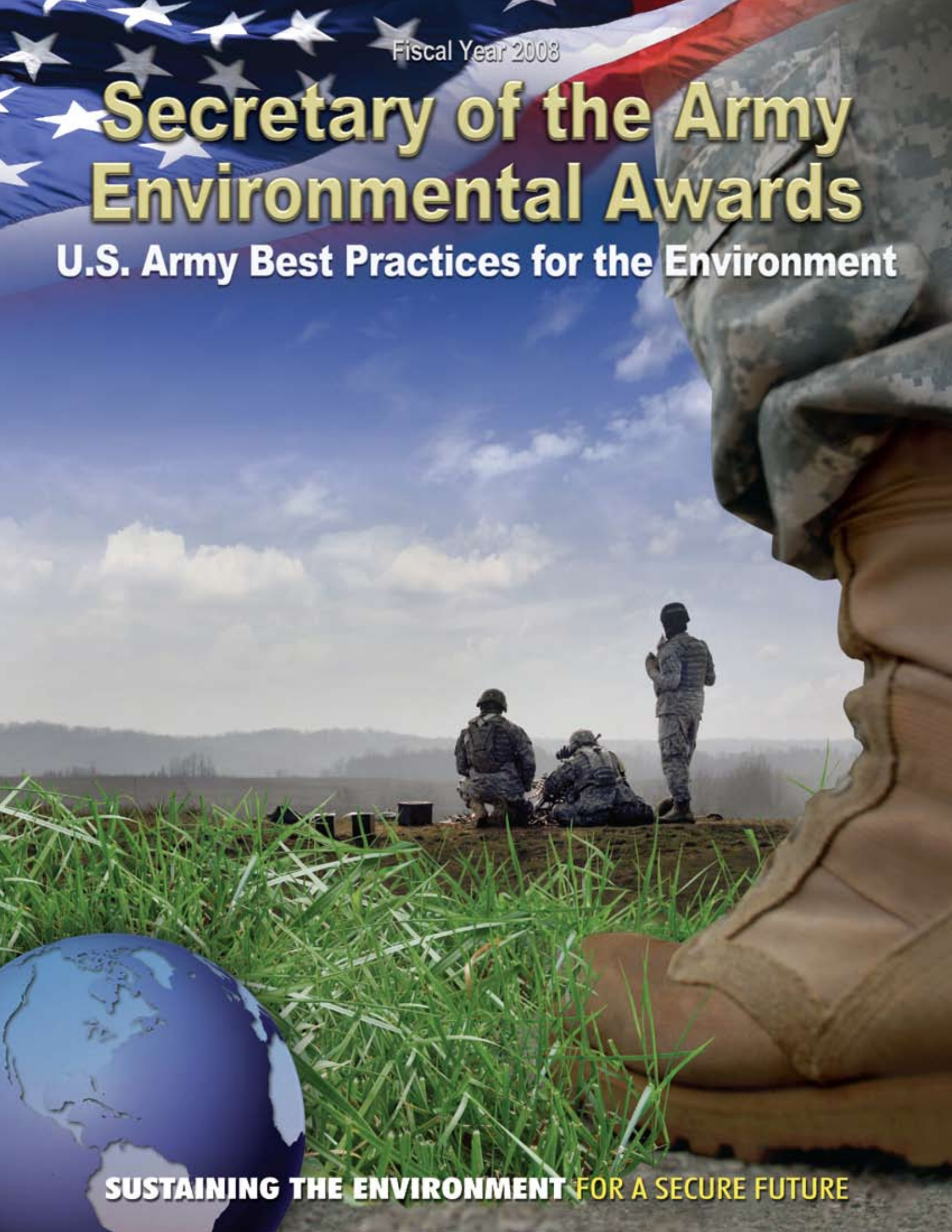


Fiscal Year 2008

# Secretary of the Army Environmental Awards

U.S. Army Best Practices for the Environment



**SUSTAINING THE ENVIRONMENT FOR A SECURE FUTURE**

**Secretary of the Army Environmental Awards Winners**  
U.S. Army Best Practices for the Environment Fiscal Year 2008

FISCAL YEAR 2008

# Secretary of the Army Environmental Awards Winners

U.S. Army Best Practices for the Environment

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**SUSTAINING THE ENVIRONMENT FOR A SECURE FUTURE**



**Secretary of the Army Environmental Awards Winners**  
U.S. Army Best Practices for the Environment Fiscal Year 2008

# Camp Ripley Maneuver and Training Center, Minnesota ARNG

## Natural Resources Conservation, Large Installation

With over 19 miles of Mississippi River frontage and representing one of the largest land holders in the region, the Minnesota Army National Guard (MNARNG) and Camp Ripley have long been prominent protectors of the mighty Mississippi and its ecosystem. As the MNARNG's primary training area, Camp Ripley's 53,000 acres support over 600 plant, 203 bird, and 50 mammal species and provide 450,000 man-days of Soldier training every year.

Since Camp Ripley resides within the forest transition zone of Minnesota it is home to a large diversity of wilderness dwellers such as the timber wolf, black bear, bald eagle, and red shouldered hawk. Camp Ripley is also rich in history and is home to the Historic Fort Ripley, Indian burial mounds, and homesteads and cemeteries of the early settlers. Camp Ripley has about

28,000 acres of forested land, 8,800 acres of wetlands, and 7,700 acres of grasslands. The remaining portion of the land is comprised of 6,500 acres of impact areas and a 2,000 acre cantonment area. Camp Ripley has also expanded its outdoor recreational program to include hunting and fishing opportunities for youth, Disabled Veterans, deployed Soldiers and the general public.

All NRC activities at Camp Ripley support the MNARNG's training mission and the complementary relationship between military land use and NRC management has been well documented. NRC activities are closely coordinated with training needs, and staff develops mitigations when needed. The Army Compatible Use Buffer (ACUB) program is especially important. The mission of the ACUB is to prevent encroachment, protect

the mighty Mississippi, and ensure sustainable training for Camp Ripley without compromising mission and a Soldier's ability to train as they will be expected to fight on the battlefield.

Partnerships with state and local agencies and universities have made Camp Ripley second to none in the region for environmental excellence and expertise. NRC staff also conducts extensive outreach on and off the installation. There are 600 full-time personnel employed and nearly 7,000 visitors come to Camp Ripley each year to enjoy the post's environmental resources. Camp Ripley's conscientious NRC management preserves the post's diversity for future generations and supports the Army's triple bottom line for sustaining the mission, the environment, and the community.

*On this page: Camp Ripley's ranges and facilities enable Soldiers to train to the highest level of proficiency such as firing the Multiple Launch Rocket System.*

### JUDGING CRITERIA



Program Management



Orientation to Mission



Technical Merit



Transferability



Stakeholder Involvement

**SUSTAINING THE ENVIRONMENT FOR A SECURE FUTURE**

## BACKGROUND

The Camp Ripley Integrated Natural Resource Management Plan (INRMP) is updated annually in partnership with U.S. Fish and Wildlife Service (USFWS), the Nature Conservancy (TNC), and the Minnesota Department of Natural Resources (DNR). The MNARNG has a signed Cooperative agreement with the DNR and both the USFWS and DNR sign a signature page approving each annual INRMP update. Camp Ripley has also completed a Biological Opinion with USFWS on bald eagles in support of a new range. These plans and the NRC program's close coordination with regulators and environmental partners have kept Camp Ripley in 100 percent compliance.

Camp Ripley's NRC program is supported by the installation's environmental directorate, which coordinates directly with the installation commander and MNARNG tenant commands. The environmental staff works closely with trainers to identify future mission needs and prioritize NRC activities around them. They are also in close coordination with the public works and Facilities Management



*The Blandings turtle is a species of special concern in the state of Minnesota, and NRC staff have long worked to enhance the turtle habitat and protect them from impacts. This hatchling is indicative of Camp Ripley's success. Thanks to NRC management, the turtle has seen an increase in survival rates over the past years.*

Office (FMO) to provide planning and implementation support for any new development. The environmental directorate also created an installation Sustainable Range Program Committee, comprised of command and unit representatives, Integrated Training Area Management personnel, engineers, FMO and others. The committee meets bi-monthly to coordinate new projects, review program budgets, and monitor progress of the conservation program.

One of the largest contributing factors of the installation's NRC success and ability to reach its many milestones over the past two years is their strong

program management. These milestones include developing new partnerships for ACUB funding and NRC management, securing special legislation that returns state timber revenues to Camp Ripley for its reforestation and forest management program enrolling 5,000 acres into the installation ACUB protecting an additional 18,000 acres in support of ACUB, and winning several awards and funding for the ACUB and other initiatives.

## PROGRAM SUMMARY

Camp Ripley lobbied for and secured new legislation this year that returns revenue from timber harvesting to the installation rather than the state general fund. This fund generates \$150,000 to \$500,000 annually to augment the NRC land fund and allow MNARNG an opportunity to more directly fund mission requirements.



In addition to minimizing dependence on nonrenewable

**Over the past several years, the Fish and Wildlife Service has been actively involved in the development and implementation of Camp Ripley's Integrated Natural Resource Management Plan, along with other federal actions requiring consultation. It has been tremendously satisfying working with Camp Ripley.**

- Nick Rowse, USFWS Biologist

resources, Camp Ripley has also realized a significant cost saving in utilizing its most common renewable resource – trees. A portable sawmill recently generated about 16,200 board feet of lumber from trees harvested on Camp Ripley. The lumber is valued at about \$11,500 and will be used for targetry and for repairing training facilities.

In 2008, Camp Ripley won second place in the Army Communities of Excellence “Special Category,” bringing the post a \$25,000 prize. Additionally, as a part of a new sustainability initiative, NRC staff and Camp Ripley reclaimed nearly 3,000 tons of concrete and over 1,100 tons of bituminous material to be reused in trail stabilization, thereby avoiding landfill disposal costs. These savings represent \$92,000 in addition to metal recycling revenue.

Camp Ripley reclaims about 80,000 tons of gravel per year from 16 miles of existing trails, avoiding the purchase of new materials for trail reconstruction and rehabilitation. This represents a cost savings of about \$970,000 each year.

The continued implementation of the installation ACUB has been a driver of the NRC program over the past two years. In addition to threatening the military mission, encroachment can have a detrimental effect on natural resources, contributing to loss of habitat and subsequent decline in threatened or endangered species. The ACUB prevents further fragmentation of natural communities, thereby preserving habitats and sensitive species.

Additionally, the ACUB program has received approximately \$10.7 million in federal funding, and

Camp Ripley has successfully leveraged partnerships in this initiative resulting in over \$45 million in funding through local contributions.

Camp Ripley has two primary partners to implement ACUB on their behalf including the DNR and more recently the Minnesota Board of Water and Soil Resources (BWSR). BWSR has greatly expedited the process of acquiring conservation easements and has significantly enhanced the ACUB outreach for the 5,000 landowners in the three-mile buffer zone. The BWSR introduced a formula-based system that allows Camp Ripley to easily identify priority parcels and track the compensation available to those landowners.



The BWSR provides a 50 percent contribution to land easement acquisitions to maximize federal funds, and in-kind contributions from other involved agencies and partners often increase contributions above 50 percent. In the region, land is valued at approximately \$2,000 per acre; landowners are offered \$1,000 per acre to enroll their properties in the program and relinquish development rights. The funding provided by partners significantly reduces the burden on federal funds.

Since the program’s inception in 2004, the number of interested landowner participants has grown to 200, representing over 29,000 acres. Approximately 5,000 acres have already been acquired (through purchase or permanent



*NRC activities are closely coordinated with training needs to enhance training opportunities and ensure no interruption. State of the art range complexes enable Soldiers to train to maximum proficiency. All NRC efforts are undertaken with an emphasis on best serving the MNARNG’s Soldiers.*

ease), and as funding and resources increase, additional lands will be incorporated.

A customized ACUB database management system was developed within the NRC program for the purpose of integrating natural resource land characteristics with mission requirements. All ACUB parcels are ranked and prioritized according to military and natural resources criteria within the database. In addition to tracking funding and land values, the database can serve as a template for other installations involved with ACUB.



Partners such as the DNR and TNC assist in training Camp Ripley personnel to conduct prescribed burns and combat wildland fires. Prescribed fires reduce fuel loads, enhance training, and sustain natural diversity on nearly 11,000 acres every year. Prescribed fire has also been effective at controlling and minimizing the spread of some invasive species.

## ACCOMPLISHMENTS

### Overall Natural Resource Conservation

In an effort to overcome the consequences of depleting nonrenewable resources, Camp Ripley and the MNARNG are leading a sustainability initiative to enhance mission capability while reducing dependence on nonrenewable resources. Camp Ripley has already capitalized on two opportunities, resulting in considerable cost savings and resource utilization that would otherwise be wasted.

One opportunity involved reclamation of about 80,000 tons of gravel per year from existing trails. Without reclamation newly crushed material or resources would be required to maintain existing trails. Another project involved reclaiming 3,000 tons of old concrete and 1,000 tons of bituminous material that would otherwise have gone to a construction/demolition landfill. The newly crushed product is used to stabilize maneuver trails in support of training.

### Land Management

As a part of its INRMP, Camp Ripley conducts regular surveys of plants, birds and animals. Additionally, 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. Also, prescribed fire training and implementation is conducted with The Nature Conservancy's assistance. Prescribed fire enhances the mission-scape for training, improves ecological habitat, and controls invasive species. Annual, prescribed fires are used to reduce fuel loads on 10,000 acres and enhance habitat on 600 to 700 acres of grasslands and forests. Prescribed fire in forested areas is eradicating invasive hazelbrush.



### Forest Management

The Camp Ripley Land Fund was approved by the state legislature this year, which permits state revenues generated by installation timber harvests to go back to Camp Ripley. About 300 acres of timber are harvested on post annually, generating \$150,000 to \$500,000 that will be reinvested in Camp Ripley's NRC program.

**“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. By working locally with Camp Ripley our effectiveness as conservation organizations is enhanced. We consider it a privilege to work with the outstanding environmental resource professionals at Camp Ripley.”**

- Todd Holman, Director, Central Minnesota, The Nature Conservancy



All forestry activities are conducted in partnership with the state DNR, including harvests, rehabilitation, replanting, nursery development, and invasive species control. Areas are selected for harvest based on habitat enhancement and training needs. Trees are thinned, spaced, or cleared with regard to sound forestry practices, with priority given to areas where training space is needed according to the desired future condition (DFC) from a military training perspective.



Camp Ripley is also developing a partnership with a local ethanol plant that needs wood fiber biomass for fuel testing. Trees that must be cleared but are not valuable as lumber or paper and residual slash piles from ongoing timber sales provide a source of wood fiber for the benefit of alternative fuel research.

### Invasive Species Control and Pest Management

Prescribed fire is 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 (SCSU). SCSU developed a web site that tracks the effectiveness of treatment combinations, which helps the installation and MNARNG to implement the most effective, efficient approach.

In partnership with the MN Department of Health and University of MN, Camp Ripley has implemented a tick testing program to combat Lyme disease. Any ticks that attach to Soldiers are removed and tested. The data generated by this testing is used on a state-wide level by the MN Department of Health.



### Mission Enhancement

All NRC activities at Camp Ripley are undertaken in support of the MNARNG's training mission, and the complementary relationship between military land use and NRC management has been well documented. In some cases, training activities support NRC activities. For example, training using unmanned aerial vehicles in simulated military missions benefit the conservation program with exercises that track deer populations, triangulate telemetry-tagged animals, and identify land in need of rehabilitation. NRC activities are closely coordinated with training needs according to DFC plans, and the staff works to develop mitigations when necessary to expand training. One example of this is the completion



of a Biological Opinion on a bald eagle nesting site and the associated habitat enhancement for eagles in fiscal year 2008 to clear the way for construction of a new Urban Assault Course.

### Environmental Enhancements

Internally, the NRC program's continuity is ensured by the installation INRMP, ACUB program, and partnership networks. Information on all NRC activities is electronically captured in databases accessible throughout the MNARNG. These databases track projects, protect data, and help with MNARNG training and NRC planning. The database Camp Ripley developed for the ACUB has particular potential for transfer to other military installations. Comprehensive and easy to use, the database has been presented at NGB workshops as an example to follow, and NGB and the Army are considering standardizing this tool for ACUB projects. The MNARNG has shared this tool with the South Carolina and Idaho Guard as well to assist those states in ACUB implementation. The NRC staff at Camp Ripley has



**“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. This level of integration has enabled them to implement one of the best, 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.”**

- Dr. Lee Barber, National Guard Bureau ITAM Program Manager

also presented their activities at national environmental symposiums and Land Trust Alliance conferences, and their expertise has been sought for the Army Sustainable Range Program.

### Community Relations

Strong partnerships and a commitment to community involvement and cooperation have given the Camp Ripley NRC program strength and staying power.

One of the goals of the MNARNG is to add value to the community. The NRC staff has done this by working in harmony with resource agencies such as the DNR and USFWS. Camp Ripley works with institutions of higher learning, such as St. Cloud State College and Central Lake College, to design and provide conservation internships and other learning opportunities. There is no better place to learn and gain field experience than from a 53,000 acre laboratory.

Camp Ripley conducts annual briefings for all the county boards and city councils in the region, presenting on upcoming training activities, ACUB progress, and environmental initiatives. Also, since the Camp Ripley ACUB began in 2004, over 250 ACUB presentations have been given to the public and local governmental officials.



### Conservation Education

Camp Ripley hosts a bi-annual event for the community, welcoming the public to the



*Using state-of-the-art radio tracking equipment to monitor the wolf populations, NRC staff have been able to demonstrate the complementary relationship between the military mission and the survival of this federally-protected species.*

installation to learn more about the MNARNG and its NRC program. The installation also hosts annual events for Earth Day, National Public Lands Day, Boy and Girl Scout Jamborees, and local water and environmental festivals.

Camp Ripley opened its environmental classroom in 2006 and now hosts field trips and special events for 6,500 to 7,000 visitors every year, including Soldiers and their families, school children, and a variety of special interest groups. The NRC staff conducts over 200 educational presentations each year in classrooms and on post, along with field tours. A mentorship program gives high school students the opportunity to learn more about jobs in the field by shadowing members of the environmental staff. Additionally, as a part of an established outreach program, school groups come to Camp Ripley for bird watching throughout the

installation. Camp Ripley has also established a bog walk and nature trail for school groups and the general public to use. Bird watching is also available at these picturesque sites.

### Fish and Wildlife

NRC staff use 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 during training, allowing the NRC office to mitigate for their protection. This tracking also demonstrates the positive relationship between training and habitat enhancement, proving that these populations are enhanced by the limited disturbance that training and NRC activities provide. The installation is investigating the federally-protected Canada lynx population on post.



## Other Natural Resources

Camp Ripley has an active hunting and fishing program that encompasses special youth archery, disabled veteran, and deployed Soldier deer and turkey hunts, as well as regular deer hunts open to the public. Special accommodations are provided for Disabled Veterans including elevated blinds, mentors, and handicap sleeping quarters. In total, these hunts provide access and recreation for over 5,500 hunters, including youth, deployed Soldiers, and disabled veterans. These are largely conducted with a lottery system that allows hunting with no fees or with minimal permit fees. The revenue generated by the hunts is administered by the DNR to support hunting programs. NRC personnel also manage lakes on the installation through a stocking program to provide Soldiers and the public with fishing opportunities.



## Natural Resource Compliance Programs

The Camp Ripley team takes pride in working through partnerships to accomplish the ultimate goal of sustaining the Army's triple bottom line of sustaining the mission, the environment and the community. They realize that the natural resources don't abide by fence lines, rivers or political lines and continual interaction with their partners has allowed them to achieve many successes as noted by Mark Holsten, DNR Commissioner.



**“For more than 23 years the Department of Natural Resources has worked in partnership with the Minnesota National Guard. 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. 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.”**

*- Mark Holsten, Commissioner,  
Minnesota Department of Natural Resources*

Camp Ripley has an open dialogue with regulators and inspectors and has never had any violations within its conservation program. On a national level Camp Ripley's conservation budget has been funded at about 85 percent of its critical level. On the state level Camp Ripley now utilizes annual timber revenues (\$150,000-\$500,000) to enhance the land management program. Natural



resources damage assessment efforts are implemented through the Range and Training Land Assessment program and all deficiencies, if any, are corrected through the ITAM program. Camp Ripley has an outstanding compliance record that includes one closed biological opinion and zero court actions, past or present.



Over 5,500 hunters visit camp Ripley every year. Special hunts are hosted for deployed Soldiers, disabled American veterans, and youth. The hunts are administered in partnership with the Department of Natural Resources. The Disabled American Veterans turkey hunt is the first of its kind in Minnesota.

**Secretary of the Army Environmental Awards Winners**  
U.S. Army Best Practices for the Environment Fiscal Year 2008

# Camp Navajo, Arizona ARNG

## Cultural Resources Management, Installation

*On this page: Soldiers from the Arizona National Guard walk down the side of a mountain on a foot patrol in the Nuristan province of Afghanistan. (U.S. Army photo by Staff Sgt. Isaac A. Graham)*

### JUDGING CRITERIA



Program Management



Orientation to Mission



Technical Merit



Transferability



Stakeholder Involvement

Camp Navajo, an Army National Guard installation located in Bellemont, Ariz., is a 28,225-acre multi-service training site used by all branches of the military. Camp Navajo is the primary training site in Arizona for active and reserve Army, Air Force, Navy, and Marines maneuver and battalion

training. Almost 4,000 Soldiers are trained at Camp Navajo per day. The installation also provides depot-level logistical support to sustain and maintain military readiness for various Department of Defense (DoD) agencies and civilian customers. One hundred thirty personnel, including the Arizona Army National Guard (AZARNG), federal, and state employees work on the installation.

Camp Navajo boasts an unusual mix of historic and cultural resources, with Native American settlements, historic homesteads and railroads, and former Basque sheepherding sites. As Camp Navajo was

formerly an Army ammunition depot, the installation still has over 750 ammunition storage igloos. Archaeological work is often coordinated with unexploded ordnance (UXO) remediation.

Camp Navajo was built by Native American work crews in the early 1940s. About 1,500 Native Americans were initially hired and housed on post. Over 7,000 tribal members lived in the settlement area and worked on Camp Navajo between 1942 and 1971. Prehistoric lithic scatters are frequently found, as the installation is located near a major obsidian source. The AZARNG manages the installation for prehistoric, Native American, and colonial archaeological resources and artifacts. The entire acreage of the installation is covered by the AZARNG Integrated Cultural Resources Management Plan (ICRMP).

## BACKGROUND

The final ICRMP was prepared by Jane Aaron of Engineering Environmental Management, Inc., and completed in October 2006. The ICRMP was finalized the following month.

The AZARNG Cultural Resources Management (CRM) program covers National Guard installations across Arizona, including Camp Navajo, and is directed by AZARNG Maj. John Ladd. Mr. David Larsen served as the agency archaeologist until October 2008, and Mr. Brian Kenny currently serves as the statewide Cultural and Natural Resources Supervisor for the AZARNG CRM program. Support personnel in the Environmental Office at Papago Park Military Reservation (PPMR) assist the AZARNG CRM program with contract support, management services and logistics to assure the professional management and timely completion of CRM-related

**“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.”**

- Katharine Kerr  
Historic Preservation Specialist,  
Advisory Council on Historic  
Preservation

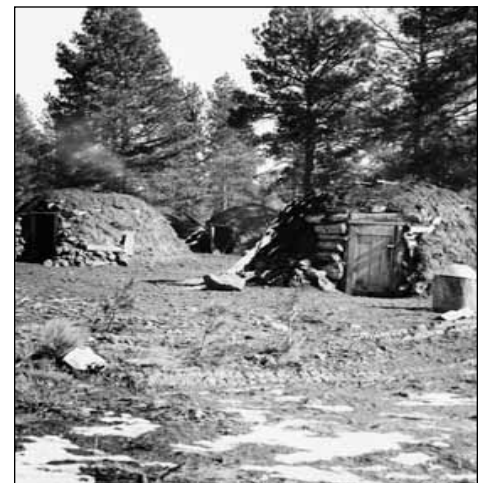
activities. The AZARNG CRM has a Programmatic Agreement with the Arizona State Historic Preservation Office (SHPO), and works closely with federally-recognized American Indian tribal governments to maintain transparent consultation and communication throughout major program plans and development projects related to AZARNG training. This interaction and cooperation ensures that CRM activities are properly reviewed and considered to protect cultural resources from impacts that may occur as a result of mission training.

## PROGRAM SUMMARY

The AZARNG has accomplished several major program milestones during the award period on Camp Navajo. This includes an installation-wide survey to inventory all historic property that affirmed full CRM compliance on the installation. The most significant focus of the Camp Navajo CRM effort has been on the comprehensive investigation of Indian Village, a former Native American habitation site. This investigation included fieldwork and an ethnographic oral history collection to document the experiences of the Native American families who built and lived at Camp Navajo in the 1940s. This project illustrates exemplary cultural resources management by encompassing accomplishments in several categories. The Indian Village project innovatively mitigates impacts to a historic Camp Navajo site, allowing the land to

be converted for training. The superior project management strengthened Native American relations cultural resource outreach geared toward Soldiers and the public, while supporting the military mission.

The CRM program has also placed emphasis on coordination and integration between many AZARNG stakeholders, and has seen much success in this effort. The AZARNG has developed a Programmatic Agreement with the SHPO to make building maintenance and management more efficient. CRM personnel have participated in a variety of outreach projects with the public, including scouting service projects, National Public Lands Days, and have given presentations at the Arizona Historic Preservation Partnership Conference.



*This 1942 photo shows a line of Navajo hogans at original Navajo Village, Camp Navajo. The hogan is a traditional type of eight-sided circular structure with a domed roof made of logs and mud plaster. Note the chimney pipe to vent smoke from a wood-burning cooking stove and the modern-style saw-cut lumber doors instead of blankets. (Photographer unknown, photo taken from Digital Date Base of Camp Navajo Cline Library Archival Materials)*

## ACCOMPLISHMENTS

### Cultural Resources Management

The AZARNG's interdisciplinary CRM program is managed through cooperation between multiple AZARNG units. Sharing cultural resources stewardship responsibilities benefits all programs and the military mission at Camp Navajo. The CRM personnel coordinate with natural resources and forestry personnel to ensure that natural resource activities, such as prescribed burns, do not have negative impacts on any cultural resources. All new activities on post are further managed through the branch's National Environmental Policy Act (NEPA) process for full coordination. CRM personnel also work closely with Army training leaders and Camp Navajo commanders to plan for upcoming training needs. Regular meetings between the cultural resources personnel and Camp Navajo commanders ensure that both cultural resource compliance requirements and AZARNG training requirements are met.



The statewide ICRMP is in place and up-to-date, maintaining Camp Navajo's cultural resources compliance. The ICRMP is bolstered by additional agreements with the SHPO and the Arizona Department of Emergency and Military Affairs (DEMA) to provide guidance regarding UXO treatment, archaeological surveys, and historic building management. The installation also partners with the Arizona State Museum for proper artifact curation.

All CRM projects are adequately funded through regular conservation branch resources. The CRM personnel, however, work to maximize cost savings and cost avoidances by prioritizing site projects, seeking additional grant funding whenever possible, and maintaining cultural resources work in-house. The National Guard Bureau funded the Indian Village ethnographic oral history project, and the CRM personnel are developing, in-house, the Programmatic Agreement to guide mitigation, protection, and construction in the historic district.

This year, an installation-wide inventory of all historic property was completed, identifying 272 archaeological sites and one historic district. The AZARNG actively managed this project to reduce cost and utilize innovative technology. The data collected through this inventory survey was integrated with older data into a geographic information system (GIS) database to store cultural resources, archaeological, and geographic information collected by a global positioning system (GPS). This data integration has allowed Camp Navajo to improve overall cultural resources management by increasing efficiency of information storage, retrieval, and presentation. All historic locations are now linked to accurate data on their attributes, National Register eligibility, and site-specific concerns. The database, in conjunction with digital project files, inventories, and electronic copies of all SHPO and regulatory



*This 2007 photo depicts a hand-made shrine (statue niche) built by Austrian WWII POWs at Camp Navajo. The shrine was constructed of fist-sized and larger chunks of volcanic rock held together with a concrete mortar. The style, shape and size of construction is based up on the POW's mental template of a proper shrine and is reminiscent of staupe niches found throughout Austria along trails and pathways. (Photo by Dorenda Coleman, AZ ARNG Environmental Staff)*

agency correspondence, provides cradle-to-grave information for many cultural resources projects. Using the GIS database, CRM personnel can quickly and easily report on and analyze each historic location. The database also simplifies the coordination process with AZARNG planners, and trainers, allowing CRM personnel to immediately make accurate priority site recommendations.

The AZARNG CRM team is comprised of professionals from the disciplines of natural resources and cultural resources management. These individuals work together to coordinate activities, plan environmental and cultural projects, and provide

reporting to satisfy the statutory and regulatory rule requirements of NEPA and National Historic Preservation Act.

### **Cultural Resources Compliance and Curation**

The AZARNG partners with the Arizona State Museum for curating archaeological recoveries. Artifacts are maintained, registered, and catalogued through this partnership.

Other cultural resources material, such as photographs and historical records, are also documented and archived. All data taken through the Indian Village ethnographic oral history is bolstered with archival documentation. To curate these oral history materials, CRM personnel are digitizing historic photographs, site maps, plat maps, and other documents. A complete history of the ammunition depot's development and use over time is documented in photos of the workers, buildings and activities that occurred at Camp Navajo, as well as original "onion skin" copies of building plans, all of which are on file at Northern Arizona University's (NAU) Cline Library. These historical collections are curated in coordination with NAU, although future curation will be conducted with the National Archives in Laguna, Calif. An on-post facility is being developed to ensure that local researchers and historians have easy access to these records. All of the oral histories are also being captured to produce a

documentary for the public that showcases Camp Navajo's history and its involvement in the Native American community.

Documentary evidence and artifact collections have been created by consultants under contract as part of their Section 106 and NEPA consultation research, and these materials are filed with the Arizona State Museum. The AZARNG collections are available to researchers on a need to know basis, and access is granted by Arizona State Museum personnel after conferring with the environmental staff of AZARNG. Access is also dependent upon consultation with affiliated American Indian tribes, especially when human remains and associated grave goods or sacred objects may be involved. Generally, collections materials are available to professional researchers and academic students working on degree-related or documentary research.

### **Historic Buildings and Structures**

The Camp Navajo historic district is eligible for National Register listing, and all buildings within the historic district are managed as though they are listed. The Camp Navajo historic district consists of five areas: the cantonment area, a World War II warehouse section, several rail car repair shops, an ammunition workshop, and over 750 ammunition storage igloos. The large number and variety of these structures led the AZARNG to develop a Programmatic Agreement with the SHPO, currently in legal review,

**"AZARNG has shown innovation and creativity in developing treatment methods for its historic properties, and prioritizing its efforts towards its most significant properties."**

*- Sarah Killinger,  
Army Program Manager,  
Advisory Council on Historic  
Preservation*

to coordinate and streamline building maintenance and management. This partnership allows the CRM personnel to focus their efforts on preserving and rehabilitating the best building examples within the historic district, while avoiding the costs of maintaining or restoring severely deteriorated structures. Structures with lower historic quality or significant deterioration are mitigated and removed to expand training or new construction, benefitting the military mission at the AZARNG. The CRM team manages the adaptive reuse of historic buildings for current mission requirements, such as adapting old ammunition storage igloos for current storage needs. In addition to these efforts, AZARNG is completing a treatment plan to site 20 new ranges on land cleared through cultural resources survey work.



### **Archaeological Resources**

The AZARNG manages prehistoric, Native American, and colonial archaeological resources and artifacts on Camp Navajo. The



installation survey for historic properties identified 272 archaeological sites, 128 of which are eligible for listing on the National Register, including the Indian Village site. Prehistoric lithic scatters are frequent on Camp Navajo, as the installation is located near a major obsidian source. Tools, arrowheads, and obsidian reduction areas, as well as some pottery, are generally protected in situ. Whenever possible, artifacts are preserved in place and these areas are mitigated and protected through avoidance. Avoidance is enforced by unit training commanders and personnel at Camp Navajo working in conjunction with CRM personnel. Training units receive training instructions in advance and are required to sign off that they have reviewed environmental preservation and compliance requirements enforced within precisely delineated training areas.

Interpretive signage describing archaeological resources was developed for portions of the Indian Village and other sites. The signage ensures that sites preserved in place can be visited by the public, and also provides the public with preservation concepts that teach ethical use and protection of significant cultural resources.

### Native American Program

Camp Navajo enjoys especially strong relationships with local Navajo and Hopi tribes, and consults with them on a regular basis. Camp Navajo goes to special lengths to accommodate

individual needs and access provisions. As an example, a non-traditional Navajo tribe member requested his ashes to be spread on post, where he had worked for many years. Camp Navajo consulted with the tribe in order to honor the deceased man's wishes without impacting any traditional tribal properties; ultimately, the man's final request will be honored.

Consultations and workshops involve contact with 35 individuals from seven tribes. Rather than limiting consultation to letters and phone calls, the AZARNG has implemented face-to-face consultation processes as well, with site visits as needed. The AZARNG hosted a Native American consultation workshop in February 2007, and the installation also has a dedicated point of contact serving as a tribal liaison.

The ethnographic oral history project for the Indian Village site is an example of Camp Navajo's superb outreach and inclusion of Native

American communities. The Indian Village was a settlement area built to house Native American work crews during Camp Navajo's construction. Over 200 individuals with connections to Native American workers on the post in the 1940s participated in the oral history project. The oral history project began as a mitigation effort due to range development impacts on Indian Village, to document the experiences and history of the Native Americans associated with the site, and to convert the land for training. Personnel and historians visited Navajo and Hopi reservations in the state and met with tribal cultural preservation officers to encourage participation. Several on-site events were scheduled to bring former Native American workers, their relatives, and their descendants back to Camp Navajo. A two-day event in May 2008 and an associated local news article allowed CRM personnel to share the material that had been collected to date, and gather any additional oral histories from the installation's



Dave Larsen, Camp Navajo staff, and Native American visitors at the Indian Village interpretive kiosk. The title of the display reads "Indian Village: Native American Contributions From WW II Through The Korean War." Visitors appreciate seeing photos from the past. (Photo provided by Suzanne Griset, SWCA Environmental Consultants)

guests. Working with an interpreter, CRM personnel are translating and transcribing recorded interviews. Many of the children of the Native Americans posted at Camp Navajo were able to share their memories of growing up on the installation. The final report will be additionally developed into technical reports for the SHPO and publications for public dissemination at schools and libraries.

### Environmental Enhancement

The AZARNG's focus on cooperation among various stakeholders benefits the cultural resources, environmental and military programs at Camp Navajo. CRM surveys directly support environmental programs, such as prescribed burning of forested areas. Prescribed burning on post can improve the environmental quality in surrounding communities by benefitting native plants adapted to fire, releasing nitrogen and other nutrients into the soil, and increasing diverse habitat for plants and grazing animals. Prescribed burns also reduce fuel build up that can lead to devastating fires.



### Mission Enhancement

All CRM projects directly support the AZARNG military mission of training and emergency response activities. CRM personnel perform archaeological surveys that clear land for unimpeded training. The Programmatic Agreement between the AZARNG and SHPO has streamlined historic building management at Camp Navajo, which reduces the funds and

resources required for property maintenance and facilitates the removal of nonessential buildings and the construction of new barracks and readiness centers. AZARNG's interagency coordination, in terms of Programmatic Agreements with the SHPO and Memoranda of Understanding with curation partners, also ensures that the installation maintains compliance with cultural resources requirements, preventing unnecessary interruptions in training. This commitment to compliance additionally contributes to



resources committee to share information and lessons learned through their work at Camp Navajo. AZARNG helps military units satisfy their training goals by providing annual training sessions in environmental and cultural resources awareness. This training includes presentations on management requirements and responsibilities under NEPA and Section 106 NHPA. CRM personnel have also presented at DoD workshops and conferences, speaking to the development and success of the Indian Village ethnographic oral history project.



*This 2007 photo depicts Dave Larsen, Tom Parker and Kevin Johnson constructing an interpretive kiosk at Camp Navajo. The kiosk was made of welded steel posts set in place and secured with poured concrete footings. The corrugated steel roof was designed to protect the interpretive display from the ravages of severe weather. (Photo by Dorenda Coleman, AZ ARNG Environmental Staff)*

successful implementation of new facilities construction projects, forestry projects, and maintenance line updating.

Camp Navajo is committed to helping other National Guard units improve or enhance their CRM activities. To this end, CRM personnel participate on the National Guard Bureau cultural

AZARNG personnel have assisted other state Guard units with prisoner of war (POW) camp context studies. Having developed a context for Camp Navajo, AZARNG CRM personnel have enhanced their professional capabilities to place POW camps within a wider context. POW camps at Camp Navajo, PPMR,

Florence Military Reservation (FMR), and other facilities can be compared and contrasted in a number of ways to help determine site eligibility and interpretive potential.

Camp Navajo staff worked with PPMR and FMR engineer services to assure coordination and information sharing with the SHPO regarding restoration and preservation of a 1930s adobe armory building. Through close coordination, personnel were able to transmit detailed information regarding preservation standards and techniques for the restoration of historic buildings.



### Cultural Resources Awareness Education

The CRM personnel support cultural resources education at Camp Navajo through exceptional Soldier training that shares responsibility for stewardship with every individual at the installation. Units training at Camp Navajo are provided with briefing materials and maps of places to conduct training activities, and places to avoid such as restricted and sensitive areas. At Camp Navajo, the installation commander and staff participate in on-site visits and discussions with Native Americans who were residents at Camp Navajo. This effort to involve former workers from Camp Navajo raises awareness of the importance of cultural resources preservation in general, and provides a deeper understanding of the benefits of cultural resources preservation. The AZARNG also develops interpretive



Dave Larsen, Camp Navajo staff, and volunteers completing construction of the interpretive kiosk. This kiosk is located at the Austrian WW II POW Camp at Camp Navajo. This kiosk educates Soldiers on the cultural resources efforts on the installation. (Photo by Dorenda Coleman, AZ ARNG Environmental Staff)

models to enhance understanding of the unique contributions made by Native American workers and their families to the development and sustainability of the Camp Navajo mission and community.

### Community Relations

Community interaction at Camp Navajo involves both extensive Native American consultation and public outreach. Public outreach begins with Camp Navajo's many working relationships with universities, DEMA, and the SHPO to improve CRM practices. CRM personnel also support regional cultural resources awareness efforts by making presentations for the Arizona Historic Preservation Partnership Conference, and CRM personnel are members of the Arizona Preservation Foundation, the Society for American Archaeology, and the Southwest Archaeological Team.



The CRM team works to expand public recreation and education on post through cultural resources awareness projects, informational kiosk displays, and participation

in National Public Lands Day, Earth Day and the National Environmental Workshop. National Public Lands Day events hosted on the installation in 2007 and 2008 featured the development of interpretive signage and a guided history walk for the public.

Camp Navajo also features public access for camping and RV areas, as well as a hunting program, and CRM awareness and education briefings are conducted for all visitors using these resources. Camp Navajo's visitor awareness briefings help to ensure that cultural resources conservation is spread beyond its borders and throughout the community.

Students, scouts and scouting groups are encouraged to attend open-house events to view static displays and to speak with environmental personnel about program activities. The AZARNG CRM staff supports scouting service projects undertaken to earn rank, and to learn about environmental career and lifestyle opportunities.

**Secretary of the Army Environmental Awards Winners**  
U.S. Army Best Practices for the Environment Fiscal Year 2008

# Camp Johnson, Vermont ARNG

## Environmental Quality, Industrial Installation

Camp Johnson, located in Colchester, Vt., is the primary industrial installation for the Vermont Army National Guard (VTARNG), and is the home to the VTARNG headquarters, vehicle maintenance and paint shops, a Qualified Recycling Program (QRP), a Combined Support Maintenance Shop (CSMS), Field Maintenance Shop (FMS), United States Property and Fiscal Office (USPFO), state maintenance buildings, state and federal warehouses.

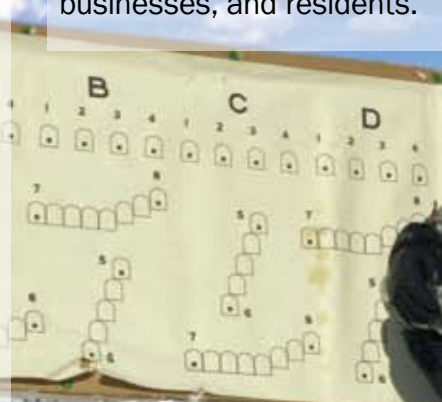
The lands, buildings, and activities at Camp Johnson provide high quality training opportunities for its Soldiers. The installation supports every unit in the state, maintaining and rehabilitating over 1,500 pieces of equipment every year, including automotive, body work, armament, and electronic.

With approximately 370 personnel assigned there, Camp Johnson is also a brigade deployment site, making it critical to not only the VTARNG, but also the greater military mission in Iraq and Afghanistan. Given the scope of its mission and state and federal environmental quality standards, environmental quality

management is extremely important to Camp Johnson and the VTARNG.

The State of Vermont's commitment to environmental standards ranked it first among America's Greenest States in a recent independent study of all 50 states environmental quality. The state's emphasis on strong environmental policies promotes energy efficiency and high air quality standards for all government agencies, businesses, and residents.

*On this page: Vermont Army National Guard Sgt. 1st Class James Rooney displays a target that was untouched by sustained small-arms fire during a recent demonstration about the effectiveness of snow fortifications. (U.S. Army photo by MSG Bob Haskell)*



### JUDGING CRITERIA



## BACKGROUND

Camp Johnson is faced with several unique challenges that include historical, natural resource, and compliance aspects to environmental issues. The installation has a long history in the United States since it was first developed in the late 1800's. It was home to the Buffalo Soldiers during the early 1900s and was turned into an Air Force Base between the 1920s and 1940s, then reestablished in the 1960s for the VTARNG. Camp Johnson is now a Joint Army-Air Force military installation.

Several natural resources pose interesting challenges for Camp Johnson. It is home to sand plains habitat that was formed during the last Ice Age. These sand plains just happen to provide the habitat for the pitch pine trees

**“The VTARNG has a very strong technical program that seeks and uses innovative technology to maintain and go beyond environmental compliance to reduce its’ environmental footprint. They have a good community outreach program that promotes partnerships with academia, foundations and other government agencies to involve them in their environmental mission.”**

- Ray Fatz,  
President and CEO,  
Plexus Scientific Corporation

and other natural communities that are very rare in Vermont. In addition, Camp Johnson is also home to the Grasshopper Sparrow which is on the State of Vermont Threatened and Endangered Species List. This bird has specific habitat and nesting needs. The VTARNG has had to identify and isolate training areas during certain times of the year to accommodate the sparrow, but has done so in a way that does not impact training.

In the compliance realm, the installation is unique in that it is a split of state and federally owned property. The installation has three different maintenance support facilities that must conform to the regulations of both federal and state agencies.

## PROGRAM SUMMARY

The environmental office oversees environmental activities for the

installation and all other VTARNG facilities. Its objective is to provide information and education to all VTARNG Soldiers and employees on how their operations affect the environment as a whole. This information starts with a policy established by the Adjutant General and is overseen by the Environmental Quality Control Committee (EQCC) which is comprised of the Chief of Staff and other senior leaders in the National Guard.

The office's close working relationship with command, planning, and facilities offices in the VTARNG ensure collaboration on all activities that have a compliance component. Environmental staff work collectively with various shops' personnel, with frequent visits and regular phone calls to encourage open communication and collaboration.



*Camp Johnson is the state headquarters of Vermont Army National Guard units. Located in Colchester, Vermont, their environmental office oversees environmental activities for the installation and all other VTARNG facilities. The staff's objective is to provide information and education to all VTARNG Soldiers and employees on how their operations effect the environment as a whole.*

Eight people make up Camp Johnson's environmental team, they are:

- CPT Jacob Roy – Environmental Program Manager
- Mrs. Lee Ann Banks – Environmental Compliance Manager
- Mr. Mike O'Hara – Conservation Manager
- Mr. Mike Young – Environmental Analyst
- Mr. Ryan Ochs – GIS Manager
- Ms. Kim Wittorff – Environmental Analyst and Cultural Resource Manager
- Mrs. Suzette Bourdeau – Environmental Technical Support Specialist
- Mr. Rodney Hall – Recycling Technician

Environmental personnel are involved in environmental training and collaboration throughout the National Guard Bureau. One staff member is the chair of National Guard Bureau's Environmental Advisory Council and previously chaired the Compliance Committee. Camp Johnson's staff also provided a presentation on spill response and prevention planning in a 2007 conference.

The environmental team at Camp Johnson is committed to ensuring program continuity and sharing their success with other units. Internally, program sustainability is supported by the VTARNG's ongoing implementation of ISO 14001. The Environmental Management System (EMS) management program is well-documented via an environmental web site



Camp Johnson's environmental staff from left to right: Captain Jacob Roy, Kim Wittorff, Suzette Bourdeau, Lee Ann Banks, Mike O'Hara, Rodney Hall, Mike Young, and Ryan Ochs.

that is available to all VTARNG Soldiers and civilians. Camp Johnson has also implemented a Unit Environmental Compliance Officer (UECO) program in fiscal year 2008 that will ensure that environmental training is received at the lowest unit level. The VTARNG environmental web site links Camp Johnson with all other VTARNG facilities, providing instant access to documentation and data for all compliance, pollution prevention, conservation, and planning activities. This transparency and access to information at Camp Johnson and throughout the VTARNG ensures that new staff can be brought up to speed quickly and easily.

Camp Johnson has designed and implemented an EMS program that improves compliance, prevents pollution, and integrates other means of improving environmental performance in accordance with EMS standards and goals.

## ACCOMPLISHMENTS

### Environmental Management System

One purpose of Vermont's EMS program is to identify how the VTARNG operations impact the environment. The implementation of the VTARNG EMS program has been a key project at Camp Johnson, an initiative that began in 2005. Full integration of EMS program goals and targets has been a driving force for a number of environmental quality projects at Camp Johnson. Over the last five years, the VTARNG has eliminated or significantly reduced impacts identified when the EMS program was initially established. Recently, in an effort to sustain the progress of the program, the VTARNG has identified other impacts and has set objectives and targets to address those impacts. Using the plan-do-check-act process, Camp Johnson has developed a sound management program that allowed Camp Johnson to achieve several milestones including





*SGT Mark Labonte of FMS 1, conducts an inventory of his flammable cabinet using the new scanner from the Hazardous Material Tracking System. The new system helps reduce hazardous material purchase, disposal, and waste with its inventory tool. Shops at Camp Johnson and throughout the state are able to swap unused or unneeded materials, avoiding the costs associated with new purchase and disposal of expired products.*

significant waste and emissions reductions and increases in recycling and landfill diversion rates. Due to the success of the EMS program the following other programs have flourished:

- Qualified Recycling Program
- Antifreeze Recycling Program
- Pitch Pine Preservation and Management Program
- Pollution Prevention Program
- Hazardous Material Tracking Program
- Energy Efficiency Program, to include backup and supporting generators, a wood chip plant, and lighting upgrades

Camp Johnson offers a collection point for the installation and other VTARNG facilities for light bulbs and batteries. A robust recycling

program also collects cardboard, paper, plastic, scrap metal, aluminum, and construction and demolition debris, some of which generates recycling revenues.

Camp Johnson's new QRP has helped to maximize recycling and streamline the recycling processes for Soldiers, and has generated significant revenue for environmental quality initiatives and other areas of mission support. As part of the QRP, Camp Johnson is constructing a new ammunition residue collection facility for brass collection and processing. The QRP is one way that Camp Johnson has developed new revenue streams to support the environmental and military missions. Under the QRP, the post has also instituted a program to earn money from cardboard recycling.

New software tools that track all hazardous materials in the VTARNG's armories and maintenance shops allows for better control of hazardous material usage. The tracking system will also help reduce hazardous material purchase, disposal, and waste with its inventory tool; shops at Camp Johnson and throughout the state are able to swap unused or unneeded materials, avoiding the costs associated with new purchase and disposal of expired products. Material tracking and sharing also helps to reduce redundant orders on Camp Johnson and throughout the VTARNG. Additionally, inventory data updated monthly with scanning equipment to avoid

human error and create up-to-date information, helps shop personnel take accountability for material stock and eliminate the losses associated with unnecessary purchasing and expiration from nonuse.

All environmental plans for Camp Johnson are up-to-date and reviewed on a five-year rotation. The spill plan and hazardous material management plans were both formally reviewed in fiscal years 2007 and 2008.

Management plans, the VTARNG EMS, and close working relationships with environmental regulators help Camp Johnson remain in full compliance. The installation has a perfect inspection record with no Notices of Violation (NOV).

### **Pollution Prevention and Waste Reduction Efforts**

In addition to improving material management, Camp Johnson has been proactive in eliminating toxic and hazardous materials as much as possible, replacing them with greener alternatives that have simpler use, storage, and disposal requirements.

Camp Johnson has phased out traditional paint shop systems over the past several years, and it now uses water-based CARC paint equipment and media-based paint strippers. This switch has not only increased the safety of the paint process for VTARNG Soldiers, but also eliminated the purchase and disposal of toxic solvents and painting materials.





Camp Johnson has an air permit requiring emissions reports to the state. However, over the past two years changes to shop equipment has allowed the installation to maintain its same level of operation while reducing emissions to under five tons, thereby eliminating the payment of state fees for emissions. These equipment changes include both the increase in the use of water-based CARC painting systems and the use of natural gas rather than heating oil.

Closed-loop wash racks in Camp Johnson shops collect grit and oil with used wash water and cycle these materials through a series of filters. The water is available for re-use, while the oil and sludge can be collected and disposed. One Wash Rack uses a system that separates oil and dirt from the wash waste and then evaporates the water.

Camp Johnson also uses equipment that refurbishes diesel fuel from vehicles undergoing maintenance. The system filters out dirt, particles and waste, putting the reclaimed fuel back into use. Reclaimed oil is also burned for heating, off-setting energy costs. Used oil that cannot be reclaimed is picked up by oil recycling vendors. Camp Johnson has been recycling their antifreeze for almost 15 years. This is done in-house and has saved the VTARNG thousands of dollars in procurement and disposal costs. Through recycling efforts such as these and other programs, the VTARNG has reduced the amount of hazardous waste generated by more than 90 percent since 1993.



To prevent spill issues and protect water resources, large fuel vehicles are parked in containment systems. Fueling points are also surrounded by containment systems, and all staff at Camp Johnson are regularly trained on spill prevention and response.

### Environmental Compliance Assessment and Management Program

In the past two years, Camp Johnson has not had to conduct environmental assessments for new construction, but environmental staff did use the NGB checklist and Record of Environmental Consideration (REC) and obtained State Historic Preservation Office (SHPO) and regulator concurrence as needed for construction and renovation projects at Camp Johnson. In addition the environmental office has RECs for 14 new, mission-essential pieces of equipment, three real estate actions, and two training and support events. All installation underground heating fuel tanks have been upgraded



to Category 1 standards with double wall construction and automated interstitial monitoring. The installation also installed a backup generator that allows the post to be off the local power grid during emergencies or to ease the strain on the local grid in the summer.

Camp Johnson has an impeccable compliance record, with no NOVs or fines. The installation received two unannounced state inspections over the last three years, with the installation in full compliance, marking an achievement under strict state regulations. The installation's maintenance technicians are well-trained in hazardous waste management and spill prevention and control, and Camp Johnson has updated spill plans for all sites.

### Community Relations

The majority of the installation's community outreach comes through its partnerships with local schools, Saint Michaels College, and the University of



Students from the University of Vermont take core samples of Lilly Pad Pond on Camp Johnson for analysis. The students are part of a partnership program between the installation and University provide environmental education opportunities and study the changes in our environment. In addition, students learn that the military takes responsibility for the environment.

Vermont to provide environmental education opportunities. Every year high school students visit Camp Johnson to study the installation's wetlands, conduct water sampling, and research plants and animals. University students also conduct field work and collect boring samples from wetland sediments for analysis. Graduate students are also able to conduct research projects on the installation's natural communities.

The state Natural Heritage Program partners with Camp Johnson through a Memorandum of Understanding to manage sand plain and pitch pine habitats on the installation.

Since 1992, the Vermont Military Department and the Vermont Fish and Wildlife Department have worked to develop and implement a plan for the restoration and management of pine-oak-heath-sand plain habitat and its constituent rare, threatened, and endangered plant species at Camp Johnson.

The benefits of partnering with the local schools are twofold. First, it is a great community outreach program that shows the students and teachers what the military does to preserve the natural and cultural resources within its boundaries. These areas are protected, real-life laboratories where students have a chance to take samples and study the changes in our environment.



*Two workers plant seedling pitch pines in the preserved sand plains area of Camp Johnson. Since 1992, the Vermont Military Department and the Vermont Fish and Wildlife Department have worked develop and implement a plan for the restoration and management of pine-oak-heath-sand plain habitat and its constituent rare, threatened and endangered plant species at Camp Johnson.*

Secondly, the VTARNG gets positive public exposure. Traveling through the installation the students see what the Guard has to offer and sometimes interact with Soldiers in the field. The students get to see a side of the military that rarely gets published. In addition, copies of the studies that are conducted are furnished to the VTARNG for Camp Johnson's records.

Regular environmental training for Camp Johnson's Soldiers and staff and the integration of environmental protection into all operations, helps ensure that VTARNG Soldiers are able to carry environmental awareness and stewardship back to their communities.

### **Effective Use Of Funding**

Because the hazardous materials tracking tool is still in its infancy, it is difficult to quantify the savings. However, Camp Johnson

anticipates that by allowing the sharing of inventory information between shops, and with help from the excess feature of the program, fewer items will need to be disposed and purchased. In some cases, it is difficult to order a small quantity of an item, forcing a shop to order a case lot. With the HAZMAT tracking tool, the shop should be able to look at other shop stock and see if they can obtain an item via internal exchange without ordering a case if only one or two of something is needed.

By using environmentally friendly products, the maintenance shops on Camp Johnson have reduced the use of solvent materials containing hazardous chemicals. The intangible savings from this reduction are a better working environment for the Soldiers and the reduction in the use of chemicals that have a high impact on the environment when disposed.

While dollar savings are minimal in the switch to water-based CARC paint, there are intangible savings. The impact on the labor force is lessened as the water-based material is less toxic and less expensive to clean than the solvent-based material. The switch to water-based paint has also reduced our air Volatile organic compound VOC emissions, which has contributed to the lowering of our overall emissions at Camp Johnson. This switch has allowed us to fall below the fee paying threshold set by the state.



A total of 156 tons of waste was recycled at Camp Johnson in fiscal year 2007, representing a disposal diversion rate of just less than 50 percent.

Camp Johnson has collected a total of 82.5 tons of scrap metal and brass and 54 tons of paper, cardboard, glass, and plastic, in fiscal year 2007. In addition, 6.5 tons of miscellaneous items (antifreeze, used oil, light bulbs, ballasts, and electronic waste)

were recycled at the installation in fiscal year 2007.

Camp Johnson's new QRP generated over \$16,000 in fiscal year 2007. In calendar year 2008 Camp Johnson generated over \$27,000 from the brass and metal recycling program and the newly instituted cardboard recycling program.

The recycled oil program incorporates the cost of the disposal of the oil into the purchase price, so essentially there is no cost to dispose of the oil. By participating in the re-recycled oil program, oil is also reused beneficially over and over. For oil that is not recycled, the burning of the used oil also decreases the amount of new fuel that we need to purchase and burn. This saves the VTARNG about \$3/gallon or about \$150/drum of oil. Camp Johnson burned almost 1,000 gallons of used oil in 2008 at a savings of about \$3,000. In 2008, approximately 2,000 gallons of diesel fuel was refurbished. The refurbished

diesel was used as fuel in a couple buildings at Camp Johnson and as vehicle fuel for a savings of around \$5,000 (based on a diesel cost of \$2.50/gal.).

By land farming contaminated soil, Camp Johnson saves on the impacts of transporting that soil to a certified treatment facility and the impacts of the thermal destruction process at the facility. As far as cost savings, 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 costs associated with it, i.e., plastic costs and testing costs, but because the dirt stays on-site, there is no external impact to the environment.

## SUMMARY

Camp Johnson's vibrant environmental quality program helps to ensure that no compliance issues ever interrupt operations and military support. As the lead on environmental quality in the state, Camp Johnson sets the standards for the rest of the VTARNG structure including 20 armories, an Army Aviation Support Facility, Camp Ethan Allen Training Site which is a 11,000 acre federal installation, small maintenance shops, and more. Camp Johnson's environmental office supports the federal and state mission of the National Guard by ensuring that training lands and facilities are available to provide realistic and quality training for its Soldiers.



*The Camp Johnson Fuel Point is a fully automated refueling station. Each vehicle has a key that operated the pumps and the pumps send the gallons used, mileage, and employee that pumped the fuel to a central computer. This fuel point is also a secondary containment not only for the tanks but for fuel transport vehicles when they are loaded.*

**Secretary of the Army Environmental Awards Winners**  
U.S. Army Best Practices for the Environment Fiscal Year 2008

# U.S. Army Garrison Bamberg, Germany

## Environmental Quality, Overseas Installation

The U.S. Army Garrison (USAG), Warner Barracks, at Bamberg, Germany, is located in northern Bavaria and is part of the 7th Army and the U.S. Army's Installation Management Command (IMCOM)-Europe. The garrison's workforce is made up of about 565 people, including 272 local nationals.

USAG Bamberg's mission is to provide services and facilities that support mission readiness and enhance quality of life for the military community, while optimizing resources. Major activities include community events, plans, operations, security, training, education, transition of personnel, supply, vehicle maintenance, food services, facilities engineering in accordance with the IMCOM established Common Levels of Support (CLS), logistical, and recreational support activities. All Environmental Management Division (EMD) activities have the sole purpose of supporting the military readiness and civil works missions.

The thousand-year-old city of Bamberg, a United Nations Educational, Scientific and Cultural Organization's World Heritage member since 1993, is a beautiful city in the German state of Bavaria. The

city's beauty lies in a cultural background and lifestyle that can only be found here in the Franconia region of Bavaria.

With a local population of about 70,000, Bamberg rests in the transition flat valley of the Regnitz River and the foothills of the Northern Franconian Hills. The USAG headquarters and Local Training Area (LTA) are located between the eastern City of Bamberg and a large forest area in the eastern part of central Germany.

The USAG Bamberg military community boundary encompasses approximately 3,244 acres, with 1,550 acres of buildings, roads and other impermeable surface. Including the LTA, there are 2,892 acres of unimproved area under the responsibility of the U.S. Army. Nine percent of the 3,244 acres is comprised of valuable ecological habitats with approximately 297 threatened and endangered species to be preserved and managed.

*On this page: U.S. Army Soldiers simulate breaching a house during a patrol and breach training class at Camp Blue Diamond in Ramadi, Iraq. The Soldiers are based out of Germany. (U.S. Air Force photo by Tech. Sgt. Jeremy T. Lock)*

### JUDGING CRITERIA



Program Management



Orientation to Mission



Technical Merit



Transferability



Stakeholder Involvement

## BACKGROUND

USAG Bamberg's EMD staff consists of two environmental engineers and two environmental specialists, with contractors supporting the core compliance and conservation programs. The EMD's program responsibilities include: environmental program management; implementation of an Environmental Management System (EMS); hazardous waste/materials; natural resources; geographical information system (GIS); radon; asbestos; air emissions; environmental noise; petroleum, oil, and lubricant (POL) storage; contaminated sites remediation; cultural resources; and online data calls and reporting. The USAG Bamberg initiated EMS implementation in fiscal year 2004, by the USAG commander signed the EMS policy. The legal driver of the environmental programs are the Final Governing Standards - Germany.



The USAG Bamberg's Environmental Management Division are responsible for the environmental management of the installation. The rest of the staff is made up of contractors who assist with a myriad of environmental response duties. Each member takes an active role in coordinating with the city of Bamberg.

Operations on the installation include training of rotational units for field artillery and marksmanship, engineer, and infantry support. Included in the footprint of the garrison are LTAs Pödeldorf, Bug, Appendorf, Burgebrach, Schesslitz, Kunigundenruh, and South Hauptsmoorwald. The EMD supports the Training Support Division by providing guidance and assistance for accomplishing sustainable range program and Integrated Training Area Management (ITAM) projects.

The Garrison uses an EMS that addresses pollution prevention opportunities, has a powerful recycling program, promotes the protection of public health and the environment, and conserves valuable material and energy, and maintains sustainable use of Army land through environmental conservation practices. USAG Bamberg's environmental management programs comply

with the IMCOM - Europe Region's Narrative Funding Guidance as well as locally developed standards.

## PROGRAM SUMMARY

The USAG is integrated with the local city government, and enjoys a strong and healthy relationship with its neighbors. The EMD is involved in external and internal committees and boards, outlined in the EMS manual as goals of the installation's environmental program. Environmentally related internal input is made through: weekly division level meetings, Director of Public Works (DPW) staff meetings, biweekly work order review meetings, monthly DPW project meetings, and the weekly commander's briefing.

The Environmental Quality Control Committee (EQCC), which is an installation-wide board, meets quarterly to communicate and discuss current environmental issues. At



**“The amount of plant species on the Berliner Ring increased from 320 to 420 due to the intensive care. This was made possible because of the close cooperation with the (Bamberg) garden office and the (Garrison) road construction office, which are responsible for the care.”**

- Dr. Juergen Gerdes, City of Bamberg  
Environmental Representative

the weekly Garrison Command and Staff Meeting, the DPW communicates environmental issues to Garrison Directorates as well as representatives of community and support organizations.

The EMD is focusing on the full implementation of the EMS, natural and cultural resources management and the expansion of the existing GIS.

## ACCOMPLISHMENTS

### EMS

In accordance with the North Atlantic Treaty Organization Status of Forces Agreement, Article 54A, USAG Bamberg's EMS program is consistent with German and state laws. To comply with EMS standards, USAG Bamberg has identified four significant environmental goals to meet:

- Energy consumption
- Solid waste generation
- Soil and groundwater contamination
- Air emissions

EMS implementation started within the DPW and was expanded in fiscal year 2006 to all Garrison directorates. All required Department of the Army metrics have been met at the highest standards including: environmental aspects (update annually), objectives, targets and programs (update annually), EMS audit procedure (update and conduct annually), management review (conduct annually), environmental training

(continuously), and operational control (update annually).

The Garrison has met the highest EMD standards by following significant EMS professional environmental management practices:

- Annual installation-wide reduction of total energy consumption by 3 percent (baseline fiscal year 2005)
- Continuous increase of the recycling rate by 2 percent annually (baseline fiscal year 2005)
- Reduction of (avoidance of) soil and groundwater contamination at buildings 7102 and 7027
- Reductions of air emissions at building 7027 to a threshold limit value

The Cross Functional Team (CFT) and the EMS Project Manager (PM) review the list of significant aspects and use it as a basis to develop objectives and targets

to mitigate and minimize the environmental impact of these aspects. The EMS manual defines the operational and organizational structure and functional responsibilities within EMS and contains procedures regarding the International Organization for Standardization (ISO) 14001:2004 Standard. The EMS manual is applicable to all USAG Bamberg personnel, military units, tenant units and contractors within the garrison's footprint. Standing Operation Procedures (SOPs) for operational control and an Environmental Management (Action) Plan for energy conservation, solid waste management, soil and groundwater management, memoranda for remediation and prevention of soil and groundwater contamination at Buildings 7102 and 7027 and air emissions at Building 7027 were developed and are signed by the Garrison Commander.



The Garrison Commander and teachers plant a tree during the Earth Day celebration. The annual tradition is part of the Garrison's commitment to environmental conservation. Each year, elementary school students and the Garrison Commander plant a tree in honor of Earth Day.



A modern underground recycling set for glass, cans and plastic. Only the inlets are visible. The containers are in the ground and can be lifted by the truck.

Besides reviewing and evaluating practices and procedures, the EMS-CFT is involved in providing environmental topics to non-environmental organizations and Garrison activities. The EMS Management Representative C/PAIO, the EMD, and Garrison representatives are appointed by the Garrison Commander. After receiving EMS training, the EMS-CFT members train people in their Area of Responsibility and coordinate the EMS at activity level. The EMS-CFT meetings are held quarterly.



residents, the Army Community Service, Community Expo, celebrates Earth Day with many activities and educates students of the elementary school. On Earth Day the Garrison Commander plants one tree with the students, but Elementary School students plant ten trees every Fall.

Energy conservation encompasses heating, electricity, fuel conservation and hot and cold water consumption. EMD initiated a program with the Bamberg Elementary School to teach and promote conservation of natural resources. EMD trains building energy appointees on energy conservation techniques. The EMD contacts rear detachments in the winter to turn off lights and heating when units are deployed.



EMS Training Numbers Calendar Year 2008
250 newcomers during People Encouraging People program
600 students at Earth Day and recycling classes
351 Soldiers (most were deployed) 2007: 906 Soldiers
303 civilian workforce

EMD provides training and guidance to all divisions, in-processing Soldiers, participates in the People Encouraging People (PEP) program for spouses, contributes to the Housing Division-provided newcomer information package for new

the population with S.O.R.T. information on a regular basis. The recycling rate compared to remaining waste disposal in fiscal year 2006 was 43.88 percent, in fiscal year 2007 41.46 percent and in fiscal year 2008 43.58 percent. The recycling rate consistently exceeds standard.

Category	Tonnage (Fiscal Year 2008) [metric tons]
Organic Waste	136.24
Grease	302.20
Paper/Cardboard	486.46
Glass	49.42
Textiles	11.52
Plastic	33.62
Cans/Metal	214.38
Fluorescent Light Tubes	0
Construction Debris	15.40
Batteries	22.36
Bulk Refuse	125.50
Tires	9.66
Electronic	18.90
Wood	187.0
Remaining Waste	2,127.11

Another significant objective is the maintenance of biotopes, or biological communities that were identified during the inventory conducted in 2007. One hundred and fifty-two acres or nine percent of unimproved Army land are valuable biotopes. Military training activities during past decades created and maintained a great variety of biotopes. Keeping the high density of the population and intensive use of the surrounding farm land in mind, Army training grounds have become ecological areas of national importance.

### Pollution Prevention and Waste Reduction Efforts

In spite of increased deployments and redeployments with the associated supply delivery and purchase activities EMD continues to provide Sort or Recycle Trash (S.O.R.T.) awareness training courses. EMD provides



Reduced training activities due to deployment result in a significant decrease of biotope areas. Therefore, the EMD has implemented a maintenance program for disturbance-dependent species and their habitats.

### Environmental Compliance Assessment and Management Program

Energy conservation affects everybody within the community of USAG Bamberg. There are many “players” involved, for example users, building coordinators and occupants. The DPW’s Operation and Maintenance (O&M) Division is focused on informing and training the entire population on energy conservation possibilities. For that achievement the DPW O&M Division received the Secretary of the Army Energy Efficiency and Energy Management Award.



During EMS management reviews, strengths and weaknesses of the EMS are identified and discussed, and corrective action plans are developed. The Garrison Commander, the EMS Management Representative, the EQCC, the EMS-CFT, and the EMS PM conduct the annual environmental management review each December. The Garrison Commander supervises the performance and approves the results of the annual environmental management review. The annual internal EMS audit, the internal Environmental Performance Assessment System and the annual management



*Bamberg Elementary school students celebrate Earth Day at USAG Bamberg's Engineer Lake. In addition, Bamberg Elementary School students plant trees in remembrance of September 11th. Each of the school's 24 classes have planted a fruit tree as part of the installation's environmental conservation.*

### Effective Use of Funds

- The EMD was the first activity of the USAG with a fully working Geographic Information System (GIS). Data exchange within the Garrison of ecological and other environmental inventories are now communicated to 100 percent (31) relevant organizations.
- The DPW’s O&M Division focused on informing and training 1,504 of the base population on energy conservation possibilities. Efforts resulted in savings of 38,000 million British thermal units which equals a monetary saving of \$450,000 in 2007.
- Successfully implemented the EMS in accordance with Army metrics and expanded to the 100 percent of the Garrison using GIS information sharing.
- In 2007 the Garrison constructed a new recycling center and collected approximately 3,739.77 metric tons of waste in fiscal year 2008. Higher recycling rates increase cost savings for the community. Disposal of remaining waste is more expensive than recycling. Recycling also conserves the limited exhaustible raw materials. In addition, recycling is established in Germany law and is an important issue in Germany.
- Reduced the number of 21 suspected contaminated sites as of February 2005 down to three sites in 2008.



review guarantees a long-term sustainability of the environmental program.

Building 7027 (AAFES garage) is in violation of environmental, safety and fire prevention provisions. As a direct result of EMS implementation EMD, Fire Department, USAG Safety and AAFES jointly inspected the building and came up with a solution to improve conditions.



An effective remediation program combined with close cooperation with host nation agencies reduced the number of 21 suspected contaminated sites as of February 2005 down to three sites in 2008. State authorities will

most likely discontinue the long-term monitoring program at two remediated landfills. The last remaining contaminated site is a former filling station at Building 7102. The remedial action is funded and ongoing.

### Community Relations

For many years, the Garrison has supported the city's nature conservation office through conservation measures at the Army Airfield Storage and Range Area. Upon official city request, the Garrison Commander agreed to include 34.6 acres, into the program of reduced mowing of dry sand meadow habitats. And, in 2007 a well-known, non-profit environmental organization



awarded the City of Bamberg the title "Environmental City of Germany" for their efforts in creating and protecting naturally grown dry sandy meadows.

EMD's sound Natural Resources Management Program enables the IMCOM-Europe Garrison and the United States Army, Europe (USAREUR) to train Soldiers to doctrinal standards and to be leaders in environmental stewardship at the same time.



The Engineer Lake area adjacent to the garrison was reshaped from minor ecological significance to an area where recreation, ecological habitats, and nature experience are combined. Increased use



A contractor with USAG Bamberg's Environmental Office fights the undesired Reed Grass (*Calamagrostis*) at the U.S. Army airfield. Biotope maintenance is needed more frequently due to a lack of military training. Military training operations prevents the Reed Grass from growing in the area.

of the site for family barbecues and other recreational activities during the past two years reflect the acceptance of the reshaping and landscaping project of the Engineer Lake recreation area.

### Environmental Planning and Analysis

The main external communication platform is the unique “Round Table” at DPW. This forum discusses landscaping, tree cutting, construction and planning issues for the USAG Bamberg. Permanent members are representatives from DPW, such as Engineering Division, Master Planning, O&M, EMD, and the Federal Forester. At the Garrison Commander’s request, members of the Force Protection Office, City of Bamberg, also join the “Round Table.”

The Garrison also uses periodic project meetings to coordinate planning processes with the Federal Real Estate Office

and appropriate local parties/ authorities to assist Bamberg with special forest management.

The EMD was the first activity of the USAG with a fully working GIS. The current GIS includes a great variety of themes: e.g., 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 material storage areas, above ground storage tanks, underground storage tanks, trees, biotopes and forests. Most of the themes are also available in 3-D.

A central DPW server allows sharing of environmental data with 31 other involved activities such as Buildings and Grounds Branch at O&M Division. The Master Planning Division can

easily retrieve environmental data for their needs. In addition, there is a GIS data exchange between EMD’s and the Training Support Center’s ITAM GIS. The GIS is used to coordinate the increased number of biotope maintenance projects recommended by the 2007 biotope inventory. Undesired vegetation will be removed. Inventories of flora and fauna prove the success of these projects and their sustainability. Larger open areas within forests will be kept open for nature conservation reasons, military training and tank driving exercises.

### SUMMARY

The EMD and Training Support Center, Range Control jointly assure that the Sustainable Range Program (SRP) is in full compliance with environmental laws and regulations. EMD shares data on natural and culture resources, biotope development, wetlands, threatened and endangered species with the ITAM Coordinator prior to implementation of training area development projects and provides guidance on how to meet mission requirements with minimized or no environmental impacts. The collaborative efforts between EMD and Training Support allows the IMCOM-Europe Garrison and USAREUR to simultaneously train Soldiers to doctrinal standards and be leaders in environmental stewardship.



The USAG Bamberg opened a new recycling center in 2007. The center collected approximately 3,739.77 metric tons of waste in fiscal year 2008. The center is opened day and night for resident’s use.

**Secretary of the Army Environmental Awards Winners**  
U.S. Army Best Practices for the Environment Fiscal Year 2008

# Combined Support Maintenance Shop, Michigan ARNG

## Pollution Prevention, Non-Industrial Installation

The Michigan Army National Guard (MIARNG) Joint Forces Headquarters in Lansing, Mich. and its Combined Support Maintenance Shop (CSMS) and Environmental Division have been recognized for being a shining example of environmental stewardship and sustainability in the region. The MIARNG's mission is to provide trained and ready forces in support of the National Military Strategy; respond as needed to state, local and regional emergencies to ensure peace, order and public safety; and add value to our communities through continuous interaction.

One way that the MIARNG is providing that value is through the installations' pollution prevention (P2) program. The MIARNG CSMS has implemented new pollution prevention technologies that help make their operation more mission practical, environmentally sound, and therefore more sustainable.

The MIARNG CSMS is located in the capital city of Lansing, which is the sixth largest city in the state located about 80 miles west-northwest of Detroit.

*On this page: (Left to right) Ukraine Capt. Alexander Dodukh, Staff Sgt. Brandon Post and Staff Sgt. Chris Collins of the Michigan National Guard compare wind speed readings during a joint training exercise. (U.S. Marine Corps photo by Gunnery Sgt. Donald E. Preston)*



### JUDGING CRITERIA



Program Management



Orientation to Mission



Technical Merit



Transferability



Stakeholder Involvement

As stated in the Adjutant General (TAG) Environmental Policy Statement, the MIARNG is committed to a sustainable mission operation through its commitment to environmental improvement, P2, environmental compliance, and mission sustainable training. The P2 efforts of the CSMS have been essential to the military mission of the MIARNG. Prior to the opening of the new CSMS four years ago, the previous paint shop could not pass the state regulatory requirements and painting activities ceased for many years. The MIARNG's new CSMS is the only full re-painting facility for the MIARNG and processes 12 to 15 vehicles/pieces of equipment every month in support of MIARNG missions. The CSMS is a 143,518 square foot ground-vehicle maintenance facility consisting of 53 work bays and eight motor vehicle storage bays. The shop occupies 31.2 acres and is part of the Joint Forces Headquarters Complex which totals 58.64 acres. The CSMS employs 100 full-time MIARNG members and



**“If it wasn’t for P2 initiatives that we employ in our painting operation I have to believe our operating costs would be much higher, perhaps even an order of magnitude higher.”**

*- Richard L. Wilder, CW4 OD MIARNG, CSMS Allied Trades Section*

80 part-time members and is committed to expanding P2 awareness. In fact, some of the CSMS employees also serve on the MIARNG Environmental Management System (EMS) Cross-Functional Team which leverages teamwork and partnership, to identify mission priorities across the installation to maintain a sustainable operation. The MIARNG is transitioning its installation headquarters into a truly joint force headquarters and enhancing adaptive-mission strategies to execute our nation's defense strategy. The MIARNG is a leader for the National Guard in its P2 practices and commitment to sustainability.

## BACKGROUND

The National Guard has a unique dual mission that consists of both Federal and State roles. The

MIARNG's mission is to provide a trained, ready, and sustainable force structure in support of the National Military Strategy. One way that MIARNG is completing their mission is through the installations' P2 program. P2 focuses on conservation of resources, replacement of hazardous materials with less hazardous materials, waste reduction, recycling, and other preventive means to successfully and cost effectively avoid, prevent, or reduce the generation of pollutants. The MIARNG installation Environmental Division works with the National Guard Bureau (NGB) to find new equipment that will benefit the installations' P2 efforts and develops budgets to fund the procurement of that equipment. The money saved by implementing these P2 efforts is redirected to soldier training and



An aerial view of the CSMS located at the Michigan national Guard's Headquarters Complex in Lansing, Mich. The MIARNG CSMS paints and processes 12 to 15 vehicles/pieces of equipment every month and provides the only full re-painting services for the MIARNG. In addition, the Allied Trades Shop manages sheet metal repairs and weapons storage/shipping containers for mobilization and annual training.

readiness, facility and equipment improvements, and other mission related programs and resources. The CSMS is one such shop that promotes environmental improvement and encourages pollution prevention through its practices and materials. The CSMS is ISO9001 and AS2000 certified and supports vehicle maintenance and mobilization and training activities. The MIARNG CSMS has reached some key milestones over the past two years which have made it greener and more sustainable than ever.

**Key Milestones:**

- Implemented Spray Technique Analysis and Research for Defense (STAR4D) painter training programs
- Conversion from solvent-based to water-based Chemical Agent Resistant Coating (CARC) painting systems and water-based painting materials

**P2 Benefits of Water-Based Painting Systems:**

- Reduced air filter replacement
- Cut hazardous waste streams
- Reduced hazardous waste disposal costs
- Enhanced soldier safety

The MIARNG believes that EMS implementation plays an important role in mission sustainability, as outlined in TAG’s Environmental Policy statement. The MIARNG is committed to maximizing the availability of training areas and facilities to enable soldier training and readiness today and into the future, maintaining compliance with environmental



*The MIARNG CSMS received their ISO 9001:2000 Quality Management Systems certification. It includes a requirement for the continual improvement of Quality Management Systems.*

regulations, preventing pollution of training lands, water, and air, and improving the performance of environmental, energy, and fuel management practices to sustain our natural resources and advance our nation’s energy security. The CSMS and Environmental Division staffs work closely on a day-to-day basis, they also meet quarterly with the MIARNG Environmental Quality Control Committee (EQCC) to review EMS integration and set targets and objectives for operations throughout the installation. One such target accomplished in the past two years was training and equipping all paint staff with water-based CARC paints.

**New Technologies**

One of the most promising new technologies utilized in the painting operation at the CSMS is

the Closed Loop Advanced Water-jet System (CLAWS) used in the paint stripping bay. The CLAWS is a paint stripping operation designed to remove old paint with water instead of the typical, more commonly used blasting material. CLAWS uses a high pressured water jet to remove old paint, a process that significantly reduces the amount of both solid waste and hazardous waste generation and significantly lowers labor and disposal costs as well as future liability. The chart below compares the typical cost of waste generation differences between CLAWS and conventional paint stripping methods one would expect to find with each.

The Allied Trades staff at the CSMS likes the ease and simplicity of this system that can strip paint at a comparable, if not faster rate than conventional stripping methods (personnel strip

	Typical Waste Disposal Unit Costs	Typical Annual Disposal Cost	Vehicles/Equipment stripped per week
<b>Conventional Method</b>	72 tons at unit cost of \$52/ton	\$5,000	3-4
<b>CLAWS Method</b>	205 lbs at unit cost of \$0.52/lb.	\$500	3-4

approximately 12-15 vehicles per month, in addition to numerous other pieces of equipment of varying size). The CSMS has made the switch from using a solvent-based CARC paint and primer to a water-based CARC paint and primer on tactical vehicles because it does not soak up chemical agents the way alkyd (oil) paint does. It also resists removal by decontaminating solutions. Moreover, from a mission perspective, the water-based CARC paint reportedly is up to 3-times more durable than conventional solvent-based CARC paint. The CSMS Allied Trades group realizes that having the right equipment and using the correct materials are not enough in the painting process. Therefore, each painter is sent to the STAR4D program, a three-day training course for military coatings operations. The program teaches effective spraying techniques to maximize coating efficiency and minimize environmental pollution.

## PROGRAM SUMMARY

The MIARNG CSMS has met and exceeded its primary goal to be efficient and utilize new technologies. During its inception, saving time and money and providing a safe work environment for employees, while protecting the environment was on everyone's mind. As a result many pollution prevention control measures were installed at the new facility. Sound program management has contributed to the CSMS' P2 program success. Key accomplishments over

the past two years include earning ISO9001 and AS2000 certifications; implementation of the STAR4D painter training programs; conversion from solvent-based to water-based CARC painting systems and water-based painting materials; and participating in Green Procurement and Leadership in Energy and Environmental Design (LEED) training hosted by the MIARNG. One goal that the MIARNG Environmental Quality Control Committee achieved in the past two years was training and equipping all paint staff with water-based CARC paints. Water-based CARC and primer were created to meet U.S. Environmental Protection Agency's Clean Air Act regulations but they also have the added benefit of being safer for painters, are easier to use, and significantly reduce the hazardous waste stream volume for the painting operation.

## ACCOMPLISHMENTS

### Material Substitution

In the past two years, the transition to painting procedures entirely based on water-based CARC paint has been completed, eliminating the need for solvent-based paints, thinners and reducing air filter replacement. An external filter covered with



*New paint mixers ensure the most efficient mixing and storage for vehicle and equipment paint. This not only reduces the likelihood of spills, but also simplifies operations for CSMS painters. Paint mixers also reduce waste by keeping paint fresh, avoiding the disposal of unused paint.*

pre-filter mesh cloths capture downdraft paint particulates in the paint booth. The pre-filter cloths can be replaced more often at limited cost, while the filters themselves have longer use. Filters also are disposed of as solid waste minimizing the overall waste stream of the CSMS paint shop. The shop replaced solvent-based primers with water-based primers, producing environmental and operational benefits. The CLAWS used in the paint prep shop recycles the water used for paint stripping through a filtration system. A micro-separator uses a centrifuge process that collects paint particles, rust, and debris from used water. The deionization process also minimizes flash rusting, enhancing paint life. The substitution to water-based paint has also benefited soldier health and safety by minimizing their exposure to potentially harmful toxins.

### Process Improvement

STAR4D training is an important element for CSMS operations. The new CSMS training processes





have also helped make the shop an example within the Guard. When a new painter is hired, he or she is teamed with an experienced painter for mentoring. After approximately two months working in this capacity, the new painter will be considered a full member of the paint shop team and sent to STAR4D training. With an extensive analysis and research library, the STAR4D experts have the most up-to-date information on coatings, technologies, and application techniques. The painters attending STAR4D training are given both an entrance test as well as an exit test. Test results indicate an across the board improvement of approximately 10 percent. This equates to decreased VOCs being released into the atmosphere, an improvement in transfer efficiency and savings in paint material used.

### Improved Material Management

Using updated material management practices minimizes the CSMS waste streams and provides inventory and personnel support which helps the shop run more efficiently.

- The environmental staff provides regular training on spill prevention and response, hazardous materials management, and compliance protocols. All plans and SOPs are updated as the work environment changes.
- CSMS and the environmental staff conduct spill drills to prepare the CSMS staff in the event of an accident. This



*A painter uses claws equipment to strip paint from a MIARNG vehicle. The system recycles the water used for paint stripping through a filtration system. The substitution to water-based paint processes has also benefited soldier health and safety by minimizing their exposure to potentially harmful toxins.*

proved beneficial this past year when a vehicle fuel tank was damaged and leaked in the paint stripping shop. The CSMS staff was able to contain and clean up the spill and the quick response resulted in no negative actions.

- The Standard Army Maintenance Management System-Enhanced (SAMS-E) not only allows the CSMS to track man hours, assign jobs, and account for equipment, it also provides inventory support that tracks the paint and shop supplies on-hand, monitor use and expiration dates, and guide re-purchasing.

### Recycling Program

Another area that the MIARNG's CSMS focuses on is recycling. The CSMS continues to look for new recycling streams. Water is already recycled in the paint prepping process using CLAWS and waste disposal has been minimized. A micro-separator

uses a centrifuge process that collects paint particles, rust, and debris from used water. These waste materials are the only stream that has to be disposed of as hazardous waste. The deionization process also minimizes flash rusting, therefore enhancing paint life on material. In addition, all aerosol cans used at CSMS are punctured and drained after use then recycled as scrap metal. A special laundry contract also collects shop rags for laundering and reuse, thereby eliminating this solid waste stream and avoiding the costs of new material purchase.

### Education, Outreach, and Partnering

The MIARNG installation has set a leadership example of Army's Triple Bottom Line of mission, environment, and community by hosting numerous meetings and events and providing tours of the CSMS and its operations for public and



private organizations. They have given tours and demonstrations to Lansing Community College classes, scout troops, Department of Defense/State of Michigan Environmental Alliance, the Environmental Protection Agency, and the Department of Environmental Quality. The MIARNG has also supported private companies interested in switching to water based CARC painting systems. In 2008, the MIARNG hosted the annual Department of Defense and State of Michigan Environmental Alliance Federal Facilities Workshop on Green Procurement and LEED training. The 2008 workshop was the first time the Environmental Alliance reached out to a target audience comprising participants other than environmental personnel to emphasize the importance of Cross-Functional Integration to organizations who want to achieve a sustainable operation. The training helps enable MIARNG to meet Army and DoD procurement policy requirements while supporting the overall sustainability of its operations through sound management of fiscal resources, natural resources, infrastructure, and energy.



### Reductions Achieved

The CSMS has achieved significant reductions in hazardous waste, resources used, and disposal costs by integrating new technologies and training into its everyday P2 operations. The CSMS has made the switch from using a solvent-based CARC paint and primer to a water-



CSMS painter Chris Adair explains the camouflage painting process for a 34-ton semi-trailer to MIARNG Soldiers. Internally, regular training and planning updates help to keep all CSMS personnel up-to-date on compliance and P2 requirements. The mentoring relationship for new staff ensures that best practices are continued throughout the organization.

based CARC paint and primer on tactical vehicles. The water-based CARC and primer contain no hazardous air pollutants and have significantly reduced air emissions of Volatile Organic Compounds (VOCs). The results of training studies at the STAR4D program, which the CSMS sends its painters to, demonstrates significant improvement in painting efficiency. A comparison of pre-training 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 VOC air emissions of over 15 percent. The CLAWS operation only generates approximately 15 lbs of hazardous waste per month or less, keeping operating and labor costs low while reducing future disposal liability concerns. The total hazardous waste disposal cost including analytical testing for the

painting operation was less than \$1,000 for fiscal year 2007. This is significantly less than disposal costs generally associated with more conventional paint stripping methods.

### Program Management

The staff at the CSMS manage automotive repair, supply facility weapons repair, and Allied Trades operations. Working closely with the MIARNG Environmental Division, and following EMS and TAG policy guidelines, the staff has integrated environmental awareness into all operations, and cooperates to target waste streams for reduction and identify process improvements. The location of the Headquarters campus also ensures that CSMS and Environmental Division staff can easily communicate and collaborate with MIARNG





*The micro-separator uses a centrifuge process that collects paint particles, rust, and debris from used water; these waste materials are the only stream that has to be disposed of as hazardous waste. The deionization process also minimizes flash rusting, therefore enhancing paint life on material.*

command to expand P2 activities. All management plans for P2 and compliance are up-to-date and reviewed annually. This commitment to planning and training has helped the installation to maintain its record of no Notices of Violation or compliance problems.



### **Compliance with E.O. 13423**

In accordance with E.O. 13423 Strengthening Federal Environmental, Energy and Transportation Management, the CSMS has designed their processes to reduce negative impacts on the environment, improve the comfort of the building occupants, and reduce operating costs while improving building performance. Eliminating solvent-based materials has reduced air filter replacement, cut hazardous waste streams, and enhanced soldier safety. The use of the CLAWS system has reduced water consumption. The use of water-based CARC has led to a reduction in the use of chemicals and toxic materials.

The implementation of EMS at all appropriate organizational levels to ensure use of EMS as the primary management approach for addressing environmental aspects of internal agency operations and activities has ensured that the CSMS will remain a sustainable and environmentally friendly facility.

### **Green Procurement**

Green procurement is rooted in the principle of pollution prevention, which strives to eliminate or to reduce risks to human health and the environment. The CSMS has received its ISO9001 and AS2000 certifications for continuing to improve their quality management systems. The CSMS has made the switch from using a solvent-based CARC paint to a water-based CARC paint on tactical vehicles. The water-based CARC and primer contain no hazardous air pollutants and have significantly reduced air emissions of Volatile Organic Compounds (VOCs). The implementation of STAR4D training has reduced material consumption and VOCs. The CLAWS system recycles water used for paint stripping through a filtration system. The substitution to water-based paint has had a positive impact on soldier health and safety by minimizing their exposure to potentially harmful toxins.

### **CONCLUSION**

The MIARNG's Joint Forces Headquarters set the standard for pollution prevention initiatives and sustainability in Michigan.

Many other states are taking notice of the MIARNG's P2 practices and are continuing to seek out the MIARNG's expertise in setting up similar operations in their facilities. The CSMS was recognized by the Department of Defense/State of Michigan Environmental Alliance for their efforts in pollution prevention by having their success story posted on the Michigan Department of Environmental Quality web site. The NGB has selected the MIARNG and its \$24 million CSMS facility as the 2008 winner of the NGB "Pollution Prevention" environmental award. Winning the award was truly a joint effort between the environmental office and the CSMS staff. The partnership included procuring and obligating funds through the NGB's P2 program to purchase painting equipment, provide specialized training that increased efficiency and minimized waste generation, and to invest in waste stream evaluation and analysis resulting from water based CARC and painting operations. This partnership between the CSMS and Environmental Division staff demonstrates how the ability to accomplish the mission can be enhanced through sustainable actions such as P2. The MIARNG's commitment to outreach, information-sharing, and engagement with environmental regulators, government agencies, industry, and other members of the community has made the installation a pollution prevention leader not only in Michigan, but also in the region and throughout its military structure.

**Secretary of the Army Environmental Awards Winners**  
U.S. Army Best Practices for the Environment Fiscal Year 2008

# Fort Bragg, North Carolina

## Environmental Restoration, Installation

Fort Bragg, N.C., home to the XVIII Airborne Corps and 82nd Airborne Division and future site of the U.S. Army Forces Command (FORSCOM) Headquarters, is a premier “Power Projection Platform of Excellence” with 52,000 Soldiers and a total daytime population exceeding 150,000. Not only is Fort Bragg the largest U.S. Army installation, but it can also be considered the fifth largest city in the State of North Carolina.

Developable land is at a critical premium and a massive \$2 billion in new construction is scheduled over the next three years due to the Department of Defense (DoD) Base Realignment and Closure (BRAC) Act, Grow the Army, and additional expansion initiatives. Fort Bragg’s continued viability depends heavily on its Installation Restoration Program (IRP) to restore land for use in these high-profile, mission-vital projects.

The environmental goal of Fort Bragg is to not only reduce consumption of natural resources and minimize its ecological “boot print,” but to ensure that the installation’s 52,000 dedicated service

members are provided the best possible conditions in which to train, prepare for and perform their mission-essential duties.

Out of the 160,000 acres that make up Fort Bragg, the installation has removed 1,100 non-compliant underground storage tanks (UST) and remediated 93 of the installation’s 104 identified Solid Waste Management Units (SWMU), returning 675 acres of “developable real estate” to Fort Bragg’s inventory.

The IRP’s unique achievements are crucial to military readiness, as the restored acreage will return 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 of the IRP extend beyond the installation boundaries to pave the way for DoD, as Fort Bragg’s restoration goals and lessons learned are disseminated through its extensive network of partners, regional presence as Sustainable Sandhills, regular stakeholder briefings, community outreach events and activities, and local media.

*On this page: Paratroopers from the 82nd Airborne Division, Fort Bragg, NC, assault an objective as part of a training exercise. (U.S. Army photo by Staff Sgt. Mike Pryor)*



### JUDGING CRITERIA



Program Management



Orientation to Mission



Technical Merit



Transferability



Stakeholder Involvement

## BACKGROUND

Fort Bragg's IRP was initially developed to investigate and identify the most resource-efficient, cost-effective and environmentally sound means for remediating 100 SWMUs and five areas of concern identified in a 1988 installation-wide environmental survey.

Now, with \$2 billion in new construction scheduled to occur on Fort Bragg over the next three years developable land is in high demand. However, due to the extensive presence of the endangered red-cockaded woodpecker in the wooded areas surrounding Fort Bragg's urban area, cutting down pine trees for expansion is not an option.

Thus, Fort Bragg's goals and objectives are to reuse existing developed land. This in itself presents challenges due to the prevalence of contamination on the installation; as such, Fort Bragg must rely heavily on the IRP to efficiently and effectively restore these contaminated areas for mission-critical construction.

In order to meet its ambitious goals, Fort Bragg's IRP has made creative and innovative use of standard technology such as geographic information systems (GIS) to substantially reduce the project review process and streamline communication and collaboration between internal project managers and the U.S. Army Corps of Engineers (USACE) throughout the lifecycle of a project. The GIS system is

**“Implementing the WCS technology is an excellent example showing how an installation's environmental restoration program working with other internal offices can expedite construction projects required by BRAC.”**

*- Dennis Druck, Environmental Scientist,  
U.S. Army Center for Health Promotion and Preventive Medicine*

used by the USACE, architect and engineering firms and subcontractors to review multiple levels of real-time data; IRP data is shared extensively across the installation for use in a variety of capacities, from construction management to environmental assessment.

Another management tool used by the IRP to efficiently organize and expedite restoration projects is the work coordination system (WCS), Fort Bragg's state of the art workflow tracking database for all Military Construction (MILCON) and Operations and

Maintenance, Army (OMA) projects. The program utilizes the interactive system to streamline communication between internal project managers and the USACE. Facilitated by the WCS, all proposed MILCON and OMA projects are reviewed for environmental constraints at the monthly internal stakeholder/customer coordination meeting. The WCS is a tool used to ensure that a project is on-track and within budget; the system also reflects changes within the project and identifies project execution challenges.

### Significant Accomplishments (1 October 2006 – 30 September 2008):

- Collaborated with AEC and Parsons Corporation in the development of a performance-based contract saving the Army \$2.5 million
- Saved Fort Bragg over \$1 million and reduced remediation time by eight years by using a more efficient and cost-effective alternative remediation technology
- Expedited cleanup of the future FORSCOM headquarters and 4th Brigade Combat Team vehicle maintenance shop complex to ensure on-time completion of these critical BRAC projects totaling approximately \$600 million
- Partnered with state regulators to apply underground storage tank regulations to spill sites, avoiding the Resource Conservation and Recovery Act investigation process
- Collaborated with state regulators to develop innovative methods of compatible development, including the Notice of Residual Petroleum
- Utilized geographic information systems to reduce the review process time on investigations by 50 percent
- Employed the innovative work coordination system that expedited project review processes. This became the model for installations in the Southeast region.

To reach an even broader audience, IRP staff regularly use the platform of local and regional media. Environmental assessments are published for public review and feedback in the installation-wide *Paraglide* newspaper, as well as regional newspapers such as the *Fayetteville Observer*, and the *North Carolina State Environmental Review Clearinghouse*. Program personnel are also in the process of coordinating with Bragg TV to develop a series of Public Service Announcements on the restoration program to transfer lessons learned to the public.

Furthermore, the program's external web site provides a more technical overview of the program's accomplishments and lessons learned. Individuals and installations alike are freely encouraged to browse the web site to learn more about the program's goals, management practices, technology and lessons learned. The web site includes a listing and map of Fort Bragg's SWMUs, files documenting key program decisions, and the IRP manager's phone number to contact for additional information.



## PROGRAM SUMMARY

To meet all of their goals and objectives, Fort Bragg took part in a number of collaborations and used several innovative techniques. One milestone of the Installation Restoration Program was validated in 2006 when Fort Bragg collaborated



*Injectant is being delivered at SWMU 69, a former Army equipment dismantling yard contaminated by chlorinated solvent. A number of wells were manifolded together for concurrent product delivery, and the balance of the system was adjustable using gate valves in the system. Using an alternative remediation of vegetable oil in place of HRC® will save Fort Bragg in excess of \$400,000 throughout the total lifecycle of the project and an additional \$750,000 in monitoring costs.*

with the Army Environmental Command (AEC) and Parsons Corporation in the development of a performance-based contract saving the Army an estimated \$2.5 million. Similarly, the Installation Restoration Program saved Fort Bragg over \$1 million and reduced remediation time by eight years at SWMU 69 and SWMU 103 by eschewing previously proposed methods for a more efficient and cost-effective alternative remediation technology.

Another milestone came for Fort Bragg in 2007 when they negotiated and partnered with state regulators to apply UST regulations to spill sites, avoiding the long and drawn out Resource Conservation and Recovery Act (RCRA) investigation process. Fort Bragg also collaborated with state regulators to develop innovative methods of compatible development, including the Notice of Residual Petroleum.

Additionally, Fort Bragg utilized GIS to reduce the review process time on investigations by roughly 50 percent and improved communication and collaboration between project stakeholders. Finally, Fort Bragg employed their WCS to expedite the project review process through streamlined communication between internal project managers and the USACE. This innovative system is now the model for several installations in the Southeast region.



## ACCOMPLISHMENTS

### Fast Track Cleanup

Implementation of a variety of management programs – whether alone or in combination, proven or innovative – form the nucleus of Fort Bragg's continued dedication to this pursuit. This approach to program management is apparent in the December 2006 collaboration with AEC and Parsons Corporation to develop an innovative performance-based contract statement of



Fort Bragg personnel inspect riprap and fencing installed as part of the first phase of surface water remediation at SWMU 103. Parsons will be installing surface water treatment measures, as necessary, in the stream in a phased approach. The first two phases - installing rip rap and small drop structures - are passive treatment measures, while the last two phases - forced air sparging and fountain aeration - will be active measures. This remedial action will result in an estimated \$600,000 lifecycle cost savings over the projected 30-year monitoring period for the site.

work (SOW) for the remediation and monitoring of its remaining SWMU sites. The contract, which addresses long-term monitoring at seven former landfills and one former pesticide storage area as well as remediation of SWMU 103 and SWMU 69, is estimated to save the Army approximately \$2.5 million dollars in comparison to standard acquisition practices. Establishing this contract enables Fort Bragg to complete a robust MILCON program without mission impacts, as reflected by its green rating on the Installation Status Report.



For example, substantial savings were realized at SWMU 103, a former service station located near post housing. Under the SOW, contractors are required to demonstrate their experience with 1,1,2,2-perchloroethane, the primary contaminant in the site's 90-acre chlorinated solvent plume. This contaminant is unique in that it has a relatively low vapor

pressure and Henry's constant, making it difficult to strip from ground and surface water.

Fort Bragg and Parsons recognized that treating this contaminant using traditional approaches such as pump-and-treat would result in a remediation time of over 100 years and exceed costs in the tens of millions of dollars. Instead, the program chose to pursue a monitored natural attenuation approach with source area treatment to reduce remediation time by 50 years and lifecycle cost by \$8 million. The remedial action resulted in an estimated \$600,000 lifecycle cost savings over the projected 30-year monitoring period for the site.



### Reducing Risk to Human Health and the Environment

A major milestone in the program's restoration efforts was the removal of 15 drying beds at Fort Bragg's waste water treatment plant (SWMU 50). The beds had been used by the plant to dry and reduce sludge, and remained on-site, along with potential soil contamination, until a RCRA Facility Investigation completed in 2005 recommended their removal. During the first and second quarters of fiscal year 2007, over 17,000 cubic yards of Class A sludge and contaminated soil were removed - that's equivalent to over 1,500 standard dump truck loads. The removal of the material, and a subsequent No Further Action decision from the state, has allowed Fort Bragg to restore over three acres of



developable land to Fort Bragg's inventory.

The program continues to face the challenge head-on, successfully replacing 1,100 non-compliant USTs (50 of which were removed in the last two years), remediating 93 of the installation's 104 identified SWMUs, and returning 675 acres of "developable real estate" to Fort Bragg's land inventory for use in traditional and non-traditional approaches.

### Innovative Technology Demonstration

In order to meet its ambitious goals, Fort Bragg's IRP has made creative and innovative use of standard technology such as GIS to substantially reduce the project review process and streamline communication and collaboration between internal project managers and the USACE throughout the lifecycle of a project. 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 SWMUs and other environmental hazards, to developing 3-D models of plume contamination and subsurface modeling, the IRP has been a leader in the innovative development and utilization of GIS data. The GIS system is used to review real-time IRP data and is shared across the installation for use in a variety of capacities.



The IRP utilizes the interactive WCS to streamline communication between internal project managers and



the USACE. Facilitated by the WCS, all proposed MILCON and OMA projects are reviewed for environmental constraints at the monthly internal stakeholder and customer coordination meeting. The WCS is a tool used by high-level management and project managers to ensure that a project is on-track and within budget; the system also reflects changes within the project and identifies any foreseen project execution challenges.



### **Environmental Management System (EMS) Operational Controls**

The IRP is a leader in Fort Bragg's Environmental Division in its development of standard program procedures and operational controls. Used by Fort Bragg construction project managers, master planners, and construction contractors alike, these key tools outline the specific steps required to remove various pieces of equipment that other programs do not cover. These documented EMS procedures have proven to be invaluable to facilitating the process and communicating IRP and environmental requirements concurrently across multiple executing agencies.



Several major incidents prior to the year 2000 have illustrated the importance of implementing standard operational controls. Fort Bragg's integrated EMS Emergency Response Plan, for example, was developed partly in response to several

major above- and below-ground releases occurring at the former fueling point for Simmons Army Airfield. Intensive investigation subsequent to the releases indicated a major plume of free product below the tank area and the fuel tanks were removed in 2004. Remedial action was selected in 2007 and, since February 2008, a monthly vacuum-enhanced free product removal effort has removed almost 200 of the estimated 250 gallons of recoverable free product from the ground. These releases provided the impetus for the development and testing of the installation's newly established EMS and culminated in the development of operational controls through the installation's EMS corrective and preventative action program.

The Installation Action Plan (IAP) – the IRP's long-term management control – outlines the goals of the program, annual objectives, timelines, and funding sources and amounts. It is a true buy-out plan that encourages rapid progress towards the finish line. This document is shared with the public via the Internet.



### **RABs**

Fort Bragg does not have a formal Restoration Advisory Board (RAB). However, through an aggressive community outreach program, Fort Bragg engages and interacts with the surrounding communities using a wide variety of venues and forums. In doing so, Fort Bragg has strengthened and enhanced its relationship with the



*Fort Bragg NEPA analyst uses IRP GIS data to facilitate a quick and efficient project review. The IRP has been a Fort Bragg leader in the innovative development of quality, standards-based GIS data. The program's data is used extensively across the installation in a variety of capacities, from construction management to environmental assessment.*

six surrounding counties to a far greater degree than most other installations.

One of the cornerstones of Fort Bragg's regional collaboration is the creation of Sustainable Sandhills, a non-profit organization the installation co-founded with the Secretary of North Carolina's Department of Environment and Natural Resources to address mutual concerns in the region. One of the primary goals for the non-profit is compatible land use, and Fort Bragg has periodically briefed community and government forums in each of the six counties to address issues and concerns and facilitate discussion on related topics, including the installation's restoration and reclamation efforts. In August 2005, Fort Bragg helped Sustainable Sandhills obtain a three-year \$260,000 STAR (Science to Achieve Results) grant from the EPA's Collaborative Network for Sustainability program to create a set of GIS-based models of regional land suitability to enhance each community's



ability to assess the implications of the land use priorities they develop.

Fort Bragg also regularly partners with the BRAC Regional Task Force and Regional Land Use Advisory Council in the development of initiatives whose scope and intensity far surpass those of an average RAB in the pursuit to achieve a fully sustainable regional community. These partnerships have helped produce such innovative projects as Greater Fayetteville Futures, a community study designed to improve coordination of regional economic development; a joint land use study for the Fort Bragg region within a five-mile buffer; and construction of the All-American Trail, an off-road multipurpose recreational path that will eventually circumscribe the entire installation.

An active member and partner of the RAB of neighboring Pope Air Force Base, Fort Bragg has used that forum to gauge community interest and need for its own RAB based on the feedback received there. Fort Bragg is positioned to assume the closing base's quarterly RAB in September 2009.

### **Opportunities for Small and Small Disadvantaged Businesses in Environmental Restoration**

Great emphasis has been placed on using small, small disadvantaged, and Native American-owned firms in environmental restoration projects on Fort Bragg. Small businesses are strongly

encouraged to participate in the DoD contract acquisition process, and are invited to meet teams of DoD project managers, technical specialists, and contract specialists to understand the government's needs, requirements, and processes. Small businesses are given multiple opportunities to showcase their capabilities through formal presentations, conference calls, face-to-face meetings, and company literature. DoD presents its work requirements and expectations and, after careful evaluation of capabilities, contracts are awarded to the qualified firms who can provide quality products/services tailored to DoD specifications. All contract awards are coordinated with regional SBA offices. DoD personnel routinely attend small business conferences and workshops to learn more about small business firms.

In fiscal year 2007, Fort Bragg awarded five small business firms 11 environmental restoration/



compliance contracts totaling in excess of \$4.3 million. In fiscal year 2008, five small business firms were awarded 17 environmental restoration/compliance contracts totaling in excess of \$6.2 million. The majority of subcontractors used for execution of work were locally-owned and -operated, directly contributing to the local economy in terms of substantial job generation and income.

### **Reducing Risk to Human Health and the Environment**

Fort Bragg has identified over 600 acres of land that have either been restored and/or returned back to the installation's "property inventory" because of the IRP's implementation of efficient and effective site management techniques. Through the use of performance-based acquisition contracting, the environmental restoration program, Fort Bragg has been able to shorten the installation's goal to be 100 percent Response Complete/Remedy In Place from the year



*Fort Bragg's Main Post Chapel after the installation of a below-grade vaulted storage tank. This installation prevented a potentially costly heating fuel release and preserving the Historic District's integrity. With this discreet placement, all that can be seen from the street is a manhole cover and the strategically placed landscaping that surrounds the vault area.*

2010 to 2008 and reduce the remediation effort by an estimated 50 years.

In concert with the State of North Carolina and Army representatives such as the USACE and Army Environmental Command, Fort Bragg has expended an immense amount of effort to expedite the removal of contaminant sources such as USTs and contaminated media from past releases to the environment. This ability to remove a larger number of contaminated sources and media such as soil and free product at a vastly more expedient pace directly impacts human health and the environment by reducing the risk of groundwater contamination and reducing prolonged exposure to contaminants.



Improvements in Fort Bragg's site characterization techniques have significantly decreased



*A monitoring well at Simmons Army Airfield's former fuel point hints at the environmental damage caused by several above- and below-ground fuel releases. Monitoring activities identified a major plume of free product below the tank area and the contamination is being actively addressed via vacuum-enhanced free product recovery. Since February 2008, almost 200 of the estimated 250 gallons of free product recoverable has been removed from the ground.*

the risk to human health and the environment. At sites where contamination has been discovered, expedited site characterization has been achieved through the use of field screening tools. This has minimized the overall cost of the investigation through the use of sample collection by geoprobe rather than installing wells where possible.

A significant aspect of the IRP is its effective implementation of land use and institutional controls. In areas where the threat of potential exposure exists – such as where there is exposed landfill debris or a contaminated surface water feature – the area is fenced in and signs are placed to discourage entry into the area. Fort Bragg has also implemented a strict policy prohibiting the installation of groundwater supply wells on the cantonment area of the installation, thus preventing groundwater from being used for drinking. This may be the most successful tool in Fort Bragg's arsenal to reduce the risk of exposure to its Soldiers, civilians, and residents.



### Leveraging Partnerships

IRP staff proactively leverages key state and federal partnerships - including those with North Carolina Department of Environment and Natural Resources (NCDENR), the USACE and AEC – to identify new, innovative and resource-efficient ways to expedite the remediation and restoration process. For instance, Fort Bragg and NCDENR recently collaborated

on a groundbreaking solution to apply standard UST rules to spills and Aboveground Storage Tank (AST) release sites, rather than formally designating the area as a SWMU under the RCRA program. Streamlining investigation and cleanup efforts under this process saves Fort Bragg approximately \$200,000 and accelerates restoration of land for reuse in other mission-vital priorities.



A perennial steward of its natural and cultural resources, Fort Bragg also works closely with the State Historic Preservation Office (SHPO) to preserve the integrity of our historical infrastructure. One such example of this relationship is Fort Bragg's installation of a below-grade vaulted storage tank at the Main Post Chapel, the installation's oldest continuously operating chapel. The chapel was previously served by an old single-wall UST; however, because of the building's location, it was determined that a conventional AST would be visually incompatible with the rest of Fort Bragg's historic district.

After consulting with SHPO, IRP staff reached a compromise to place the AST in a below-grade vault. With this discreet placement, all that can be seen from the street is a manhole cover and the strategically placed landscaping that surrounds the vault area. This has been a win-win situation for Fort Bragg in both the prevention of a potentially costly heating fuel release and the preservation of the Historic District's integrity.

**Secretary of the Army Environmental Awards Winners**  
U.S. Army Best Practices for the Environment Fiscal Year 2008

FY2008 Secretary of Defense Environmental Awards

# Fort Drum, New York

## Cultural Resources Management, Team

### JUDGING CRITERIA



Program  
Management



Orientation  
to Mission



Technical  
Merit



Transferability



Stakeholder  
Involvement

*On this page: U.S. Army Soldiers from the 10th Mountain Division (Light Infantry), Forward Support Battalion Fort Drum, NY, survey the area for any possible threats at Kandahar Army Airfield, Afghanistan. (DoD photo by SPC Gul A. Alisan)*

Fort Drum, home of the Army's 10th Mountain Division, is situated on 107,265 acres within multiple counties in Northern New York State. The Fort Drum population is comprised of 3,200 civilian employees; 1,400 contract employees; 16,700 Soldiers, of which approximately 5,000 are currently deployed; and 9,000 family members. Since 1990, the 10th Mountain Division (Light Infantry) has deployed units to combat and peacekeeping operations worldwide. Fort Drum has also been the mobilization and deployment site for almost 27,000 Soldiers in 985 Reserve Component units from throughout the U.S. in support of the Global War on Terror. Today, Fort Drum is capable of rapidly deploying forces anywhere in the world. As the Army grows and transforms to address current and future requirements, the installation remains an exceptional training and living environment.

**SUSTAINING THE ENVIRONMENT FOR A SECURE FUTURE**

## BACKGROUND

Fort Drum Cultural Resources Management (CRM) is an independent section of the Public Works Environmental Division and reports directly to the Chief of the Environmental Division. The CRM staff update the Garrison Commander at quarterly Environmental Quality Control meetings. The staff includes a federal Cultural Resources Manager, Dr. Laurie Rush, and contractors who work for Colorado State University Center for the Environmental Management of Military Lands (CSU-CEMML). Dr. Rush identifies, evaluates, and protects all of the significant cultural resources on Fort Drum, and manages the LeRay Mansion historic district. Dr. Rush is also the Native American Affairs Coordinator for the installation.



Two members of the nominated team, Dr. James Zeidler and Tracy Wager, are based on campus at Colorado State. In addition, the team includes several full-time Fort Drum based CSU-CEMML employees: Ian Warden, Land Rehabilitation and Maintenance Coordinator for the Integrated Training Area Management program; Jaime Ratner, GIS Specialist; Heather Wagner, Public Relations and Outreach Coordinator; and Margaret Schulz, Program Coordinator. Mr. Warden provides expertise and coordination for site protection and hardening. Ms. Ratner is responsible for all survey mapping and archaeological database management. Ms. Wagner plans and implements all cultural resources public programming and writes cultural resources publications. Ms. Schulz directs the archaeological surveys on Fort Drum. The team also includes summer seasonal employees Francis Scardera, Special Projects Crew Chief; Lawrence Schulz, Site Monitoring Chief; and Alissa Nauman, Curator and Lithics Specialist.

The Fort Drum CRM team has been awarded and recognized in various means. The DoD Legacy Resource Management Program selected the Fort Drum team to write a cultural resources Best Management Practices booklet. The St. Regis Mohawk Tribe honored the Fort Drum CRM consultation program by showcasing it as a positive example at an EPA Region II conference. At the request of the DoD, Dr. Rush was the first archaeologist to participate in the planning process for a military exercise, the Bright Star War Games Planning Conference in July 2007. Dr. Rush has also shared her experiences at the World Archaeology Congress, the first meeting of the International Military Archaeologist Working Group, the Archaeology Institute of America Annual Meeting, and the DoD Sustainability Conference. Dr. Rush also was awarded the Chairman's Award for Federal Achievement in Historic Preservation by the Advisory Council on Historic Preservation (ACHP) for developing the "In Theater Heritage Training Program."

**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.**

*- Katherine Kerr,  
Historic Preservation Specialist,  
Advisory Council on Historic  
Preservation*



*Dr. Stanford of the Smithsonian, the Fort Drum CRM Team, and the 310 Aviation Air Crew prepare to review and photograph paleo maritime archaeological sites from the air. (Photo provided by Dr. Laurie Rush, Fort Drum Cultural Resources Manager)*

## ACCOMPLISHMENTS

### **Cultural Resources Management**

The strength of the CRM program at Fort Drum lies in its expert staff, its relationships with installation-wide personnel, its long-term approach to CRM, and its adherence to the core principles of sound management techniques, responsible cultural resources stewardship, and the enhancement of the military mission.

Fort Drum has one of the most distinguished teams of cultural resource professionals in the Army, with over 75 years of combined experience working in the military cultural resources setting; and over 60 years of combined experience at Fort Drum specifically. The Fort Drum approach of having CSU employees as a de facto “in house” cultural resources team allows archaeologists to be called to any project at any location on the installation at a moment’s notice, often with immediate management recommendations for project engineers. This availability and presence of cultural resources staff benefits the military mission by setting a precedent of cooperation and support of training needs, and avoiding delays in evaluating projects.

This history of cooperation resulted in a truly integrated stewardship ethic across the Garrison, and has established strong partnerships between the team, project engineers, and range training personnel. Other

installations look to the Fort Drum CRM as an example of excellence because there have been no delays due to archaeology though nearly a billion dollars worth of construction has recently occurred on the installation. Six historically significant sites have also been saved by using design avoidance, and Fort Drum was the first installation to develop archaeological properties into training assets. The Fort Drum CRM program uses its Integrated Training Area Management assets wisely for archaeological site protection by employing a Land Rehabilitation and Maintenance coordinator as a member of the CRM team, lowering costs and improving installation-wide coordination.

Fort Drum has a long-term approach to cultural resources management. The CRM team surveys land ahead of schedule, including all of the bridges and potential range expansion perimeters, ensuring that construction and repair projects in these areas can be carried out quickly without further evaluation and consultation documentation. The DoD Legacy Resource Management Program selected the Fort Drum Team to write a Best Management Practices booklet.

The Fort Drum Integrated CRM Plan, designed to provide guidance from 2006 – 2010, covers the entire acreage of the installation. Fort Drum’s CRM team is responsible for over 240 prehistoric and 700 historic

archeological sites and six National Register Listed Historic and Archeological Districts. Approximately 87 percent of the surveyable land area on Fort Drum has been subjected to at least preliminary archaeological survey. Fort Drum’s building inventory is complete, with the exception of one masonry World War II building that would benefit from further evaluation.

Fort Drum has worked under two major programmatic agreements: the 1987 Department of the Army Advisory Council on Historic Preservation Programmatic Agreement for demolition of WWII Wooden Structures; and a partnership in the Office of the Secretary of Defense Legacy/ Strategic Environmental Research and Development Program (SERDP) Predictive Modeling and Programmatic Agreement program. The SERDP and Legacy funded demonstration project was launched to use archaeology predictive modeling as a basis for establishing programmatic archaeological compliance agreements. This agreement will streamline consultation, enabling more decisions to be made at the Fort Drum level, and will obviate any further requirements to provide sub-surface archaeological testing in areas that are very unlikely to have archaeological sites present.

### **Cultural Resources Compliance**

In addition to the Predictive Modeling and Programmatic Agreement project, Fort Drum has built a number of relationships and partnership projects. These



projects include a SERDP funded humic acid research protocol with Cold Regions Research and Engineering Laboratory; a SERDP and Environmental Security Technology Certification Program funded remote sensing software project with U.S. Army Corps of Engineers (USACE) Construction Engineering and Research Laboratory and the Center for Advanced Spatial Analysis at the University of Arkansas; and a Legacy funded archaeology data quality project with the Statistical Research Inc. Foundation.

The Fort Drum team leverages its experience and extensive archaeological GIS database to determine priority sites for archaeological survey. With more than 20 years worth of data and an expert understanding of the landforms that may produce archaeological sites, the CRM team is able to strategically focus survey dollars on locations that have a real potential to affect a cultural property.

## Curation

The Fort Drum Curation Facility is located in a World War II barracks building that meets all of the requirements for full compliance with 39 CFR 79 with the exception of its frame structure. The CRM team stores collections here for Fort Drum and Fort Totten. Ongoing efforts to improve management include Ms. Nauman's potential redesign of the artifact database to enhance the search capabilities, and the systematic redress curation of artifacts provided by the 1980s contractor who completed some

of the original cantonment survey. All of the Fort Drum archives and paper files meet archival curation standards, and the CRM team is in the process of duplicating the essential information from site files onto acid free paper for storage in a separate building.

The Fort Drum and Fort Totten collections are completely available for researchers and the interested public. Components of the Fort Drum collections are currently on loan to the Fort Drum Heritage Collection, to Hamilton College for a project on nineteenth century farmsteads and ethnicity, and to Saint Lawrence University (SLU). Fort Drum has been in partnership with SLU for over five years, and the collections have been integral for providing SLU students hands-on opportunities to learn faunal identification. SLU also has a copy of the Fort Drum collection inventory records, so that the university can offer these collections to students working on honors theses. Researchers and archaeology PhD candidates at SUNY Potsdam and Syracuse University are also using the Fort Drum collections, and CRM team member, Mr. Scardera, recently earned an M.A. using a Fort Drum site as his thesis topic.



## Historic Buildings and Structures

Fort Drum has five historic structures in the LeRay Mansion Historic District, consisting of the Mansion and four remaining outbuildings in an historic landscape. The Mansion Estate dates back to 1804, and the

current Mansion structure was built in 1826-1827, after the original was destroyed by fire. The LeRay Mansion has been restored by the Army, for Mission purposes, to its original use: hosting important guests, functions, and gatherings in the region. The upstairs bedrooms in the Mansion, the original Farm Manager's house and backyard cottage, the Mansion parlors, porch, and formal lawns are used for significant events such as distinguished guest visits, brigade and command level holiday receptions, and hails and farewells. The CRM team works closely with one of the most highly regarded preservation architects in the region if structural maintenance and repair expertise is required.

The Fort Drum CRM team has been very fortunate to have the full support of the Public Works Engineering Real Estate Program.



*The Fort Drum CRM team plays an active role in responsible management of the LeRay Mansion Historic District. The team provided all of the preservation coordination for replacement of a deteriorated column at the Mansion and insured that the project met the Secretary of Interior standards. The team documented the unique column architecture and curated samples of the very unusual curved bricks that were produced at Fort Drum Historic Site 1290, the Brick Clamp at LeRaysville. (Photo provided by Gary Head, DPW Fort)*



Through this cooperation, the installation real property inventory was brought completely up to date with respect to historical status of all the properties.

### Archaeological Resources

Over the past 15 years, the Fort Drum archaeology field team has excavated over 100,000 shovel tests, surveyed over 40,000 acres of military land, and discovered over 200 Native American ancestral places, preserving many of them. Fort Drum team has also documented over 160 historic occupations including farms, homes, sawmills, grist mills, cheese factories, schools, churches, and even sugar bushes.

The Fort Drum CRM team protects and preserves archaeological sites in place, while still supporting the military mission. The CRM team works with project engineers to protect sites by either shrinking or redesigning proposed project footprints. A successful example of this method of protection 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, protecting the sites that were discovered as well as any additional sites that may occur in the landform but may not have been found using conventional archaeological survey techniques.

The most important archaeological research

contributions made by Fort Drum team members have been associated with the Legacy supported paleo maritime project. The CRM team discovered that Fort Drum has ancient shorelines from Glacial Lake Iroquois, an ice age lake larger than Lake Ontario. Archaeological sites were discovered along the Holocene shorelines and fossil islands of Lake Iroquois. Two of these sites contain potential boatbuilding tools that date to approximately 11,000 years ago, and a Clovis point that dates to 8-10,000 years ago. The CRM team developed a map of the potential DoD lands that may have evidence of early boatbuilding. Working with eminent Smithsonian archaeologist Dr. Dennis Stanford, CRM team member Ms. Ratner used GIS to map shorelines sites at Fort Drum that contain tools matching shoreline sites in Vermont; she subsequently discovered that these sites are shorelines of ancient beaches along the same waterway. The high quality of these maps led Dr. Stanford to include them in a film being made about his research into the earliest people of the eastern United States. This research has the potential to change scientific understanding of earliest human migration to the Americas.



### Native American Program

The Fort Drum CRM team has found consultation to be one of the most rewarding aspects of the program and has worked hard to maintain and benefit from healthy stakeholder relationships.

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 Tribes may have to the Command Group, organizes Head of State visits when Nation leadership wishes to visit Fort Drum, and offers Tribes visits to archaeological sites and field tours.

Native Americans may access ancestral places on Fort Drum at any time at their request. The CRM team prepares the arrangements with Range Control and provides escort. The team has offered to consult on harvest of plant material, but at this point, the Tribes have not needed to harvest on Fort Drum. However, the CRM team has actively secured special arrangements for the Tribes to carry out a special harvest of deer for their Winter Ceremony, when desired.

The Fort Drum CRM program also partners every year with the Equal Opportunity Office for their Native American month celebration. This year the CRM team brought exhibits detailing the Fort Drum program. In addition to the long term Fort Drum consultation partnership with the three Nations listed above, Fort Drum also initiated consultation with the Tuscarora, Cayuga, and Seneca Nations concerning plans for the 10th Mountain Division to train at Seneca Army Depot. The Fort Drum program prepared the most

comprehensive Native American site map for the depot to date and purchased concrete barriers that can be placed around the sites to provide physical protection.

The St. Regis Mohawk Tribe honored the Fort Drum CRM consultation program by showcasing it as a positive example at an EPA Region II conference. The Tribe requested that Dr. Rush share the podium with then Tribal Historic Preservation Officer Sheree Bonaparte at the EPA consultation meeting with the Haudenosaunee people.

### **Mission Enhancement**

The CRM program at Fort Drum is dedicatedly mission oriented and has actively shifted program priorities toward direct mission support. No training encroachment due to cultural resources or archaeology has ever been encountered. There have been no delays in range or construction projects, and the CRM team has converted culturally sensitive sites from solely protected areas to allow for use as training assets. This has allowed Fort Drum to develop training scenarios with realistic heritage complications. These management methods are applicable across DoD and have been implemented at Edwards AFB, Fort Riley, and USMC Base Quantico.

Fort Drum successfully used the 1987 Programmatic Agreement for Demolition of World War II Wooden Structures

to facilitate environmental review in preparation for the timely demolition of over 77 structures. This action enabled the installation to efficiently prepare for Grow the Army construction related to posting a sustainment brigade at Fort Drum.

Dr. Rush has also shared her experiences at the World Archaeology Congress, the first meeting of the International Military Archaeologist Working Group, the Archaeology Institute of America Annual Meeting, and the DoD Sustainability Conference.

### **Environmental Enhancement**

With support from the Legacy program, Fort Drum had the opportunity to work with one of the leading forestry professors in the nation, Dr. Marc Abrams of Penn State University. Dr. Abrams' Legacy project has offered Fort Drum the opportunity to partner with Naval Base Yorktown and Seymour Johnson Air Force Base on research that is designed to analyze vegetation patterns as an indicator for prehistoric occupation and potential archaeological site locations. This project also enhances Native American consultation by building on the body of research that documents the sophisticated land management practices of indigenous people. This project will also produce a series of slides of indicator species that can be immediately used by all cultural resource managers up and down the Eastern Seaboard.

The CRM team strives to implement the best mission-

**“The Fort Drum team consistently develops programs that look beyond the Fort Drum boundaries and have military-wide application.”**

*- Sarah Killinger,  
Army Program Manager, Advisory  
Council on Historic Preservation*

oriented ideas from the Fort Drum program across the DoD. At the request of the joint staff engineers, Dr. Rush participated in the Bright Star War Games Planning Conference in July 2007. She provided an archaeology awareness briefing and served as a liaison to egyptology subject matter experts for military planners for the western desert maneuvers and navy divers for underwater demolition scenarios. This partnership evaluated proposed operations to ensure that there would be no negative effects on Egyptian archaeological properties. This prototype process resulted in a model that can be used to implement Environmental Annex L during future operations plans anywhere in the world with no delays to the mission, especially useful for stability and nation building operations.

One of Fort Drum's National Register listed archaeological districts is the nineteenth century iron furnace town of Sterlingville. This 75-acre archaeological property is used for historic area training. Soldiers may use this area for any training scenario, except digging. This opportunity provides realistic practice for operating in archaeologically



rich and sensitive areas like the ancient cities and tells of Iraq, Mesopotamia and Afghanistan. Using funding from the Legacy program, the Fort Drum team did a demonstration project of these techniques - hardening two historic sites at USMC Base Quantico. The team also made a video and handbook for DoD-wide distribution. Ms. Wagner and Ms. Wager also completed development of a cultural resources outreach calendar to be distributed throughout DoD.



### Cultural Resources Awareness Education

The Fort Drum cultural resources team values its relationship with Soldiers and the interested public. During the recent National Public Lands Day program, Ms. Wagner organized a volunteer effort for Tiger Cub scouts and students from Immaculate Heart High School to enhance a recreational trail on Fort Drum that would be used by Wounded Warriors as a place of solace and recovery. The



Each year, an archeology class from Loyola High School in Montreal, Canada visits the installation to put their classroom lessons into real world use. They join the Fort Drum Cultural Resources crew for a day of shovel testing and site visits. This type of outreach provides valuable instruction to future generations of potential archaeologists. (Photo provided by Francis Scardera, Fort Drum Special Projects Crew Chief)

effort added benches, interpretive signage, flowers and bulbs, and tree identification tags.

The Fort Drum CRM team has taken an active approach to supporting environmental challenges to the military mission, on a global level. Four years ago, the team developed the "In Theater Heritage Training Program," funded by DoD and the Legacy program. Milestones accomplished through this program include: sponsoring a symposium at the World Archaeology Congress 2008 in Dublin; Dr. Rush's inclusion as the first archaeologist to participate in planning the 2007 Bright Star military mission; the development of a new set of Egyptian archaeology awareness playing cards to complement the 120,000 original decks of Iraqi and Afghan heritage cards already distributed; and numerous public presentations and military briefings at prestigious universities and throughout the government. The media coverage of Fort Drum's archaeology awareness playing cards had the positive effect of enabling DoD to develop a network of professionals concerned with cultural resource protection abroad. This empowered DoD personnel to partner with the Iraqi people to prevent further damage to archaeological properties, such as at Tell Arba'ah Kabiir where the Army worked with representatives of the Iraq Ministry of Culture to prevent damage during expansion of a patrol base.



### Community Relations

Educational partnerships have been one of the ongoing strengths of the Fort Drum program. The CRM program focuses on public interpretation through displays, demonstrations, and participatory activities at annual installation Earth Day and Safety Day events. Team members also give scientific presentations and guest lectures on a regular basis.

Fort Drum offers field trip and field work opportunities to archaeology students attending universities throughout upstate New York, parts of New England, and Lower Canada. The installation offers opportunities to visit pre-contact and post-contact archaeological sites, a state of the art GIS laboratory, a curation facility, and examples of design avoidance site management. The Fort Drum CRM program works closely with archaeologists from Syracuse University, SLU, Colgate University, Colorado State University, SUNY Potsdam, and the New York State Museum to provide sophisticated analysis that includes archeomagnetic dating, Carbon 14 dating, electron microscopy, artifact identification, and evaluation of ceramics. In addition, the CRM team has a volunteer who has prepared a series of traveling display cases containing artifacts from the Fort Drum collections; one display uses collection materials to illustrate the story of an Iroquoian pot. These displays are taken to interested school groups.



**Secretary of the Army Environmental Awards Winners**  
U.S. Army Best Practices for the Environment Fiscal Year 2008

# FMS 2 Pollution Prevention Team, North Carolina ARNG

## Pollution Prevention, Individual Team

The North Carolina Army National Guard (NCARNG) Pollution Prevention (P2) Team at the Field Maintenance Shop #2 (FMS 2), located in Lenoir, N.C., provides the NCARNG with industrial and P2 support for five surrounding counties—Caldwell, Burke, McDowell, Ashe, and Watauga. While the team's primary mission is the maintenance and rehabilitation of rolling stock equipment, communications and electronics equipment, and weapons systems integral to the NCARNG's training mission, they also provide their supported units with hazardous material management, recycling, and compliance training programs.

The NCARNG is composed of approximately 10,250 Soldiers and maintains 122 facilities in 74 counties. The NCARNG's FMS 2 is a 27,942 square foot facility with five work-bays, and has 16 team members. Over the past two years, the team has achieved several program milestones, including the opening of a new, green facility for equipment rehabilitation and servicing, significant reductions in both hazardous and universal waste, and the implementation of new training and material inventory programs.

The NCARNG's FMS 2 is located in Lenoir, N.C. Lenoir is a city in Caldwell County in the Blue Ridge foothills. The city was named for Revolutionary War figure and early North Carolina statesman General William Lenoir, who lived nearby. There are also many outdoor activities and recreational opportunities in the area.



*On this page: Sgt. 1st Class Cary Hathcock (center) and Sgts. David Cortes (left) and Fletcher Sargent, North Carolina Army National Guard, observe the border with Mexico in San Luis, Ariz., as part of their duties with the U.S. Border Patrol. (U.S. Army photo by Tech. Sgt. Brian Christiansen)*

### JUDGING CRITERIA



Program Management



Orientation to Mission



Technical Merit



Transferability



Stakeholder Involvement

## BACKGROUND

Key members of the NCARNG P2 Team include environmental specialists, mechanics, and a dedicated facility environmental coordinator to oversee day-to-day compliance and quality issues. Sgt. 1st Class Todd L. Lingerfelt, serves as the facility manager, program coordinator, and emergency management lead. Staff Sgt. Timothy S. Howell is the containment team leader, facility environmental coordinator, mechanic, and supervises the spill team. Staff Sgt. Robert A. Simonson is on the Containment Team and a mechanic. Staff Sgts. Terry Carswell, Conley L. Paige, and Sgt. 1st Class David E. Penley are on the security team and

**“During the last two years, the NCARNG FMS 2 pollution prevention 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. The program is an exemplary operation with best practices that can be easily adopted at other Army facilities.”**

*-Rachel Dagovitz,  
Solid Waste Manager,  
Army Environmental Command*

serve as mechanics. Donald E. Bentley, Henry C. Schaich, and Robert D. Swink work in the FMS 2 as mechanics. All other facility personnel as required are to report, contain, and coordinate spill recovery measures.

### Position Description

The P2 Team is responsible for all management associated with pollution prevention and equipment rehabilitation, including:

- Maintenance and rehabilitation of rolling stock equipment
- Maintenance of communications and electronics equipment
- Maintenance of weapons systems
- Hazardous material management
- Spill Team/Containment Team management
- Facility security
- Recycling
- Compliance training programs
- Supporting the overall military mission
- Soldier training

The team’s dedication to environmental quality has helped it to do its job more cleanly and efficiently. Its record of full compliance ensures that training won’t be interrupted by environmental issues in the shop. Sgt. 1st Class Todd L. Lingerfelt, the Facility Manager and Program Coordinator, has over 14 years of experience within the NCARNG and FMS 2. Staff Sgt. Timothy Howell, the Facility Environmental Coordinator has over eight years of experience, is involved at the support level for all FMS 2 supported units, and acts as a liaison between the facility and the state environmental office. Staff Sgt. Howell also serves as a trainer to new personnel embedded in supported units and serves as a monitor of environmental operational hazards that may occur during training. Additionally, some of the team members are active in other organizations in support of FMS 2. The team’s attention to Soldier training helps to spread better environmental practices and awareness throughout the



*The newly opened FMS 2 building was designed to meet Energy 10 standards. Its features include a geothermal heating and cooling system, water reducing facilities, occupancy sensor lighting systems, and tank-less water heaters. The green design sets a foundation for further pollution prevention efforts.*

NCARNG organization and out into the Soldiers' communities. 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.

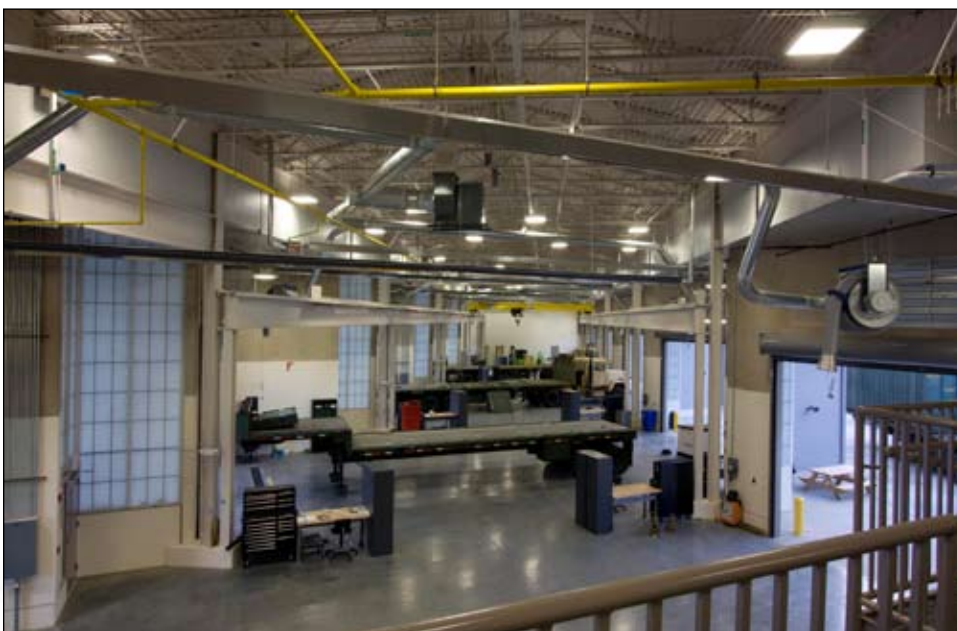
### Awards and Services

In September 2007, FMS 2 received the "Best Field Maintenance Shop" award during the State Maintenance and Safety Conference in Atlantic Beach, N.C. This award is presented to one shop annually for sustained superior performance in all aspects of maintenance, safety, and environmental criteria. There are 18 FMSs that strive to attain this coveted award and FMS 2 is one that successfully achieved this. In 2008, FMS 2 received notification that they were winners in the Pollution Prevention Team award category of the Secretary

of the Army Environmental Awards Program. The Secretary of the Army Environmental Awards represent the highest honor in the field of environmental science and sustainability conferred by the Army. FMS 2 has achieved high marks on all its Environmental Compliance Assessment System (ECAS) inspections and all its management plans and protocols are up-to-date and approved by the NCARNG environmental office. FMS 2 hosted the Regional Facility Environmental Course in August 2008, which included all Regional Facility Environmental Coordinators from 30 counties in western North Carolina. In the past six years, the team has operated with such high compliance standards, that it has received no negative marks, fines, or compliance findings in either internal or external regulatory reviews or inspections.

### Program Management

Quality program management techniques are key to the team's success, and they have contributed to the achievement of several program milestones, including the opening of a new, green facility for equipment rehabilitation and servicing, significant reductions in both hazardous and universal waste, the implementation of new training and material inventory programs, and ongoing compliance excellence in the Environmental Performance Assessment System (EPAS). All management plans are updated annually and revised every five years. These plans include P2, hazardous material management, waste management, and spill prevention and control. The team conducts sustainment training to incorporate any plan changes and provides this training to their supported units as well. FMS 2 is regulated to conduct annual inventories of paint, oil, and lubricant products, but instead, conducts these on a quarterly cycle to ensure accountability of manageable quantities and prevent excessive stock of unneeded materials. Budgeting for FMS 2 is controlled by the Director of Supply and Logistics (J4) with suggestions on regulatory requirements and compliance programs from the state environmental office, with a regional representative dedicated to the shop. Cost avoidance is achieved through the team's significant waste stream reduction via reduced disposal costs. Overall, the team's superior management and



*In addition to supporting the hazardous and waste materials management for its units in five counties, the P2 Team services and supports over 600 pieces of rolling stock, which represents 75% of all its units' equipment. Over 500 pieces come through their facility every year for servicing and rehabilitation. Without the team's support, the NCARNG would not be able to accomplish its military mission.*

support throughout its five-county region saves countless hours and NCARNG resources in compliance-related activity, freeing Soldiers to focus on their jobs without harm to the environment.

## ACCOMPLISHMENTS

### Material Substitutions

The team has implemented several significant material substitutions. They recently adopted the “Gell-Cell” battery, a battery which is completely sealed and poses no risk of acidic leaks. The battery offers a much longer lifespan that outweighs its initial cost (versus the older lead batteries that were replaced) and is air transportable as a non hazardous material. The battery can also be stored for up to 30 months, reducing the disposal costs associated with unused or expired batteries. If it is recharged every six months during storage it will last almost indefinitely. Older battery technologies, such as the lead-acid vehicle batteries have been replaced through attrition and reclaimed by the original contracted battery vendor to eliminate the possibility of environmental damage by controlled measures. The team has also substituted water-based paints for hazardous and toxic paints, which minimizes costs for storage and disposal while simplifying the shop’s paint processes. They no longer need to use harsh solvents or chemicals in paint and washing processes. The team has also eliminated redundant products from the approved material lists and sought out green alternatives;



*As part of an EMS initiative, the P2 team implemented an inventory standardization project for the NCARNG. As part of this effort, they set the guidelines for installing flammable cabinets and specialized storage, provided the environmental training in the system for all units, updated the material management plans for all facilities, set new threshold limits for certain materials, and reviewed all material acquisition practices to encourage adoption of green product alternatives. Within their shop, the team was able to reduce their stock of hazardous materials by half and drop below the 1300-pound storage threshold.*

they have successfully eliminated acetones and solvents in painting processes.

### EMS Implementation

The P2 Team is part of the statewide adoption of the NCARNG’s EMS program. They monitor all activities to maintain alignment with overall environmental goals and targets. Part of this was the implementation of a standardized inventory system for all other shops and units in the NCARNG. The team took the lead on this project, setting the guidelines for installing flammable cabinets and specialized storage, providing the environmental training in the system for all units, updating the material management plans for all facilities, setting new threshold limits for certain materials, and

reviewing all material acquisition practices to encourage adoption of green product alternatives. The NCARNG’s environmental targets and objectives include:

- 10 percent reduction in energy usage by 2010
- 10 percent reduction in water usage by 2010
- 5 percent increase in recyclables by 2010

Within their shop, the team was able to reduce their stock of hazardous materials by half and drop below the 1300-pound storage threshold. The team’s inventory project has helped the NCARNG to reconsider the value of buying materials in bulk when storage and disposal costs are greater than the cost savings of large purchases. Establishing this management continuity across all NCARNG units has



not only streamlined the team's operations, but also simplified and improved material management throughout the state.

## Waste Management and Reduction

In the case of hazardous materials, supported units contact the FMS 2 Team who in turn contact the Regional Environmental Coordinator to schedule the units for on-site pickup and transport, minimizing the risk for spills or accidents prior to disposal. The team coordinates with unit environmental representatives on a weekly basis, with open communication for any issues that need to be addressed immediately. Within FMS 2 itself, the team's hazardous material management is guided by storage and maintenance plans and an inventory system that identifies expiration dates and disposal needs. They have installed flammable storage cabinets to improve storage practices. In the event of a spill, the team is fully trained and equipped with absorbent socks, blankets, and reusable rugs for oil. The facility's central wash site captures any oil residue from vehicle washing in oil/water separators.



## Improved Material Management

NCARNG FMS 2 has instituted facility management practices for pollution prevention, to reduce or eliminate the volume and toxicity of waste, material storage, recycling, and reclamation of used materials, and effluent discharges. Paint, oil, and lubricant wastes that are accumulated during the



workday are segregated by type and placed in their designated containers for contractor pickup. Drain pans are emptied at the end of each task and contents are kept in designated holding area. All used oil filters are crushed using a filter press and then collected in a storage drum for contracted pickup. The facility recycled 80 pounds of used oil filters in fiscal year 2008. Inspections of controlled hazardous material and waste storage areas are conducted weekly to ensure program compliance. The generation of waste antifreeze has been negated with the utilization of a vehicle coolant filtering machine.

## Process Improvement

The use of a vehicle coolant filtering machine minimizes the need to stock excessive quantities of replacement antifreeze. Petroleum products are dispensed via overhead pneumatic pump to negate the possibility of accidental release while transporting between storage and work stations. Fluorescent bulbs

containing mercury are collected and placed in controlled storage until the contractor picks them up. The facility collected and turned in more than 22 pounds of bulbs during fiscal year 2008. FMS 2 conducts weekly sweeps of the vehicle parking areas to ensure that no leaks are present or left uncontrolled and vehicle oils do not enter the storm water run-off systems. Gell-Cell batteries are replacing the lead-acid batteries through attrition which are collected through the original battery vendor to eliminate the possibility of environmental damage by controlled measures. The battery offers a much longer lifespan and outweighs older lead-acid battery costs.



## Recycling

The team runs its own recycling program for the shop and its supported units. Approximately 2,800 pounds of aluminum and one ton of cardboard are recycled by the team annually. The facility recycled 2,950 pounds of cardboard, 2,800 pounds of



Petroleum product recycling is accomplished with help from an outside recycling plant. The contractor pumps used vehicle motor-oil through a high-velocity recovery pump, returns the oil to a central facility for filtering processes with diesel fuel, and re-injects the fuel/oil mixture back into the retail system for use as residential and industrial heating oils, allowing for greater used oil reuse. The NCARNG no longer has to transport, store, or otherwise dispose of used oil products or purchase greater quantities of diesel fuel.

aluminum, 300 pounds of white paper, 3,800 pounds of heavy/light metals, and 520 pounds of plastic in fiscal year 2008. These materials are turned into either Fort Bragg via the NCARNG headquarters in Raleigh, N.C., or managed with local recycling contractors. FMS 2 participates in the Wood Pallet Reclamation and Restoration at Broughton Hospital in Morgantown, NC. Broughton is a state funded mental hospital that employs its patients in vocational rehabilitation programs. They use the pallets in reclamation and restoration work programs intended to give the patients a sense of accomplishment as well as provide a quality product which is reused to support movement and storage of assets belonging to the state of North Carolina. The Electronic Technical Manuals Library which houses Army manuals and forms on compact disks eliminates the need for paper. Mechanics rags, shop towels, and improved parts washers for vehicle brakes, are items currently on contract with local vendors to further control waste streams and minimize



the possibility of environmental contamination. The team also turns in petroleum products and used antifreeze for recycling, which further reduces the waste stream. These recycling and waste management efforts have resulted in significant waste stream reductions (see chart below).

### Education, Outreach, and Partnering

The team has already been tremendously successful at transferring its management improvements to other units within the NCARNG. One team member, Staff Sgt. Timothy Howell, conducts sustainment compliance training at the armories supported by FMS 2 and assists the Regional Environmental Coordinator in monitoring of the armory hazardous material management plans. In terms of outreach, public access at FMS 2 is unavoidably restricted, so the team focuses on communication with their state environmental offices, particularly regulatory agencies and emergency response contacts



in the county. The NCARNG is required to host visits from county emergency management officials and regional environmental coordinators on an as needed basis. A commitment to environmental quality and stewardship has helped to cement the NCARNG's reputation as an environmental leader and good neighbor.

One program improvement that could be easily transferred to other units in the National Guard Bureau (NGB) or DoD is the team's transition to an electronic, non-paper-based communication and compliance system. This eliminates the need to order and stock paper forms by incorporating a component automation system that is linked to Pentagon and NGB databases. FMS 2 has received numerous "kudos" from Major General William Ingram, the Adjutant General of North Carolina; Colonel Beth Austin, the Director of Supply and Logistics; Colonel Bill Johnson, the Director of Facilities and Energy Management; and Ms. Vickie Dudick, the State Environmental Program Manager upon recognition of being awarded the Secretary of the Army Environmental Program Award.

**Compliance with E.O. 13423**  
Sustainable Design and Development includes the design, construction, and operation of buildings to reduce negative impacts on the environment, improve the comfort of the building occupants, and reduce operating costs while improving building performance. This

YEAR	WASTE TYPE	TOTAL WASTE	REDUCTION FROM PREVIOUS YEAR
<b>2006</b> <i>Old Facility (1940-2006)</i>	Universal	6,553 lbs.	<b>318 lbs.</b>
	Hazardous	1,443 lbs.	
<b>2007</b> <i>Temporary Facility</i>	Universal	6,285 lbs.	<b>711 lbs.</b>
	Hazardous	1,000 lbs.	
<b>2008</b> <i>New Facility (Recent consolidation of the FMS 2 with the FMS 3 resulted in an overall hazardous waste increase)</i>	Universal	54,41.5 lbs.	<b>843.5 lbs.</b>
	Hazardous	2,604 lbs.	

requires a multi-disciplinary approach that incorporates strategies and objectives set in Executive Orders, E.O. 13423, Strengthening Federal Environmental, Energy and Transportation Management into the design and construction process. The NCARNG's FMS 2 green building meets several objectives in water efficiency, energy and atmosphere, indoor environmental quality, and materials and resources due to its environmentally friendly design.



Fuel and oil filter crushers are part of recycling efforts at FMS 2. The crushers allow the P2 Team to reclaim petroleum products for recycling and allow used filters to be recycled as scrap metal rather than disposed of as hazardous waste. Antifreeze is also recycled with help from an outside recycling vendor.

## Green Buildings

The technical merits of the team's P2 program span a wide range of environmental areas, beginning with the very design and construction of the FMS 2 building itself to Energy 10 standards. Opened for operation in April 2008, the new FMS 2 building has a number of



green design elements including:


- A geothermal heating and cooling system that works on a closed loop system with on-site water wells. Pipes on the closed loop circulate cool water from the wells through the building's heat exchanger to the heating and cooling system, and back through the wells. The geothermal system is saving heating gas and electrical costs as well as reducing emissions. Annual estimates calculated CO<sub>2</sub> emissions reductions of over 500 tons, SO<sub>2</sub> emissions reductions of six tons, and NO<sub>x</sub> emissions reductions of two tons.
- Occupancy sensors automatically control lighting systems that use T5 fluorescent energy efficient lamps, and perimeter lighting uses solar indicators to minimize the time that lights need to be on. Waterless urinals contribute to the building's overall water conservation measures, saving approximately 40,000 gallons of fresh water annually.
- Contracted pickup of used petroleum products at the shop contributes to waste stream reduction. The contractor pumps used vehicle motor-oil through a high-velocity recovery pump, returns the oil to a central facility for filtering, processes with diesel fuel, and re-injects the fuel/oil mixture back into the retail system for use as residential and industrial heating oils, allowing for greater used oil reuse.

## CONCLUSION

The NCARNG P2 Team's leadership in pollution prevention and their efforts to make their shop as green as possible while maintaining the highest degree of environmental quality has set them apart in North Carolina and in the region in terms of environmental excellence. Over 500 pieces of equipment come through their facility every year for servicing and rehabilitation. Without the team's support, the NCARNG would not be able to accomplish its military mission. The team's dedication to environmental quality has helped it to do its job more cleanly and efficiently. This P2 approach seeks to increase the efficiency of a process, thereby reducing the amount of pollution generated at its source. The NCARNG has achieved this by opening a new green facility for equipment rehabilitation and servicing, significant reductions in both hazardous and universal waste, recycling, and the implementation of new training and material inventory programs. The P2 Team's commitment to environmental quality and stewardship has helped to cement their reputation as an environmental leader and good neighbor not only in North Carolina, but also in the region and throughout its military structure.



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For more information about the Secretary of the Army  
Environmental Awards program, go to  
<http://aec.army.mil/usaec/newsroom/awards00.html>  
or call the U.S. Army Environmental Command  
public affairs office at (410) 436-2556.



