Earlier this year, the team selected 19 projects to be validated at 14 installations during 2009. Each project had SDD goals as developed using either LEED or the Sustainable Project Rating Tool. The Army adopted LEED for use on all MILCON beginning in fiscal year 2008; however, projects using SPiRiT were included to also validate that tool, which had been used since 2002.

Projects were selected using several criteria. The three top requirements were that the facility be vertical construction with conditioned space, located within the continental United States and ready for occupancy in the mid-April timeframe.

Other qualifying criteria were also evaluated. These included whether the construction was a single building project, the facility type, whether the building and site work were completed by the same contractor and whether it was a Centers of Standardization facility. Other factors were the project's MILCON Transformation tier — the projects with the highest priority were chosen — and the project costs so that examples from across a broad spectrum could be selected.

Army validation sequence

The internal validation process has four parts. First, the project delivery teams score and document the projects' adherence to SDD standards throughout the planning, design, construction and turnover phases. Next, the installation Directorate of Public Works or Reserve equivalent, the USACE COS and the designer or builder as applicable endorse the project delivery team's final certifiable LEED scores.

This endorsement occurs at the beneficial occupancy and construction closeout stage. OACSIM then reviews and validates the project delivery team's score — SPiRiT or LEED — to judge the effective implementation of SDD policy for Army construction. Finally, the validation committee visits the building and conducts a walk-through to verify that the desired SDD results have been achieved. For LEED rated projects, the team uses LEED Online, which is the U.S. Green Building Council's member support web site.

External validation

With 968 new Army buildings being constructed this year, the external validation process needs to include 48 buildings to meet the EISA's 5 percent requirement. Most of the same selection criteria used for internal certification were applied in selecting buildings for external validation. The exception is that the facility also had to be a design-build project.

LEED-accredited professionals will conduct the third-party assessments. The Army validation team will report results to the Facilities Standardization Committee by October. For more information on the Army's use of LEED, visit *https://eko.usace.army.mil/fa/sdd*.

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Schedule of validation visits

May 5-7 – Fort Lee, Va. (Norfolk District): Administrative Facility; Dining Facility-Transient Training; Transient Unaccompanied Personnel Housing

May 19-21 – Fort Lewis, Wash. (Seattle District): Brigade Headquarters; Child Development Center

June 9 – Fort Bliss, Texas (Fort Worth District): Company Operations Facility

June 11 – Fort Huachuca, Ariz. (Los Angeles District): Senior Noncommissioned Officer Three-bedroom Family housing

June 23 – Letterkenny Army Depot, Pa. (Baltimore District): Guided Missile Maintenance Facility

June 25 – Picatinny Arsenal, N.J. (New York District): Fire Station

July 7 – Fort Benning, Ga. (Savannah District): Training Barracks/Company Operations

July 9 – Fort Bragg, N.C. (Savannah District): Vehicle Maintenance Shop

July 21 – Fort Sill, Okla. (Tulsa District): General Instruction Building

July 23 – Fort Riley, Kan. (Kansas City District): Barracks

August 4 – Fort Wainwright, Alaska (Alaska District): Junior Noncommissioned Officer Three-bedroom Family housing

August 6 – Fort Richardson, Alaska (Alaska District): Child Development Center

Acronyms and Abbreviations	
COS	Center of Standardization
EISA	Energy Independence and Security Act
LEED	Leadership in Energy and Environmental Design
MILCON	Military Construction
OACSIM	Office of the Assistant Chief of Staff for Installation Management
SDD	sustainable design and development
SPiRiT	Sustainable Project Rating Tool
USACE	U.S. Army Corps of Engineers

Army recognizes environmental and sustainability best practices

by Jennifer Gaskill

Army programs making strides in endangered species protection, historic preservation, waste reduction, environmental restoration, sustainability and pollution prevention earned Pentagon recognition in January as the Department of the Army announced the winners of its highest honors for environmental stewardship and sustainability.

Seven installations, three teams and one individual received fiscal 2008 awards for their environmental and sustainability program achievements.

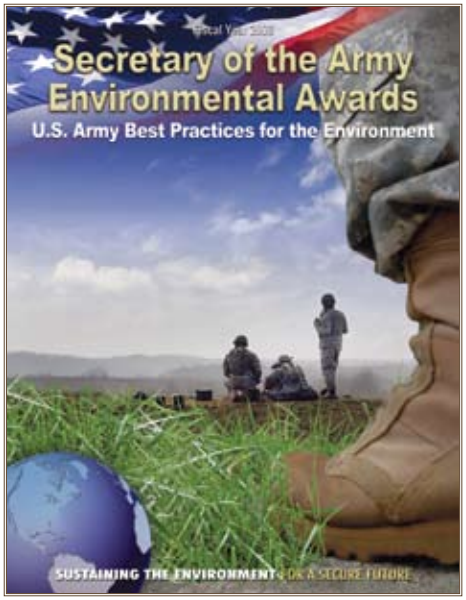
The winning accomplishments included designing a multi-phase, ethnographic, oral history collection project; achieving significant waste and emissions reductions; securing special legislation that returns state timber revenues to the Army; constructing a photovoltaic array to reduce dependence on fossil fuel; and implementing performance-based contracting to save the Army millions of dollars in cleanup costs.

"The Army is committed to protecting the environment at installations here and overseas," said Tad Davis, deputy assistant secretary of the Army for environment, safety and occupational health. "In fact, as the winners of our environmental awards demonstrate, the Army is getting more and more sophisticated in its use of environmental technology and sustainable practices. We're becoming a greener shade of green."

The winners of the 2008 *Secretary of the Army Environmental Awards* are:

Camp Johnson, Vermont Army National Guard, earned the *Environmental Quality at an Industrial Installation* award. Camp Johnson's environmental quality program was recognized for its many successes that included recycling proceeds of $16,000 in one fiscal year.

U.S. Army Garrison Bamberg, Germany, won the award for *Environmental Quality at an Overseas Installation*. Using a geographic information system allowed 31 organizations across the garrison to share information in order to integrate efforts for greater benefit to the environment, part of the garrison's robust environmental program.



Graphic courtesy of the U.S. Army Environmental Command

Camp Navajo, Arizona Army National Guard, was recognized for *Cultural Resources Management at an Installation*. Camp Navajo's comprehensive fieldwork and ethnographic oral history collection documented the experiences of the Native American Families who built and lived on the installation in the 1940s.

Fort Bragg, N.C., earned the *Environmental Restoration at an Installation* award for expediting the removal of 1,100 noncompliant underground storage tanks and remediating 93 of the installation's 104 identified solid waste management units, returning 675 acres to the installation's real estate inventory.

The Camp Ripley Maneuver and Training Center, Minnesota Army National Guard, won the award for *Natural Resources Conservation at a Large Installation* for enrolling 4,000 acres into the installation Army Compatible Use Buffer program and protecting an additional 18,000 acres in support of the buffer.

Combined Support Maintenance Shop, Michigan Army National Guard, was recognized for its work in *Pollution Prevention at a Nonindustrial Installation* for implementing spray technique analysis and research for defense painter training programs and converting to a water-based chemical-agent-resistant coating painting system.

Field Maintenance Shop 2 Pollution Prevention Team, North Carolina Army National Guard, earned the award for its *Pollution Prevention Team* effort. It was recognized for opening a green facility for equipment rehabilitation and servicing that significantly reduced both hazardous and universal waste.

Fort Drum, N.Y., was recognized for its *Cultural Resources Management Team*. The Fort Drum team protected and preserved archaeological sites in place while supporting the post's operational mission.

The winners of the *2008 Secretary of the Army Sustainability Awards* are:

Fort Hood, Texas, won the *Sustainability award for Installations*. Since Fort Hood implemented oil and fuel collection in 2006, the installation has collected and sold 206,122 gallons of used oil and 160,785 gallons of JP-8 fuel, resulting in a profit of $373,300 and a significant decrease in hazardous waste disposal.

Fort Carson, Colo., earned the *Sustainability award for Teams*. Fort Carson constructed a 12-acre, 2-megawatt photovoltaic array — one of the Department of Defense's largest — to increase the post's renewable energy portfolio. Locating the solar array on a former landfill site allowed mission-support use of a site that otherwise had limited development value.

Maj. Laura McHugh, Pennsylvania Army National Guard, won the *Sustainability award for Individuals*. McHugh incorporated sustainability and environmental management system courses into the ➤

Camp Johnson's recycling generates big rewards

by Jennifer Gaskill

As the lead on military environmental quality in Vermont, Camp Johnson ensures that compliance stays in balance with operations and military support and sets the standards for the rest of the Vermont Army National Guard structure, including 20 armories, a flight facility, training sites, small maintenance shops and other facilities. Camp Johnson's Environmental Office supports every National Guard unit in the state, maintaining and rehabilitating more than 1,500 pieces of equipment each year.

The post's Environmental Quality program recycled 156 tons of waste in fiscal 2007, including more than 82.5 tons of scrap metal and brass; 54 tons of paper, cardboard, glass and plastic; and 6.5 tons of miscellaneous items, such as antifreeze, used oil, light bulbs, ballasts and electronic waste. These numbers represent a disposal diversion rate of nearly 50 percent.

"Camp Johnson's new qualified recycling program generated more than $16,000 in fiscal 2007," said Capt. Jacob Roy, Environmental Program manager. "Thus far, more than $8,000 has been generated in fiscal 2008, and the installation has collected approximately $26,000 in 2008."

Another program success is the use of equipment that refurbishes diesel fuel from vehicles in maintenance. The system filters out dirt and particles and puts reclaimed fuel back into use. The team refurbished about 2,000 gallons of diesel fuel in 2008 to use as fuel for buildings and vehicles, saving an additional $5,000.

Camp Johnson saved the VTARNG roughly $3 per gallon, or about $150 per drum, of oil by using almost 1,000 gallons of used oil in 2008 at a savings of about $3,000. This reclaimed oil is used for heating and offsets energy costs. Used oil that cannot be reclaimed is sold to oil recycling vendors.

The camp has also been recycling its antifreeze for almost 15 years. Antifreeze recycling is done in-house and has saved the VTARNG thousands of dollars in procurement and disposal costs.

Wooden pallets from Camp Johnson's maintenance shops are turned into wood chips at a local plant. The chips can be used as a renewable energy source for heating.

Camp Johnson has also phased out traditional paint shop systems during the past several years, and it now uses water-based, chemical-agent-resistant coating equipment and media-based paint strippers. This switch increased the safety of the paint process for VTARNG Soldiers and eliminated the purchase and disposal of toxic solvents and painting materials.

By locally land farming contaminated soil, Camp Johnson avoids transporting that soil to a certified treatment facility for thermal destruction. A typical spill generates about 25-30 cubic yards of contaminated soil, which would cost about $2,800 per load. Land farming on site does have some associated expenditures, i.e., plastic costs and testing costs, but because the dirt stays on site, there is no impact to the external environment.

Sgt. Mark Labonte of Camp Johnson inventories his flammable cabinet using a Hazardous Material Tracking System scanner. Shops at Camp Johnson and throughout the state can swap unused materials, avoiding the costs of purchasing new and disposal of expired products. U.S. Army photo

Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health Tad Davis recognized Camp Johnson as having the Army's most outstanding environmental quality effort at an industrial installation in fiscal 2008.

"The VTARNG has a well-rounded environmental program that focuses on reduction of pollution, recycling, cost savings, community involvement and robust training to help sustain the mission," said Justin Gean, *Secretary of the Army Environmental Awards* judge.

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Acronyms and Abbreviations	
VTARNG	Vermont Army National Guard

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pre-initial entry training plan, implemented green purchasing and advocated comprehensive recycling initiatives and Leadership in Energy and Environmental Design standards for training facilities.

The *Secretary of the Army Environmental Awards* represent the highest honor in the field of environmental science and sustainability conferred by the Army. More information is available at *http://aec.army.mil/usaec/newsroom/awards00.html*. (*Editor's note: Articles about the environmental awards recipients appear in this section of the* Public Works Digest.)

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Bamberg applies GIS technology to environmental program

by Jennifer Gaskill

The U.S. Army Garrison Bamberg, Germany, doesn't have to wonder what it has in its ecological and other environmental inventories now that this data is exchanged using a geographic information system. The electronic mapping tool allows 31 organizations across the garrison to share information in order to integrate efforts for greater benefit to the environment.

The Environmental Management Division was the garrison's first activity with a fully working GIS. The GIS holds a variety of information that includes: geology, drillings, water and soil tests, surface waters, landscaping features, landscape maintenance responsibilities, cultural and archaeological resources, cultural monuments, contaminated sites, recycling points, oil-water separators, hazardous-waste accumulation points, hazardous materials storage areas, above-ground storage tanks, underground storage tanks, trees, biotopes and forests.

"By optimizing resources and implementing GIS to manage the environmental program, the garrison's Environmental Management Division and Training Support Center now use the biological inventory to coordinate maintenance projects," said Wolfgang Grimm, command forester, U.S. Army Installation Management Command, Europe Region.

"Using this new system, undesired vegetation is scheduled to be removed, creating larger open areas within forests for nature conservation, military training and tank driving exercises," Grimm said. "This is just one example of how garrison organizations are using GIS to coordinate integrated programs."

Because of the high population density and intensive use of farm land in the surrounding area, Army training grounds have become ecological areas of importance.

Acronyms and Abbreviations	
GIS	geographic information system
USAG	U.S. Army Garrison

A USAG Bamberg's Environmental Office worker fights the undesired reed grass (Calamagrostis) at the U.S. Army airfield. U.S. Army photo

These valuable biological communities are inventoried in the USAG Bamberg GIS that monitors 152 acres of unimproved Army land.

Using GIS is part of a robust Environmental Quality program that includes many successes. USAG Bamberg's environmental programs address pollution prevention opportunities, instill a powerful recycling program, promote the protection of public health and the environment, conserve valuable material and energy, and maintain sustainable use of Army land through the conservation of existing resources.

The Environmental Management Division uses GIS for a maintenance program for disturbance-dependent species and their habitats. For example, energy conservation techniques taught by the Public Works' Operation and Maintenance Division educated the garrison population on energy-savings methods. This effort resulted in a savings of 38,000 million British thermal units, which totaled $450,000 in 2007. For this success, the division received the *Secretary of the Army Energy Efficiency and Energy Management Award.*

In addition, the garrison constructed a new recycling center that is open to the surrounding community and collected about 3,739 metric tons of waste in fiscal 2008. The garrison's environmental programs are integrated with the local city government and were instrumental in the city receiving the *Environmental City of Germany* award.

Continual improvement of its initiatives is tracked by USAG Bamberg using an environmental management system, part of the overall installation management system that specifically addresses the potential risks to the environment from Army activities. This system is a tool that can help ensure that Soldiers today and in the future have the land, water and air resources that they need to train; a healthy environment in which to live; and the support of local communities.

Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health Tad Davis recognized USAG Bamberg as the Army's most outstanding overseas environmental quality effort in fiscal 2008.

"USAG Bamberg has provided a sustainable environmental quality to its personnel and surrounding community through its environmental management projects," said Amy Potter, *Secretary of the Army Environmental Awards* judge.

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Camp Navajo documents oral history of Native American workers

by Jennifer Gaskill

Stories of Native American workers at Camp Navajo, Ariz., will be a part of the site's historical record forever, and those working at the Camp Navajo Garrison Training Center and the Arizona Army National Guard have a richer understanding of their own history thanks to the Camp Navajo Cultural Resources Management Program oral history project.

The oral history project began as an effort to mitigate range development impacts on Indian Village, established for the Native American crews who helped construct the installation in the 1940s. The project documented the experiences and history of more than 200 participants with connections to those Native American workers.

About 1,500 Native Americans were initially hired and housed on post, but more than 7,000 tribal members lived in the habitation area and worked on Camp Navajo between 1942 and 1971. In most cases, all that remains of the housing area are foundations and the infrastructure of road networks.

Planned range development was to affect Indian Village. To help mitigate impacts to this cultural resource, the Arizona ARNG implemented a multiphase, ethnographic oral history collection project.

Cultural resources management personnel collected as many oral histories from the participants as possible. Staff and historians visited Navajo and Hopi reservations in the state and met with tribal cultural preservation officers to encourage participation. The stories were captured to produce a documentary that showcases Camp Navajo's history and the camp's involvement in the Native American community.

"The ethnographic oral history project is not only an innovative mitigation method, but it also directly supports the Camp Navajo military mission by allowing this land to be converted for training," said Lt. Col. Adrian Nagel, Camp Navajo Garrison Training Center commander. "This project also illustrates Camp Navajo's superb consultation with and inclusion of Native American communities, and the cultural resources management team's outreach and education efforts."

Lt. Col. Adrian Nagel, Camp Navajo Garrison Training Center commander, and members of the Elfrieda Etsitty Tsosie Family examine documents at the Camp Navajo Reunion July 19, 2007. Photo courtesy of Suzanne Griset, SWCA Environmental Consultants

Camp Navajo's cultural resources management staff accomplished several other major program milestones, including an installationwide survey to inventory all historic property and affirming full cultural resources management compliance on the installation. The historic properties inventory identified 272 archaeological sites, 128 of which are eligible for the National Register, including the Indian Village site.

The cultural resources management program manages prehistoric, Native American and colonial archaeological resources and artifacts on Camp Navajo. Prehistoric lithic scatters are frequent on post, and tools, arrowheads, obsidian reduction areas and pottery can be found. Artifacts recovered at Camp Navajo are registered, maintained and catalogued through the Arizona ARNG's partnership with the Arizona State Museum for curation of archaeological data.

Cultural resources material, such as photographs and historical records, are documented and archived. All data taken through the Indian Village ethnographic oral history is bolstered with archival documentation. To curate these oral history materials, cultural resources management personnel are digitizing historic photographs, site maps, plat maps and other documents.

Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health Tad Davis recognized Arizona ARNG and Camp Navajo as the Army's most outstanding cultural resources management installation effort in fiscal 2008.

"Camp Navajo's government-to-government consultation with federally recognized Indian tribes is encouraging. It should be seen as a model for other installations in developing and maintaining these important relationships for the stewardship of historic properties," said Katharine Kerr, *Secretary of the Army Environmental Awards* judge and historic preservation specialist for the Advisory Council on Historic Preservation.

Acronyms and Abbreviations	
ARNG	Army National Guard

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Fort Bragg cleanup returns needed acres to real estate inventory

by Jennifer Gaskill

With $2 billion in new construction scheduled over the next three years due to the Base Realignment and Closure Act and other expansion initiatives, developable land is in high demand at Fort Bragg, N.C. The widespread presence of the endangered red-cockaded woodpecker in the woods surrounding Fort Bragg, means the installation must reuse existing developed land.

The prevalence of previous environmental contamination on portions of the installation also presents challenges. Fort Bragg must rely heavily on its Installation Restoration Program to efficiently and effectively restore these contaminated areas for mission-critical construction.

"Fort Bragg's decade-old IRP continues to rise to the challenge of increasing external pressures with the successful removal of 1,100 noncompliant underground storage tanks, 50 of which were removed in the last two years alone," said Steven Harris, IRP manager. "Additional remediation included 93 of the installation's 104 identified solid waste management units. These are only a few of the environmental restoration efforts that have returned 675 acres of developable real estate to Fort Bragg's inventory."

One major milestone in the program's restoration efforts was the removal of 15 drying beds at Fort Bragg's wastewater treatment plant. The beds had been used by the plant to dry and reduce sludge. They remained until a Resource Conservation and Recovery Act Facility Investigation recommended their removal.

During 2007, more than 17,000 cubic yards of sludge and contaminated soil were removed — equivalent to roughly 1,500 standard dump truck loads. The removal of the material and a subsequent no-further-action decision from the state allowed Fort Bragg to restore an additional three acres of developable land to its inventory.

Acronyms and Abbreviations	
BRAC	Base Realignment and Closure Act
GIS	geographic information system
IRP	Installation Restoration Program

A Fort Bragg IRP staff member consults with North Carolina Department of Environment and Natural Resources personnel at an IRP site. U.S. Army photo

Another 24 acres was reclaimed from two former landfill sites within Fort Bragg's cantonment area. In collaboration with the North Carolina Department of Environment and Natural Resources, Fort Bragg recommended that two former landfills, occupying 12 acres each, be considered for uses compatible with the types of waste buried there.

One location was selected as the site for three radar platforms to support adjacent U.S. Army communications complex. The other is being considered for a future recreational area due to its proximity to both wetlands and housing.

To meet its ambitious goals in a timely manner, Fort Bragg's IRP creatively and innovatively uses a geographic information system to substantially reduce the project review process and streamline communication and collaboration among internal project managers and the U.S. Army Corps of Engineers.

From using Fort Bragg's extensive archive of 60-year old aerial photographs to observe a former dump site in its prime period of operation, to mapping the aerial extent of environmental hazards, to developing 3-D models of plume contamination and subsurface modeling, the IRP has been a leader in the innovative development and use of GIS data. By implementing GIS, Fort Bragg has reduced the review process time on investigations by 50 percent and improved communication and collaboration among project stakeholders.

The IRP's unique achievements are crucial to military readiness, as the restored acreage will be returned to Fort Bragg's limited inventory as viable training land, suitable living quarters and critical training facilities for the impending influx of Soldiers. The benefits extend beyond the installation boundaries, as Fort Bragg's restoration goals and lessons learned are shared regionally through regular stakeholder briefings, community outreach events and local media interaction.

Deputy Assistant Secretary of the Army for the Environment, Safety and Occupational Health Tad Davis recognized Fort Bragg as having the Army's most outstanding environmental restoration effort in fiscal 2008.

"Fort Bragg demonstrates how an installation's environmental restoration program, working with other internal offices, can expedite construction projects required by BRAC," said Dennis Druck, *Secretary of the Army Environmental Awards* judge and environmental scientist with the U.S. Army Center for Health Promotion and Preventive Medicine.

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Minnesota Guard exemplifies effective natural resources protection

by Jennifer Gaskill

With more than 19 miles of river frontage, the Minnesota Army National Guard and Camp Ripley, among the largest land holders in the region, have long been prominent protectors of the mighty Mississippi and its ecosystem.

Camp Ripley enrolled 4,000 acres into the installation Army Compatible Use Buffer program and protected an additional 18,000 acres in support of the program. The camp also developed new partnerships for ACUB funding and natural resources conservation management, and secured special legislation that returns state timber revenues to Camp Ripley for its Reforestation and Forest Management program.

Development can have a detrimental effect on natural resources, contributing to loss of habitat and endangered species. By preventing incompatible development, the ACUB averts the further fragmentation of natural communities, thereby preserving habitats and sensitive species and ensuring sustainable training for the installation.

"Camp Ripley has brought conservation of scale to the local community as recognized by other local units of government partnering with Camp Ripley in ACUB and other community-based programs," stated Todd Holman, director of the Central Minnesota Office of the Nature Conservancy. "By working locally with Camp Ripley, our effectiveness as conservation organizations is enhanced."

The installation's Range and Training Land Assessments program tracks the positive impacts of NRC activities. The NRC staff uses telemetry equipment to monitor sensitive species such as timber wolves, black bears and white-tailed deer.

Radio tracking collars on wolves and bears show where populations are located during training, allowing the NRC office to mitigate for their protection. This tracking also demonstrates the positive relationship between training and habitat, proving that these populations are enhanced by the limited disturbance that training and NRC activities provide.

As part of its Integrated Natural Resources Management Plan, Camp Ripley conducts regular surveys of plants, birds and animals. In addition, with assistance from the University of Minnesota, Camp Ripley completed a wetlands demonstration project that inventoried all wetlands and set enhanced guidelines for their preservation.

Prescribed fire training and implementation is conducted with assistance from the Nature Conservancy. Prescribed fire enhances the "mission-scape" for training, improves habitat and controls invasive species. Annual prescribed fires reduce fuel loads on 10,000 acres, eradicate invasive hazelbrush and enhance habitat on 600-700 acres. Prescribed fire is also a primary tool for plant pest species management, augmented by mechanical removal and limited chemical use.

Camp Ripley completed an analysis and delineation of invasive plants last year that tested treatment techniques in partnership with St. Cloud State University. The university developed a web site that tracks the effectiveness of treatment combinations, which helps the MNARNG apply the most effective, efficient approach.

Partnerships with state and local agencies and universities have made Camp Ripley second-to-none in the region for environmental excellence and expertise. The NRC staff also conducts extensive outreach.

"For more than 23 years, the Department of Natural Resources has worked in partnership with the MNARNG. Together, we have successfully blended natural resource conservation and restoration with high quality military training. … With the addition of the ACUB program, our partnership has grown," said Mark Holsten, commissioner, Minnesota DNR. "The DNR has become enthusiastic and committed to creating a buffer around Camp Ripley that serves both a military mission and a goal of protecting significant natural areas."

Acronyms and Abbreviations	
ACUB	Army Compatible Use Buffer
DNR	Department of Natural Resources
ITAM	Integrated Training Area Management
MNARNG	Minnesota Army National Guard
NRC	natural resources conservation
RTLA	Range and Training Land Assessments

Radio-tracking collars like the one on this wolf help the Camp Ripley NRC staff track the range and habitat requirements of sensitive species populations. Photo by Julie DeJong, Minnesota DNR

Camp Ripley has an open dialogue with regulators and inspectors and has had no violations within its conservation program. The camp uses its annual timber revenues of $150,000 to $500,000 to enhance its land management program. Natural resources damage assessments are implemented through the RTLA program, and any deficiencies are corrected through the Integrated Training Area Management program. Camp Ripley's outstanding compliance record includes one closed biological opinion and zero court actions, past or present.

"Camp Ripley's approach to land management prioritizes the requirements of military training and fully integrates those requirements into the execution of training, environmental and facilities management programs," said Lee Barber, National Guard Bureau ITAM program manager. "This level of integration has enabled them to implement one of the best, ➤

Michigan Guard converts to innovative water-based painting systems

by Jennifer Gaskill

The pollution prevention innovations of the Michigan Army National Guard's Joint Forces Headquarters and its Combined Support Maintenance Shop set the standard for environmental stewardship and sustainability in Michigan.

One goal that the MIARNG Environmental Quality Control Committee achieved in the past two years was training and equipping all paint staff with a water-based paint known as chemical-agent-resistant coating. The paint and primer contain no hazardous air pollutants, such as methyl isobutyl ketone or toluene, and therefore have significantly reduced air emissions of volatile organic compounds.

Water-based CARC and primer were created to meet the Environmental Protection Agency's Clean Air Act regulations, but they also are safer for painters, easier to use and significantly reduce the hazardous waste stream volume for the painting operation.

A new technology that the CSMS introduced into its painting process was the closed-loop, advanced water-jet system used in the paint stripping bay. That system removes old paint with water instead of the more commonly used blasting material.

By converting from solvent-based to water-based painting systems and materials, and analyzing spray techniques for defense painter training programs, the MIARNG showed its commitment to maximizing Soldier training and readiness.

CSMS painter Chris Adair explains the camouflage painting process for a 34-ton semi-trailer to MIARNG Soldiers. U.S. Army photo

Workers strip the paint from about 12-15 vehicles per month, in addition to numerous other pieces of equipment of varying size. The CARC painting system can strip paint at a comparable or even faster rate than conventional stripping methods.

The CSMS made the switch from solvent-based to water-based paint on tactical vehicles because water-based CARC paint does not soak up chemical agents the way alkyd (oil) paint does. CARC also resists removal by decontaminating solutions. Moreover, from a mission perspective, the water-based CARC paint reportedly is up to three times more durable than conventional solvent-based paint.

In addition to having the right equipment and using the correct materials in the painting process, each painter is sent to the Spray Technique Analysis and Research for Defense program, a three-day training course. The program teaches effective spraying techniques to maximize coating efficiency and minimize environmental pollution.

STAR4D training is an important element for CSMS operations. When a new painter is hired, he or she is teamed with an experienced painter for mentoring. After about two months, the new painter becomes a full member of the paint shop team and is sent to STAR4D training.

The results of training studies at the STAR4D program demonstrate significant improvement in painting efficiency. A comparison of pretraining data to post-training data shows an increase in transfer efficiency of 23 percent, a decrease in material consumption of more than 15 percent and a reduction of volatile organic compound air emissions of more than 15 percent.

Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health Tad Davis recognized MIARNG as the Army's most outstanding pollution prevention effort at a nonindustrial installation in fiscal 2008.

"With a strong commitment to planning and training, the MIARNG ensures continuous improvement for their pollution-prevention efforts. By eliminating solvent-based paints and associated hazardous waste streams and improving painting processes and procedures, the MIARNG reduces harmful exposures and improves health and safety for all installation personnel," said Marlin Gottschalk, *Secretary of the Army Environmental Awards* judge.

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Acronyms and Abbreviations	
CARC	chemical-agent-resistant-coating
CSMS	Combined Support Maintenance Shop
MIARNG	Michigan Army National Guard
STAR4D	Spray Technique Analysis and Research for Defense

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if not the best, ITAM program in the Army National Guard. I continually find myself holding up their business practices as an example of how an effective ITAM program should be run."

Deputy Assistant Secretary of the Army for the Environment, Safety and Occupational Health, Tad Davis, recognized Camp Ripley for having the Army's most outstanding NRC effort at a large installation in fiscal 2008.

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N.C. Guard builds leading edge green facility

by Jennifer Gaskill

The North Carolina Army National Guard Pollution Prevention Team's efforts to make its field maintenance shop as green as possible while maintaining more than 500 pieces of equipment that come through its facility each year sets them apart in North Carolina and in the region.

The primary mission of the new shop is the maintenance and rehabilitation of rolling stock, communications and electronics equipment, and weapons systems for the NCARNG's training mission. The team also provides units with hazardous material management, recycling and compliance training programs.

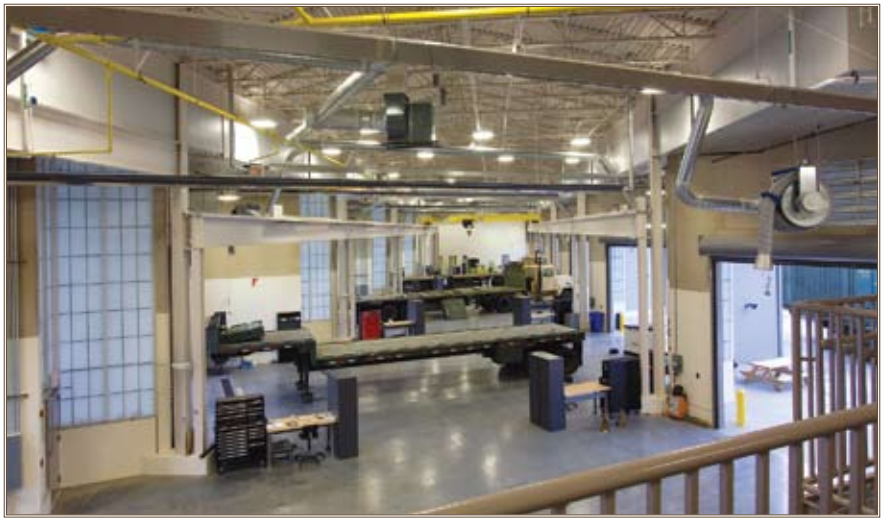
The maintenance shop was designed to meet the Sustainable Buildings Industry Council Small Commercial Buildings program standards using the council's Energy 10 software. The shop's green features include a geothermal heating and cooling system, water-reducing facilities, occupancy-sensor lighting systems and tankless water heaters.

"The P2 Team's commitment to environmental quality and stewardship has helped to cement the NCARNG's reputation as an environmental leader and good neighbor," said Sgt. 1st Class Todd Lingerfelt, facility manager.

The maintenance shop's geothermal heating and cooling system works on a closed loop system with on-site water wells, which are covered to protect them from outside contamination or impacts. Pipes on the closed loop circulate cool water from the wells through the building's exchanger to the heating and cooling system, and back through the wells.

The groundwater, at a constant 55 degrees, cools the entire building without conventional air conditioning and also provides for efficient heating. Because the system is in the ground, it does not degrade or require maintenance and will have a service life of 25 years or longer. The system is computer-controlled and monitored and operates only during working hours.

Acronyms and Abbreviations	
NCARNG	North Carolina Army National Guard
P2	pollution prevention



The NCARNG's field maintenance shop features a geothermal heating and cooling system, water-reducing facilities, occupancy-sensor lighting systems and tankless water heaters. U.S. Army photo

The geothermal system saves heating gas and electrical costs. It also reduces emissions. Annual emission estimates show reductions of more than 500 tons of carbon dioxide, six tons of sulfur dioxide and two tons of nitrogen oxide.

Another feature of the field maintenance shop green design is its occupancy sensors, which automatically control lighting systems that use T5 fluorescent energy efficient lamps. The shop's perimeter lighting uses solar indicators to minimize the time that lights need to be on.

Waterless urinals also contribute to the building's overall water conservation measures, saving about 40,000 gallons of fresh water annually. Low-flow aerators on all water spigots and shower stalls and low-flow toilets reduce water use, while tankless water heaters heat water instantaneously rather than waste energy on continuously heating an entire tank of water. These tankless heaters provide limitless hot water, reduce water evaporation, require little space, have a service life of more than 25 years and need little or no maintenance.

Because of the design and equipment of the facility, storm-water testing is no longer required for the team's shop. All storm-water runoff is controlled by sewers or caught in a contained system, and oil-water separators sound alarms if oil and storm water are mixed.

Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health Tad Davis recognized the NCARNG for having the Army's most outstanding pollution prevention team effort in fiscal 2008.

"During the last two years, the NCARNG P2 Team has successfully managed a new facility for equipment rehabilitation and servicing, achieved significant reductions in hazardous and universal wastes, developed new training and material inventory programs and adopted the 'gell-cell' battery, among other pollution prevention activities," said Rachel Dagovitz, Army Environmental Command solid waste manager. "The program is an exemplary operation with best practices that can be easily adopted at other Army facilities."

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Fort Drum's proactive archaeology efforts prevent construction delays

by Jennifer Gaskill

A long-term approach to cultural resources management and experts with three-quarters of a century of collective installation experience combined at Fort Drum, N.Y., to produce one of the most effective CRM teams in the U.S. Army.

The team's practice of predicting expansion on Fort Drum and surveying land ahead of schedule avoided archaeology-related delays to nearly $1 billion of new construction in the past two years. The approach helped the installation change its designs to avoid damage to six historically significant sites. Fort Drum is also the first Army installation to develop archaeological properties into training assets.

The CRM team is responsible for more than 240 prehistoric and 700 historic archaeological sites and six historic and archaeological districts listed on the National Register of Historic Places. During the past 15 years, the Fort Drum archaeology field team has performed more than 100,000 shovel tests, surveyed more than 40,000 acres of military land and discovered more than 200 Native American ancestral places, preserving many of them.

What distinguishes this CRM team is that it has established an environment in which it works in proactive cooperation with those responsible for Military Construction projects and range training. In spite of the installation's robust archaeological discovery program and intensive monitoring, there have been no construction delays that have occurred in the last two years, no sites known to be damaged or destroyed during construction or training, and no negative impact on military training due to archaeology.

The secrets of the team's success include early inventory, excellent relationships with the engineering program, design avoidance, site monitoring and proactive support for maximizing training opportunities. The CRM team works with project engineers to protect archaeological sites by either shrinking or redesigning proposed project footprints.

Acronyms and Abbreviations	
CRM	cultural resources management

Maj. Gen. Michael Oates, commander, 10th Mountain Division, offers a gift for the Onondaga Nation School at a recent head-of-state visit. Photo courtesy of Laurie Rush

A successful example of this method occurred when a series of cultural deposits were found along a wetland in an area that was being proposed for a borrow pit. The CRM team partnered with the wetlands manager and project engineers to design the borrow pit to preserve the entire landform. Working together, their actions protected the discovered archaeological sites and will protect any additional sites in the landform that were not found using conventional archaeological survey techniques.

Another key feature of the success of the Fort Drum CRM team is its commitment to involving stakeholders in the CRM process.

"The Fort Drum CRM team has worked hard to maintain and benefit from healthy stakeholder relationships," said Laurie Rush, Fort Drum cultural resources manager. "Fort Drum routinely consults with the St. Regis Mohawk tribe, the Oneida Indian nation and the Onondaga nation, and the CRM program is completely open to these tribes."

The CRM team provides tribes with copies of all survey information, conveys concerns that the tribes may have to the commander, organizes heads-of-state events when nation leadership visits Fort Drum and offers tribes tours to archaeological sites and field areas. Maj. Gen. Michael Oates, commander of the 10th Mountain Division, hosted a head-of-state visit from the Onondaga nation leadership that included a luncheon and tour to ancestral places on Fort Drum.

Native Americans may access these places at any time at their request. The CRM team organizes the visits and provides escort. The team has also arranged for the tribes to carry out a special deer harvest for their Winter Ceremony.

Educational partnerships have been one of the ongoing strengths of the Fort Drum CRM program. The team supports public interpretation through displays, demonstrations and participatory activities at annual installation Earth Day and Safety Day events.

The CRM team also works closely with archeologists from several universities and the New York State Museum to provide sophisticated analyses that include archeomagnetic dating, Carbon 14 dating, electron microscopy, artifact identification and evaluation of ceramics.

Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health Tad Davis recognized Fort Drum for having the Army's most outstanding cultural resources management team in fiscal 2008.

"Fort Drum continues to push the meaning of stewardship in the management of federal historic properties, clearly illustrating that the military's mission can be met while meeting the requirements of the National Historic Preservation Act and other cultural resources laws and regulations," said Katherine Kerr, *Secretary of the Army Environmental Awards* judge and historic preservation specialist for the Advisory Council on Historic Preservation.

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Hawaii's natural resource program takes Fish and Wildlife award

by Stefanie Gardin and Candace Russo

Army conservation efforts across the island of Oahu gained national exposure when the U.S. Fish and Wildlife Service presented U.S. Army Garrison Hawaii with the *2008 Military Conservation Partner Award*, the second time in the award's five-year history that the Army in Hawaii has been chosen for the honor. USAG Pohakuloa won in 2006.

The *Military Conservation Partner Award* brings to the forefront work that often happens behind the scenes, many times in remote areas like cliff faces, mountaintops and thick forests. The award recognizes the garrison's significant contributions to environmental conservation, achieved in large part through cooperation and partnership.

A USFWS release said Schofield Barracks maintained active partnerships with the USFWS, other federal and state agencies, private organizations, landowners and the University of Hawaii. Through these partnerships, the Schofield Barracks staff developed creative tools that benefit threatened and endangered species, the military and the state of Hawaii.

The Army in Hawaii manages more endangered species than any other federal agency in the state and more endangered species than any other Department of Defense installation in the United States, said Michelle Mansker, Natural Resources Section chief. The 53-person staff of the Oahu Army Natural Resource Program conserves 73 federally-listed endangered species on Oahu.

The Army's management of these species revolves around threat control. Invasive plants and animals, like goats, pigs and rats, wreak havoc on the native forests, according to Mansker.

"We are out counteracting those impacts on a daily basis — rappelling off of cliffs to collect plant species, putting in fences, getting rid of [hoofed mammals], banding birds, controlling rats …," she said. "Without this kind of work, … there's no way these species would survive long term."

Lauren Weisenberger, Oahu Army Natural Resource Program propagule management specialist, collects seeds from the endangered Chamaesyce herbstii *plant. Photo courtesy of the OANRP*

Of the 73 endangered species, 63 are plant species, the majority of which are found only on Oahu. Field crews often return to base with propagules — seeds and cuttings that can be used to grow a new plant. The OANRP horticulture staff maintains three greenhouses where propagules are nurtured into new plants, which will be returned to the wild to help bolster population numbers or stored to preserve genetic material.

By preserving genetic material, such as seeds, the OANRP has saved two endangered plants — a lobelia and a mint — from extinction. Rat and pig damage to these plants eliminated them from the wild; however, using stored seeds, both plants have been successfully reintroduced.

The OANRP also bolstered the population of the endangered loulu, Oahu's only native palm, at Makua Military Reservation. In 1999, the loulu was on the brink of extinction, with only one fruit and no seedlings found at Makua. Through OANRP's fence construction and management, which keeps pigs and goats from destroying native plants, more than 600 loulu seedlings are now growing on Makua's mountain ridges.

In addition to its extreme mountain work, the OANRP collaborates with other agencies by providing funds to partners, researchers and graduate students. These partnerships include the state of Hawaii Division of Forestry and Wildlife, the University of Hawaii, the Nature Conservancy, Lyon Arboretum, Natural Resources Conservation Service, Oahu Fire Council and private landowners.

Through such cooperative efforts, the OANRP has helped fund and pioneer new techniques for endangered plant propagation, rediscovered a rare tree snail thought to be extinct for 20 years and responded when wildfires threatened endangered plant populations.

The OANRP's outreach — educating and involving the local community through presentations and volunteer opportunities — is the remaining critical component of the program's environmental efforts.

"[We] appreciate the recognition, but more importantly, we're excited to have the chance to heighten awareness about Oahu's unique endangered species," said biologist Kapua Kawelo.

Acronyms and Abbreviations	
OANRP	Oahu Army Natural Resource Program
USAG	U.S. Army Garrison
USFWS	U.S. Fish and Wildlife Service

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Stefanie Gardin is chief, External Communications, USAG Hawaii Public Affairs; Candace Russo is an environmental outreach specialist, OANRP.

Corps mingles technologies to cut environmental impact at Camp Bondsteel

by Justin Ward

Ten years ago, abandoned wheat fields spackled the hills just outside the village of Ferizaj/Urosevac in eastern Kosovo. There, in late 1999, the U.N. sent in NATO peacekeeping forces to establish Camp Bondsteel, its forward expeditionary base for administering that disputed region of the former Yugoslavia.

The proposed idea has always been — and still is — to return the expropriated 955 acres on which Camp Bondsteel sits to the nascent Kosovo government when NATO's Kosovo Force is no longer needed. Until then, sound environmental stewardship limits the adverse ecological impact posed by the nearly 5,000 military and civilian personnel employed there.

It's no easy task. But through the ingenuity of mingling old and new technologies, the U.S. Army Corps of Engineers' Europe District has made it work.

Physically and metaphorically, Camp Bondsteel rises above the surrounding villages like a city on a hill, symbolizing to local Kosovars the ideals of the West. Like many modern military bases, this "city" — NATO's headquarters for the Kosovo Force's U.S. Army-led Multinational Task Force East — includes all the requisite conveniences of a modern metropolis, including residential areas, restaurants, commercial vendors, a big-box retailer, education centers, religious centers and perhaps the best hospital in Kosovo.

To serve these activities, the camp requires all the infrastructure modern cities do — roads, power plants, wells and water distribution lines, gas, refuse collection and sewage sludge processing. Relying on local utilities to provide, maintain and process these products and services has always been untenable, said Francis Furlong, the Corps' former director of public works in Kosovo.

"In terms of waste, water and energy, we do anything and everything on this camp to make it self-sustaining, not only because it ends up better serving the needs of our customer, but because we should," said Furlong.

Kellogg, Brown and Root contractors walk by a 50,000-gallon bladder of diesel fuel on their way to install a unique manhole system that will provide secondary containment of any spill or contamination to the area. Photos by Justin Ward

Dealing with waste

Bill Loman, the Corps' environmental officer on the camp from December 2007 to January 2009, said his favorite environmental success story at Camp Bondsteel is the compost yard.

The millennia-old technique of composting was kicked up a few notches in 2005 when Loman's predecessor negotiated with the U.S. Army Europe, Kellogg Brown and Root, and the German firm Comp-Any GmbH to set up a "mobile aerated static heap" composting system at Camp Bondsteel. The system, he said, reduces manpower, accelerates the natural composting process, limits odors and reduces the effect of extreme weather.

"What's surprising is how high-tech this is," said Loman, who oversees this performance work area. "And it's also simple."

Previously, solid waste collected from the camp was incinerated on the site using one gallon of diesel fuel for each cubic meter of waste. The residual waste and ash was transported to an off-site landfill. Sewage sludge and food waste also had to be transported off site for disposal.

Today, after a six-week curing process combining chipped wood, paper, cardboard, yard trimmings and all sewage sludge and food waste generated on the camp, the installation produces cheap, clean mulch that is ready to be used as a base for new landscaping or to aid with erosion control.

"I can't say enough about how much better this system is for the environment than the previous one," said Loman. "That's probably why it's my favorite. … I hope we're starting a waste management trend."

Dealing with water

Another "wasteful" endeavor for Loman was solving the camp's nagging water leakage problem. For months, camp personnel complained of low water pressure. Experts examining the "lost water" phenomenon thought the camp's aquifer was being depleted beyond its means, signaling long-term consequences for the camp's mission.

The camp was losing more than 3,600 gallons of water an hour, said Loman. That's enough water to fill an Olympic-sized swimming pool every week. ➤

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"The water just went away into the environment," said Furlong. "And until Bill Loman stepped in to deal with the issue, it seemed nothing was going to happen."

The perpetrator turned out to be a variety of pipe breaks and connection failures throughout the water main supply network. By systematically isolating sections of the network and fixing underground leaks as they were discovered, Loman was able to reduce the loss to only 700 gallons per hour, Furlong said.

"His unflagging insistence that the water distribution network was the problem infuriated many but eventually forced all parties to deal with the problem," Furlong said of Loman. "He has successively and successfully eliminated that leakage problem and very shortly will be reducing it even further, down to next to nothing."

A second water conservation issue Loman has tackled is the laundry water recycling center, which is expected to be complete this spring.

"There are 3,000 people at Camp Bondsteel at any given time," said Loman. "And everybody's laundry comes here. That's a lot of water used to clean those clothes."

The system to be constructed would take the collected wastewater used after each laundry cycle and pass it through a series of nanofiltration membrane pods that remove up to 99 percent of dissolved solids. The water is then moved to a processed water tank where potable make-up water is added for the next laundry cycle, said Loman.

"This is leading edge technology in water treatment," Loman said. "We're expecting about 80 percent recovery on a daily basis. That's a lot of saved water, energy and money."

Dealing with energy

Reliance on the Kosovo Electric Cooperative would tax the fledgling public utility beyond its capacity, said Furlong. Thankfully, the camp has fashioned a way to be self-reliant, depending only on benzene-fired, heavy-duty, diesel load share generators for electric power.

To power those generators, Camp Bondsteel houses Europe's largest bulk fuel storage and distribution "bag farm," where 750,000 gallons of aviation and diesel fuels are stored in 50,000-gallon bladders. Maintaining that farm has been the Corps' mission.

"It's a permanently temporary solution," quipped Loman, which powers generators that supply electricity to the camp. "It's actually pretty state of the art, and not just for this area of the world."

The bags are all separated and surrounded by plastic-lined clay berms, which form pits to contain the area in case of a spill. When the bag farm underwent a long overdue rehabilitation recently, engineers recognized a design flaw that could have impeded the drainage system and resulted in a hazardous spill.

"It would have compromised secondary containment," said Loman. "So we had to think of a way to contain the drainage system in case of contamination."

Ultimately, engineers decided on a manhole system that called for a 12-foot-long six-inch pipe to pass through each berm. These pipes, each with its own shut-off valve, would drain the potentially contaminated runoff into a separate sump area. From there, it would run through an oil-water separator where the water runoff would be cleared to enter the environment.

"Putting in the manholes allows us to release the water in the pits evenly to the oil-water separator and not contaminate the other pits," said Sgt. 1st Class Mark Maness, Class III (Bulk) noncommissioned officer in charge. It is a lot better now that we can contain the contamination and not allow it to run into the groundwater and possible well contamination in the surrounding towns."

Although these waste and energy programs primarily serve the task force by saving water, money and energy, together they also decrease the camp's environmental impact on the region.

"We are better able to leave this camp — whether intact or dismantled — in the hands of the Kosovars thanks to the environmental stewardship we've been able to provide to the task force," said Furlong.

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The millennia-old technique of composting was kicked up a few notches at Camp Bondsteel when the U.S. Army Corps of Engineers' Europe District set up a high-tech system that combined dry materials like cardboard with the sewage sludge and food waste generated on the camp to produce cheap, clean mulch.

Fort Bragg barracks receives pioneering force protection retrofit

by Erin Barstow

An innovative technology being used on Warriors in Transition barracks at Fort Bragg, N.C., stands to revolutionize force protection for the installation.

In August 2008, work began on the former Old Nurses' Quarters to renovate the concrete-reinforced structure into a handicapped-accessible barracks for Soldiers recuperating from injuries sustained during duty. The building is being retrofitted with an innovative fiber-reinforced polymer product designed to strengthen the structure against earthquakes, terrorist attacks and other potential structural damage.

The new technology complies with Department of Defense design specifications UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*, and UFC 4-023-03, *Design of Buildings to Resist Progressive Collapse*, for facilities taller than two stories.

FRP is a very durable, lightweight composite material constructed from fiberglass or carbon fiber for the purpose of repairing and reinforcing concrete, masonry, wood and steel structures. The material, which resembles wallpaper, is flexible, versatile and easily adheres to most surfaces and shapes — including walls, beams, columns, slabs, steel girders, pipes and utility tunnels. FRP requires no special equipment to apply and, at only one-twentieth of an inch thick, can fit in tight or difficult-to-access areas or around columns without adding bulk.

FRP is also leak-proof, corrosion-resistant and able to withstand the same temperature variance as conventional construction materials. When it comes to strength, however, the material is matchless. Nearly three times stronger than steel, a five-inch wide strip of carbon fiber FRP is designed to withstand 75,000 pounds of tensile force, comparable to a five-eighths-inch diameter piece of rebar.

Acronyms and Abbreviations	
DoD	Department of Defense
FRP	fiber-reinforced polymer

FRP is a durable, wallpaper-like material nearly three times stronger than steel that fits easily around columns without adding bulk. Photo by Nathaniel Hermann

Retrofits on the Warriors in Transition barracks are being performed by QuakeWrap Inc.

In standard construction, a floor is designed to bear pressures pushing down on its surface, called *gravity loads*, but is extremely vulnerable to an upward exertion of force, such as those typical with blasts, said Mo Ehsani, founder of QuakeWrap.

"That was not a consideration in the original design, so most existing buildings do not have proper steel reinforcement in the right locations to take that type of upward pressure," Ehsani said. "It's just something nobody at the time these buildings were being designed had given any consideration."

To upgrade the structure to meet the new standards, FRP is being applied to the slab surface and underside of each of the barracks' three floors and attic. It is also being applied to the building's columns to improve their structural integrity in tension as well as compression.

While the material is designed to fortify a building in the event of a natural disaster or terrorist attack, Ehsani stressed that the ultimate goal is not to prevent structural damage but to limit any localized damage incurred from causing an entire structural collapse.

"[If a building is compromised,] damage is going to occur and sometimes the building may not be usable afterwards, but the point of concern is human safety," he explained. "The attempt in all of these retrofits is to make sure that the building remains up so that people can get out safely."

While FRP retrofitting is a relatively new concept for Fort Bragg and North Carolina, the material's exceptional ability to inhibit progressive collapse is gaining widespread popularity in areas particularly prone to seismic activity or terrorist interest, such as federal buildings and courthouses, facilities in Washington, D.C., and U.S. embassies.

Because FRP retrofits do not require adjustments to a building's foundation, application is noninvasive and can typically be completed in fewer than 75 days. Thus, FRP retrofits stand to substantially reduce overall project costs and environmental impacts by circumventing the need for major demolition and reconstruction and its associated wastes. In addition, retrofits can be performed while the building is occupied, allowing operations to continue without interruption.

While the Warriors in Transition barracks are the first facility on Fort Bragg to receive FRP retrofits, the future implications of this method are many. As funding becomes available, similar retrofits may be considered for future projects, such as the Old Post District and the XVIII Airborne Corps Headquarters.

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Fort Bliss uses growth as energy security opportunity

by Valerie Hines

The Army's investment of $4.6 billion to expand the mission and operations at Fort Bliss, Texas, provides a unique opportunity to strengthen America's energy security by reducing dependence on foreign fossil fuels as the post builds excellent facilities. By balancing mission, energy security, environmental responsibility and quality of life for Soldiers, civilians and Families, Fort Bliss can be the proof-of-concept for an "installation 2020" vision.

Fort Bliss is primarily an air defense artillery testing and training installation. The post is the home of a heavy maneuver division with state-of-the-art training areas, ranges and facilities. It encompasses 1,119,700 acres — more than the state of Rhode Island — and 13.3 million square feet of buildings, making Bliss one of the largest Army posts in the country.

The growth at Fort Bliss will push its population of troops and Family members from 24,660 in 2005 to an estimated 90,418 by the end of 2012.

The installation's energy goals are designed to meet mandated energy targets from legislative and policy requirements, such as the Energy Policy Act of 2005, Executive Order 13423 and the Energy Independence and Security Act of 2007. Due to its location, Fort Bliss has abundant sunshine, wind and geothermal resources that can be tapped to complement its planned expansion and also comply with the federal goals for renewable energy.

Fort Bliss continues to pursue new and innovative ways to increase renewable energy production and reduce energy consumption through higher efficiency equipment and reduction of inefficient and wasteful processes including human behavior. A tiger team was created to help the installation attain energy security by identifying potential energy improvement projects and considering their environmental impacts.

The Fort Bliss Tiger Team consisted of subject matter experts from the Office of the Deputy Assistant Secretary of the Army for Energy and Partnerships, the Fort Bliss Directorate of Public Works, the Office of the Assistant Chief of Staff for Installation Management, the Installation Management Command, the U.S. Army Corps of Engineers, the Rand Corporation and Pacific Northwest National Laboratory.

A tiger team is addressing Fort Bliss's increasing electricity and water needs from new facilities being constructed to meet growth, like this dining facility. Photo by Donald Vincent, Fort Bliss Department of Public Works' Energy Office

What is Fort Bliss doing to improve its sustainability and secure its future?

First, the tiger team is researching ways to increase renewable energy production by looking at technologies such as solar thermal hot water, solar photovoltaic power, geothermal power, integrated municipal solid waste, and concentrated solar power and wind power. Recent studies indicate that Fort Bliss has access to renewable resources with the potential to generate significant amounts of electric power, possibly more than is required by the installation. The identified options provide more than enough capacity to generate electricity from renewable resources to meet the post's power needs and the requirement for 7.5 percent renewable energy by 2013.

Second, due to the growth, the installation's energy and water needs will dramatically increase. Electricity at the installation is supplied by El Paso Electric. The post consumed 250,000 megawatt-hours of power in fiscal year 2008 with a total electricity bill of $18 million. Fort Bliss is a summer-peaking facility, with a peak consumption of 48 megawatts in 2008.

The installation's planned growth will increase the demand for energy and water resources substantially. In addition to the new building space, 20 new ranges will add power requirements, without any additional square footage, to accommodate use of new weapon systems with high wattage plug-in requirements. These new loads are expected to demand an additional 50 megawatts per year by 2013.

Third, through the use of energy efficient equipment and devices such as advanced meters; day lighting; LED and compact florescent lighting; LED and florescent glow-in-the-dark exit lighting retrofits; programmable thermostats; heating, cooling and ventilation controls; and waterless urinals, Fort Bliss can move toward a more secure future.

Also, ensuring use of efficient practices — such as closing windows and doors during the air-conditioning season; and programming sleep mode for all printers, copiers, monitors, scanners and computers during nights, weekends and other unoccupied times — can reduce unwarranted demand.

Fourth, Fort Bliss is working to correct inefficient behaviors, such as leaving on lights, changing the set temperature on thermostats and not completely turning off water faucets. This effort is also part of the *Army Energy Security Implementation Strategy*, which states, "The desired ➤

Fort Lewis and listed species: reintroduce, recover, relocate

by Rod Gilbert, Jim Lynch and Todd Zuchowski

The Fort Lewis, Wash., Fish and Wildlife Program supports both the post's training mission and the habitats necessary for viable, self-sustaining populations of flora and fauna. The program sets overall goals for each ecosystem that address training requirements as well as the maintenance of the habitat conditions.

Fort Lewis's 86,176 acres are bordered on the north by McChord Air Force Base and suburban and commercial development; on the east and south by rural areas, forested land and several small communities; on the west by Puget Sound, the Nisqually Indian Reservation and rural areas that surround Mount Olympia.

Preserving healthy ecosystems benefits native biodiversity by retaining a mosaic of habitat types, including late-successional forest, wetlands, prairies and ecotones between habitats. This mosaic supports a large number of flora and fauna, including several rare and listed species.

The Fish and Wildlife Program supports the Army training mission through the development of management goals and strategies designed to maintain Fort Lewis's ecosystems while still providing a variety of training conditions. Projects to improve the habitat maintain viable populations of flora and fauna while working towards the recovery of listed species in the region. In addition, these projects enhance military training opportunities by opening more training areas.

Reintroducing Oregon spotted frog

Listed as state endangered and a federal candidate, the Oregon spotted frog, *Rana pretiosa*, has experienced extreme declines in recent years. As part of a regional recovery effort, led by the Washington Department of Fish and Wildlife, aimed at restoring the species throughout its range, more than 500 juvenile Oregon spotted frogs were released into a wetland at Fort Lewis believed to be capable of sustaining a stable population of this rare species.

This spring, 139 adult frogs were released, and increasing numbers of juveniles will be released each year until a successful population has been established. This project is providing the pilot information necessary to recover this species at other locations in its range.

Recovering Taylor's checkerspot

Taylor's checkerspot butterfly, *Euphydryas editha taylori*, is a species whose rapid decline in south Puget Sound from 1998 to 2000 illustrated an acute need for a proactive approach to recovery. There are only six populations left: four in Washington and two in Oregon. Of the four, three are limited to 150 individuals each. The only occupied site remaining in south Puget Sound is on Fort Lewis.

Rearing in captivity – A captive rearing program, established at the Oregon Zoo in Portland, made tremendous progress in developing captive rearing protocols, which has led to large numbers of Taylor's checkerspot caterpillars returned to the field in an effort to re-establish wild populations.

Taylor's checkerspot
Photo courtesy of Rod Gilbert

Over the past three years, the Washington Department of Fish and Wildlife has released more than 1,200 checkerspots at various life stages from egg to pupa. This project released 2,200 larvae this spring. They will be distributed across six release areas on three separate sites both on and off Fort Lewis. ➤

Fort Lewis listed species:

- Taylor's checkerspot
- Oregon spotted frog
- Mardon skipper
- Mazama pocket gopher
- Western gray squirrel
- Bald eagle – delisted but still monitored and protected
- Streaked horned lark
- Chinook salmon
- Steelhead
- Bulltrout
- Water howellia – federally listed plant

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end state is that all Army facilities and staff will gain a better understanding of how to help eliminate energy waste though education and training and that enhanced awareness will enhance conservation efforts and installation level programs."

The Army's goal is to create a culture where all personnel have a stake in responsible, efficient use of energy and water resources, adding to the nation's security. Fort Bliss is moving toward greater energy security by increasing efficiency, seeking alternative sources and creating a culture of energy accountability while sustaining or enhancing operational capabilities.

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IMCOM Europe defines 'What is Success' for cleanup project

by Mary Kay Foley and Uwe Dannwolf

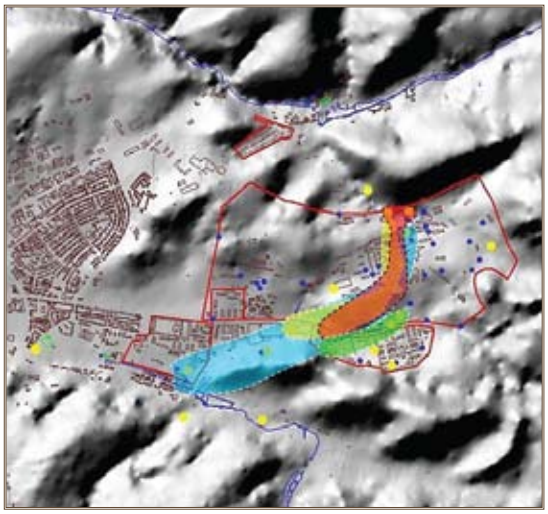
The challenge with any cleanup site is to make the best use of scarce remediation funds. Installation Management Command, Europe Region's goal for its cleanup projects is to choose an endpoint that is protective of the environment but does not reach the point of diminishing returns beyond which funds are spent without significant improvement to public or ecological health.

To accomplish this objective, IMCOM Europe formed a technical team with U.S. Army Garrison Kaiserslautern, Germany, and the U.S. Army Claims Service to create a "What is Success" strategy. By beginning with the end in mind, the Army will support mission, save money and maintain a good working relationship with the host nation.

Acronyms and Abbreviations	
BCR	benefit/cost ratio
CHC	chlorinated hydrocarbons
HN	host nation
IMCOM	Installation Management Command
ISCO	in-situ chemical oxidation

The What Is Success matrix helped define cleanup goals for a complex cleanup site at the Kaiserslautern Army Depot. The contaminated site contains at least 10 plumes of chlorinated hydrocarbons underlaid with fractured porous bedrock.

German regulators were concerned about this site because small amounts of CHCs, below drinking water standards, were found in nearby public drinking water wells. So great was the host nation's concern that German officials wrote to U.S. congressmen, resulting in congressional language directing the Army to continue working with the HN toward site cleanup. The partnership with the HN led to a historical review, creation of a groundwater model and development of a joint remediation strategy.



This map shows multiple groundwater plumes at Kaiserslautern Army Depot. Graphic by Uwe Dannwolf

Groundwater modeling indicated the contamination plumes were essentially stagnant and not expected to further impact the drinking water wells. The model showed that contamination is unlikely to exceed drinking water ➤

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Restoring the habitat – The Nature Conservancy and Fort Lewis Fish and Wildlife are enhancing habitat for the rare prairie butterfly at several sites on and off post. They are controlling invasive plants while increasing both larval and nectar plants through direct seeding and planting nursery-grown seedlings on select parcels of seminative prairie.

Although butterfly habitat enhancement activities are designed to provide specific benefits to target butterfly species, most prairie fauna are expected to benefit from restoration activities that reduce nonnative plants while increasing natives and restoring historical prairie structural components to the vegetative community.

Relocating Western bluebird

Fort Lewis's bird box and tree cavity creation program was initiated more than 30 years ago and remains a core duty of the Fish and Wildlife Program. The installation now has an abundant population of more than 200 nesting pairs of the Western bluebird, *Sialia mexicana*, which speaks to the success of the program.

Fort Lewis has partnered with the American Bird Conservancy and the Ecostudies Institute to relocate western bluebirds to habitats where they historically occurred but are presently absent. Two years ago, 18 nesting pairs were moved from Fort Lewis to San Juan Island in an effort to establish a new population there. At last report, 25 young fledged on San Juan Island at the end of the last season.

Partnership works

Through the efforts of a strong Fish and Wildlife Program and many cooperative partnerships inside and outside the installation, federal- and state-listed species have been maintained at a sustainable level. This accomplishment has provided benefits to the surrounding community, the environment and the mission of Fort Lewis.

Partnerships have included: the Washington Department of Fish and Wildlife, Wolf Haven, the Northwest Zoo and Aquarium Alliance, the Nature Conservancy and Evergreen State College. The approach taken in all of these projects is one of relocation, restoration and preservation of the lands on which the creatures have historically lived and thrived.

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standards during the next 70 years. These results are supported by the fact that samples taken at the wells since the 1990s have not shown CHC levels above drinking water standards.

As part of the groundwater modeling, a number of different cleanup scenarios for the 10 source areas were compiled to model the results of different remedial schemes. Several pilot projects were conducted to test cleanup technologies, including pump-and-treat and bioremediation, but these methods were not successful due to the complex site conditions. After a thorough feasibility study, technology review, project contingency and management analysis, the technical team recommended an innovative treatment technology — in-situ chemical oxidation.

The HN regulators did not initially favor this technology because it included injecting additives into groundwater. However, the HN agreed to try the ISCO technology due to the successful partnership established with the U.S. Army and because other remediation methods that did not involve additives had failed. However, the HN stipulated that the Army must show hydraulic control of the test field site prior to injecting additives.

A pilot study of ISCO at one of the 10 plumes is in progress. If the pilot test shows this method is technically unfeasible, then other risk mitigation strategies, such as wellhead treatment at the public water supply wells, will be considered due to lack of other suitable remedial options.

The drinking water standard has never been exceeded at the public water supply wells, and the groundwater model showed that it is unlikely there will be legally acknowledgeable impact to the drinking water wells in the future. This situation makes setting a goal for remediation difficult. Since the drinking water is unlikely to be severely impacted, the question becomes: Why remediate at all?

Under German law, the groundwater itself is considered public property, which may be used as a future water supply. Therefore, any contamination in groundwater must be remediated unless it can be shown it is not necessary, technically feasible or reasonable. If the pilot test shows a technical feasibility, the question then becomes: What cleanup levels are reasonable for this site?

This question must be answered through HN collaboration, which will be based on the pilot test outcome, coupled with the technical feasibility and effectiveness of the ISCO technology. The technical team believes that cleanup is unlikely to reach drinking water standards at the source zone due to the complex hydrogeological conditions but that significant reductions in concentrations are possible.

Remediation costs largely depend on defining the pilot test endpoint in combination with the overall site remediation goal. The technical team must balance the cost to comply with German law and the wise use of remediation funds.

The technical team decided to define What is Success with two questions:

1. What is achieved with a "monitor-only" scenario?
2. What metrics monitor success?

The monitor-only scenario sets a baseline to compare against the cost of active scenarios for development of an optimal use of cleanup funds. This scenario is the absolute minimum necessary to comply with German law and Army policy, maintain mission capability and maintain good relations with the HN.

To answer question 1, data will be collected on the consequences of not remediating the site with regard to the impacts to the mission, the environment, public health, the relationship with HN authorities and the wider public. The technical team will complete a benefit/cost ratio to quantify the monitor-only scenario.

To answer question 2, the technical team developed quantifiable success metrics for the ISCO pilot test. In-field measurements of the selected parameters will be conducted throughout the pilot test, and the initial metrics will be refined iteratively with the stakeholders. Upon pilot test completion, the cleanup scenarios compiled during groundwater modeling will be recalculated using the test results.

The BCR for the monitor-only scenario will be compared with the BCR for a variety of active cleanup scenarios. The technical team will then collaborate with the HN to determine which scenario will achieve the necessary, technically feasible and reasonable definition of success in accordance with HN laws and make the best use of U.S. Army cleanup funds.

IMCOM Europe envisions the What is Success strategy as a precedent for other challenging remediation sites in the U.S. Army Europe theater.

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Fort Benning tests cobra-head induction street lamps

by Tony Westbrook, Vernon Duck and Don Yochum

Fort Benning, Ga., continues to embrace sustainable technology in the quest to reduce energy consumption per Executive Order 13423, *Strengthening Federal Environmental, Energy and Transportation Management*. One project involves the use of cobra-head induction street lamps coated with titanium dioxide.

Induction lighting

The Directorate of Public Works is testing new induction street lamps designed to last longer and use less energy. Induction lamps are considered green for two reasons: they have a long productive life as compared to incandescent bulbs, meaning fewer resources are used to maintain them and less waste is generated over time; and they are up to four times as energy efficient as standard street lighting systems. In addition, these lamps produce a good quality light that reduces the need for additional lamps.

Lighting induction lamps are high frequency light sources, which follow the same basic principles of converting electrical power into visible radiation as conventional fluorescent lamps. The life of induction lamps on the market today reaches 100,000 hours. This factor makes it beneficial to use such lamps in applications where lamp maintenance is expensive. They also are capable of producing a wide range of color temperatures, and they maintain lumen (light) output over their life.

Titanium dioxide

In addition to the energy savings achieved by using induction lamps versus the traditional high pressure sodium lights, Fort Benning is also attempting a photoremediation energy conservation measure by quantifying the positive effects created by activated titanium dioxide on surfaces exposed to sunlight or fluorescent light.

Acronyms and Abbreviations	
ECM	energy conservation measure
UV	ultraviolet light

Cobra-head induction street lamps stand ready to light the way at the Fort Benning propane plant. Photo by Tony Westbrook

Fort Benning has 15 cobra-head induction street lamps coated with titanium dioxide.

Titanium dioxide, or TiO2, technically classified as a semiconductor, provides some very interesting behaviors when exposed to ultraviolet light. Its composition is sensitive to the UV spectrum. In its basic composition, it blocks or absorbs UV. It is the staple compound in common products such as toothpaste, makeup, paint and sunscreen.

Certain forms of titanium dioxide go through a process that produces an additional interesting characteristic applicable for energy and environmental activities. This process is called photocatalysis and is seen in applications such as self-cleaning windows, self-cleaning masonry, air deodorization and environmental remediation.

Properly applied to a surface, this product provides a reduction in operation and maintenance activities due to its self-cleaning features. Also impacted in this photocatalysis are airborne chemicals. Nitrogen oxides, sulfur oxides and volatile organic compounds are all degraded in a photocatalytic reaction.

Titanium dioxide's effects in remediating air pollution were successfully demonstrated in a three-year European Union study titled *Photocatalytic Innovation Coverings Applications for Depollution Assessment*. Interestingly, this study was nearly devoid of any identification of the incremental energy savings through the use of this product.

Japan has also actively studied the product for decades and has published on its photoremediation and bacteriostatic properties. Additional research in the automotive industry is investigating titanium dioxide as a semiconductor to create a paint that generates electricity and reduces its carbon footprint.

With approval from Environmental Protection Agency Region 4, the participants in the Fort Benning ECM are seeking to quantify the end effect of photocatalysis on common air pollutants for purposes of securing remediation and energy credits from state and federal agencies. The installation has been working with Trane, LitePak and the University of Central Florida on this project to quantify the energy, environmental and operations-and-maintenance benefits.

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Corps builds LEED strong at Fort Huachuca

by Daniel J. Calderón

On Fort Huachuca, Ariz., employees and contractors of the U.S. Army Corps of Engineers' Los Angeles District are designing and building to green standards that will benefit Soldiers, the community and the environment for generations to come.

"As an environmental engineer, I understand the value of making the best use of available tools and resources," said Col. Thomas H. Magness, Los Angeles District commander. "I believe we can build high-quality buildings and infrastructure using methods and materials that are good for our Soldiers, good for our country and good for our planet."

There are several projects underway on Fort Huachuca designed to Leadership in Energy and Environmental Design standards. According to the U.S. Green Building Council, "LEED is a third-party certification program and the nationally accepted benchmark for the design, construction and operation of high performance green buildings."

"It's important that we design and build using sustainability principles," said Mike Brown, resident engineer at the Fort Huachuca Resident Office. "It's important we only use what we can replace. Things like fossil fuels — we can't replace that. They will soon be all used up."

Among the more than a dozen construction projects currently underway is the Advanced Individual Training complex. The complex combines four projects, with four separate contractors, in one area. It includes the AIT barracks complex, battalion headquarters, dining facility and parade ground.

Brown manages the logistics of the separate projects. Each project incorporates various elements of sustainable engineering into its design and construction.

Acronyms and Abbreviations	
AIT	advanced individual training
FSC	Forestry Stewardship Council
LEED	Leadership in Energy and Environmental Design

Contractors at a barracks under construction on Fort Huachuca inspect what will be a wall built using wood from suppliers certified by the Forestry Stewardship Council or who follow similar practices. Photo by Daniel J. Calderón

Among the sustainable aspects is the use of wood in the frames of the new AIT barracks from suppliers who are certified by the Forestry Stewardship Council or who follow similar practices. The FSC is an international organization that works toward sustainable forestry worldwide. The council coordinates the development of forest management standards throughout the United States and works with certification organizations to promote certification.

"The FSC certification is based on sustainable growth of the trees used in projects," said Jandak. "It limits clear-cutting of forests and helps control growth and harvesting of wood."

The district is applying LEED principles and sustainable practices to each of its projects. Contractors are responding by employing LEED-accredited project managers.

"We're awarding contracts where contractors need to provide LEED checklists," said Brown. "The Army has bought in to the idea that we need to be sustainable."

Another project is the effluent treatment facility. The facility will treat wastewater so that it is nearly potable. The treated water is not suitable for drinking; however, it can be used to maintain the post's greenery.

The project benefits nearby Huachuca City, too. Currently, the city has no wastewater infrastructure other than effluent ponds in which the water evaporates naturally. During the rainy season, the ponds can overflow, allowing effluent to run through common areas. The city has nearly completed a pipeline that will carry the effluent to the post where it can be treated.

"The post does such a good job conserving water that they don't have enough effluent to do the recharge and reuse," said Brown. "Fort Huachuca needs the water. The treatment facility will be able to treat two to three million gallons of water per day."

Because the post has implemented water-savings practices over the last decade, its ability to recharge and reuse water has been degraded. Now, it is under orders to balance its use and recharge ability. The flow from Huachuca City will come into an underground basin and be treated by the new facility. The reclaimed water will be used for sprinkler systems for the parade field at the AIT complex, the golf course and the recharge ponds in the local area.

"Everyone wins in this deal," said Brown.

In addition to the AIT complex and the effluent treatment facility, the Corps is working with the post to build projects to provide sustainable electricity on post. These projects represent a paradigm shift across the Corps' building spectrum.

"In the Corps, our motto is 'Building Strong,' " said Magness. "I want that to mean we are building something to last, something that will give back to the environment just as much as, if not more than, it took to construct it. I think we have to build with a vision of how our proj- ➤

Fort Carson recycles 93 percent of building's deconstruction waste

by Susan C. Galentine

One brick wall and wood beam at a time, building deconstruction is gaining ground as an attractive alternative to traditional demolition of buildings past their prime. Deconstruction provides Fort Carson, Colo., with large-scale recycling opportunities to reuse valuable building materials, supporting installation sustainability efforts to reduce the amount of waste going to landfills.

A recent example of deconstruction success is Building 6220, part of the World War II-era Old Hospital Complex. Ninety-three percent of the building materials — including cinder blocks, cement, steel, wood and fixtures — was dismantled and accepted by local vendors and recyclers.

Deconstruction of the building, completed in February, yielded more than 600 tons of reusable materials, said Dave Martin, a Directorate of Public Works environmental protection specialist who provided technical expertise on the project. Only 7 percent, or 45 tons, of the materials was deemed not recoverable and disposed of at a landfill.

The recovered wood waste went to a local company that shreds wood for use as mulch. The building's concrete filler and cinder blocks will be reused locally as concrete material on other projects.

Traditional demolition — or "smash-and-haul" — brings with it a host of costs, including landfill disposal, truck fuel and tipping fees. In addition, any building materials containing lead and asbestos increase the cost of both deconstruction and demolition due to cleanup and disposal requirements for regulated waste. For example, the exterior paint from Building 6220 as well as that in some interior areas contained lead and asbestos which required cleanup before the building materials could be shipped off site to vendors.

Fort Carson's Old Hospital Complex facilities, constructed during World War II, provide an opportunity to recover valuable materials through deconstruction. Photo by Susan C. Galentine

Martin calculated Building 6220's deconstruction cost at $13,750, yielding an estimated 10 percent savings over standard demolition and landfill disposal. From a long-term perspective, putting waste materials in landfills adds decades of uncalculated monitoring costs to ensure water leaching from the disposal site does not contaminate groundwater.

Through this experience, a cost comparison is now available for the remaining seven Old Hospital Complex buildings slated for deconstruction in the next five years.

Fort Carson initially conducted pilot deconstruction efforts in 2004 on three buildings. The main materials recovered from Building 6286 at the time included high-value wood from beams, flooring and trusses. Other recovered materials included reusable fluorescent light fixtures, ceiling tiles, windows, lighting and plumbing fixtures, scrap metal and more than 500 glass window blocks.

Deconstruction of two primarily wooden structures, Buildings 227 and 226, yielded about an 80 percent diversion rate. At the end of the three-building pilot project, a total of 280 tons of material had been diverted from the landfill.

The Directorate of Family and Morale, Welfare and Recreation opted to deconstruct the Cheyenne Shadows Golf Course Clubhouse, Building 7800, to build a new, more sustainable clubhouse in 2005. According to the contractor, the effort yielded an 88 percent diversion rate for concrete and 85 percent for nonconcrete materials, including lumber, metal, windows, wiring, lighting, ceiling tiles and mechanical equipment.

The market for used building materials is more robust now than when the initial three buildings were deconstructed in 2004. The primary building material of the Old Hospital Complex structures — cinder block — is accepted by vendors for reuse and creates a greater waste-diversion rate for Fort Carson, which helps the post to achieve its goal of zero solid waste generated on the installation.

"At Fort Carson, we strongly believe in sustainable practices and doing the right thing for our environment and the Colorado Springs community," said Carlos Rivero-deAguilar, Environmental Division chief. "Deconstruction projects not only allow us to meet Department of the Army solid waste diversion, recycling and sustainability goals but also support the local economy with the right types of projects."

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ects will affect the environment. After all, this planet we share is the only one we've got."

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Fort Polk fights mold to improve Soldiers' quality of life

by Tammy G. Veillon

Over the last decade, indoor mold growth has become a rising concern in both the civilian and military communities. Regulatory guidance on indoor air quality has been limited to maintaining the safety and health of the worker, since each individual's susceptibility to mold is different. Currently no Department of the Army entity exists that has been assigned the task of monitoring IAQ conditions on Army posts.

In March 2007, through a garrison commander initiative, the Joint Readiness Training Center and Fort Polk (La.) IAQ Program was established. The program's objectives are to develop a standardized protocol to assess the IAQ conditions within a facility and to provide feasible recommendations for engineering or operational controls to improve the IAQ.

Development of the protocol for IAQ assessment included all major areas that have the potential to significantly impact IAQ — the heating, ventilation and air conditioning system; the building envelope; existing microbial growth; and occupant contributions. The protocols were developed by the IAQ team, consisting of environmental professionals.

The IAQ program was introduced to the garrison command at the fourth quarter 2007 Environmental Quality Control Committee, and the IAQ team's mission and positive effects on the Soldiers' quality of life were emphasized. During initial efforts to promote the program, the team —

- responded to historical service orders requesting mold assessments;
- developed and disseminated flyers to inform Soldiers about concerns related to mold growth;
- presented briefings to facility managers; and
- forwarded information about the program through the Directorate of Pubic Works and the garrison command to the major support commands.

In September 2008, concerns related to cleaning large areas of mold growth lead to the creation of a new facet of the IAQ team, certified mold remediators. The remediation team responds to calls about medium to large areas of mold growth that have exceeded the recommended microbial threshold due to improper HVAC operation, occupant contributions or facility management.

Mold growth on a bathroom ceiling is due to inoperable exhaust fans and inadequate dehumidification. Photo courtesy of Directorate of Public Works, Fort Polk

Occupied barracks rooms containing large areas of mold growth or high-risk occupants are subjected to expedited occupant relocation to allow for cleaning without the potential for damage to the personal belongings of the Soldier. These requests are forwarded through the garrison command to the major support commands. Creation of the remediation team decreased the burden on the unit commanders by decreasing time spent away from accomplishing the mission.

The IAQ team recognized the need to provide Soldiers with the tools and information required to clean small areas of mold growth, i.e., less than10 square feet. As a result, the Mold Buster Kit was created. This kit, available at Unit Self Help, provides all items necessary to clean small areas affected by mold growth while minimizing exposure, including personal protective equipment.

Due to the large percentage of deployed Soldiers on JRTC and Fort Polk, the IAQ team developed the Walk-Thru Assessment Program to identify rooms with significant IAQ concerns before the rooms are issued to Soldiers. The IAQ team performs semiannual assessments on each barracks room, excluding facilities under renovation.

Acronyms and Abbreviations	
HVAC	heating, ventilation and air conditioning
IAQ	indoor air quality
JRTC	Joint Readiness Training Center

The total in fiscal year 2009 will be 4,096 walk-throughs.

During assessments, some Soldiers have voiced health concerns related to mold exposure. Any Soldier who expresses such worries, is exhibiting symptoms or may otherwise present a health concern is referred to the Department of Preventive Medicine for evaluation.

The newest facet of the IAQ program is the Mold Prevention Program. The goal of the Mold Prevention Program is the make each Soldier, civilian, contractor, spouse and child aware of the concerns presented by mold and how IAQ is affected by the actions of each person.

Members of the IAQ team developed an outreach program that included additional flyers addressing mold treatment and prevention techniques, an IAQ Self Checklist and general information about mold. The team has also participated in discussions on IAQ with youth at the North Fort Polk Elementary School and has scheduled an IAQ event with the Youth Activity Center for the summer.

Soldiers and civilians also receive briefings about the IAQ program during various training courses. Commanders may also request more individualized training on mold prevention techniques for their respective units. ➤

Fort Riley uses prescribed fire for more than ecosystem management

by Mark Neely

A match is lit, and a quick puff of black smoke rises up from the drip torch. The wildland fire managers of Fort Riley, Kan., are set to begin one of many prescribed burns scheduled for the year.

Prescribed fire in the Flint Hills of Kansas is common from mid to late spring. Ranchers frequently burn their pastures to invigorate the grasses and forbs that are a critical part of their livelihood. The Fort Riley Directorate of Public Works takes to the field to accomplish the same goal but for a variety of additional reasons.

Fire has played an important role in the development and maintenance of the tallgrass prairie of Kansas. Prehistorically, Native Americans intentionally lit fires to attract grazing animals and to occasionally herd them as a hunting advantage. Lightning strikes during spring and summer thunderstorms also caused wildfires that may have burned thousands of acres at a time.

These occasional fires served to keep woodlands confined mostly to gallery-type forests that lined rivers and streams. Removal of previous years' growth also provided attractive forage for large grazing animals that were critical to the survival of Native Americans.

At Fort Riley, prescribed fire planning begins in midsummer when priorities for burning are identified. Most of these plans serve to accomplish a primary goal of the installation's *Integrated Natural Resources Management Plan*. This specific goal states that all prairie areas on post are to be burned at least two years out of every five. This schedule serves a dual purpose — to reduce the likelihood of a wildfire and to maintain the vigor of Fort Riley's training platform, the tallgrass prairie.

A wild land fire manager uses a drip torch to start a prescribed fire at Fort Riley. Photo courtesy of Fort Riley.

In recent years, burn requests have increased, reaching beyond maintenance of the prairie to include support of mission-critical elements, such as preconstruction activities, blackening of known firing points, and archeological and unexploded ordnance surveys.

Proper timing is often the most critical element in achieving the desired outcome. The timing can be affected by weather, fuel conditions and the availability of each training area. In addition, smoke management has become a critical element to minimize air quality issues with neighbors.

The first and foremost concern is troop safety. Military training activities can and do cause wildfires, and, if sufficient fuel exists, those wildfires can endanger troops and equipment. Prescribed burning removes excess fuel that effectively decreases the frequency and intensity of wildfires.

The highest priority burns are those that produce a firebreak effect. Most important is the annual burning of medians that effectively split Fort Riley's training areas into quadrants. This provides a secondary containment measures for burn crews and provides adequate protection from spot fires jumping over the roadway.

Annual prescribed burning plays an increasingly important part in providing a safe, sustainable training platform. The community of plant species that adapted to prolonged droughts, occasional wildfires and intensive grazing by enormous herds of bison also provides a sustainable training platform for heavy mechanized training. Even as training missions change, the prescribed fire mission will continue to play an important role at Fort Riley.

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Mark Neely is an installation wild land fire management specialist, Directorate of Public Works, Fort Riley.

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The recent development of the IAQ Assessment Checklist rounds off the Mold Prevention Program. The checklist provides a brief but concise report to the occupant and his or her command of the assessment results as well as any action that has been taken or needs to be taken to alleviate the mold concern.

Additional projects that will positively affect barracks' IAQ are in progress. These projects include: anti-microbial coatings and devices to inhibit the growth of surface molds while Soldiers are out of the room for extended periods; the redesign of storm-water runoff to direct water away from barracks and minimize erosion; and HVAC upgrades that will provide Soldiers control of the room temperature and increased dehumidification.

These projects demonstrate a multi-disciplinary approach to evaluating IAQ that will improve the quality of life of the U.S. Army Soldier.

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Tammy G. Veillon is the IAQ program manager, Fort Polk Directorate of Public Works.

Camp Bullis conservation efforts help species thrive

by Lucas Cooksey

Now, more than ever, human encroachment is increasing around Camp Bullis, Texas, and there is a greater need for military training. As growing urbanization occurs, Camp Bullis not only becomes an island of open space for the military but for all the plant and animal species that have been displaced.

Despite more than 100 years of military training, the camp continues to be one of the most ecologically diverse and significant areas for plants and animals because of military stewardship of the natural resources.

Camp Bullis is the 28,000-acre field training area of Fort Sam Houston in northern San Antonio. The camp supports more than 750,000 man-days of on-the-ground military training while at the same time implementing a natural resource conservation and management program that promotes healthy ecosystem relationships of native plants and animals.

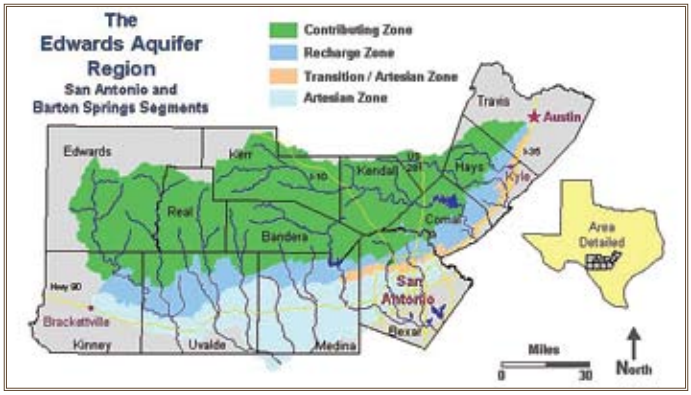
Nestled among the rugged hills of the southern Edwards Plateau, it provides realistic training for all branches of the military and, on a space-available basis, federal, state and local law enforcement agencies, and other public service groups. This training spans the gamut of Army medical training to Air Force ground combat skills and convoy training, all of which prepare deploying military personnel for real world missions in Iraq and Afghanistan.

The installation also provides local law enforcement and other agencies much needed open space. And with operational tempo expected to increase due to Base Realignment and Closure, conservation of natural resources is key.

The go-to plan for any military installation is its integrated natural resources management plan. This document is required by the Sikes Act and is an indispensible tool for resource managers to plan, conduct and evaluate natural resource management at an exceptional level.

Acronyms and Abbreviations	
INRMP	integrated natural resources management plan

One of the main focuses of the INRMP is endangered species management and conservation. The plan is further aided by a detailed endangered species management plan covering all five endangered species on Camp Bullis. The camp supports two migrant neotropical song birds, the Golden-cheeked warbler and the Black-capped vireo; three cave-adapted invertebrate species, the *Rhadine exilis* and the *Rhadine infernalis*, which are cave beetles; and one blind cave spider, *Cicurina madla*.



Groundwater recharge is a significant part of natural resource management at Camp Bullis. Graphic courtesy of Lucas Cooksey

Management for the bird species includes designation and protection of dense old growth woodland for the Golden-cheeked warbler and dense regrowth brushland for the Black-capped vireo. Within this habitat and an associated buffer, lighted nighttime activity, smoke generation or specific noise disturbances are not allowed during the breeding season, March 1 through Aug. 14. The endangered bird species populations are surveyed annually, and the warblers have shown significant increases in population.

For the karst species, Camp Bullis has a Karst Management Plan with the U.S. Fish and Wildlife Service. This plan enables efficient management of both cave biology and ground water recharge on Camp Bullis.

There are 24 caves identified as supporting populations of at least one of the three federally listed cave invertebrates. Each of these caves has its own native vegetation preserve boundary around it to support foraging areas for species of cave crickets. These crickets serve as the nutrient transport system for the cave ecosystem, which is why cave-adaptive invertebrates are able to survive in such a nutrient poor environment.

Red imported fire ant management also occurs around these and 50 other caves that contain sensitive species of concern. This nonnative, invasive ant species preys on any available food source, including the foraging cave crickets.

A specific treatment regime follows U.S. Fish and Wildlife Service protocols, using only boiling water near the cave opening to eradicate the fire ants. Through this time-consuming practice, predation on the cave crickets is reduced, helping to ensure the delicate balance required by these cave ecosystems.

Groundwater recharge is a significant part of natural resource management as well. San Antonio is the largest city to be supported by the single-source Edwards Aquifer. Ensuring clean and efficient recharge water enters the aquifer, Camp Bullis protects almost 4,000 acres of designated recharge zone and 24,000 acres of contributing zone from contaminants and erosion.

Within these 4,000 acres, there are numerous cave and karst features that serve as the transport pathway of surface water to the groundwater aquifer. Military training is limited in the recharge zone to only those activities that do not introduce contaminates or could create excessive erosion. In addition, the staff enhances ➤

At Schofield and Shafter, maintaining batteries maximizes potential

by Chantal Leonard

Field support representatives trained 100 military and civilian employees on various types of equipment and techniques to maximize the life cycle of batteries used in tactical and nontactical vehicles, generators, golf carts, forklifts and other equipment at Fort Shafter and Schofield Barracks, Hawaii.

"These practices will enhance their sustainability posture and help them achieve top environmental performance by reducing their battery consumption," said Alvin Char, chief, Environmental Division, Directorate of Public Works, U.S. Army Garrison Hawaii. Char hopes military and civilian organizations will adopt maintenance and management practices they learned in the training.

"Reducing battery consumption will help organizations free up operational dollars that can be used to support other mission requirements. It also merges financial interests with doing what is right by the environment and the community," he explained.

In its *2008-2010 Strategic Sustainability Action Plan*, USAG Hawaii outlines its commitment to the "Triple Bottom Line-Plus," which combines mission, environment and community plus the economic benefits that sustainability provides.

Acronyms and Abbreviations	
AGM	absorbed-glass-mat
DPW	Directorate of Public Works
USAG	U.S. Army Garrison

DPW's Environmental Division encourages organizations to switch from conventional "flooded" lead-acid batteries to absorbed-glass-mat-type batteries. AGM technology is a greener, longer-lasting and better performing battery technology. However, even without the conversion to AGM, organizations can make their batteries last longer by implementing a simple preventive maintenance program.

The reality is that organizations often don't maximize the life cycle of their batteries. A number of motor pools don't use battery chargers, or Soldiers are not trained to use them properly. Dead batteries are automatically replaced with new ones without attempts to recharge them.

DPW's goal is to lower the installation's consumption levels to below Environmental Protection Agency reportable quantities. Char said achieving that goal will require everyone's participation.

"Even smaller organizations need to take this issue to heart, because one small positive act multiplied hundreds of times produces immense benefits," he said.

Left-behind equipment or vehicles stored for long periods of time are invariably inoperable when needed, thereby affecting a unit's readiness. USAG Hawaii units have a great opportunity to achieve and maintain optimal performance using solar chargers and by performing proper maintenance. Cost savings and enhanced unit readiness increase greatly by embracing solar technology for long-term outdoor storage of equipment and vehicles.

USAG Hawaii Soldiers listen as an instructor trains them on new technology and practices to reducing battery consumption. Photo by Kristine Kutscher, Environmental Science International Inc., DPW, USAG Hawaii

AGM battery technology is being incorporated in almost all of the Army's original equipment manufacturer production lines, and some of the diagnostic and charging systems are now part of the standard Army tool set and forward repairs system.

To reap maximum benefits of the Triple Bottom Line-Plus, organizations must enforce a battery maintenance program and ensure Soldiers are provided proper training to achieve the full potential of these new technologies.

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recharge features and stabilizes the soil around them to further limit the amount of erosion that can take place during high surface-water flows.

This is just a glimpse of the management practices that help to maintain and restore healthy ecosystems relationships at Camp Bullis. The keys to these programs are diversity, adaptability, education and action. Employing these keys is the only way to decrease human impacts over time and ensure the continuation of these natural resources.

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Public Works Awards: 8 recognized for excellence

by John Krajewski

Seven public works professionals and one support contractor won the annual Army *Directorate of Public Works Awards*. Winners were announced March 13, and the awards were presented during the IMCOM Master Planning Conference April 7 in Houston.

The *DPW Awards* Program recognizes individuals and organizations who demonstrate excellence in management and execution of the Army public works and real property maintenance missions. The winners have improved the quality of life for Soldiers and their Families.

The 2008 *DPW Award* winners are:

James Duttweiler
U.S. Army Garrison
Fort Campbell, Ky.

William C. Gribble DPW Executive of the Year

James Duttweiler
Photos courtesy of IMCOM Public Works Division

This award recognizes leadership skills, professional engineer knowledge and managerial excellence at the highest levels of installation DPW management.

Duttweiler's committed leadership was a major factor in guiding Fort Campbell through a difficult period that included mobilization and demobilization of deploying units, Army Modular Force transformation, expanded Soldier training and a large Military Construction program. He led a successful Flagship Projects Program that included $42 million in needed repairs completed while units were deployed, ensuring that Soldiers returned to facilities reset to higher standards.

His emphasis on long-range planning resulted in an installation master plan, improved communication with mission commanders, a robust $605 million MILCON program and construction of 2,000 new barracks spaces.

Anne de la Sierra
USAG Fort Stewart, Ga.

DPW Engineering and Planning Executive of the Year

Anne de la Sierra

This award recognizes leadership skills and managerial excellence in the engineering and planning functions at the installation level and recognizes the successful integration of requirements, plans and programs into effective execution.

De la Sierra's strong technical knowledge, wisdom and experience were apparent in the superior planning, design and execution of a $400 million construction program to support the stationing of a new infantry brigade combat team at Fort Stewart. She was also involved in the development of the installation's master plan that included environmental sustainability, architectural themes, an innovative community town-center concept and expanded use of Hunter Army Airfield.

Julie Poyser
USAG Fort Riley, Kan.

DPW Business Management Executive of the Year

Julie Poyser

This award recognizes managerial excellence in the DPW business management function at the installation level and the successful integration of requirements, plans and programs into effective execution.

Poyser was recognized for outstanding achievements in requirements identification, programming, cost estimating, funds control and acquisition planning. Particularly noteworthy was her leadership on the Public Works Commercial Activities Team that identified innovative Most Efficient Organization and productivity improvements that saved more than $4 million and enabled the garrison to win the commercial activities contract. She also served as the Fort Riley lead in fielding the General Fund Enterprise Business System, meshing the new system with the existing Common Levels of Support program and establishing baseline data for the Base Operations Requirements Model.

Connie Glenn
USAG Fort Leavenworth, Kan.

DPW Housing Executive the Year

Connie Glenn

This award recognizes managerial excellence in the DPW housing function at the installation level and recognizes the successful planning, programming and provision of excellent housing for Soldiers and their Families.

Glenn's sound leadership and financial oversight of the Fort Leavenworth Family Housing Privatization Program, for which she managed several fund sources and disbursements in excess of $50 million, were particularly commendable. Also significant were her lead roles in fielding the First Sergeants Barracks Initiative, which improved in-processing for deploying and returning Soldiers, and expanding the barracks self-help and maintenance programs. Her actions exemplified a cutting-edge leadership and a customer-first focus in Army housing management.

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Acronyms and Abbreviations	
DPW	Directorate of Public Works
IMCOM	Installation Management Command
MILCON	Military Construction
USAG	U.S. Army Garrison

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John Ghim
USAG Yongsan, South Korea

DPW Operations and Maintenance Executive of the Year


John Ghim

This award recognizes exceptional leadership, managerial excellence and productivity improvements in the DPW operations and maintenance function at the installation level and the successful execution of the engineering operations, maintenance and repair missions of the DPW.

Ghim's leadership and contributions were instrumental in Yongsan's multiyear recognition in the Army Communities of Excellence Competition. He implemented an improved maintenance program that reduced service orders by 50 percent and saved $1.4 million without lowering customer response. His energy program management and initiation of an Energy Savings Performance Contract will save the garrison $2 million annually.

Alvin Char
USAG Hawaii

DPW Support Executive of the Year


Alvin Char

This award recognizes managerial excellence and productivity in a DPW support function at the installation level and the successful execution of the engineering, operations, environment and natural resources mission of a DPW organization.

Under Char's leadership, a fragile environment with a diverse population of animal and plant endangered species plus hundreds of native Hawaiian cultural sites was innovatively managed, and the Army in Hawaii was recognized as a Center of Environmental Excellence. His vision and leadership led to completion of the final Environmental Impact Statement for the Makua Military Reservation and successful implementation of an Army Compatible Use Buffer Program that protects the integrity of military training areas. He has fostered a spirit of environmental cooperation and helped raise environmental awareness that benefits the entire Army Family in Hawaii.

Richard Baker
Northeast Region, Fort Monroe, Va.

DPW Region Support Executive of the Year


Richard Baker

This award recognizes excellence in management in a diverse range of DPW functions on the region level along with a high level of support to the installations within the region.

Baker was instrumental in the Northeast Region's comprehensive Sustainment, Restoration and Modernization Program. His aggressive response to calls for assistance from the U.S. Military Academy at West Point, N.Y., DPW led to an on-site team to survey and improve summer training facilities at Camps Buckner and Natural Bridge. He developed an economical approach to bring needed utilities to a recreation complex, assisted with the Michie Stadium repair project and provided technical guidance to remove mold and mildew from cadet barracks. His dedicated, hard-working, professional attitude makes him the go-to engineer for technical and managerial issues in the Public Works arena.

ITT Federal Services GmbH
USAG Kaiserslautern, Germany

DPW Support Contractor of the Year

This award recognizes excellence in contractual execution of an installation's public works base operations, real property maintenance and engineer support missions.

Erhard Bauman and Ken Nachbar accepted the award for ITT Federal Services GmbH, which provided superb customer service that led to outstanding customer satisfaction. The contractor teamed with the garrison staff and seamlessly integrated and cooperated with it. The contractor accomplished a full range of plant operations, service orders, and minor and major projects with exceptional work quality and response time. Customer satisfaction was consistently high with contractor award fee scores exceeding 98 percent. The contractor's management initiatives to reduce costs and increase productivity resulted in savings of $217,000 and a substantial increase in employee time on the job.

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John Krajewski is an engineer, Public Work Division, Headquarters, IMCOM.


Erhard Bauman (left) and Ken Nachbar (center) accept the support contractor award from Don LaRocque, chief of Public Works for IMCOM.

Activity career program managers pave the career highway

by Lt. Gen. Robert L. Van Antwerp

Our path toward GREATNESS in the Army depends on great ACPMs. The Army is full of acronyms, and this is one that you many not be familiar with, but if you are a member of a career program, it is vital that you know who your ACPM is and the crucial role that the ACPM has in both the management of the career program as a whole as well as your own individual career.

ACPM is short for *activity career program manager*. Career Program 18 currently has 65 ACPMs across the Army. These individuals are responsible for directly interfacing with commanders, supervisors and individuals throughout their installations, districts and divisions. All CP-18 training requests and information are coordinated with and through these key employees.

Local commanders appoint senior Army civilians to the position of ACPM. Their role is to actively support developmental assignments, reassignments, intern programs and formal training of CP-18 employees. Their duties include:

- Ensuring that all individuals within their areas of responsibility are provided information about the Army CP-18;
- Proactively assisting and providing counsel to supervisors and individuals about career development opportunities;
- Identifying and coordinating developmental assignments;
- Approving and monitoring CP-18 intern Individual Development Plans;
- Assessing intern progress in meeting specified developmental objectives of intern training and determining intern eligibility for promotion when these objectives are met;
- Providing to the CP-18 functional chief representative and proponency team feedback and ideas on all aspects of the career program;
- Providing candidate endorsements for university funding applications, Army Management Staff College, Army competitive professional developmental opportunities and senior service schools.

Acronyms and Abbreviations	
ACPM	activity career program manager
CP-18	Career Program 18, Engineers and Scientists – Resources and Construction

The training of ACPMs is very important. It includes topics such as mentoring; the *Master Intern Training Plan*; distance learning and ACPM tools; the Army Civilian Training, Education and Development System; competitive professional development; and best practices among others.

This year's training workshop will be hosted by the Corps of Engineers' Southwestern Division in Dallas July 14-16. Hold the date on your calendars and visit the CP-18 web site, *https://ekopowered.usace.army.mil/cp18/*, often to find out about up-to-date training opportunities. Register as soon as you can so that you are notified when changes are made or updates to events are posted.

As we move forward on our path to greatness, I thank our ACPMs for their dedication and passion. The CP-18 team, in conjunction with the ACPMs, is dedicated to driving forward to ensure that we recruit, train and retain employees in order to develop a diverse world-class work force with a reputation for technical and leadership excellence.

Engineers will play a crucial role in helping our nation through these historic times, both here and abroad. In addition, "The American Recovery and Investment Act (Stimulus)" focuses us on having "GREAT ENGINEERS" with the requisite competencies to "get 'er done." Army engineers are working in 33 countries providing full-spectrum engineering services — from Public Works engineering on installations, to sapper and construction engineering in combat, to water resource planning and construction on our river systems, to geospatial engineering, to disaster recovery and reconstruction.

Lt. Gen. Robert L. Van Antwerp
Photo by F.T. Eyre

We have a significant mission ahead. What a great time to be an ENGINEER!

BUILDING STRONG

Lt. Gen. Robert L. Van Antwerp is chief of engineers, commanding general of the U.S. Army Corps of Engineers and the functional chief of CP-18.

Workshop on using LonWorks systems at Army installations

by David Schwenk

The Corps of Engineers and Installation Management Command will conduct a three-day workshop on employing LonWorks building automation systems Aug. 25-27 at the Hilton St. Louis at the Ballpark Hotel. This free workshop provides a rare opportunity for Army personnel and industry representatives to learn about and discuss how to implement open LonWorks systems in the Army environment using the CorpsLON specifications developed by the Corps.

Attendees need not have prior knowledge of LonWorks. The workshop includes a LonWorks "crash course" to provide the necessary fundamentals.

Installation Management Command will sponsor travel, but not labor, for a *limited* number of Army installation personnel through invitational travel orders issued by the Engineer Research and Development Center's Construction Engineer Research Laboratory. Requests for consideration for travel funding must be e-mailed to BAS.CERL@us.army.mil by July 15.

Joe Bush (left) and David Schwenk of the Construction Engineering Research Laboratory work on a direct digital control panel. By implementing open standards for building automation systems, components such as direct digital controls will no longer be limited to a single vendor's product line. Photo by Dana Finney

Workshop highlights

Day 1 – Joint industry and government session: LonWorks crash course with details and requirements of CorpsLON

Day 2 – Joint industry and government sessions: more on the details and requirements of CorpsLON with a discussion of system testing and certification

Day 3 – Government-only session: implementing CorpsLON at an Army post, including topics on procuring, expanding and using a postwide building automation system

Registration

To register for the workshop, e-mail BAS.CERL@us.army.mil; include your name, phone number, organization name, city and state in your request. Registration must be submitted by July 31.

Hotel reservations can be made by calling 1-800-HILTONS. Request a room from the USACE LonWorks Workshop block. The block of sleeping rooms will be available until July 31.

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David Schwenk is a mechanical engineer, Construction Engineering Research Laboratory, Engineer Research and Development Center.

Look us up on the WEB

For an electronic copy of the

Public Works Digest,

go to:

http://www.imcom.army.mil/sites/pw/digest.asp

Master planning training available

by Andrea Wohlfeld Kuhn

Spaces are available in this year's two remaining master planning classes. Classes are open to all interested parties, including contractors, private citizens, and state, city and county employees.

Course 326

Master Planning Applied Skills

June 22-26, Huntsville, Ala.

This class provides an overview and techniques to develop real property requirements and allowances and assess stationing actions.

Course 952

Advanced Real Property Master Planning

July 27-31, Huntsville

Through an intensive, hands-on workshop, students will use a planning charrette technique to develop an area development plan for a real world planning problem at an installation. Participants are required to have a fundamental knowledge of master planning and/or real property management.

To register or view course descriptions, go to *http://pdsc.usace.army.mil*, or contact Janine Wright, 256-895-7431, *janine.p.wright@usace.army.mil*; or Andrew Browning at 256-895-7429 or at *andrew.s.browning@usace.army.mil*.

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IMCOM

U.S. ARMY INSTALLATION MANAGEMENT COMMAND