FY03 SECRETARY OF THE ARMY AWARDS WINNERS

# BEST PRACTICES

*PRESERVING THE ENVIRONMENT WHILE PROTECTING OUR FREEDOM*

# BEST PRACTICES

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ENVIRONMENTAL RESTORATION—
INDIVIDUAL/TEAM

# ANNETTE ISLAND PROJECT DELIVERY TEAM, ALASKA DISTRICT, U.S. ARMY CORPS OF ENGINEERS

## INTRODUCTION

By using the best technology and management practices available, the U.S. Army Corps of Engineers' (USACE) Project Delivery Team (PDT) made important environmental restoration contributions on Annette Island, Alaska, during fiscal years 2002 and 2003. The main sources of contamination on Annette Island are polychlorinated biphenyls; heavy metals, such as lead and liquid mercury; fuel; and solvents. The team overcame many challenges such as regulatory sovereignty of Annette Islands Reserve; multiple involved parties, each with their own organizational and mission constraints; and logistics of operating at the remote site with its unique environmental characteristics.

The many landowners, responsible parties, stakeholders, and regulatory agencies involved at Annette Island have unique schedules and approaches to site cleanup, as well as different definitions of success, all of which complicates environmental restoration. To add even more complexity, nearly 300 separate contaminated sites are located on the Metlakatla Indian Reserve, accessible only by boat or air. The multitude of barriers to success is staggering.

**The Annette Island Environmental Cleanup and Restoration Team made many noteworthy accomplishments in the past two years.**
**Major accomplishments include:**

- **Cost savings** approaching $900,000 in fiscal year 2002 and fiscal year 2003
- **Reduction in number** of disputed sites from over 150 to less than 35
- **Schedule savings** estimated at five years, based on previous progress toward site closure
- **Removal** of 65 tons of contaminated soil and the recovery and recycling of four pounds of liquid mercury
- **Resourceful composting** of contaminated soil, using fish and wood waste, reducing contamination levels by a factor of three
- **Creation of a single database** replacing dozens of distinct and disconnected data sets, facilitating information sharing


▲ Contaminated soil removal at the former hospital area, courtesy of USACE/Jacobs.

## BACKGROUND

The PDT is tasked with the mission of reducing risks from physical hazards and dangerous chemicals remaining from previous federal operations on Annette Island, which is an official Formerly Used Defense Site (FUDS). The PDT was assembled based on the unique mix of skills required for the successful execution of the Annette Island Project and modified based on the appropriate time in the life cycle of the project. Managing the breadth of the program by ensuring the right specialists were involved at the right time was critical to the success of the project team.

▲ Historic photo of Army dock used for off-loading of material and supplies. Courtesy of the Anchorage Museum of Natural History.

### PROJECT DELIVERY TEAM

Team members who were instrumental in the success of the environmental restoration effort are listed below.

- Robert Johnston, USACE Project Manager
- Todd Fickel, P.E., USACE Engineer
- Julie Sharp-Dahl, USACE Chemist
- Gary Haynes, USACE Contracts Specialist
- Diane Hanson, Ph.D., USACE Archaeologist
- Lizette Boyer, USACE Environmental Specialist
- Tammy Phillips, USACE Quality Assurance Representative
- Anne Roth, USACE Legal Counsel
- Dave Morbach, USACE Real Estate Officer
- Kelly Davis, USACE Program Analyst
- Sarah Trent, USACE Legal Counsel
- Suzanne Beauchamp, P.E., USACE Program Manager
- Jon McVay, Jacobs Project Manager
- Eric Detmer, Jacobs Quality Control Supervisor
- Drew Anderson, Jacobs Engineer
- Kelly McGovern, Jacobs Chemist
- Betty Lewis, Jacobs Subcontracts Administrator
- Jennifer Anderson, Jacobs Environmental Engineer
- Heather Sather, Jacobs Environmental Scientist
- Sylvia Elliott, Jacobs Cultural Resources Specialist
- P.S. “Kiwi” Thompson, Jacobs Site Manager
- Jeremy Yancey, Jacobs Safety Officer
- Sarah Nutt, Jacobs Administrative Assistant

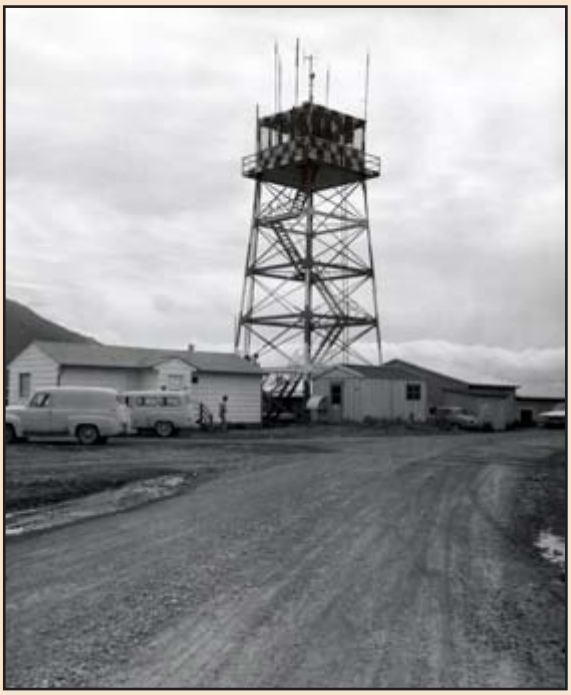
## POSITION DESCRIPTION

The primary duties required to support the FUDS Program are assessing and mitigating risk to human health and the environment associated with former Department of Defense (DoD) properties on Annette Island. In support of these duties, the PDT plans actions, investigates problems and remediates sites on Annette Island following the Comprehensive Environmental Response, Compensation, and Liability Act process. This process involves investigations, reports, interim removal actions, feasibility studies, design of remedial alternatives, implementation of plans, and determination of no further action. Secondary duties include supporting other stakeholder projects that are managed through the Alaska District.

### BACKGROUND

Annette Island is located in southeast Alaska, approximately 900 miles southeast of Anchorage, Alaska, and 700 miles north-northwest of Seattle, Wash. The Department of Defense began activities on Annette Island prior to the outbreak of World War II, and by 1942 had completed construction of a station that included a naval facility, infantry training facilities, a coastal defense system and two runways with support facilities. The Annette facility expanded to become a major stopover point for aircraft headed to the North Pacific Theater of Operations. After the war, the airport and support facilities were operated by a number of parties, including government agencies, private corporations and the Annette Island Metlakatla Indian Community. In 1973, the construction of Ketchikan International Airport displaced the use of the Annette Island Airport as the primary civilian airport in the area. DoD involvement is currently limited to environmental cleanup and restoration of the FUDS on the island.

The Bureau of Indian Affairs (BIA) holds real estate property in trust for the Metlakatla Indian Community, a group of Tsimshian Indians who migrated from Metlakatla, British Columbia, in 1887 seeking religious freedom. Annette Island is the only Indian Reserve in Alaska; the land belongs to the U.S. Department of the Interior and is administered through the BIA. At present, the National Weather Service, United States Coast Guard, and the Federal Aviation Administration (FAA) operate and maintain minor facilities at the station.



▲ Historical photo of Army Air Traffic Control Tower. Courtesy of the FAA.

## ACCOMPLISHMENTS

### Overview

#### *Stakeholder Coordination*

The primary aspect of program management that makes this project so successful is coordination between stakeholders. Stakeholder management is of the utmost importance to the team. Potentially responsible parties for the hundreds of sites on Annette Island include five federal agencies, private corporations and the Metlakatla Indian Community (MIC) as a sovereign entity. The stakeholders' interests had to be managed and potential conflicts were mitigated through the Memorandum of Understanding (MOU) Work Group process.

**MOU WORK GROUP**

- U.S. Army Corps of Engineers
- Federal Aviation Administration
- Bureau of Indian Affairs
- United States Coast Guard
- Metlakatla Indian Community

Because of the large number of agencies involved, each with its own potential environmental cleanup responsibilities, a Memorandum of Understanding (MOU) was signed and a MOU Work Group was formed to address environmental impacts of past government activities on Annette Island. The group evolved into a highly integrated team, comprised of government and contractor personnel. Members demonstrated their collective ability to plan and execute consensus based environmental restoration activities with exemplary results due to an outstanding level of communication, information sharing and coordination.

▲ The draining and removal of pipelines often entails a lot of manual labor, as the marsh/bog conditions are not conducive to heavy equipment. Courtesy of USACE/Jacobs.

#### *Funding Identification and Cost Savings*

The team worked diligently to identify the appropriate funding sources to attain the goals of the mission. To date, USACE capitalized on the Defense Environment Restoration Program-Formerly Used Defense Sites (DERP-FUDS) program and Native American Lands Environmental Mitigation Program (NALEMP) for funding and execution of restoration work. FUDS and NALEMP have been the primary source of funding for DoD cleanup and restoration; however, when other sources are recognized they are shared with members of the group. For instance, through information sharing, the community is seeking funding through the Brownfield Program to augment areas at sites not covered by FUDS or NALEMP.

Additionally, USACE partnered with other federal agencies to stretch the power of the cleanup dollar. Methods have included:

- Proactive identification of potential problems and planning appropriate mitigation actions
- Coordinated efforts with other agencies to leverage the Total Environmental Restoration Contract (TERC) mechanism and utilize this contract to conduct distinct phases of work for multiple federal programs and agencies
- Compliance with regulations using unusual approaches to project challenges
- Capitalizing on similarities among various stakeholders to build a unified team, including a common database and work plans, sharing of resources and sequencing fieldwork to maximize use of local resources
- Real-time, measured performance of project progress, to ensure that disparate sources of funding are all used efficiently and appropriately

### *Project tracking and coordination*

The PDT established a method to track progress among the agencies, grouped them into similar categories and searched for ideas to accomplish the activities cost effectively and within the constraints of their respective programs. The method the PDT used was the Web-based database and mapping program called Portal—a complex integration of inter-related data that replaces dozens of distinct databases. Portal is a single repository for all program related documents. All documents open to the public are housed on Portal. The team developed the Portal database to exchange and share information and used measured performance to monitor progress. The management system enabled the team to mitigate potential adverse effects and maintain compliance with program and regulatory requirements. Environmental data are entered onsite during preparation of the chains of custody for sample management. The field crew on Annette Island has nearly immediate access to every report prepared for, and every sample collected on Annette Island, to facilitate informed and timely decisions. When back in the office, whether in Anchorage or Washington, D.C., each member of the team can access and share the same project information.

▲ The recovery of drums from a sensitive salmon stream bed is a time-consuming process. The majority of the drums recovered are empty. Courtesy of USACE/Jacobs.

### *Effective communications and information sharing*

Communication is key to effectively transfering lessons learned from the Annette Island project. Affected stakeholders were involved in every step of the process, from inclusion in meetings, to development of strategies, to removal of contaminated soil. The PDT developed both communications and stakeholder management plans. The success of the program is greatly affected by stakeholder involvement.

The project team sought community involvement at several levels. The NALEMP work was assigned to the Metlakatla Indian Community through a cooperative agreement. More than 20 MIC members have been hired to support FUDS and NALEMP work, through which they can be directly involved and experience the benefits of their efforts and the efforts of the project team. Partnering with the community through NALEMP improved the USACE relationship with local regulators. Under NALEMP, aesthetic and physical hazards have been prioritized and mitigated. The local regulators experience firsthand the effectiveness of using the NALEMP and FUDS funding approach to meet the PDT's objectives. The community can use NALEMP to level the resource requirements within the community, extending employment to nearly year-round, which is good for the community and well received by the MIC regulators.

### Accelerating Cleanup/Reducing Risk to Human Health and the Environment

Vigorous coordination developed opportunities to accelerate cleanup and save money in the process. For example, the NALEMP program coordinated to use the same subcontractor as the other programs to eliminate the need to remobilize equipment and resources in November 2002, saving approximately $150,000 in one field season. This opportunity would have been missed if the NALEMP team had not been communicating with the FUDS and FAA teams as part of the overall program management strategy of the MOU.

Other means to accelerate cleanup developed as the program matured. The team recognized that the types of work conducted at multiple sites throughout the island were similar enough to allow for a common management plan to manage fieldwork. The team developed a common Operations and Management Plan and a common Quality Assurance Program Plan to support clean-up operations. The plans contain commonalities among work activities including contract specifications that would be applicable to any contractor conducting the work. The plans also give the team flexibility in implementation. As new sites are slated for action, relatively brief site-specific addenda are prepared. This saved both time and money and resulted in savings of approximately $45,000 per annum.

▲ In some cases, helicopter transport of contaminated and backfill material was more economical and less environmentally damaging when compared to the construction of access roads. Courtesy of USACE/Jacobs.

The team modified specialty resource involvement throughout the project to provide best value to the federal government. When feasible, USACE identifies in-house resources to work for several customers. One example is a single USACE archaeologist supporting FUDS, NALEMP and FAA work. This results in a unified approach and consistent documentation as appropriate.

Another example is preparing environmental assessments (EAs) to support work to be conducted by multiple programs. Rather than having separate EAs for the FUDS, NALEMP and FAA projects, efficiencies are achieved through simultaneous preparation of EAs for all work. This saved an estimated 85 hours of work over the past two field seasons.

Beginning in fiscal year 2002, the team held meetings with stakeholders to identify individual goals and pursue common causes such as restoration of the island, managing budgets as effectively as possible and lowering the high local unemployment rate. The team was able to identify programmatic requirements and available funding sources to execute work required to complete site cleanup and meet stakeholder needs. In a move that saved considerable time, resources and money, separate projects funded by the Department of Transportation and DoD were executed simultaneously. This resulted in cost savings approaching $900,000 since the beginning of fiscal year 2002. Each department determined that a shared plan would avoid the

costs of developing two different plans, having two different field crews and creating two different reports. The team conducted community outreach for this project simultaneously as well. This saved considerable time and resources as only one presentation was prepared and less staff traveled to the island (travel for a two-hour meeting takes three days).

Cost savings and other efficiencies have directly impacted the progress towards site remediation. With nearly 300 sites and severely constrained budgets, the team was able to turn the $900,000 savings into accelerated progress toward site closure. This, combined with accelerated agreements regarding site restoration, shaved nearly five years off the total project schedule.

**COST SAVINGS**

| | FY02 | FY03 | FY02+FY03 |
|---|---|---|---|
| **DoD** | $55,000 | $213,000 | $268,000 |
| **Other Agencies** | $293,000 | $330,000 | $623,000 |
| **Total** | $348,000 | $543,000 | $891,000 |

The team used interim removal actions such as the removal of contaminated soil to reduce the source of contamination and reduce risk to human health and the environment. Small pools of mercury, one of the most toxic metals, were identified at an area that could only be accessed by foot. Calculations of in-situ conditions revealed that the team has removed over five tons of contaminated soil and recovered and recycled four pounds of liquid mercury. The team also emphasizes hazardous waste exclusions to recycle lead-laden scrap metal in lieu of disposal. Recycling has removed hundreds of tons of metal from the waste stream on Annette Island and eliminated short-term disposal costs while also reducing potential long-term liabilities associated with the landfill.

One of the main management techniques used to keep the program within schedule and budget is a long-term plan or agenda. The PDT conducted work to meet the annual and semi-annual milestones with the end goal in mind. Another technique is to collaborate on a master schedule. This allows the PDT to look for ways to share or reduce costs. The PDT attempts to capitalize on specialized equipment already mobilized to the site. Additionally, members of the team sequence work so that local resources may be fully utilized and not overwhelmed. Simple sequencing levels the resources substantially while maintaining critical milestones.

▲ One of many drum dumps on Annette Island. Courtesy of USACE/Jacobs.

**AWARDS AND SERVICES**

Government and contractor team members alike have been recognized for efforts on a variety of projects. The team includes Diane Hanson, Sylvia Elliot, Drew Anderson, Suzanne Beauchamp and Gary Haynes who received the fiscal year 2002 Secretary of the Army Award for Cultural Resources Management. The Jacobs team members received recognition for "efforts made during fiscal year 2002 in support of the Annette Island Project, fostering relationships in the community and identifying local sources to meet project needs." *(Dan Sweet, Federal Small Business Liaison)*

Dr. Diane K. Hanson is the senior district archaeologist for the Alaska District. She is currently the president of the Alaska Anthropological Association and the Alaska Consortium of Zooarchaeologists. She received a teaching excellence award as an adjunct professor in 2000. Jacobs' cultural resources planning coordinator, Sylvia Elliot, was on the board of directors of the Alaska Association for Historic Preservation from 1996-1998.

## Stakeholder Involvement

The MIC formed an Environmental Restoration Advisory Committee (ERAC), similar to a Restoration Advisory Board. The ERAC includes members of the MIC, which is the local governing authority. The PDT makes regular visits to Annette Island for meetings with the mayor and ERAC.

All stakeholders meet regularly to discuss and align organizational goals. The MOU team, led by USACE, communicates via teleconference every two weeks to share plans, challenges and solutions. The MOU team has increased face-to-face meetings from less than once per year prior to 2002 to at least three times a year now.

Educating the community of the risks associated with the remnants of past DoD activities and the hazards of cleanup was difficult. The team created a community relations plan to keep interested residents and local officials informed about the progress of environmental cleanup activities performed by the agencies. The goals included communicating progress, encouraging two-way communications and providing opportunities for the public to contribute. The team also uses face-to-face techniques to involve and educate the community. Members of the community work with the team to remove contaminated material and collect samples. It was during these times that the team educated and trained the community about risks, providing significant learning opportunities through hands-on experience during government cleanup. Through involvement of the stakeholders, the number of disputed sites was reduced from over 150 to fewer than 35. The primary stakeholders are pleased and the EPA is also satisfied. Not coincidentally, this project was identified as an Environmental Justice Case Study.

▲ Head nets are a must, as the most prevalent inhabitants on Annette Island are whitesocks, mosquitoes and no-see-ums. Courtesy of USACE/Jacobs.

> "Knowing people at the other agencies has been a tremendous help. You get to know people in the other agencies, and you start to look to them for other project partnerships dealing with other issues."
>
> *— Interviewee, Metlakatla Partnership*
> *Towards an Environmental Justice Collaborative Model:*
> *Case Studies of Six Partnerships Used to Address*
> *Environmental Justice Issues in Communities*
> *January 2003*

Involvement with the community also impacted the local infrastructure. In terms of money infused into the community, approximately $350,000 per year was spent in local businesses and disbursed through the hiring of local community members. This had a positive effect on small businesses: the number of small, local businesses able to support field operations grew from 62 in early fiscal year 2002 to 124 in late fiscal year 2003.

## Regulatory Coordination

The regulatory environment for this project is challenging. Conflicting state, local and federal regulations have been further complicated by executive orders related to working with Indian Nations like the Metlakatla Indian Community

on the Annette Island Reserve. Although the site is not on the National Priorities List, the project team maintains communications and interactions with the EPA to ensure full compliance with federal requirements. MIC is the primary regulatory agency; however, the regulations for the state of Alaska are more comprehensive and complete. Thus, regulatory criteria are often absent and additional coordination efforts are required to establish criteria. Phone, email and fax are used regularly due to distance between stakeholders. The geographic area spans from Anchorage, Ala., to Pasadena, Calif. In order to bridge this distance, active communication, coordination and consultation with the MIC, EPA and the Annette Island community are keys to the success of the restoration effort.

▲ To access certain sites today, the construction of roads was necessary. This access road was constructed across a salmon stream, requiring timing and specialized engineering to minimize impacts to spawning salmon. Courtesy of USACE/Jacobs.

## Cost Avoidance

The PDT is diligently striving to find cost-effective measures to reduce risks associated with previous DoD activities. Yet whenever activities associated with other agencies are identified, costs are reassessed to ensure that the government does not fund the cleanup of environmental contamination caused by others. One example is the disqualification of fuel pipeline systems that were used by private companies, a usage identified only through examination of obscure documents. Without close cooperation led by USACE, the relevant information would not have been available to the right parties, and the correct determination of fiscal liability could not have been made. By sharing information, the team reduced costs to complete investigation and cleanup work by over $1,000,000.

The project team works with multiple agencies as customers to integrate the TERC contractor as a cost savings method. In fiscal year 2002, while working for FUDS, FAA and the USCG, the team saved nearly $60,000 by conducting work for multiple agencies during a single mobilization. Substantial mobilization costs forced the PDT to implement a systematic approach to evaluate creative solutions.

During cultural resource evaluations, there were over 100 features potentially eligible for preservation as significant sites under the National Historic Preservation Act. USACE joined financial forces with the FAA to share costs associated with mobilizing qualified subcontractors to the remote sites to make definitive determinations of eligibility. The PDT also sequenced NALEMP funded removal work to coincide with mitigation of eligible features. In all, cost sharing between FAA and FUDS, and actively sequencing work appropriate to the critical tasks, $168,000 was saved in fiscal years 2002 and 2003 during the documentation of these eligible features.

Because of the relative isolation and the unique environmental conditions characteristic of Annette Island, many standard approaches to site investigation and remedial action are reviewed and deemed infeasible. Site conditions consist primarily of wet muskeg and rain-saturated, thick vegetation. These characteristics make new approaches imperative to the success of the project. Travel and material logistics can be challenging due to intermittent services between the city of Ketchikan, Ala., and Annette Island.

Treatment pilot studies were conducted to assess the viability of certain techniques under local conditions, including composting and land farming of petroleum contaminated soil and phytoremediation of polychlorinated biphenyls and other contaminants. Unique conditions to Annette Island, such as the abundance of fish and timber, made composting of petroleum-contaminated soil a potentially viable treatment option. Locally available resources including fish waste from the local processing plant and wood waste from the years of logging and the local timber mill were used to compost the contaminated soil. These resources, coupled with the rareness of topsoil and the costs associated with remoteness of the island, determined the feasibility of a pilot study for this option. The results of the study revealed that composting, using locally available resources, reduced contamination by a factor of three. This technology was determined potentially feasible and provides lower lifecycle costs by using the waste from local fish processing and timber industries. The resulting product of treated soil was a cleaner, high-organic-content soil that could be used on the island, which is mostly covered by rock, water and peat.

### Other Benefits

The USACE, under the FUDS program, has the primary responsibility for cleaning up former military sites, including Annette Island. Through the FUDS program, the USACE responds to DoD generated pollution that occurred before the property transferred to private owners or

▲ View from Yellow Lake. Courtesy of USACE/Jacobs.

to federal, state, tribal or local government entities. DoD involvement is currently limited to environmental cleanup and restoration of the FUDS on the island.

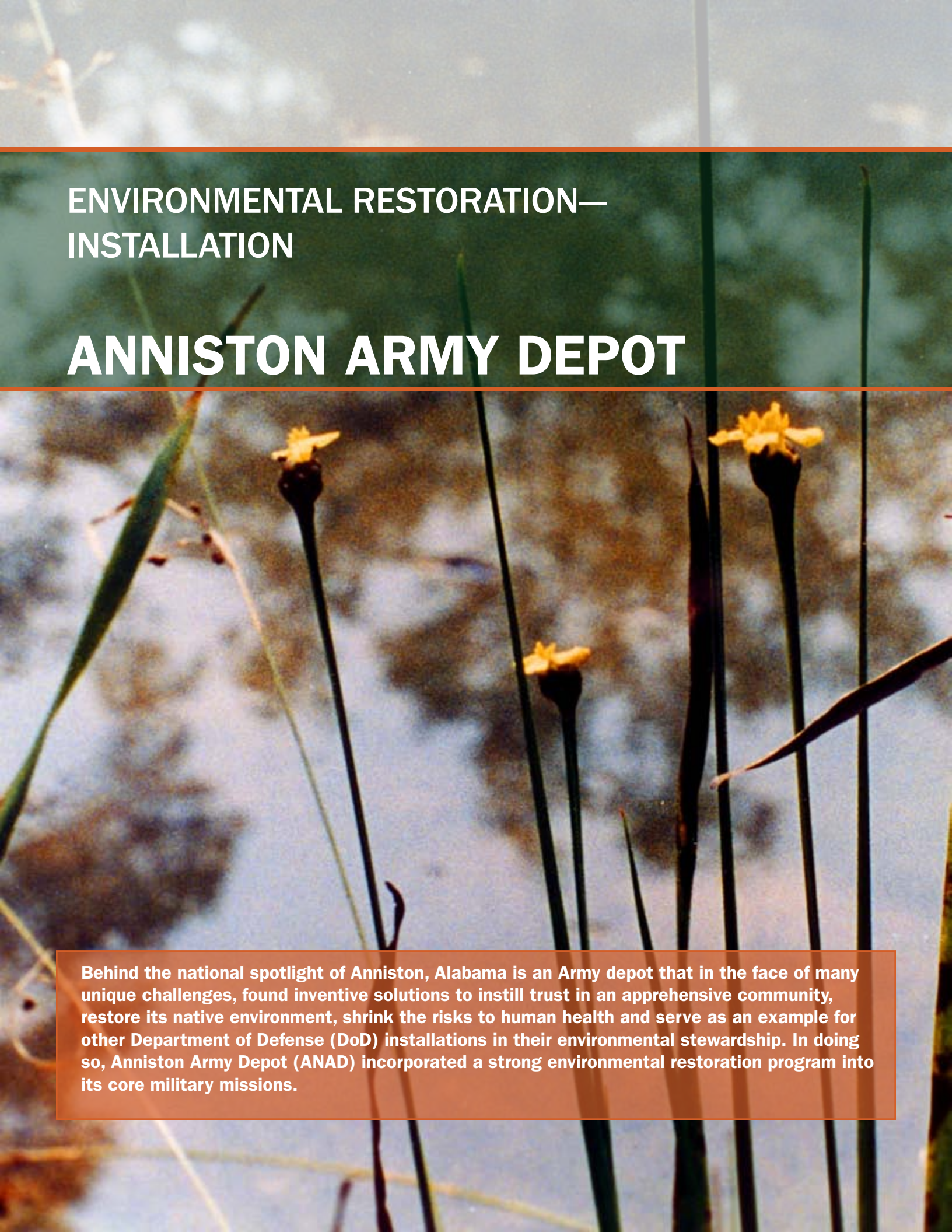
The PDT is managing work that impacts the quality of life on Annette Island by:

- Infusing money into the community;
- Providing jobs, thereby reducing the 80 percent; unemployment rate
- Providing on-the-job training; and
- Increasing the number of small businesses.

*Involvement of local residents improves relationships and fosters trust.*

## CONCLUSION

The events and accomplishments over the past two years demonstrate the outstanding benefits of cross-agency cooperation, innovative approaches to site restoration and efficient logistics management. The cooperative effort also expedited the cleanup of Annette Island, improved the infrastructure of the remote town of Metlakatla and provided a means for community members to learn new skills.



## ENVIRONMENTAL RESTORATION—INSTALLATION

# ANNISTON ARMY DEPOT

**Behind the national spotlight of Anniston, Alabama is an Army depot that in the face of many unique challenges, found inventive solutions to instill trust in an apprehensive community, restore its native environment, shrink the risks to human health and serve as an example for other Department of Defense (DoD) installations in their environmental stewardship. In doing so, Anniston Army Depot (ANAD) incorporated a strong environmental restoration program into its core military missions.**

## INTRODUCTION

▲ An aerial view showing the depot's industrial complex.

Since 1941, the depot has served the United States in times of war and peace. The initial mission was ammunition storage, but over the decades, it evolved into serving as the Army's premiere vehicle and weapon maintenance and repair facility. ANAD is the only Army depot capable of performing maintenance on both heavy and light tracked combat vehicles and is designated as the Center of Technical Excellence for the M1 Abrams Tank. The depot also performs maintenance on individual and crew-served weapons as well as land combat missiles and small arms. The depot continues to store and maintain conventional ammunition and missiles and also stores seven percent of the nation's chemical munitions stockpile. One of eight stockpile sites in the United States, ANAD began destroying its M55 rockets filled with nerve agent in 2003. The chemical demilitarization program in Anniston gained local as well as national attention because of potential program risks and resulting community concerns.

The depot is the largest employer in the city of Anniston, which lies 10 miles to the east. Anniston is an industrial and agricultural area of approximately 26,000 residents. ANAD has more than 5,300 employees including tenants and contractors. The depot is located on 15,279 acres in Calhoun County in northeastern Alabama and is surrounded by small communities clustered primarily along its southern and eastern boundaries. Land use around the base is primarily residential, with approximately 3,900 residents living near the facility.

**ANAD Profile**

- 110 miles west of Atlanta
- 50 miles east of Birmingham
- 15,279 total acres
- 15,000 acres of woodland
- 10 acres of lakes and streams
- 4,784 total employees
- 2,850 depot employees

▲ M1 Abrams Tanks are lined up to be upgraded before being returned to soldiers.

## BACKGROUND

### Environmental Restoration Challenges

The historical mission of the depot left its present day leadership challenged to address soil and groundwater contamination that spread beyond installation boundaries, possibly impacting local water sources. Primary contaminants of concern at the depot are trichloroethylene (TCE), a common degreaser used to clean metal, and other dense non-aqueous phase liquids (DNAPLs), which are chemicals in a sludge-like form that exist throughout the environment. In several places, complex geology as well as the nature of the contaminants have led to increased technological hurdles.

ANAD faces these challenges in a community with pre-existing sensitivities due to nationally publicized industrial polychlorinated biphenyl contamination in the area as well as ANAD's chemical demilitarization mission.

As such, ANAD's leadership recognizes that successfully implementing environmental restoration requires the full involvement of a variety of stakeholders, including the local community and state and federal regulators. Through its Installation Action Plan (IAP), the depot takes a vigorous approach to environmental restoration that incorporates strong working partnerships with the Army, regulatory agencies and the public.

### *Complex Geology and Nature of Contamination*

The U.S. Environmental Protection Agency (EPA) placed ANAD's Southeast Industrial Area (SIA) on the National Priorities List in 1989, recognizing it as a top priority hazardous waste site. This area, although only representative of a small percentage of the depot's total land area (about 600 acres), is also one of the Army's top five most complicated areas due to complex geology and the nature of the contamination.

On-site disposal of industrial chemicals from 1950 to 1981 resulted in soil and groundwater contamination from DNAPLs throughout the SIA. The diverse nature of the earth's subsurface and the physical characteristics of DNAPLs make its migration very unpredictable and difficult to model. Because DNAPLs tend to sink below the water table to reach layers of low permeability within fractured bedrock, the dense liquids are difficult to remove.

The industrial area is located close to the installation's southeastern boundary adjacent to private drinking water wells and within one mile of Coldwater Spring, the area's water source. Over the years, monitoring confirmed that plumes of contamination from the facility have migrated beyond the installation boundaries and have impacted (or may eventually impact) groundwater used by the surrounding communities.

### *Technological Challenges*

Contamination within fractured bedrock was detected at depths of 400 feet below ground surface. Because of geological challenges presented by the nature of the bedrock and depth of contamination, current technology may not offer cost-effective solutions. The depot's environmental specialists have taken action to seek out new and developing technologies to help overcome this challenge.

Feasibility studies are underway for *in-situ* chemical flushing technologies. These technologies involve injecting a liquid through the contaminated zone for dissolution, displacement or chemical destruction. *In-situ* chemical oxidation involves an exchange of electrons between chemical species. This exchange of electrons affects the oxidation state of the chemical species involved, by breaking the carbon bonds. The organic compounds are either completely destroyed or converted to smaller and typically less hazardous compounds.

Other technologies such as air-sparging, in-well air stripping, dual phase extraction, thermal treatment and electrokinetics are also being evaluated.

### *Community Challenges*

Community members in Anniston have voiced their concerns about the environmental condition of the area. Faced with a community with pre-existing sensitivities toward contamination as well as the depot's chemical demilitarization mission, ANAD took an aggressive, proactive approach to include community relations in all of its environmental restoration initiatives.

## Organization and Management Approach

To address its unique challenges, ANAD took an inventive approach to overall program management that stresses partnership building, coordination and communication.

This approach led to the establishment of a two-tiered *Partnering Team*, comprised of state and federal regulators, scientific experts and Army staff that has a significant role in guiding

the environmental restoration program. It also stresses community outreach and involvement. The local Restoration Advisory Board (RAB) actively serves as a forum for citizens of local communities, representatives of the installation and regulatory agencies to discuss and exchange information about the environmental restoration program.

▲ Anniston Partnering Team.

To ensure that the depot's mission is not jeopardized by environmental contamination issues, ANAD's approach fosters communication within the installation as well. Specifically, the Installation Restoration Program (IRP) manager meets with other directorate representatives to coordinate any excavation or dewatering activities associated with construction projects. The IRP manager provides the guidance needed to facilitate and expedite construction, while ensuring appropriate protection for human health.

The environmental restoration staff routinely works with installation engineers and production staff to support their requirements in mission capability and completion. They also work hand-in-hand with the public works department during construction activities by providing them with support to evaluate hazardous conditions and evaluate and dispose of removed materials.

The depot is an active participant in the DoD IRP, which was established to identify and evaluate past hazardous waste sites and to control the migration of hazardous contaminants from these sites. ANAD's Directorate of Risk Management (DRK) manages the program with oversight provided by the U.S. Army Environmental Center (USAEC).

### Agreements and Plans

In June 1991, ANAD entered into a Federal Facility Agreement (FFA) with the Alabama Department of Environmental Management (ADEM) and the EPA. This agreement establishes a procedural framework and schedule for developing, implementing and monitoring appropriate response actions to contamination problems at the SIA and other areas of the depot.

The IAP is updated annually and was last updated in October 2003. ANAD gathers input and insights from many organizations to ensure the most efficient roadmap for the IRP program. The *Partnering Team*, the U.S. Army Corps of Engineers (USACE) Mobile District, the U.S. Geological Survey, and community groups all participated in this coordinated effort to construct the plan. It provides a detailed path for the IRP program by defining the requirements, proposing a comprehensive approach and identifying associated costs to conduct future investigations and remediation at the depot. Additionally, the IAP establishes current project funding to ensure that all remedies are in place by the end of 2007.

ANAD, through the *Partnering Team*, completed draft Records of Decision (RODs) for operable units that comprise several significant sites at the depot. These units include the Ammunition Storage Area, the SIA Soils Operable Unit and the SIA Shallow Groundwater Operable Unit.

## PROGRAM SUMMARY

ANAD's IRP mission began in 1978. Remedial Action (RA) completion is scheduled for 2007. All clean-up objectives and operation and maintenance are scheduled to be completed by 2032. Objectives include:

- conducting a remedial investigation/feasibility study for all applicable SWMUs within ANAD;
- developing and implementing Remedial Design (RD) and RA in an approved ROD; and

- completing these activities on schedule in order to protect human health and the environment.

Of the 47 sites registered in the AEDB-R, 25 have completed responses (either remedial strategies chosen and approved or the designation that no further action is required). Fifteen sites have a Remedy in Place with either long-term monitoring or remedial action operation/long-term operation. The depot's fiscal year 2003 IRP budget was $4.74 million.

The depot met, or is on schedule to meet, DoD cleanup objectives listed in the Financial Management Regulation. ANAD will also meet DoD's goal to have remedial systems in place for all high relative risk sites by 2007.

## ACCOMPLISHMENTS

ANAD demonstrates its leadership in environmental stewardship in the service of both the community and the depot mission. The Anniston Chemical Demilitarization Facility (ANCDF) has begun destroying its chemical munitions stockpile through incineration, which is a point of contention for various community members and community groups in Anniston. A key focus of the environmental restoration program is community participation, which aligns with the community involvement essential to chemical demilitarization.

Leaders of ANAD's environmental initiatives work closely with the depot's public affairs team to jointly facilitate public meetings. Working together to effectively address community concerns provides a unified presence for the depot and positively impacts the installation's ability to accomplish its mission.

Through its many partnerships, ANAD implemented a program that achieved reasonable cost-effective remediation strategies to support environmental restoration. Both the EPA and ADEM recognized the program for its proactive approach to environmental cleanup.

ANAD is currently not a base realignment and closure installation; therefore, no specific fast track projects took place during the award time period. ANAD makes every effort to expedite cleanup projects to the highest extent possible.

### Innovative Technology Demonstration/Validation and Implementation Innovation

#### *State-of-the-Art Groundwater Treatment Facility*

ANAD completed construction and began operation of its new Centralized Groundwater Treatment Plant (GWTP) in early fiscal year 2002. The GWTP and associated groundwater extraction wells are designed to treat contaminated groundwater and control plume migration through state-of-the-art treatment technology. The technology combines chemical oxidation and aeration to treat organic and inorganic contaminated groundwater, resulting in treated water that meets drinking water standards.

Using this technology, the depot saved thousands of dollars per year in operation and maintenance costs compared to the previous pump and treat system. Much of the equipment and infrastructure needs of the new GWTP were effectively converted from a former chromium treatment facility, substantially reducing the initial capital costs.

The new GWTP is a success story resulting from the partnering efforts that are a vital part of the IRP. *Partnering Team* efforts ensured the operation of the plant met federal and state regulatory requirements and is supported by the EPA Region IV and ADEM. The RAB actively participated in the design and construction of the GWTP, reviewing the progress and having on-going discussions with the installation risk managers.

#### *Hydrogen Peroxide Injection*

During the award period, a report was finalized and published on the first large-scale use pilot study of in-situ chemical oxidation in the Army, which ANAD completed. The report was distributed to other installations to use as a model and at least six installations requested the report. In the pilot study, which began in 2000, ANAD used chemical oxidation with a 50 percent hydrogen peroxide mixture and proprietary catalyst to neutralize contamination from solvent and waste oil sludge

lagoons that were closed in 1978. As part of this project, an emergency removal action of 7,200 cubic yards of soil in the area was undertaken. The objective was to use *in-situ* chemical oxidation on soils to remove waste chemical constituents that were contributing to an increase in health concentration limits in soil and area groundwater.

Hydrogen peroxide injection proved to be effective in reducing soil contaminant concentrations to below Site Screening Levels. The cost of the *in-situ* chemical oxidation was approximately one-fourth the cost of the excavation and disposal of the contaminated soil for a savings of almost $3 million. The depot now uses the site for vehicle storage.

### *Sampling/drilling techniques*

The complex geologic features of contamination sites at ANAD required certain drilling technologies to install monitoring wells. These technologies resulted in large quantities of drilling fluids and Investigation Derived Waste (IDW). Disposal of large quantities of this waste were cost-prohibitive.

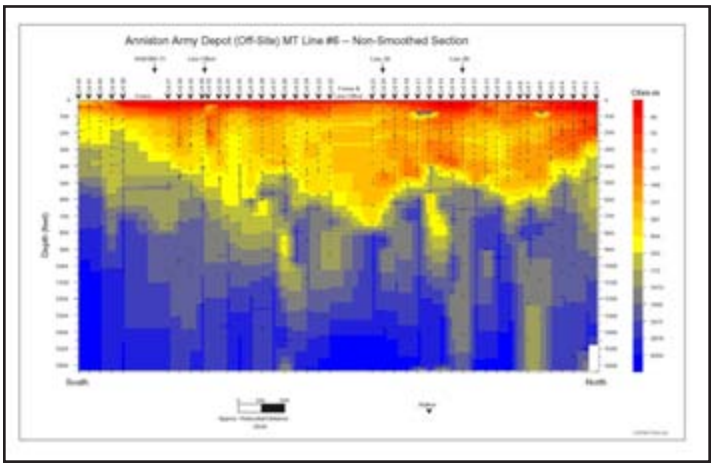
Subsequently, the depot employed an innovative IDW treatment technology and ambitious sampling plan that allowed direct discharge to surface water. Although treating water contaminated with volatile organic compounds is a common technology, high concentrations of sediment and suspended solids in the drilling fluid required removal prior to discharge to surface water. The IDW treatment technology filters out the sediment before it is discharged. ANAD closely monitored the program by taking frequent samples to ensure that the treated water achieved water-quality discharge standards. This treatment technology will now be used when drilling in contaminated areas. The technology allows significant cost savings in IDW disposal costs while complying with the Clean Water Act.

Following the installation of these monitoring wells, ANAD installed Flexible Liner Underground Technology (FLUTe) systems. The FLUTe system seals bore holes with a pressurized flexible liner, but leaves open intervals or ports for future sampling. This new technology increases the number of zones that can be sampled throughout different depths of the monitoring wells. These groundwater depth samples provide key information on the zones that are experiencing contaminant migration.

▲ A FLUTe liner is installed.

In addition, ANAD is using the following state-of-the-art technologies and practices to define the condition and distribution of the DNAPL masses:

- Seismic refraction for mapping the bedrock surface, locating surficial fractures and establishing their orientation.
- Resistivity and Magneto Tellurics, to locate fractures in the bedrock.
- Hydrophysics on selected boreholes to identify all fractures that produce water.

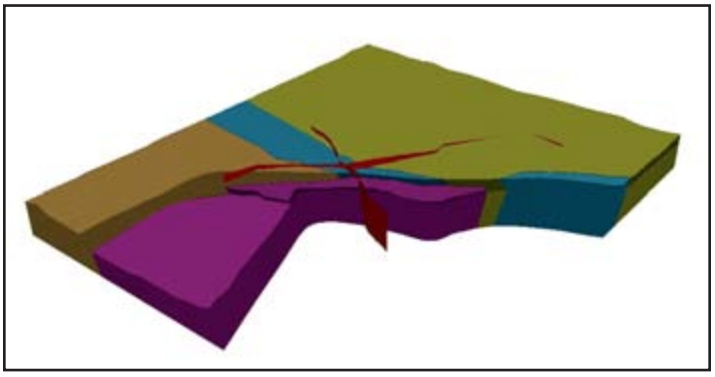



▲ Results of Magneto Tellurics used to determine potential drilling locations.

The use of hydrophysics is a relatively new approach. The open borehole is filled with deionized water and a probe is inserted to measure conductivity. The conductivity indicates the depth of the location of water flow zones, which is vital information for determining contaminant migration. All of these techniques are approved through the *Partnering Team* process, streamlining implementation.

### *Optimization of Modeling Techniques*

The current phase of the RI focuses on migration pathways to waterways and defining the remaining sources of DNAPL. Because of the complex geology and expensive drilling techniques to install monitoring wells, ANAD agreed to use an advanced modeling and simulation approach. Modeling and simulation supported critical installation restoration decisions that addressed reducing the risks of contamination to acceptable levels at dramatically lower costs. Information from the model provides greater input to the technical impracticality (TI) zone delineation, expands the groundwater contaminant transport prediction parameters and refines the predictions to the TCE plume.



▲ Three-dimensional model depicts geologic units and fractures.

In the past, plume delineation was based on monitoring well installation and sampling, which became cost prohibitive. Using the modeling and simulation approach, ANAD was able to identify processes that significantly reduce risk or decrease uncertainty and reduce RI costs. This information helps the team avoid unnecessary costs and refocus efforts to more beneficial processes. In addition, ANAD expects to reduce the quantity of complex and expensive data collection activities in fractured rock conditions.

The depot also developed a site-wide conceptual model of subsurface geology, hydrogeology and groundwater chemistry. Based on the model, numerical flow and transport simulations were analyzed. The results allowed ANAD to eliminate six deep monitoring wells from the investigation for a total estimated cost savings of $500,000. Future modeling results will assist in identifying the most appropriate wells for long-term monitoring. Prediction of the plume migration allows ANAD to be proactive in protecting potential receptors.

### *Technical Impracticability Waiver*

Although ANAD strives to remediate contamination at all sites, the lack of reasonable, cost-effective technologies that address the depot's site-specific challenges can cause difficulties. In these instances, ANAD focuses on the more practical goal of preventing future migration of contaminants. Therefore, the depot is pursuing a cutting-edge process that will serve as a model for other DoD installations, once complete. The depot is in the process of obtaining a TI waiver as a remedial alternative for the groundwater contamination existing within defined portions of the depot's SIA and other specific sites within the area. If successful, the waiver will be approved by regulators and will declare that the restoration of the area to appropriate standards is unachievable from an engineering perspective. Emphasis on this site will be on preventing migration of contaminants. When a cost-effective, reasonable technology is developed, the depot will then use its resources to pursue restoration the right way the first time, at a reasonable cost. If obtained, the TI waiver will save the Army millions of dollars because ineffective technologies will not have to be implemented.

## Partnerships Addressing Environmental Cleanup Issues

### *Partnering Team*

ANAD formed the *Partnering Team* in April 1997 to facilitate and help coordinate the planning and implementation of environmental restoration initiatives among the Army, regulatory agencies and the public. The *Partnering Team's* mission is to restore, to the maximum extent possible, all historically contaminated groundwater and soil sites, both on or off depot, along with the primary goal to reduce risks to levels that are protective of human health and the environment.

The *Partnering Team* was a key player in the many different environmental restoration initiatives undertaken during this award period, including completing draft RODs and updating the IAP. This partnership, while not a legally binding relationship, represents a commitment and an agreement among the parties to work together to achieve mutually beneficial goals.

The *Partnering Team* consists of two levels of stakeholders:

- Tier I consists of depot, EPA and ADEM personnel who actively participate in site-specific decisions on a weekly basis. The Tier I team meets every quarter to reach a consensus on the continued direction of the program on a site-by-site basis.
- Tier II consists of high-level depot, ADEM and EPA personnel who also meet on a quarterly basis to discuss broader restoration issues, such as land use controls and technology applications, and support the Tier I team as needed.

**Members of the following organizations make up ANAD's *Partnering Team***

- Installation Restoration Program Manager, ANAD
- U.S. Army Corps of Engineers, Mobile District
- Alabama Department of Environmental Management
- U.S. Environmental Protection Agency
- Gannet Fleming, Inc.
- Science Applications International

Issues raised during Tier I team meetings are discussed through a facilitation process. As a consensus is reached, the decisions are documented. If issues arise that are not able to reach consensus through the Tier I team, the issue is raised to Tier II team members. Since the initiation of the partnering program, ANAD has yet to formally raise any issues to the Tier II level. This displays the *Partnering Team's* ability and dedication to work through issues and achieve mutually agreeable solutions.

### *Stakeholder Involvement Creates Partner of Opposition Group*

The RAB recently joined forces with a former grass-roots opposition group, Community Against Pollution (CAP) to educate local residents about TCE. This unprecedented partnership stems from the commitment of the depot, the *Partnering Team* and the RAB to share information and take responsibility for protecting the health of its neighbors.

CAP helped conduct an opinion survey of community residents in September 2003. Overseen by ANAD, this effort gauged community concerns about groundwater contamination and provided a basis for defining community involvement initiatives to support emergency response planning. The survey covered a 25-mile radius from the Anniston city center, representing a diverse cross-section of the community. In just under one month, CAP helped interview property owners, business owners, elected officials, citizen interest groups, residents, school officials, government representatives and religious leaders. Survey questions touched upon the level of concern regarding community water and TCE, the level of interest in receiving more information on the issue, the preferred methods and frequency of information distribution, specific areas of interest and perceptions of ANAD. In response to the survey results, ANAD placed even more emphasis on its community outreach efforts and is able to better focus on community needs.

## RESTORATION ADVISORY BOARD

To achieve greater community and outside agency involvement in the environmental restoration process, ANAD established a Technical Review Committee (TRC) in 1993. The TRC was converted to a RAB in May 1998. The RAB meets quarterly to provide advice on cleanup, discuss key issues, review plans and reports, identify proposed project requirements and recommend priorities.

There are currently 23 voting members representing the diverse makeup of the Anniston community. Membership includes representatives from the affected community, the installation, EPA Region IV, ADEM, other state and federal agencies and interest groups, as well as interested individuals. Co-chairpersons are Colonel Gerald Bates, commander, Anniston Army Depot and Dr. Barry Cox, a Jacksonville State University professor representing the civilian community.

In addition to participating in discussions of ongoing IRP activities, the RAB plays an active role in public meetings and implementing ANAD's community outreach plan. In 2003, the RAB developed fact sheets and brochures with community friendly language designed to educate stakeholders on the health affects of TCE.

The RAB also contributed key information to ANAD's environmental restoration programs. It provided a private well and spring inventory, which was used for the On-Post Groundwater Operable Unit Plan to treat hot spots and the Combined Groundwater RI.

## REDUCING RISKS TO HUMAN HEALTH AND THE ENVIRONMENT

### *ANAD-Utility Partnership Demonstrates Commitment to Public Health Protection*

The depot took a proactive approach to help protect the community's drinking water sources. In 2003, the depot entered into a partnership with the Anniston Water Works and Sewer Board (AWWSB) to expand the Board's water treatment facility. Additionally, ANAD worked with the Department of the Army (DA) during fiscal year 2003 to gain approval for funds to be provided to the AWWSB to treat Coldwater Spring. The funding provides for the installation of air stripping equipment that will remove TCE from the waterway, even though the TCE levels that appear in the spring are well below the maximum contaminant level set by EPA and ADEM.

RI studies conducted by ANAD in the 1990s and recent monitoring data indicate that groundwater quality degraded, as TCE concentration levels in Coldwater Spring steadily rose. While there is no current threat to human health, the predictable increase in contaminant levels led to the conclusion that there will eventually be an unacceptable risk to human health at this site for which the Army is responsible. With funds approved and provided, AWWSB plans to complete installation of the air strippers in fiscal year 2004.

▲ A homeowner's private well water is sampled.

### *Established Base-Wide Standard Operating Procedure (SOP) for Land Use Controls*

ANAD developed an internal Standard Operating Procedure (SOP) for land use controls that became a model for other installations. The depot was able to develop this comprehensive document and gain EPA approval even though a land use control (LUC) dispute remained unresolved between the DoD and EPA. This management tool establishes responsibilities, restrictions on land use and mechanisms for implementation. Developed with input from the DoD LUC working group, ANAD's SOP also details new approaches to control land use.

The IRP program manager is responsible for implementing the SOP with the cooperation of the Directorates of Risk Management, Production Engineering, Public Works and Law Enforcement and Security.

This SOP supports mission readiness while maintaining compliance with applicable federal cleanup regulations. For example, ANAD needed to expand its power train facility to better meet demands, but opportunities for expansion were limited to a known contaminated site. The SOP provided the rigorous guidance needed to facilitate and expedite construction on this site, while providing appropriate protection for human health.

### Opportunities for Small and Small Disadvantaged Business in Environmental Restoration

The depot's leadership and decision-makers understand that, as Anniston's largest employer, the installation has a responsibility to support the economic development of the community. For this reason, ANAD consistently exceeded goals for contracting with local small and small disadvantaged businesses. In fiscal years 2002 and 2003, 100 percent of the subcontracts awarded through the IRP program were given to small or small and disadvantaged businesses. In addition, every goal for small and small and disadvantaged business participation was exceeded.

**IRP Goals for Small and Small Disadvantaged Business Participation**

| Business Type | USACE-Mobile Goal | Actual |
|---|---|---|
| Small business | 69.3% | 77.63% |
| Small disadvantaged business | 12% | 17.4% |
| Women-owned business | 7% | 19.6% |

## CONCLUSION

Cost-effective, innovative techniques and aggressive management of ANAD's IRP resulted in improved protection for human health and the environment and enhanced the depot's ability to fulfill mission requirements. ANAD took a proactive approach to protecting the community's raw water source through new modeling techniques, state-of-the-art groundwater treatment and innovative technologies for treating drilling water.

The depot's inventive management approach, which includes active participation and collaborative partnerships with key stakeholders, embodies a vision to go beyond mere "rubber stamp" participation. This synergy streamlines implementation, encourages innovation and reduces costs while fully supporting the overall mission of the installation.

# POLLUTION PREVENTION PROGRAM—INDUSTRIAL INSTALLATION

# ANNISTON ARMY DEPOT


**Through its impressive results, the Anniston Army Depot (ANAD) proves itself to be a good neighbor and a true stakeholder in Alabama's environmental future. The depot has achieved excellence in pollution prevention by implementing innovative and effective programs that protect the environment, increase productivity and enhance the Army's readiness.**

## INTRODUCTION

Established in 1941 for ammunition storage, the Anniston Army Depot (ANAD) is the Army's leading vehicle and weapon maintenance and repair facility. ANAD is the only Army depot capable of performing maintenance on both heavy- and light-tracked combat vehicles and is designated as the Center of Technical Excellence for the M1 Abrams Tank. In addition, ANAD performs maintenance on individual and crew served weapons as well as land combat missiles and small arms. The depot also stores and maintains conventional ammunition, missiles, seven percent of the nation's chemical munitions stockpile, and is the site of production of the Army's newest combat vehicle— the Stryker.

▲ M1 Abrams Tanks are lined up to be upgraded before being returned to soldiers.

The objectives of ANAD's Pollution Prevention (P2) program are to eliminate or reduce pollution at the source, rather than control it, and to achieve all agency and regulatory P2 requirements and goals. The leadership at the Army's premier depot is committed to the concept that combat readiness and responsible environmental stewardship are compatible, achievable, and necessary.

ANAD is located on 15,279 acres in Calhoun County in northeastern Alabama.

## BACKGROUND

ANAD's P2 program was established in 1992. Through the dedication and commitment of leadership and staff, P2 projects implemented since fiscal year 2002 have made significant improvements to on-depot processes while reducing, eliminating, or finding reuse opportunities for waste.

**ANAD Profile**

- 15,000 acres of woodland
- 10 acres of lakes and streams
- 4 buffalo in protected habitat
- 4,784 total employees
- 2,850 depot employees
- $407.1 million fiscal year (FY) 2002 operating budget

### Environmental Challenges

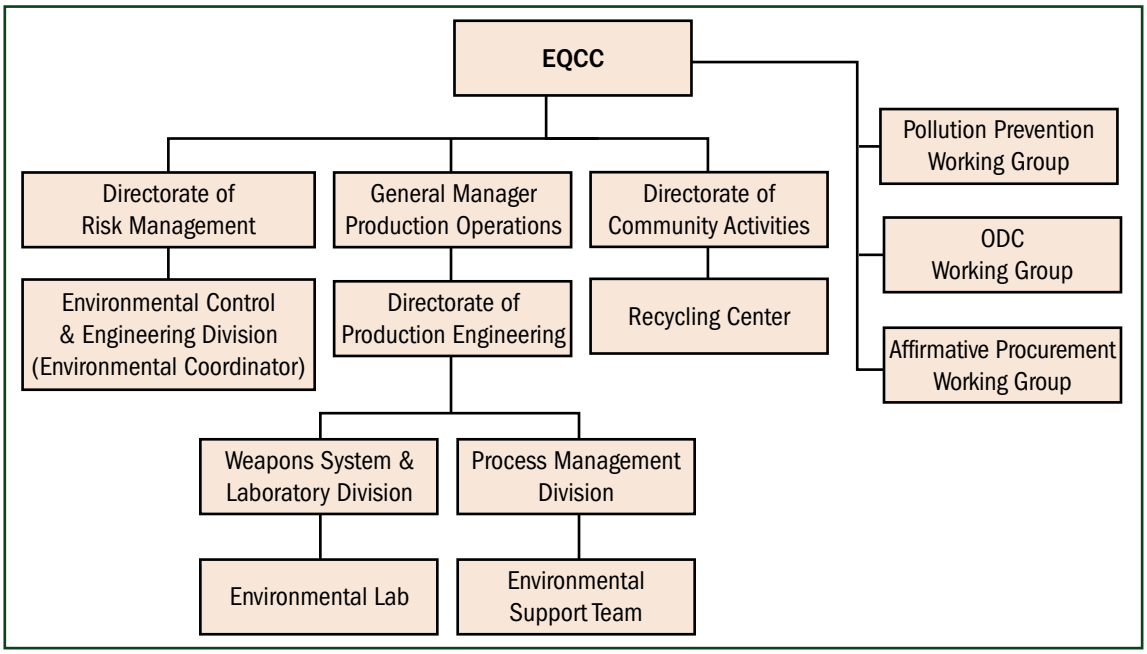
On a daily basis, the depot contends with a legacy of issues related to its industrial mission and role as storage facility for seven percent of the nation's chemical munitions. Due to the national publicity surrounding the beginning of chemical agent incineration in fiscal year 2003, the local community has a heightened awareness of its military neighbor, and, as a result, is especially sensitive to the depot's impact on the community.

ANAD is committed to meeting the metrics outlined in its P2 program and those established by regulatory and other monitoring agencies. Since baseline metrics were established in fiscal year 2000, world events have necessitated a significant increase in production and maintenance operations. Traditionally, industrial facilities find it difficult to strike a balance between production and P2 achievement, but ANAD has not bowed to tradition. Instead, the depot has been able to increase production, leveraging it to support improved P2 initiatives, and to continue effective pollution reductions.

### Organization, Staffing, and Management

ANAD manages its environmental program through the Directorate of Risk Management (DRK), although other directorates and divisions play crucial roles in the effective implementation of the

environmental and P2 programs. An organizational chart outlining ANAD's environmental program is shown in Exhibit 1.




▲ **Exhibit 1.** ANAD Environmental Program

Using an effective Environmental Quality Control Committee (EQCC) appointed by the Commander and comprised of representatives of all directorate and tenant organizations, the P2 staff and P2 Working Group (WG) "push the envelope" for technology development and implementation. The EQCC, established to advise the Commander on environmental priorities, policies, strategies and programs, coordinates environmental program activities, including the P2 program.

The P2 Program Manager is assigned to the DRK Environmental Control and Engineering Division, and serves as action officer for three highly-successful P2-related WGs (the P2WG, Affirmative Procurement (AP) WG and Ozone Depleting Chemicals (ODC) WG) and maintains P2 Project Records developed for P2 opportunities. The more than 20 members of the P2WG include representatives from environmental, production, contracting, engineering, legal and tenant activities.

The success of the P2 program lies with the commitment of its senior leadership. Directors (GS-14s) who are strongly committed to environmental stewardship actively chair all WGs. The success of the proactive P2 program results from the involvement and support of the working groups as well as the interaction and partnerships with the community.

## Completion of Environmental Management System (EMS) ISO 14001 Focal Point Analysis

An effective Environmental Management System (EMS) enhances P2 programs. Similar to a P2 Opportunity Assessment, an EMS goes beyond compliance-driven evaluations. The depot's EMS encompasses traditional P2 solutions and also focuses on environmental, safety and health impacts. The EMS also integrates these issues into the depot's larger mission, while increasing capacity, productivity and production. Additionally, it provides a robust extension to the P2 program by evaluating and ranking aspects and impacts on a process-by-process basis. The EMS Team works in close coordination with the P2WG to share findings and ideas and create program synergies.

ANAD has completed EMS ISO 14001 Focal Point Analyses for six operations, including machining, welding and several painting operations. These operations are ISO 14001 conformant and are re-audited every 90 days. Goals, objectives, and targets were developed based on the identification of aspects and impacts to reduce the effects of these operations on the environment. The analyses will be completed for the remaining industrial operations by September 2004 and allow for implementation of a mission-focused EMS.

ANAD has also partnered with the Department of Defense (DoD) EMS Alliance under which the EMS program implementation is being mentored by the University of Tennessee. This Alliance will allow ANAD to take its lessons learned to assist other installations in implementing EMS. This partnership not only demonstrates our commitment to implementing an effective EMS program depot-wide, but also to ensuring the success of EMS across DoD. Additionally, ANAD is developing a long-term Sustainable Operations Plan to reduce its impact on the environment and the cost of operations while enhancing mission performance.

▲ An aerial view showing the depot's industrial complex.

## PROGRAM SUMMARY

The depot's first P2 Plan was completed in 1992 and last updated in August 2002. The revision of the depot-wide P2 Management Action Plan (MAP) builds upon the P2 program goals and objectives, provides status updates on P2 projects and recommends new initiatives to achieve further waste reduction, cost savings and environmental protection. It is a comprehensive plan that integrates four related programs–P2, ODC Elimination, AP and integrated solid waste management into a single P2 plan.

### Program Goals

The goals of the P2 program focus on hazardous and non-hazardous waste reduction and on reduced consumption of resources. Additionally, the P2 Plan includes the goal of training employees in AP. Significant progress has been made in the following areas toward the achievement of the P2 goals:

- Development of a formal method of documenting P2 opportunities by means of the ANAD P2 Project Record. This form allows for electronic submission of recommendations and suggestions to the P2WG. The P2 Project Record provides a background description of the problem or issue, the project description and benefits, an economic analysis and the risks involved. Project Record forms are presented to the P2WG for initial screening. The forms are then further explored for implementation by one of several standing P2WG subcommittees or referred to another organization.
- Training and establishment of cross-functional P2 Opportunity Assessment Teams to evaluate production shops and operations and to identify opportunities to reduce hazardous materials, and hazardous and solid waste.
- Partnerships with local, state, and DoD organizations including the U.S. Environmental Protection Agency (EPA) Waste Wise Program, the National Pollution Prevention Roundtable, the National Recycling Coalition and the Alabama/DoD P2 Partnership.
- P2 awareness for all employees and participation in national events, such as Earth Day.

### Pollution Prevention Working Group (P2WG)

Since its inception in 2001, the P2WG, which is chaired by the Director of Production, has implemented or evaluated the following types of initiatives for implementation:

- 15 to reduce hazardous waste
- 17 to decrease solid waste
- 10 to eliminate restricted chemical usage
- 12 to reduce air emissions
- 10 to lessen wastewater generation
- 6 to limit hazardous material usage

## PROGRAM ACCOMPLISHMENTS

The P2 program has achieved significant cost savings and sizable reductions in the generation (and need for disposal) of hazardous and non-hazardous waste. These savings and reductions not only protect the environment, they enhance the depot's ability to meet its military mission by increasing productivity and leveraging savings. ANAD frequently uses new technologies and products to assist the depot in achieving its goals under the P2 program.

ANAD has achieved significant P2 milestones through innovative programs implemented by depot and tenant employees. These reductions have been achieved by material substitutions, process modifications and improved hazardous material/waste management. Additional accomplishments were achieved in the areas of process improvement initiatives, material management and continued compliance with Executive Orders.

### Material Substitution

#### *Steam Cleaning*

In early 2002, the combined efforts of the P2WG and Directorate of Production (DP) personnel identified a replacement steam cleaning compound, which eliminated Toxics Release Inventory (TRI) reportable requirements for glycol ethers and diethanolamine. ANAD reported zero releases of these chemicals for the following reporting year, compared to 12,800 pounds of both chemicals reported for the previous year.

## PROCESS IMPROVEMENT INITIATIVES

During fiscal year 2002-03, several process improvement initiatives began in painting operations, which resulted in significant reductions in the generation of hazardous waste.

### Paint Reduction Program

ANAD generates about 200,000 pounds of paint waste annually. A contributing factor to paint waste generation is excessive air and pot pressures on the paint sprayers. The Paint Reduction Program (PRP) utilized a two-pronged approach to achieve paint use reductions. First, in April 2002, the PRP established institutional controls to reduce paint waste generation and air emissions. PRP activities to date include:

- Revision of process procedures to reduce air and pot pressure requirements.
- Enhanced surveillance of painting operations for conformance with process procedures.
- Paint gun nozzle cleaning and reuse (rather than disposal).
- Air filter replacement (reducing frequency of maintenance and change-out).
- Enhanced employee training.

▶ ANAD personnel demonstrates improved painting techniques implemented under the PRP.

◀ A technician checks the pot pressures on painting equipment.

Second, High Volume Low Pressure (HVLP) paint guns are being installed in all painting operations. Use of the HVLP paint guns will result in a one-third reduction in gallons of paint used and hazardous waste generated, increased production, reduced volatile organic compounds (VOCs) and Hazardous Air Pollutant (HAP) emissions, and enormous overall cost savings. HVLP paint guns will save more than 35,000 gallons of paint per year at a cost savings of more than $3.7 million. Additionally, another $100,000 in hazardous waste disposal costs will be realized.

## IMPROVED MATERIAL MANAGEMENT

### Remarketing Program

A major emphasis of the P2 program is improvement in the procurement, use, management and disposition of chemicals on the depot. Historically, a large volume of unused hazardous materials was disposed of as hazardous waste. In early fiscal year 2002, an internal re-marketing program was developed to identify opportunities for material reuse before useful shelf-life had been exceeded. The re-marketing program substantially reduced procurement and waste disposal costs. Reusable materials are re-marketed to the depot, its tenants and other installations. Since the program's inception, ANAD has avoided more than $50,000 in waste disposal costs and realized a cost savings of nearly $10,000, while generating about $5,000 in recycling revenue.

## COMPLIANCE WITH EXECUTIVE ORDER (EO) 13148 AND EO 13123

ANAD promotes conservation through energy monitoring and energy awareness programs. The program awards recognize employee and tenant contributions toward the attainment of depot and EO 13123 energy goals.

In mid-2002, the depot was awarded the first task order of an Energy Savings Performance Contract (ESPC) to reduce energy consumption. The ESPC encompasses six projects that will conserve 72,800 MMBTU of energy with overall cost savings of the ESPC projected to be $625,800.

## RECYCLING PROGRAM

ANAD's recycling program saves money and reduces waste, while generating its own funding resources and covering the budget for staff and equipment. The Qualified Recycling Program (QRP) collects, segregates, and processes not only traditional recyclables, including metal, glass, paper, scrap wood, plastic, aluminum cans and wood chips, but also non-traditional items such as petroleum products and batteries. In fiscal year 2002-03, the QRP recycled or diverted more than 16,500 tons of materials; avoided $382,000 in disposal costs; and generated $1,056,100 in revenue (through August 2003). For fiscal year 2002 and fiscal year 2003, ANAD diverted 59.7 and 54.6 percent respectively, of its solid waste from land-fills and incineration through the recycling program, exceeding the DoD Measure of Merit goal of 40 percent, despite a dramatic increase in production.

▲ Two of the depot's recycling experts feed mounds of paper into the massive shredder. This is just one of the many recycling operations that are not only self-sustaining, but show a significant annual profit that is ultimately used for depot-wide environmental enhancements.

### Scrap Wood and Pallet Management

In fiscal year 2002-03, for the second and third consecutive time, ANAD participated in EPA's Waste Wise program, which allows organizations to design their own solid waste reduction programs to eliminate costly municipal solid waste, benefiting their fiscal base and the environment. As part of this program, federal agencies are encouraged to establish five-year goals in waste reduction, recycling and AP. One of the depot's goals is to reduce wood waste by 35 percent in the next five years. ANAD's QRP had an aggressive pallet reuse program in fiscal year 2002, reclaiming 8,766 pallets, saving nearly $104,000 in new pallet procurement costs, and

avoiding $27,000 in waste disposal costs that resulted in the depot meeting this goal early. Another wood waste reduction initiative consisted of using wood chips for on-depot landscaping, avoiding about $50,000 annually in waste disposal costs.

### Battery Recycling

The P2 program collects and ships used batteries to an off-depot recycler. All types are collected, including nickel, cadmium, alkaline, magnesium, lithium ion, lead-acid and mercury-bearing batteries. In fiscal year 2002, more than 600 pounds of batteries were recycled at no cost to the depot.

### Affirmative Procurement (AP)

AP is an important component of the P2 program. The government mandates that certain products purchased by federal agencies be manufactured with or include recycled or recovered content. ANAD has developed a model AP program that focuses primarily on buying recycled materials, but features an added objective to purchase Environmentally Preferable Products (EPPs). EPPs have a lesser or reduced effect on human health and the environment compared with competing products and services. ANAD leadership recognized the importance of the program in overall operations and environmental stewardship and formed a separate EQCC AP Working Group (APWG) in April 2002 to promote AP. The APWG is chaired by the Director of Contracting and has representatives from all directorates.

In fiscal year 2002-03, ANAD accomplished the following achievements in the AP program:

- Trained more than 300 depot, tenant and contractor employees in AP requirements;
- Issued "Buying Recycled" guidance for employees and vendors;
- Implemented a local contract clause requiring use of recycled products, or justification for non-use, for all solicitations over $100,000;
- Coordinated a contract clause requirement with the Corps of Engineers to require use of recycled products, or justification for non-use, in all job-order construction contracts;
- Updated local credit card purchasing system to track recycled content purchases; and
- Constructed new playground equipment, renovated two bathhouses at the depot's recreational lake using guideline items (shower and restroom partitions), and renovated the gymnasium using floor matting made from recycled tennis shoes.

▲ Carol Mitrisin, marketing officer from the morale, welfare and recreation division, displays a sample of the "new" recycled content (old sneakers) flooring in the renovated Physical Fitness Center.

## EDUCATION, OUTREACH, AND PARTNERING

The P2 program is designed to invite and include community involvement. ANAD reaches out to the community by leading or participating in the following public programs:

- ***Bring From Home*** program, in which employees drop off newspapers, magazines, cardboard, plastic, glass and steel and aluminum cans at designated depot locations. This program processed 160,000 pounds of recyclables in fiscal year 2002-03. The drop-off locations are stationed inside ANAD's fence line and manned by recycling personnel during working hours. The collection bins are secured at the Recycling Center at the close of business to eliminate the drop-off of nontraditional items such as batteries and hazardous waste;
- ***Annual Depot Clean-up/Recycle-A-Thons*** to remove excess furniture and other materials from work areas

- ***Saturday Sales*** conducted weekly for employees and local residents to purchase scrap wood, pallets, wood chips, mulch and used furniture;
- ***Adopt-A-School*** programs at two schools to promote environmental stewardship. Participants are taught about recycling and its environmental impacts; and
- Agreement with the Federal Corrections Institute (FCI) Talladega Prison, whereby ANAD processes prison recyclables and provides training to prison staff.

In May 2002, ANAD hosted an Alabama/DoD Partnership meeting to demonstrate innovative recycling methods used to recycle hazardous and non-hazardous waste and secure viable markets for recyclables, while generating revenue.

▲ Thelma McCullough, recycling division chief, speaks to the depot's "mentoring" school students on recycling efforts.

P2 concepts are also incorporated into the annual Hazardous Waste Operations and Emergency Response (HAZWOPER) Technician Level training provided to employees via the Local Access Network (LAN). P2 topics are covered during weekly Morning Show broadcasts and regularly in the biweekly newspaper, ***TRACKS***. National events, such as Earth Day, are also used to emphasize P2 messages. Participation by the entire workforce, including tenant and contractor staff, is highly encouraged. To further promote P2, the P2WG recognizes employees at monthly meetings. Both the P2WG and APWG are finalizing procedures for implementing internal employee incentive awards programs for significant contributions.

▲ Coldwater Elementary School students proudly display their Earth Day Award certificates.

## Research, Development, and Technology Demonstration/Validation

Currently, the depot maintains more than 125 solvent parts washer vats. With production increasing, hazardous waste generation from the solvent washers has increased to 400,000 pounds in calendar year 2001—an 11 percent increase over calendar year 2000. The P2WG is currently working with the parts washers service contractor to identify a use for the solvent to make it a recyclable material, thus eliminating ultimate disposal of the solvent as a hazardous waste and potentially avoiding more than $100,000 in disposal costs.

## Missile Recycling

In December 2002, the Anniston Munitions Center (ANMC), a major tenant activity, began operation of the Missile Recycling Center (MRC). Historically, Open Burn/Open Detonation (OB/OD) processes were used as the principal methods for demilitarization, releasing pollutants into the surrounding air and groundwater. The MRC technologies provide environmentally friendly recycling alternatives that meet the legislative requirements and EO mandates for environmentally compliant tactical missile conventional munitions demilitarization. Since

▲ An employee at the Missile Recycling Center removes the TOW missile flight motor during the disassembly process.

operations began, ANMC MRC has processed over 3,000 tube-launched, optically-tracked wire-guided missiles. The initial operational data (Table 1) show that the MRC has a total Resource Recovery and Recycling (R3) capability.

**Table 1.**
**Reductions Achieved From MRC Process**

| Tactical Missile Component | Total Pounds from 5,000 Missiles | Pounds from Projected Workload of 160,000 Tow Missiles over next 10 Years |
|---|---|---|
| **Aluminum** | 116,900 | 3,272,200 |
| **Chromium** | 600 | 16,800 |
| **Beryllium** | 0.01 | 0.28 |
| **Cadmium** | 0.014 | 0.392 |
| **Copper** | 1,550 | 446,440 |
| **Lead** | 340 | 9,250 |
| **Manganese** | 215 | 6,020 |
| **Nickel** | 122 | 3,416 |
| **Nitroglycerin** | 12,500 | 350,000 |
| **Phosphorus** | 2,.2 | 61.6 |
| **Zinc** | 340 | 9,250 |

In addition to tactical missile storage, ANAD also has the demilitarization potential of 2,000 tons of gun propellant (Table 2).

**Table 2.**
**Components in One Pound of Gun Propellant**

| Gun Powder Ingredient | Weight/ Pounds | Pounds Released over 10 year period (2,000 tons) |
|---|---|---|
| **Dibutylphthalate** | 0.044 | 3,176,000 |
| **Dinitirotoluene** | 0.088 | 352,000 |
| **K Nitrate** | 0.0064 | 25,600 |
| **Diphenylamine** | 0.0094 | 37,600 |
| **Lead** | 0.0143 | 57,200 |
| **Nitroglycerin** | 0.1773 | 709,200 |

The demilitarization by the R3 process of these munitions in lieu of OB/OD is environmentally significant in the reduction of HAPs and other TRI chemicals.

## Reductions Achieved

Tables 3 and 4 summarize reductions achieved, cost savings realized, and revenues generated for fiscal year 2002-03. Factors used to measure the quantitative P2 reductions achieved include acquisition and disposal records of hazardous chemicals and substances; product consumption records and analysis; and Emergency Planning and Community Right-to- Know Act (EPCRA), P2, and shelf-life management studies and analyses. While the accomplishments achieved through education and outreach are more qualitative, they are equally significant.

**Table 3.**
**P2 Initiative Reductions**

| P2 Initiative | Reduction Achieved |
|---|---|
| **Steam cleaning** | 12,800 pounds of TRI chemicals avoided |
| **Paint process improvements** | 35,000 gallons of paint saved |
| **QRP recycling program** | 16,500 tons of solid waste avoided |
| **Petroleum product recycling** | 375,000 gallons of used petroleum products recycled; 11,000 pounds of ethylene glycol eliminated from waste stream |

In addition, the P2 program achieved less quantifiable savings, including prolonging the life of solid waste landfills through waste reduction and recycling and improving air quality through

reduced emissions. ANAD used factors to evaluate life-cycle costs including capital, labor, operation and maintenance and energy costs over the life of a given facility. The impacts of a given project on ANAD's mission were also considered.

**Table 4.**
**P2 Initiative Cost Savings/Revenue Generated**

| P2 Initiative | Cost Savings/Revenue Generated |
|---|---|
| **Paint process improvements** | $3.7 million saved |
| **Remarketing** | $50,000 waste disposal costs saved; $10,000 additional savings |
| **QRP recycling program** | $382,000 disposal costs saved; $1.056 million revenue generated |
| **Scrap wood and pallet recycling** | $104,000 procurement costs avoided; $27,000 waste disposal costs avoided; $50,000 additional waste disposal costs avoided through wood chip reuse |
| **Petroleum product recycling** | $718,000 waste disposal costs avoided; $168,000 in revenue generated |

## CONCLUSION

ANAD continues to achieve excellence in P2 by implementing innovative and effective programs that protect the environment, save money, increase productivity and enhance the Army's military readiness. The depot has successfully formed P2 partnerships with federal, state and local agencies and civilian, industrial and business communities. All organizations depot-wide have been actively involved in the management and reduction of potential pollutants. ANAD has become a leader in its community as well as the nation in demonstrating its commitment to environmental quality and pollution prevention.

ENVIRONMENTAL QUALITY—INDIVIDUAL

# LTC RONALD SWAFFORD

## HAWAII ARMY NATIONAL GUARD

## FORT RUGER, HAWAII

## BACKGROUND

Lieutenant Colonel Ronald Swafford establishes a solid foundation and positive tone for readiness and excellence in the Army National Guard's Aloha State presence. His position involves oversight for the planning, programming, implementation, administration, records maintenance, funds management and monitoring of all programs relating to the Hawaii Army National Guard's (HIARNG) compliance with federal, state and local regulations and statutes. Swafford runs highly integrated "phantom" environmental programs that enable soldiers to accomplish their missions without doing anything extra to protect or enhance the environment.

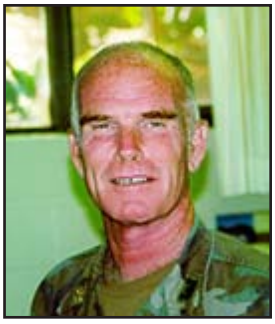
LTC Swafford is the Supervisory Environmental Protection Specialist of the Hawaii Army National Guard Facility Management Office's Environmental Branch (HIARNG-ENV), at the HIARNG Headquarters at Fort Ruger, near the world-renowned Diamond Head Crater in Honolulu on the island of Oahu. Swafford promotes the integration of the National Guard's statewide environmental planning into organizational protocols that more practically govern the HIARNG's compliance, conservation, prevention, restoration, military training and program management initiatives. Swafford developed a reputation for encouraging the protection of environmental resources and reducing both environmental impacts and associated costs through innovative ideas and effective management.

Swafford looks for every possible way to increase effectiveness and efficiency by providing an operations staff that seamlessly integrates sound environmental practices, which is as important to the success of HIARNG's environmental initiatives as solid planning and community involvement. Operating with this broad perspective, he leads efforts that include:

- Developing quality installation-wide environmental programs and promoting organizational awareness and unit participation to achieve and maintain environmental compliance.
- Managing HIARNG environmental programs and compliance activities with primary emphasis on achieving program objectives and reducing overall project costs, sometimes by balancing the use of in-house staff with staff from various agencies and institutions to manage a comprehensive and cost-effective program.
- Educating officers and non-commissioned officers about environmental programs and compliance initiatives to communicate that environmental protection and stewardship are not detrimental to military readiness—and in fact can improve readiness through efficiency.

## POSITION DESCRIPTION

The HIARNG-ENV holds the responsibility of ensuring compliance with environmental laws and regulations. HIARNG-ENV oversees the HIARNG's Ecosystem Management Program and monitors the impacts of Army and aviation units throughout the Hawaiian Islands. The wide range of program areas under Swafford's purview include mission and training compliance, endangered species protection and recovery, pest management, wetlands management,



▲ LTC Ron Swafford proves that readiness, mission-focus and environmental restoration and conservation are not mutually exclusive concepts.

Swafford looks for every possible way to increase effectiveness and efficiency by providing an operations staff that seamlessly integrates sound environmental practices, which is as important to the success of HIARNG's environmental initiatives as solid planning and community involvement.

land rehabilitation, cultural resource assessment, integrated natural resources management plan reviews and updates, environmental awareness and training impact awareness. His office also coordinates environmental project reviews, grant acquisitions, and land and other partnership agreements.

## ACCOMPLISHMENTS

### Program Integration

***Judging Criteria:*** Program Management, Transferability

***Program Breadth:*** Full environmental compliance, cost controls, innovation in procedures

LTC Swafford supervises HIARNG's Environmental Branch, a group with duties including conservation, compliance and restoration. Staff within this three-pronged structure includes environmentalists, trainers, engineers, pest eradication specialists and recycling experts. LTC Swafford also enlists the help of a large number of interns, students and volunteers. With the assistance of this group, he plans, organizes, directs and evaluates the HIARNG's environmental priorities and oversees the budget process to ensure that financial resources and obligations are leveraged to achieve and maintain environmental compliance. In addition to his innovative planning and oversight of Hawaii's resource management for compliance, conservation, and training programs, he ensures that the state continues to excel in meeting environmental goals and awareness objectives.

His environmental program was the first to use personnel from governmental agencies and volunteer organizations extensively, rather than contracting companies to write reports, conduct research and represent the HIARNG as professional consultants. A cooperative agreement with the University of Hawaii (UofH) at Manoa enables the HIARNG to contract services from the UofH Pacific Cooperative Studies Unit for in-house employees and interns. LTC Swafford also enlists the assistance of other agencies—such as the U.S. Army Environmental Center, the U.S. Army Center for Health Promotion and Preventive Medicine and the U.S. Department of Agriculture—as partners in protecting and restoring the environment. The in-house staffing concept was so innovative and unusual that the HIARNG-ENV led other Army National Guard installations in the practice for more than five years. However, the money savings are so substantial—savings in the millions of dollars, which the accounting staff from the Secretary of Defense validated twice—many similar Army National Guard offices around the country are adopting Swafford's best management practices. LTC Swafford's technique of leveraging efforts from across his and other government agencies have allowed his program to stabilize at a budget of $2 million per year, substantially down from the $8 million to $10 million in unfunded

**Awards and Services**

- The Secretary of Defense Environmental Security Award, Natural Resources Conservation, 1999
- Recognition from various agencies and organizations:
  - U.S. Fish and Wildlife Service (2002)
  - Environmental Protection Agency Region 9 (2000)
  - State of Hawaii Office of Environmental Quality Control (1999-2002)
- National Guard Bureau-Army Environmental Division Environmental Advisory Board Training Chairman
- HIARNG Combined Federal Campaign Coordinator, State Incentive Award Chairman
- Founding member, Hawaii Pollution Prevention Partnership (HP3)

His environmental program was the first to use personnel from governmental agencies and volunteer organizations extensively, rather than contracting companies to write reports, conduct research and represent the HIARNG as professional consultants.

requirements experienced yearly before his program took hold.

HIARNG estimated that the in-house staffing strategy creates an eight to one savings ratio, based on the costs incurred prior to 1996, for contractors to do projects, integrated plans or reports. The HIARNG determined this by comparing natural resource management personnel costs, estimated at approximately $600,000 in fiscal year 2002, with estimated contract costs totaling $4.8 million, according to the Secretary of Defense Independent Certified Public Accountant (CPA) report entitled "Statement of Process Improvements and Related Benefits Generated by the Hawaii Army National Guard Environmental Section's Natural Resource Management Projects at Diamond Head, Oahu, Hawaii."

The following excerpt from the Secretary of Defense Independent CPA report, issued in December 2002, sums up Swafford's approach to cost management vs. performance:

"HIARNG-ENV's use of in-house staff has been very cost-effective and the quality and quantity of work they produce is much higher than when work was contracted out separately. It also receives valuable and indispensable help from volunteers and student interns. Volunteers come from schools, private groups, state organizations and environmental protection organizations. Work done now to eradicate alien species like fountain grass and to protect forests and wetlands saves HIARNG and the state of Hawaii from much greater costs in the future."

An additional benefit to in-house staffing is that Swafford's environmental team can better guide and more closely monitor the work. With this immediate oversight and first-hand knowledge of HIARNG's unique challenges and assets, the program runs more efficiently with the capability for tailoring to the specific military users and natural resources on Army National Guard lands statewide. Since the establishment of the in-house staff in 1998, HIARNG-ENV completes projects and other tasks, which contractors found difficult to accomplish because they lacked an intimate knowledge of HIARNG's unusual challenges and responsibilities. In addition to many other activities, the in-house staff developed awareness materials for use by soldiers during training exercises, prepared successful grant proposals and conducted community outreach while realizing those same cost and time savings.

▲ Fort Ruger's location near Diamond Head Crater on the Hawaiian island of Oahu—one of America's most treasured environments—makes Swafford's mission all the more vitally important.

LTC Swafford and his team completed and administered more than 25 management plans, many of which have incorporated graphics and easily-understood language with the help of Web-based software. The management plans account for each HIARNG site's unique needs and requirements while the system continues to improve with his early adoption of the Geographic

LTC Swafford's technique of leveraging efforts from across his and other government agencies have allowed his program to stabilize at a budget of $2 million per year, substantially down from the $8 million to $10 million in unfunded requirements experienced yearly before his program took hold.

Information Systems (GIS) Enterprise software. HIARNG is one of five National Guard headquarters piloting the GIS Enterprise software, which provides an all-encompassing picture of each facility—ranging from people and training status to inventories and endangered species lists, all with plenty of images to improve comprehension. This system not only allows greater understanding of environmental issues impacting lands under the HIARNG's purview, it also means that each site can accommodate both the generic, state-wide plan—such as an overarching spill response protocol—while also making available the detailed, site-specific response templates.

The chart below illustrates the relationships LTC Swafford cultivated with several of HIARNG-ENV's partners. Through networking, relationship building and a talent for finding the straightest line between two points, LTC Swafford identified organizations and individuals who have the expertise required to fill a particular need. By leveraging these relationships, he efficiently and cost-effectively retains the expertise the HIARNG-ENV needs to achieve a particular goal, such as devising a noise reduction plan or instituting a pest management plan. For example, he was able to identify and retain a predator control specialist to cover multiple sites under HIARNG-ENV's control for the same cost as contracting the job for just one site.

Incidentally, Swafford's principles actively reach beyond the scope of the HIARNG. Many of his employees—disciples to the Swafford way—have gone on to other agencies, taking the training, tutoring and mentoring gained at HIARNG with them. Organizations including the U.S. Fish and Wildlife Agency, the U.S. Forest Service and other public, private and military agencies are now beneficiaries of Swafford's unique practices of networking and identifying efficiencies where none were thought possible. In return, the network Swafford depends

LTC Swafford and his team completed and administered more than 25 management plans, many of which have incorporated graphics and easily-understood language with the help of Web-based software.

**HIARNG Leverages Partners for Critical Services and Expertise**

| Partner | Role | Program Contribution |
|---|---|---|
| U.S. Army Environmental Center | Validate EPR projects & training | Ensure that HIARNG has the right federal agency/agent to support complicated issues |
| U.S. Army Center for Health Promotion and Preventive Medicine | Expert guidance & training | Noise survey & management plan |
| U.S. Geological Survey | Expert guidance & training | Stormwater survey & management plan |
| U.S. Department of Agriculture | Field work with design/plans | Predator control (i.e., fencing & trapping) |
| Environmental Protection Agency | Advisor | Pacific Rim Resource Center liaison |
| U.S. Fish and Wildlife Service | Expert guidance & training | Endangered species survey, out-planting & management plan |
| Hawaii Pollution Prevention Partnership | Round table participant | Brainstorming major pollution problems & resolving issues |
| Maui, Hawaii, and Oahu Invasive Species Councils | Round table information & participant | Support with equipment & personnel |

on for expertise continues to grow as former personnel branch out into other organizations.

## Water Pollution Control

***Judging Criteria:*** Program Management, Technical Merit, Orientation to Military Readiness

***Program Breadth:*** Environmental compliance, water supply and waste water abatement, spill prevention, preparedness and planning for emergency response, environmental education and training, innovations in procedures, monitoring impacts, and mitigation measures

Swafford concentrated on point and non-point pollution sources. This focus resulted in increased waste minimization efforts and pollution prevention actions, which reduced or eliminated adverse impacts and liability of the HIARNG.

To achieve its source reduction goal, the team purchased equipment that allows and encourages containment of pollutants and recycling of water, including 12 oil/water separators with a recyclable water system and secondary containments for fuel tankers at two Combined Support Maintenance Shops, four Organizational Maintenance Shops and two Army Aviation Support Facilities. LTC Swafford took an innovative approach to training by utilizing equipment at HIARNG's Unit Training Equipment Site (UTES) facility to educate weekend soldiers during everyday operations.

Readiness and integration of environmental practices are the same under this colonel's direction. LTC Swafford integrates environmentally sound practices into training and the mission to prevent detraction from readiness. For example, he uses a 10 feet by 10 feet modular secondary containment units in his spill control training and as part of his operational protocol. The smaller secondary containment units are far more manageable than traditionally large containment devices; therefore, personnel setup every tank pump unit on secondary containment; that way, if a spill occurs, it is already contained. Combining such practices with common sense instruction for field operations—such as always setting up pump units on high ground away from water in areas that are easily accessed for refueling operations—Swafford integrates operational and environmental training. According to LTC Swafford, environmentally sound practices become second nature to Guardsmen who follow his protocols, and the same practices work no matter where the Guardsmen are in the world.

▲ LTC Swafford is an "environmental warrior" to those who work with him or undergo training at HIARNG facilities.

▲ According to LTC Swafford, environmentally sound practices become second nature to Guardsmen who follow his protocols, and the same practices work no matter where the Guardsmen are in the world.

HIARNG has had no spills since 1998. This is especially impressive when 26 states, two countries and three territories used LTC Swafford's HIARNG Field Spill Prevention and Countermeasure Plan at the Joint Readiness Training Center while supporting Hawaii's 29th Infantry Brigade during that time. He ensures that personnel trained become as hardwired for sound environmental practices as operational protocols.

## Noise Pollution Control

***Judging Criteria:*** Technical Merit

***Program Breadth:*** Noise pollution abatement

HIARNG-ENV collaborated with the U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM) to

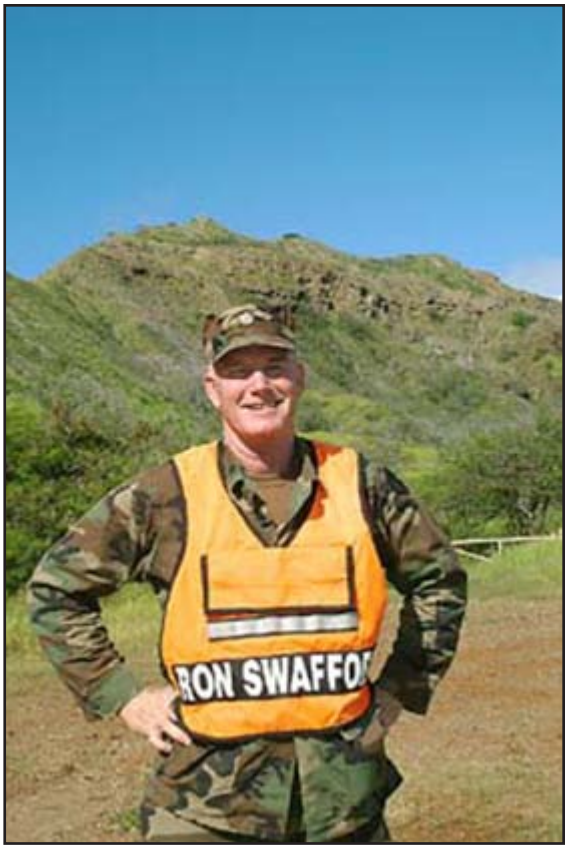
survey aviation, headquarters and maintenance sites for noise violations and time management of equipment movement. The survey resulted in an Ambient Noise plan, program and model. Implementation of the program resulted in fewer complaints from the communities and an excellent recording procedure for the public affairs office, which reports on noise control performance to the governor's office annually. The evolution of this decade program, now addresses modern challenges such as small arms training and adopting streamlined features such as computer-based tracking. LTC Swafford's teams must coordinate complex neighborhood restrictions on usage of military vehicles—in terms of both location and hours of operation—while maintaining a viable training schedule. HIARNG-ENV also anticipates when loud noise would negatively affect the nesting of species that call Hawaii home. Lastly, safety incorporates environmental noise control with personal noise training, again with the goal of making a seamless connection between environmental and operations protocol.

## Waste Management and Resource Recovery

***Judging Criteria:*** Program Management, Technical Merit, Orientation to Military Readiness

***Program Breadth:*** Solid waste management, environmental education and training, innovations in procedures

Swafford led a focused effort to rewrite and update the Guard's Solid Waste Management Plan and the Hazardous Waste Management Plan. HIARNG manifested success with a 50 percent reduction of solid waste to the landfill and no notices of violations over the past two fiscal years. In addition, the purchase of 21 biodegradable parts washers and 20 weapon cleaners ensured that soldiers would spend less time on maintenance and more time preparing for mission-essential tasks. Soldiers at all levels use filter crushers, aerosol can reclamations, paper shredders and cardboard balers; the result of which is the avoidance of more than 100 tons of waste that otherwise would go to landfills. In addition, every shop has oil filter crushers and antifreeze reclamation machines with re-use tanks.




▲ HIARNG-ENV personnel follow LTC Swafford's lead to seamlessly integrate training and operational requirements with preservation of environmental features and native species.

Per the plan, shop areas have designated holding areas for recyclable materials, which greatly benefits efficiency and readiness because the shop areas are free of debris. In addition, the sorting practice of properly containing recyclables is just part of the shop areas' standard operating procedures—environmental practices are not a separate step, but a help by getting trash such as cardboard and oil filters out from underfoot.

LTC Swafford takes recycling on the road when units train off-site. In the past, these training activities required two large roll-off containers to contain

> ***"If you ain't driving training…you ain't working!"***
>
> ***—LTC Ron Swafford***

the resulting trash. Realizing that most of the space in the roll-off was from cardboard, he now takes a transportable tire baler to compact the recyclable cardboard. The reduction in bulk refuse means that HIARNG only requires one roll-off container for remote training sites. This best management practice also eliminates a separate step to sort recyclable cardboard when units return to their home-station.

Recycling also provides operational training opportunities according to command. Swafford noted that shops hosting vehicle rebuild programs produced a large amount of scrap steel. Rather than contracting a refuse hauler to remove all the scrap, LTC Swafford turned the situation into an opportunity to train Guardsmen who drive large tractor-trailers. By having to secure the large, irregular loads of scrap steel, the Guardsmen get valuable exercise experience by safely loading, securing and transporting cargo that makes any other cargo look extremely simple to handle. At the same time, the HIARNG saves money that outside contract haulers would charge to remove the unwieldy refuse. Units conduct training without a separate step for environmental practices; therefore, soldiers train as they fight—fight the way they trained.

## Environmental Research and Education

***Judging Criteria:*** Community Interaction

***Program breadth:*** Pest management

LTC Swafford takes pride in his organization's stewardship of the environment on all the islands where personnel live and units conduct training. One of the major initiatives was a series of environmental service events for some 1,000 high school students from across the state that focused upon planting native plants and weeding noxious (alien) species. In 2002, in the Diamond Head area alone, Swafford and his staff directed a program in which the students planted nearly 8,000 plants. The plantings included 46 different species, with 12 tree species, 19 shrub species, 13 groundcover species and two sedge species.

▲ One of Swafford's initiatives is the removal of alien plant species from National Guard lands and the implementation of native species out-planting programs.

The HIARNG-ENV Natural Resources Program (NRP) took on another restoration site in September 2001. With the help of funds from a National Public Lands Day grant, the NRP began a forestry project to plant native and Polynesian-introduced canopy trees (Erythinia sandwicensis, Reynoldsia sandwicensis) in Diamond Head Crater. Volunteers now help to provide the massive amounts of maintenance required to keep the site free of non-native weeds and encourage the growth of native plants. These volunteers are invaluable to NRP personnel in maintaining the diversity and health of these recovering ecosystems.

Once established, the various native species can choke out the non-native weeds, reducing alien plant problems.

In 2002, in the Diamond Head area alone, Swafford and his staff directed a program in which the students planted nearly 8,000 plants. The plantings included 46 different species, with 12 tree species, 19 shrub species, 13 groundcover species and two sedge species.

In managing the NRP, Swafford temporarily allows the non-native trees to remain and provide shade for the developing plants. Staff will then introduce rare species, increasing the diversity. Plans include planting more trees for shade and for their value in educating visitors about native plants.

With the site's proximity to the future Diamond Head State Park Visitor Center, this site would be ideal for opening interpretative trails, supplemented with more shrubs that are native as well as other species. Partnerships with park rangers promote public access to adjacent lands, with highly promoted volunteer programs targeting residents of the Hawaiian Islands and beyond, including involvement of local community groups. Swafford himself conducts more than 20 tours each year inside Diamond Head Crater that usually ends with volunteer weed pulling or mulch spreading. He also notes that HIARNG lands are frequently hosts for film crews and "living laboratories" for students, which he supports.

## Environmental Compliance Assessment and Management Program

***Judging Criteria:*** Program Management, Technical Merit, Transferability

***Program Breadth:*** Full environmental compliance, water supply and waste water management, hazardous materials and hazardous waste management, environmental education and training, cost controls, innovations in procedures

The HIARNG ranks third in the nation in meeting compliance for protocols governing hazardous waste, Petroleum-Oil-Lubricant and wastewater. LTC Swafford initiated an ongoing review and follow-up procedures that validate the development of the Environmental Performance Assessment System checklist, which in turn validates actual inspections to regulatory agencies. National evaluations of the organization's environmental compliance and stewardship place the HIARNG near complete compliance, with minimum discrepancies. As stated earlier, HIARNG is one of five pilot state Guards to initiate GIS Enterprise, which allows the staff and facility managers to access findings and supporting regulations through a computer portal.


▲ The adoption of Geographic Information Systems (GIS) technology at HIARNG-ENV means that Swafford and his team can use computer images and modeling to oversee and supervise environmental initiatives and other events on National Guard lands.

The program's budgetary plans focus on identifying each program requirement that qualifies for federal funds. The organization has a strong record of obtaining sufficient funding and maintaining aggressive obligation rates. HIARNG's budgetary requirements focus through 2010 to ensure continued success with sustained compliance.

Swafford co-authored, designed and published an Environmental Awareness Training and Operations Manual that establishes protocols for units and unit members to reduce fire, disturbance of Hawaiian species and dispersal of "alien" species into the environment

during training activities. Graphic training aids outlined in the manual serve as the basis for pocket size rare and endangered plant and animal identification cards. The main goal of the state environmental program is to communicate an ethic to all levels of the command and to encourage organization-wide stewardship. LTC Swafford also makes a concerted effort to publish information in local and national environmental publications about the initiatives and successes of partnerships between the HIARNG and state and federal agencies in managing endangered fauna and flora at Diamond Head Crater.

### National Environmental Protection Act (NEPA) Analysis

***Judging Criteria:*** Community Interaction

***Program Breadth:*** Full environmental compliance, environmental planning and analysis, innovations in procedures, monitoring impacts and mitigation measures, usefulness in decision-making

Swafford uses the Record of Environmental Consideration and its associated checklist to document NEPA requirements. He and his staff regularly attend neighborhood board meetings and participate in various community projects in order to build better relationships with the public to support the NEPA process. Swafford oversaw efforts to write and review three environmental assessments during the past two years utilizing inter-government resources, which saved the Guard between $1–$3 million.

Several aspects of LTC Swafford's programs generated substantial savings for the Guard and taxpayers, including those highlighted in the chart below.

## CONCLUSION

As the individual charged with stewardship of the environment on 7,200 acres of paradise, LTC Swafford feels a strong obligation to preserve and protect his beautiful state of Hawaii while ensuring that 3,000 soldiers have training lands and facilities to protect our great country. He achieves these goals in a sustainable, repeatable and positive manner by constantly seeking out efficiencies in relationships, activities and time to consistently apply the best management practices and maintain a premier Army program.

> ***"The HIARNG Environmental Office has received National Guard Bureau recognition for its outstanding Natural Resources Conservation Team and Installation achievements, including receiving grant monies to fund alien species eradication and watershed protection projects. The program's success is a result of innovative resource management, creative partnerships, and an integrated conservation plan dedicated to maintaining the diversity of resources while enhancing the military mission."***
>
> *—Secretary of Defense Independent CPA Report on Diamond Head, Oahu*

### Environmental Quality Program Highlights

| Program | Activity | Technology/BMP | Savings/Cost Avoidance |
|---|---|---|---|
| Program Integration | Personnel | In-House Management Function | $1 million–$4 million |
| Water Quality | Pollution Prevention, Recycling & Reuse | (1) Recycle & Reuse water<br>(2) No spills during refuels<br>(3) No Requirement for USTs | (1) $250,000<br><br>(2) Reduced cleanup costs to zero |
| Noise | Reduction | In-House Monitoring | $25,000 |
| Education/Personnel Operations Model | Natural Resources | Volunteers, seed propagation, in-house staff | $4.3 million saved;<br>$2.6 million future costs avoided<br>(Figures derived from an Office of the Secretary of Defense accounting report) |

ENVIRONMENTAL QUALITY—
NON-INDUSTRIAL INSTALLATION

# KANSAS ARMY NATIONAL GUARD

## INTRODUCTION

Chartered by the U.S. and Kansas Constitutions, the Kansas Army National Guard (KSARNG) strives to support federal, state and community missions related to providing military capability for the nation; protecting life and property in the state; and adding value to communities. The Kansas Army National Guard is composed of 6,500 motivated citizen-soldiers that are highly trained in a wide range of military functions, including armor, aviation, infantry, field artillery, engineering, maintenance, transportation, medicine and in providing other support to augment U.S. Army operations. The KSARNG has one field training site, the Kansas Training Center, which encompasses approximately 3,600 acres near Salina in north-central Kansas as well as 90 facilities located in 54 communities throughout the state. The city of Topeka, founded in 1854, is the capital of Kansas and the Headquarters of the KSARNG and has a population of 123,993. Located at a point where the Oregon Trail crosses the Kansas River, from its beginning, Topeka has played a major role in government, transportation and health care.

▲ Soldier walking through a prairie area during a land navigation exercise at the Kansas Training Center.

## BACKGROUND AND ORGANIZATION

In support of its mission, KSARNG carries out a strong environmental quality program that features unique and successful approaches in the areas of environmental compliance assessment and management, waste management and resource recovery, as well as environmental research and education.

KSARNG's large number of armories, their varied environments and support requirements, challenge the installation to seek highly effective, cost efficient ways to achieve and surpass environmental quality program goals.

In this regard, KSARNG places a strong emphasis on working cooperatively with units and facilities across the state to ensure they are environmentally compliant and are provided with proper environmental training. This approach directly contributes to the fact that KSARNG received no Notice of Violations (NOVs) during, or immediately preceding, the award period.

One example is our **Unit Compliance Assistance Program (UCAP)**, developed in early 2002 by KSARNG's Environmental Management (EM) Section, which is comprised of traditional Guard soldiers. The program is conducted entirely by the EM Section staff and assists units with maintaining environmental compliance rather than forcing them to comply through formal inspections. UCAP provides units with the environmental assistance they need, such as

> "The team's ability to work with people and sell the environmental program to other units of the Guard has been the key to their success in achieving full compliance and understanding of environmental regulations."
>
> "Major Randall and his team have educated the other units to be environmentally proactive. The environmental staff's ability to team with everyone and maintain an excellent rapport with each unit within the Guard makes the mission of the Guard easier to administer."
>
> *– Colonel James Stewart, Director of Facilities and Engineering for KSARNG*

hands-on training, without the apprehension associated with a formal inspection. This establishes strong working relationships with units across the state. To increase the visibility of the environmental program to the traditional Guard soldier, visits are scheduled during the unit's normal periods of Inactive Duty for Training which helps to integrate the traditional "weekend" soldier into the KSARNG environmental efforts. In 2003, the EM Section staff conducted over 20 UCAP visits at units throughout the state.

The success of the environmental program lies with its ability to get all soldiers involved in environmental stewardship, whether it be through UCAP visits, training courses, recycling programs or through on-site support provided during periods of annual training. The ability to reach units across the entire state of Kansas and provide the best quality assistance and support is made possible through the establishment and integration of the EM Section into the KSARNG's overall Environmental Program.

KSARNG also has an **Internal Environmental Compliance Assessment System** that conducts annual visits to 100 percent of KSARNG facilities that are classified as Kansas Generators (generates between 55 and 2,200 pounds of hazardous waste per month) to identify mechanisms, procedures and supplies necessary to maintain compliance. Remaining facilities are visited every three years. Units receive on-site personnel training and equipment setup.

The environmental program team consists of five full-time staff members as well as three part-time weekend staff under the leadership of Major Anthony Randall, Ph.D. Each team member assumes the responsibility for addressing concerns and issues at all facilities located throughout Kansas.

The approach of organization-wide and individual involvement in environmental stewardship to support mission readiness is also reflected through inter-departmental support to KSARNG's Innovative Readiness Training (IRT) projects. These projects provide funding or manpower for engineering, transportation or medical projects in the community to groups that could not otherwise accomplish or afford the work. IRT projects allow the soldiers to keep their skills at a high level—helping the proponent while maintaining unit readiness. Prior to starting IRT projects, KSARNG is required to gauge any environmental impact of proposed construction activities by completing an environmental survey. Significant findings can prevent the Guard from participating in a community project. By working closely with the IRT leadership and staff, the environmental program team helps keep planned projects on track.

> "The National Guard award shows how much our soldiers care about protecting and preserving our environment for future generations. The records show that they did far more than what was required of them in order to carry out their mission. Going that extra mile is what being a Kansas National Guardsman is all about and I am proud of them."
>
> *– Major General Tod Bunting, Adjutant General of Kansas*

In addition, the KSARNG Directorate of Maintenance and the KSARNG Environmental Office are developing a new, more detailed environmental checklist for use during Command Maintenance Evaluation Team inspections at units and facilities located across the state.

In addition to internal coordination, KSARNG also works closely within the regulatory and military community to achieve its environmental mission. The KSARNG participated in a variety of national and regional panels:

- KSARNG is the only military installation to serve as a voting member on the Environmental Protection Agency (EPA) Region VII Pollution Prevention Roundtable, a panel composed of regulatory agencies, environmental assistance providers, academic institutions and other entities that meets for the purpose of exchanging information on new technologies and ways to maintain compliance. KSARNG has been a voting member of the Roundtable since 1998, and held the position of Roundtable President from 1999-2001.

- KSARNG was involved in the National Guard Bureau Environmental Advisory Board (2001-2002). The board, made up of environmental program managers from regions throughout the 54 states and territories, provided feedback and input from the "local" level to National Guard Bureau (NGB) environmental leaders and staff on a wide variety of issues.
- The KSARNG is also the only Army Reserve Component (National Guard and Army Reserve) organization represented with a member (Major Randall) on the Field Activity Support and Technology Transfer (FASTT) Team, a joint program of the Navy, Army and Air Force that conducts visits to military installations to provide management and technology assistance to reduce costs and improve work processes. FASTT won the Secretary of Defense Environmental Security Award in 2000.

▲ Armory in Kingman, Kansas, which has been nominated for inclusion on the National Registry of Historic Places.

The funding for KSARNG's environmental program comes completely from the Army Environmental Program Requirements system. In fiscal year 2003, the KSARNG's budget was $1.2 million and the obligation rate was 99.3 percent. In fiscal year 2004, the budget is approximately $960,000. There are no other sources of funding from the state, grants or other matching fund programs. Due to the size of Kansas and the number of facilities in the KSARNG, it is essential and critical to the KSARNG environmental program to demonstrate, based on their planned environmental projects, that they have a need for funding and will use those funds for the betterment of the Guard and the community. The ability to justify the need for those planned projects determines whether they will receive adequate funding to execute them.

"The environmental permitting process is complicated. Major Randall and his staff take time out of their day to review my program and make sure I have correctly addressed all the environmental concerns. Without Major Randall and his group, it would be more difficult to complete my work. They provide the necessary environmental support and make my work easier."

*– Captain Jeff Totman, Innovative Readiness Training project officer, KSARNG*

## PROGRAM SUMMARY

During the past two years the KSARNG attained a high compliance level. Objectives achieved during the award period include:

- ***Achieve full compliance.*** The KSARNG received no NOVs, no noise complaints and no reportable spills of Petroleum, Oils and Lubricants or other hazardous substances due to human error.
- ***Increase public safety and awareness.*** The KSARNG educates the community and makes them more aware of the threats that exist in the environment by acting as guest speakers for science classes and schools. These activities empower citizens to protect the safety and health of themselves and those around them.
- ***Protect human health and the environment.*** The KSARNG continually strives to improve the lives of both our soldiers and our surrounding communities by utilizing recycling methods and technologies that decrease the amount

of hazardous waste being disposed of and will act to significantly decrease the amount of volatile organic compounds (VOCs) being released to the atmosphere.

- ***Successfully implement EMS.*** In 2003, KSARNG established an organizational environmental policy and performed a gap analysis. Their implementation plan will be complete by March 2004. The KSARNG is bringing EMS training to Kansas for senior leadership and their "customers" in April. The KSARNG is a member of the National Guard Bureau's EMS Committee, which provides input from the states and territories to the NGB on how to adapt EMS and better incorporate it into the Guard's unique mission and operations.
- ***Develop and employ cost-effective solutions.*** KSARNG implemented several cost-effective solutions to environmental compliance issues, such as the purchase and use of solvent basins with dual on-board filtration systems. Each package (basin, drum of solvent and filters) cost less than $1,000 and saved an estimated $1,484 each, resulting in a payback period of less than one year. In addition, each basin saved approximately 1,545 pounds of solvent and related wastes from being generated annually.

**2002 KSARNG IRT Projects**

- Construction of the Police Firing Range in Horton

**2003 KSARNG IRT Projects**

- Chanute School District Sports Complex parking lot
- YMCA Camp Hammond road and trail improvements
- Elk City lake road, culvert and shoreline improvement
- Atchison County Historical Society Lewis and Clark Trail

▲ Restoration of native prairie grass at the Kansas Training Center.

## ACCOMPLISHMENTS

KSARNG's compliance and education successes are in large part due to the proactive, risk-based approach to the environmental quality they have adopted. This is highlighted by the following major accomplishments:

### Hazardous Waste Reduction and Cost Savings

KSARNG reduced maintenance and supply costs through program changes that have eliminated the need for organization-wide service and/or disposal contracts. For example, KSARNG discontinued use of a national vendor solvent service, and instead purchased 27 solvent basins with dual on-board filtration systems. These systems not only filter out particulates, but also remove oils and greases from the solvent, keeping the solvent cleaner for a longer period of time, extending the life cycle of the solvent, and in turn reducing costs. During the past two years, approximately 100 gallons (840 pounds) of solvent was disposed of, compared to approximately 2,000 gallons (16,900 pounds) annually under the contract-based solvent basin program. At the Advanced Turbine Engine Army Maintenance (ATEAM) facility, this resulted in annual savings of nearly $6,000 in recurring costs

and reduced solvent-related waste by more than 960 gallons (6,100 pounds). The ATEAM facility is only one of four in the world that can completely rebuild the turbine engines on the series of M1 Abrams Main Battle Tanks.

### Air Pollution Control

KSARNG is reducing the amount of air pollution resulting from routine painting activities. Employing High Volume-Low Pressure (HVLP) paint guns reduced air emissions of VOCs. The HVLP paint guns emit less paint through their design, which results in a 40 percent reduction in overspray and lowered air emissions.

The KSARNG also plans to implement paint gun cleaning stations that continuously recycle the cleaning solution, eliminating the need for one-time-use thinners to clean painting equipment. This method is expected to result in a 50 percent reduction in the generation of paint-related wastes at KSARNG's painting facilities. Over the past three years, KSARNG disposed of approximately 12,000 pounds of paint-related wastes at a cost of approximately $4,700. Through the use of the HVLP guns and the paint gun cleaning stations, those figures are estimated to decrease to approximately 5,600 pounds of paint-related waste generated with a corresponding disposal cost of approximately $2,300.

The KSARNG is also planning to use a water-based Chemical Agent Resistant Coating that will further reduce the amount of VOCs being emitted.

**Articles on KSARNG's pollution prevention and environmental efforts have appeared in:**

- Environmental Update, U.S. Army Environmental Center
- Kansas Department of Health and Environment Environmental News
- Central Regional Environmental Office Newsletter
- Kansas Preservation, by the Kansas State Historical Society
- Topeka Metro News

### Waste Management and Resource Recovery

The KSARNG Recycling Program, which is a Qualified Recycling Program, or QRP, uses the centralized supply distribution system to collect recyclable materials such as paper, cardboard and scrap metal from facilities throughout the state. This program allows facilities to recycle through the same process that they obtain their supplies.

What makes the Recycling Program unique is that most Army Guard states only focus their recycling efforts on large complexes, such as state headquarters and training sites. The KSARNG program reaches each and every facility across the state and involves every soldier in the recycling process.

Since its inception in the late 1990's, the Recycling Program recycled over 2 million pounds of material, with 305,000 pounds of that material being recycled in the last two years alone. The program avoided estimated costs of $9,000 in fiscal year 2001, including nearly $4,700 in generated revenue. Revenue is used (as required by QRP guidelines) for ongoing program maintenance and morale, welfare and recreation projects at our units. In addition KSARNG:

- **Recycled used antifreeze and used oil filters.** Although state environmental regulations allow for disposal of antifreeze down drains and disposal of used oil filters in trash, KSARNG policy prohibits disposal of antifreeze through drains and strictly regulates the disposal of used filters. A plan to recycle these items was developed with the Fort Riley Directorate of Environment and Safety, where units and facilities can take these materials to Fort Riley for recycling. In other instances, antifreeze and filters can be collected for recycling through a contractor. Although KSARNG must pay money to recycle these items, it is the most environmentally friendly method to manage the used antifreeze and filters.
- **Recycled Lead from firing ranges.** In fiscal year 2003, 4,800 pounds of lead was recycled from two indoor firing ranges that produce waste from bullets, saving $1,300 in one year. Transporting the lead to a recycling facility costs around $560, as compared to $1,800 to dispose of the lead as hazardous waste.

- **Recycled blast media from de-painting operations,** reducing the costs associated with having to buy blast media more frequently and disposal. Once used, the material is returned to the company from which it was purchased and is then used by that company as a raw feedstock in the manufacture of a variety of plastic items. A variety of EPA regions and state environmental departments have approved the practice, including the Kansas Department of Health and Environment. During fiscal year 2003 alone, 506,800 pounds of used blast media was collected from depainting operations at Fort Riley and recycled. If the used blast media were disposed of as hazardous waste, it would have cost the KSARNG a total cost of around $182,400.

## Technology Development

KSARNG is researching innovative, adaptive uses for existing technologies in order to reduce erosion repair costs. The KSARNG, in conjunction with the Natural Resources Conservation Service, is conducting several small-scale erosion control experiments at the Kansas Training Center in order to identify the most effective and efficient way to minimize erosion of firebreaks and training areas. The experiments include the deployment of portable silt dikes and "speed bump" terraces that slow water runoff and divert water to one side of the firebreak and the use of fabric mats on eroded training areas to stabilize the soil and underlying bedrock and re-establish the protective vegetation cover.

▲ Erosion control experiment on firebreak at the Kansas Training Center.

▲ M1 Tank being washed at the Fort Riley Vehicle Wash facility.

KSARNG is committed to conserving water resources by using new technologies, such as the purchase and installation of closed-loop vehicle wash systems at three maintenance facilities and closed-loop aircraft wash systems at two Army Aviation Support Facilities. The KSARNG also designed and constructed a state-of-the-art, closed-loop vehicle wash facility at Fort Riley. The post-wash water drains into a 420,000-gallon sedimentation basin, where sediments and oils are removed. The water is then re-circulated through the wash process, conserving an estimated 10 million gallons of water per year.

If conventional washracks or wash facilities were used, the water would have gone down the drain and could not have been reused.

In addition, at KSARNG maintenance facilities, power floor scrubbers have been purchased and are used to clean workbays; their use reduced the amount of water needed to clean workbays at the Maneuver Area Training Equipment Site alone by nearly 250,000 gallons per year.

### Comprehensive Training Activities Utilizing New Technologies

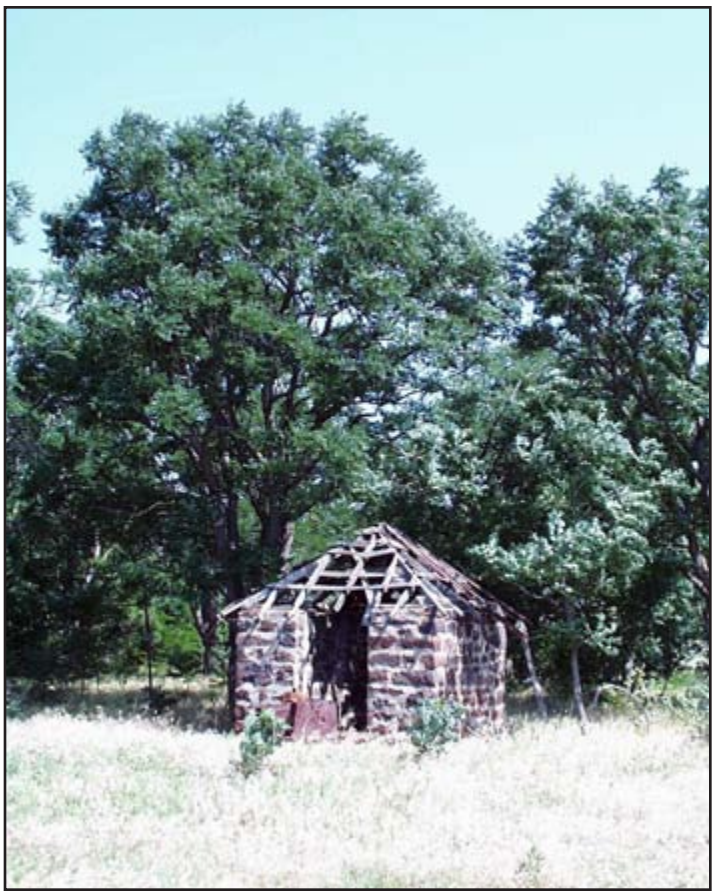
KSARNG developed a comprehensive spill prevention and response program, focusing on spill containment pallets and cabinets for material storage; spill response carts and supplies for every KSARNG facility; and individual portable secondary containment and spill response kits for each Heavy Expanded Mobility Tactical Truck and Tank and Pump Units for use during field refueling exercises.

### Environmental Research and Education

#### *Interaction with National, State and Local Partners*

As part of its strategic environmental quality efforts, KSARNG employs the assistance of local and state partnerships and non-governmental organizations such as the Nature Conservancy, Pheasants Forever and Quail Unlimited. These organizations, along with the Natural Resource Conservation Service, have all contributed guidance and expertise to help KSARNG personnel improve the condition of the training environment.

The KSARNG also developed a positive, proactive relationship with the Kansas State Historic Preservation Officer (SHPO) to identify and protect historic structures under KSARNG control. They have worked together to identify several armories that have historical significance in the state. Two of the armories were constructed during the pre-World War II (WPA) era and have been formally nominated for inclusion on the National Register of Historic Places. Due to the unique relationship between the Guard and our communities, the KSARNG and SHPO have agreed on the selection of four Cold War-era armories to be protected and treated as if they were eligible for the National Register. This is a unique approach to the management of Cold War-era structures in the Army National Guard, and is reflective of the relationships that the KSARNG have built with a number of other agencies.



▲ Preserving historic structures: old smokehouse from an abandoned farm at the Kansas Training Center.

KSARNG is developing training packages using distance learning delivery systems for online and CD-ROM-based courses that include:

- Occupational Safety & Health Administration Hazard Communication Standard
- Spill Response Train-the-Trainer Videotape and Trainer's Manual
- Natural Resources Awareness
- Cultural Resources Awareness
- Pollution Prevention Awareness

In addition to the above courses, the KSARNG produced an environmental awareness videotape

titled, "Guardians of the Prairie" which is currently used as a part of the ecology curricula at the United States Military Academy at West Point. The KSARNG also developed field guides, field cards and other conservation-related guides for use at the Kansas Training Center. The field cards were developed as a quick reference guide for soldiers to assist them in not only protecting Kansas's natural resources, but also in achieving environmental compliance. The KSARNG also developed a baseball card-sized graphic aid that identifies harmful plants, animals and reptiles found at the Center.

▲ Young whitetail deer at the Kansas Training Center.

### *Community Outreach and Education Projects*

Despite having a full-time staff of only six, the Environmental Management team still performs numerous community outreach activities. During the last two years, this included delivering presentations and handing out environmental "goodies" (coloring books, lanyards, posters, playing cards) at local preschools and elementary schools; presenting environmental science and stewardship to local high school science classes; and serving as guest speakers for a College of Engineering Lecture Series at Kansas State University. In addition, KSARNG opened up areas of the Kansas Training Center to science classes for field trips and class projects, and allows the Boy Scouts to use the Center as an outdoor classroom for teaching a variety of team-building and outdoor skills. The training center hosted the Kansas Department of Wildlife and Parks, who sponsored a Youth Shoot to promote safe hunting practices and to educate youth on the role of hunting in ecological management.

### National Environmental Policy Act (NEPA) Implementation

The KSARNG strived to improve their NEPA compliance in several ways. In 2002, instructors were brought to Topeka to present a three-day NEPA course to train Environmental Office staff, as well as personnel from other KSARNG offices and directorates. The Environmental Office's NEPA manager also attended an extensive graduate-level NEPA training course offered through Utah State University. To increase the visibility of its NEPA program to both full and part-time personnel, KSARNG uses a specially designed Web site. The site includes forms, NEPA guidance, a CD ROM-based Natural Resource Awareness course and written instructions that assist units and individuals in fulfilling their NEPA responsibilities. In order to help track the status of NEPA documents, a test version of a database is being designed. The database will include all NEPA actions and decision documents and will be available to users via the Environmental Office Web site.

The Environmental Office processed 20 NGB Environmental Checklists and Records of Environmental Consideration in 2002, and 18 in 2003. In addition, they also contracted for one environmental assessment in 2002 and two in 2003.

In order to ensure NEPA compliance, in late 2003, KSARNG instituted a data call to units to report all Local Training Areas (LTAs) currently in use. LTAs are pieces of land that are owned by an individual

or agency outside of the KSARNG that are used for military training purposes, usually small-unit tactics and skills. Many of these may have been established prior to NEPA requirements, and their impact on the environment was never fully assessed. The goal is to assess the uses of the LTAs and ensure that they are in compliance with current environmental regulations and policies.

### Pest Management

In 2002, KSARNG sent one member of the environmental staff to the Department of Defense (DoD) Pesticide Applicator Certification course and DoD Pest Management Coordinator/Quality Assurance Evaluator Certification course. This marked the first time that a certified person was on the environmental staff and could provide oversight in pest management issues. One outcome of this training was that this individual identified and reported a pesticide issue that had been overlooked not only at the state, but also at the national level. This issue concerned the use of pesticides at armories that have Head Start or pre-kindergarten programs. As a result, the concern is now being addressed by NGB and the U.S. Army Environmental Center.

In 2003, a new Integrated Pest Management Plan was written to replace an older outdated one. Although the KSARNG met the Measure of Merit to reduce pesticide usage by 50 percent (from a 1993 baseline), this plan puts integrated pest management measures into effect that will further reduce pesticide usage statewide while still providing effective pest control.

## CONCLUSION

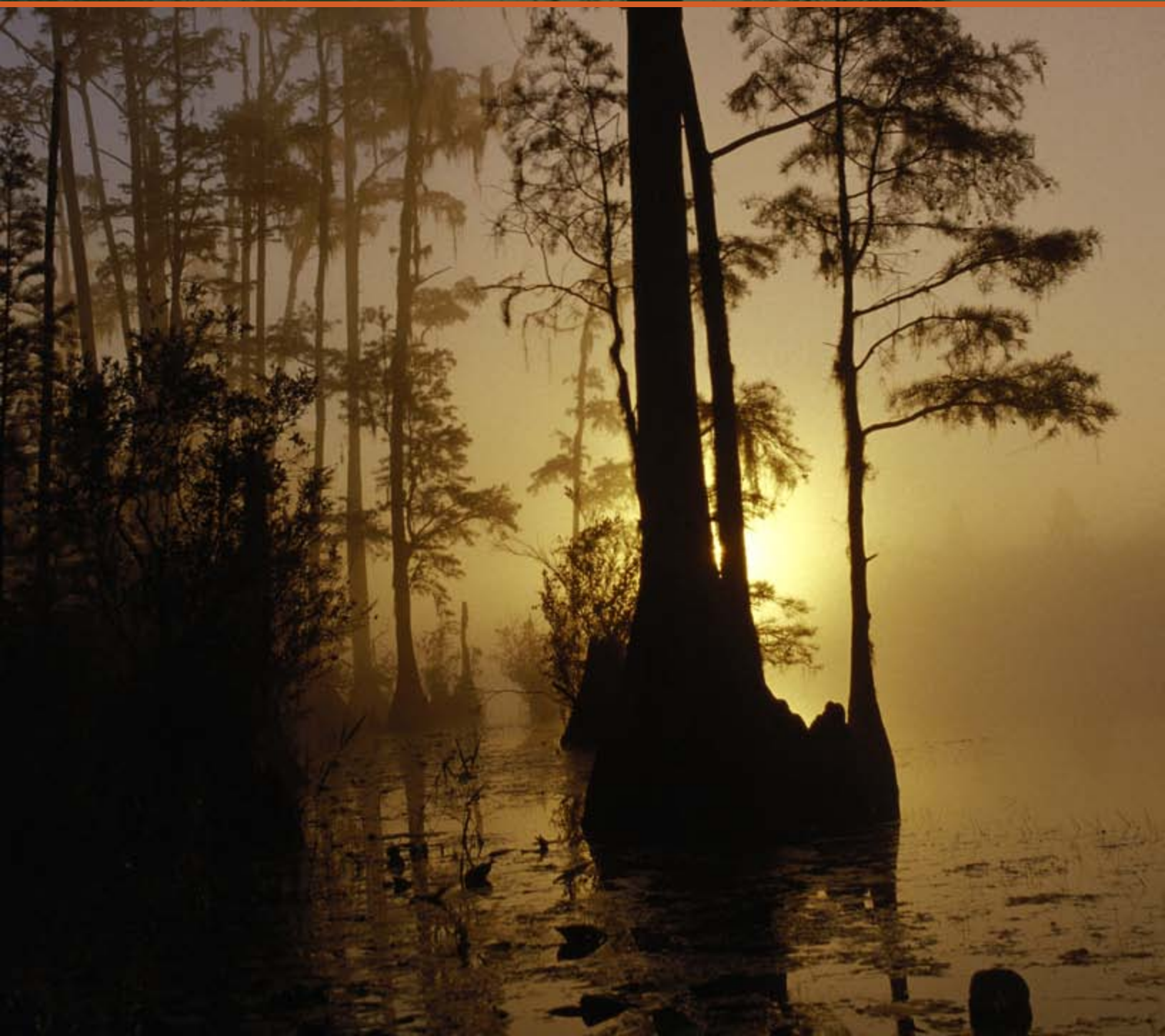
Achieving these kinds of environmental goals resulted in reduced maintenance and supply costs, allowing Commanders to allocate more funding for equipment and training, which increases the readiness capacity for crisis or emergency responses and improves our level of military readiness.

The KSARNG improves the quality of life for all residents of Kansas by planning initiatives that positively impact populations beyond the military community. By decreasing the generation of hazardous wastes, reducing the occurrence of hazardous materials spills and minimizing damage to training areas and their ecosystems, the KSARNG is serving as a steward in protecting our environment for this, and future generations of Kansans.

NATURAL RESOURCES CONSERVATION—
INDIVIDUAL

# MR. THOMAS D. BRYCE

## FORT STEWART & HUNTER ARMY AIRFIELD, GEORGIA



## INTRODUCTION

There's a reason Fort Stewart has one of the premier freshwater fisheries programs within the Department of the Army (DA) and the Department of Defense (DoD). His name is Thomas Bryce. Mr. Bryce first arrived on the installation in 1981. At the time, he was one of the first professional fisheries managers in the Army. Today, he is a renowned expert in his profession, and sets an example for all to follow.

## ACCOMPLISHMENTS

During his tenure, Thomas Bryce has expanded the Fort Stewart Fisheries Management Program on the philosophies of sustaining the training mission and advancing the soldier's quality of life. In doing so, he develops programs that:

- support soldiers' families;
- implement sound science while pursuing excellence in aquatic resources stewardship;
- promote healthy professional partnerships;
- advance strong garrison-community relationships; and
- advocate a positive public image for the installation and the United States Army.

Thomas uses an estimated $65,000 annually from the Fish & Wildlife Conservation Fund to operate his recreational fisheries program. Thomas also secured $14,000 annually to obtain assistance from the U.S. Army Environmental Center's Conservation Assistance Program for shortnose sturgeon conservation needs, and manages his aquatic stewardship programs and shortnose sturgeon recovery programs on an annual budget of more than $400,000.

### Sustaining the Training Mission

Every environmental management professional knows that the training operations of an installation must be balanced with its natural resources conservation to achieve and surpass compliance. For this reason, Mr. Bryce works closely with military units to ensure that Fort Stewart and Hunter Army Airfield's primary mission of training is preserved. For instance, Mr.

▲ Thomas Bryce putting in a day's work on the Canoochee River.

**Thomas D. Bryce**
**Supervisory Fisheries Biologist,**
**GS-482-11, Fish & Wildlife Branch,**
**Environmental & Natural Resources Division, Fort Stewart, GA**

Mr. Bryce directs the Fisheries Management Program for Fort Stewart's Fish & Wildlife Branch. His primary responsibilities are the administrative and conservation oversight of all aquatic resources on the installation. He oversees 22 ponds and lakes totaling 450 acres, and monitors over 200 miles of coastal "blackwater" streams and rivers. Additionally he manages the Ogeechee River system's endangered shortnose sturgeon population. Mr. Bryce supervises a team of biologist, biological technicians, and equipment operators (federal employees, ORISE interns, and contractors).

**Professional Organizations & Program Partners**

- American Fisheries Society National & State (Georgia) Chapters
- National Military Fish and Wildlife Association
- Georgia Lake Society
- Canoochee Riverkeepers Association
- Aquatic Plant Management Society National & State (Mid-South) Chapters

**Primary Partners**

- U.S. Fish & Wildlife Service – Warm Springs Regional Fisheries Center
- National Marine Fisheries Service – Office of Protected Species
- Georgia Department of Natural Resources–Wildlife Resources Division, Coastal Resources Division, and Non-Game and Natural Heritage Program

Bryce has worked closely with trainers to optimize swim-training exercises for the Bradley Fighting Vehicles without impacting Fort Stewart's natural resources. Mr. Bryce assisted in developing on-site logistics for the installations' designated swim-train facility to minimize environmental impacts and maximize training realism. Applying his thorough knowledge of the installations' waters, Mr. Bryce has often assisted troops with site selection for water purification training and works closely with units in choosing suitable ponds and lakes for survival training. In addition, he often works with the 3rd Infantry Division and National Guard engineer units to help design and implement projects that support heavy equipment operator training, such as road construction and boat launching facilities.

The installations' Dam Safety Program is another way Mr. Bryce helps ensure sustainability. He is responsible for the repair, maintenance, and inspection of Fort Stewart's dams and periodic replacement of the water control structures for these nine impoundments. Mr. Bryce demonstrates he is proactive in this role through a water control structure replacement initiative for structures that are approaching their safe-life expectancy. His aggressive engagement in this ambitious program accelerated the restoration of several structures and as a result, the final water control structure will be replaced in 2004. In addition, his focused efforts in dam safety positioned Fort Stewart as one of the first installations to prepare Emergency Action Plans for all dams on the installation.

## Improving Quality of Life

▲ Bradley Fighting Vehicle conducts a swim-train exercise at Fort Stewart.

Mr. Bryce works diligently to provide soldiers and their families recreational programs that are entertaining and beneficial to morale. He works closely with the installation's Hunting and Fishing Advisory Council, which provides a strong interface between installation's command, soldiers, fish and wildlife managers and tenants. To support the council's goals, Mr. Bryce maximizes military participation in the Installations' recreational fishing events. One shining example is the annual Kids Fishing Event that Fort Stewart has hosted since 1990. Each year, the command works cooperatively with the Georgia Department of Natural Resources by heavily stocking channel catfish in designated installation ponds and managing those fisheries so that all area children under 16 years of age experience a successful and fun fishing adventure. Since the program's

▲ Keith Grimes, participating in the Kids Fishing Event, shows off his catch.

**Achievements**

- Planned, organized, implemented first ever Shortnose Sturgeon Conference
- Organized and chaired first ever basin-specific, multi-agency team for recovering the endangered sturgeon
- Created and maintained two comprehensive hunting & fishing web sites
- Implemented integrated pest management program demonstrating a cost savings of $45K over the past three years
- Directs one of the Army's largest sport fisheries management programs
- Implemented multi-dimensional water quality assessment program for Canoochee River basin
- Initiated first systematic freshwater mussel inventory, benthic invertebrate survey, and fish tissue contaminant study

inception, more than 2,000 children have caught nearly 9,500 fish. During Operation Iraqi Freedom, Mr. Bryce moved from one annual Kids Fishing Event to six monthly events, improving morale in the children and families of the 3rd Infantry Division. The Kids Fishing Event is one of the longest running and most successful of its kind in the state of Georgia.

Water is a precious and valuable resource at any installation, which is why this responsibility is among Mr. Bryce's principal duties. At a time when the nation's public fishing waters face deep scrutiny, Mr. Bryce initiated an Installation Lake Fish Health Survey to systematically monitor for possible fish tissue contaminants such as PCBs, heavy metals and pesticides. He also works with the Georgia Department of Natural Resources to establish fish consumption guidelines for installation anglers as needed. To further ensure water quality standards, he implemented a state-of-the-art Continuous Water Quality Monitoring Program that continually evaluates water flowing on and off the installation from the Canoochee River. Through these efforts, Fort Stewart maintains a water quality database for coastal Georgia's blackwater[1] streams, an effort that is unsurpassed by many environmental agencies. Last year, this model water quality management program was important in reducing environmental and compliance impacts on Fort Stewart by providing vital data useful in the replacement of the installation's Industrial Wastewater Treatment Facility, resulting in fewer harmful toxins finding their way to the garrison's waterways. All of these water quality assurance measures sustain the installations' mission and improve the quality of life for installation residents and the local community.

▲ Evan's Field Ponds were formerly borrow pits that have been converted into fishing ponds for installation and local anglers.

When the Directorate of Training's Range Division approached Mr. Bryce for help concerning possible unexploded ordnance (UXO) in recreational use areas, he worked quickly to develop and distribute educational material to installation hunters and anglers. These sportsmen and women now have ready access to important information regarding identification of UXO, safety precautions and emergency contact information. Mr. Bryce's quick action increased public awareness of potential dangers at Fort Stewart. Furthermore, Mr. Bryce aided the Range Division via a Process Action Team in identifying possible UXO resting sites and in developing safe recreational user access policies for the installation.

## Promoting Excellence in Aquatic Resources Stewardship

Managing Fort Stewart and Hunter Army Airfield's natural resources is no small task. As the top fisheries manager on

> ***"Mr. Bryce's technical expertise stands out as a true example of professional fisheries management. His colleagues repeatedly call upon him to advance sound fisheries techniques throughout the Department of the Army and DoD."***

[1] *Blackwater streams and rivers originate in heavily forested bottomland areas. They are named so because the water that flows through them is stained dark brown by organic acids.*

"The Georgia Wildlife Resources Division has had a productive and long-standing relationship with Tom and the Fort Stewart Fisheries Section. Together, we have worked to develop an understanding of the aquatic resources in the Ogeechee River basin and have taken great strides towards protecting these valuable resources. Tom's commitment to aquatic resources conservation and his ability to forge partnerships towards the protection of these valuable resources has proved to be an invaluable asset."

*—Chuck Coomer, Chief of Fisheries, GA DNR–Wildlife Resources Division*

the largest Army installation east of the Mississippi River, Mr. Bryce oversees 22 lakes and ponds totaling 450 acres as well as monitoring more than 200 miles of coastal blackwater streams and rivers.

Mr. Bryce worked with installation environmental managers to establish the Borrow Pit Reclamation Program to transform once earth-mined pits into pristine productive ponds. Since fiscal year 2001, Mr. Bryce has directed the refurbishment of two abandoned borrow pits, and as a result, local residents can now enjoy over 50 additional acres of fishable waters.

Stream and riverbank erosion and sedimentation is a constant reminder of natures' meandering evolution. Under Mr. Bryce's direction over the last three years, the installation's lake and river shorelines have seen the construction of seven new hardened boat ramps that have not only improved recreational access but have played a significant role in stabilizing banks, stemming erosion in problem areas and reducing the amount of sediments washing downstream into public waterways.

▲ Thomas Bryce holds a healthy shortnose Sturgeon, an endangered species found in Fort Stewart's waterways.

Mr. Bryce's Christmas Trees for Fish Homes Program is a creative example of his dedication to the installation's fisheries resources. Mr. Bryce encourages the recycling of discarded Christmas trees from installation residents for reuse as fish attractors[2]. Since 2001, his program recycled more than 500 trees to refurbish 25 attractor sites.

Mr. Bryce's technical expertise stands out as a true example of professional fisheries management. His colleagues repeatedly call upon him to advance sound fisheries techniques throughout the Department of the Army and DoD. Additionally, his management protocols and policies have proven transferable to other installations. Mr. Bryce has aided the fish and wildlife management programs at Fort Gordon, Fort Benning, Fort Jackson, and Beaufort Marine Corps Air Station by supplying them with technical advice in implementing some of his effective aquatic resources management techniques.

*[2] Fish attractors provide unique habitats for many different species of fish. These fabricated structures enhance protective cover, feeding areas, and spawning sites for fish while providing anglers targets for improving their fishing success. Fish attractors are generally made of 10 to 20 trees sunk vertically in the water at a relatively shallow depth in lakes or ponds.*

## Managing Aquatic Pests

Mr. Bryce's development of an Invasive Aquatic Species Monitoring and Control Program has proved integral to the success of managing nuisance plant species (i.e. hydrilla, alligatorweed, water hyacinth and watermill foil) and animal species (i.e. Asiatic Clam and the Flathead Catfish) on the installation. Mr. Bryce combines this effort with an Aquatic Weed Management Program to manage nuisance aquatic species at Fort Stewart and Hunter Army Airfield. Realizing that chemical control agents can potentially impact the water quality he works so hard to improve, Mr. Bryce sought more environmentally friendly approaches. For instance, he utilized two leaf-eating beetles to control the spread of the exotic and invasive alligatorweed, as well as a nuisance native emergent plant known as creeping water primrose. However, the best example of Mr. Bryce's alternative approach is his use of the sterile grass carp as a biological control agent. By introducing this species to control weeds, Mr. Bryce reduced the anticipated use of various aquatic herbicides by 240 percent, saving the installation $45,000 over the past three years. Were grass carp not utilized, significant quantities of herbicides (Diquat, 2,4-D, and copper sulfate) may have been required to treat infested acreage of ponds and lakes.

## Promoting Healthy Professional Partnerships

To Thomas Bryce, partnering with other agencies is a necessary and integral part of each day's work. When the Georgia Department of Natural Resources (DNR) conducts their annual River-Care Assessment each fall, Mr. Bryce and his team assist by performing standardized fish sampling on the Canoochee River. Additionally, he provides assistance to the Georgia DNR's Richmond Hill Hatchery. Recently, Fort Stewart has donated surplus yearling and adult largemouth bass to support the Hatchery's Brood Stock Program. The Georgia DNR uses these fish for stocking public and private lakes and ponds throughout

"I would like to applaud Mr. Bryce's formation of the Ogeechee River Shortnose Sturgeon Working Group. Such interagency collaboration at the local level is extremely valuable toward the recovery of endangered species. I understand that this is the first group of its kind for shortnose sturgeon, and therefore may serve as a model for future regional groups."

*—Dr. William T. Hogarth, Director, National Marine Fisheries Service*

"When the Coastal Resources Division discontinued its scientific studies of Atlantic and shortnose sturgeon, we were fortunate that Tom was able to acquire the fiscal and human resources necessary to conduct much needed population monitoring on the Ogeechee and Canoochee rivers. The information gained from this long-term monitoring program has been critical to development of conservation policy not only within Georgia but also along the entire eastern seaboard."

*—A.G. "Spud" Woodward, Assistant Director for Marine Fisheries*
*GA DNR – Coastal Resources Division*

▲ Shoreline anglers enjoy a day of fishing at Fort Stewart.

southeast Georgia, ultimately generating revenue from fishing related sales for the local economy.

Mr. Bryce also used a cooperative agreement with the Coastal Georgia Community College and a regional malacological expert to enact the first systematic inventory of freshwater mollusks along the Canoochee river basin. Freshwater mollusks are not only a bio-indicator[3] of water quality but are also one of the most threatened groups of aquatic animals in the nation's waterways. Variations in mollusk populations can help detect and evaluate changes in environmental conditions and help natural resource professionals determine potential causes for these changes. By systematically surveying for these mussels, Mr. Bryce can contribute to the scientific community's knowledge of this understudied group of aquatic organisms, as well as better assess the installation's water quality.

## Recovering Endangered Species

Realizing that Fort Stewart's military training operations could pose a threat to the already endangered shortnose sturgeon, Mr. Bryce took charge and began learning how he could help protect the rare fish. He prepared and integrated a Shortnose Sturgeon Endangered Species Management Plan into Fort Stewart's 2001-2005 Integrated Natural Resources Management Plan.

In 2003, Thomas Bryce co-hosted, with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS), the first ever Shortnose Sturgeon Conference. More than 60 scientists from across the United States and Canada attended to discuss the status of the sturgeon and develop a strategy for its recovery. This gathering proved to be a monumental success and received the praises of the NMFS director, who oversees protection and recovery of this sturgeon species. As a result of this landmark conference, the NMFS's Office of Protected Resources is resurrecting their former Shortnose Sturgeon Recovery Team and is establishing Regional Implementation Teams that will refocus and revitalize national efforts to accelerate recovery of the fish.

Mr. Bryce didn't stop there. He organized the first river-basin specific, multi-agency team for recovering the local population of shortnose sturgeon. In designing the team, he partnered with the NMFS, USFWS, U.S. Army Corps of Engineers, Georgia DNR (Wildlife & Coastal Resources Divisions and Environmental Protection Division); University of Georgia; Georgia Aquarium; Canoochee Riverkeeper Association and local citizens. The team enhances and expands installation efforts to recover the

▲ A crew from the Fisheries Management Branch electro-fishing. This method is often employed by scientists to test and track fish species without harming the fish.

▲ These mussels are part of the first Freshwater Mollusk Inventory conducted for the Canoochee River. Data collected from the inventory will help the Fisheries Management Branch and the scientific community assess the installation's water quality.

*[3] A species may serve as a good bio-indicator if it depends on stable conditions or lives on the edge of its range (www.nps.gov).*

fish through cooperative pooling of resources and collaborative sharing of knowledge. Another benefit of Mr. Bryce's shortnose sturgeon initiatives has been a commitment by the Georgia DNR to fund a two-year diadromous[4] fish biologist position to aid in the local conservation campaign.

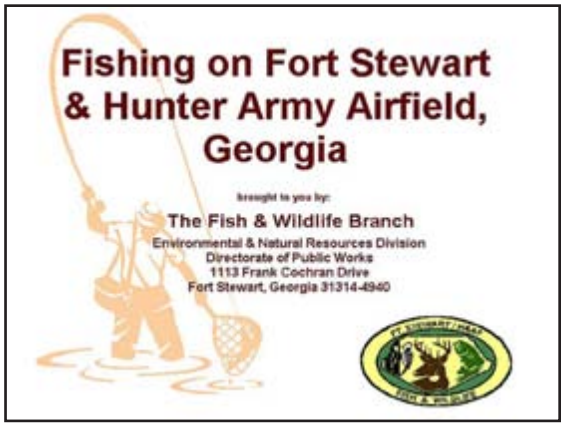
Through these partnerships, Mr. Bryce successfully led the preparation of a Biological Assessment accepted by the NMFS. Together, they officially agreed that the mission at Fort Stewart is "not likely to adversely affect the shortnose sturgeon." His hard work helped Fort Stewart avoid a Biological Opinion that could have impacted the installations' training mission. By taking the lead on recovery programs for the installation and utilizing the many resources of his partners, Mr. Bryce prevented restrictions on military training operations.

## Advancing Strong Garrison-Community Relationships & Conservation Education

Many avid hunters and anglers throughout southeast Georgia and beyond take full advantage of the ample resources Fort Stewart and Hunter Army Airfield have to offer. In fact, Fort Stewart and Hunter Army Airfield constitutes the second largest hunting and fishing area in the state. Under the leadership of Mr. Bryce, fishing on the installation grew nearly 15 percent from 59,900 angler-days of participation in fiscal year 2001 to 68,700 angler-days in fiscal year 2003. The number of participating anglers during this period grew by more than 500, resulting in an average total collection of over $67,000 per year from fishing permit sales.

> "The USFWS recognizes Fort Stewart's role in conservation leadership and especially the direct work and contributions of Mr. Bryce. He has been the catalyst for the Ogeechee Working Group, and he has gained the trust of all those who work with him."
>
> *—Vincent A. Mudrak, Director, USFWS, Warm Springs Regional Fisheries Center*

The fishing and hunting web sites Mr. Bryce developed are the garrison's most visited on-line public resources, accommodating 12,000 to 20,000 hits per year, respectively. Here, local anglers can find updated information on fisheries management, fisheries resources on the installation, local game fish identification data, notable catches[5], pond depth and safety regulations.




▲ The Fish and Wildlife Branch's fishing web site is Fort Stewart's most visited web page.

Mr. Bryce is a staunch supporter of public outreach and education, and he demonstrates this through notable relationships with local schools and universities. He coordinates numerous instructional field trips for college and university science classes and is always happy to perform demonstrations of his fisheries management techniques. As a result of the command's promotion of Earth Day and the Army's strong environmental stewardship philosophies, Mr. Bryce developed annual multi-media, hands-on fish and wildlife presentations for both on- and off-post elementary schools. The annual Community Day held at Hunter Army Airfield has also been the beneficiary of Mr. Bryce's educational displays and exhibits. It's clearly evident that Mr. Bryce enjoys

*[4] Diadromous fish migrate between freshwater and saltwater. Migration patterns differ for each species and have seasonal and lifecycle variations (www.noaa.gov).*

*[5] Fort Stewart has produced 10 of the top 45 largemouth bass in Georgia, a record no other fishery in the state has matched.*

imparting his passion for natural resources management to these future scientists and biologists.

## Creating a Positive Public Image

Mr. Bryce's programs and outstanding performance record consistently earn national recognition for the garrison. Fort Stewart's natural resources professionals time-and-again are invited to speak of their successes and findings. In 2001, Mr. Bryce was invited to present on the installation's sturgeon conservation work at the 4th International Symposium on Sturgeon in Oshkosh, Wis., and at the Annual Meeting of the Georgia Chapter of the American Fisheries Society held in Augusta, Georgia. In 2002 alone, Mr. Bryce and his team were invited to present at the Annual Meeting of the American Fisheries Society in Baltimore, Md., and the 3rd Biennial Symposium of the Freshwater Mollusks Conservation Society in Durham, N.C. In 2003, Mr. Bryce and his fishery co-workers presented at the Annual Meeting of the Georgia Chapter of the American Fisheries Society in Rome, Georgia; the 2003 National Shortnose Sturgeon Conference and the Annual Meeting of the Ecological Society of America, both of which were held in Savannah, Georgia; and the Annual Meeting of the Southeastern Association of Fish and Wildlife Agencies held in Mobile, Ala.

The installation's fine public image, outstanding fish and wildlife conservation record, and strong outreach programs have prompted the Georgia DNR to host one of its "Weekend for Wildlife" tours at Fort Stewart in 2001, 2002 and 2003. The National Association of County Agricultural Agents Conference held their 2003 event on the installation, as did the Institute of Journalism and Natural Resources Expedition Learning Program in 2002. Mr. Bryce also assisted the installation's hosting of the 2002 and 2003 Georgia Extension Services Master Naturalist Program, the 2002 and 2003 National Wild Turkey Federation's Women in the Outdoors Program, and the 2003 Georgia-Pacific Southeastern Management Assistance Program Conference.

Mr. Bryce's membership with the Georgia Lake Society, the Canoochee Riverkeeper Association and the American Fisheries Society (national and state chapters) afford Fort Stewart's exceptional programs the regional recognition they deserve. As a member of the National Military Fish & Wildlife Association and the Aquatic

▲ This student is closely observing a salamander on display at Hunter Army Airfield's annual Community Day.

> ***"In 2001, Mr. Bryce was invited to present on the installations' sturgeon conservation work at the 4th International Symposium on Sturgeon in Oshkosh, Wis., and at the Annual Meeting of the Georgia Chapter of the American Fisheries Society held in Augusta, Georgia."***

Plant Management Society (national and state chapters), Mr. Bryce shares his and Fort Stewart's successes and innovative fisheries management programs with colleagues across the nation.

Mr. Bryce enjoys a strong relationship with local and military media groups, realizing that part of public outreach is a robust communications plan. Many of his success stories have been published in print and on-line publications such as the Coastal Outdoor Magazine, The U.S. Army Environmental Center's Environmental Update, Georgia Outdoor News, The Coastal Courier, Heartland USA, The Georgia Sportsman, The Fish and Wildlife News, the Army's Environmental Grapevine, and the installations' weekly newspaper, The Frontline. Mr. Bryce also enjoys a good relationship with local television news affiliates of CBS, NBC and ABC, which have aired several installation fisheries-related stories.

### Enhancing the Mission

Mr. Bryce's interaction and coordination with range managers regarding UXO issues, and with soldiers during training activities clearly demonstrate his dedication to the overall mission at Fort Stewart and Hunter Army Airfield. Additionally, each of his programs lend to the overall success of the installations' sustainability initiatives.

### Surpassing Natural Resources Compliance

Mr. Bryce's efforts have made Fort Stewart's natural resource management programs a comparative standard for all others to follow. Confirming this declaration, the Army's 2003 Environmental Performance Assessment (EPAS)[6] inspection team cited the installations' Fisheries Management Program with a most notable "positive finding," highlighting the overall management program, accomplishments in sturgeon conservation and its successes in public outreach.

▲ Local anglers take advantage of a beautiful day on Dogwood Lake.

## CONCLUSION

Mr. Bryce's tireless dedication and exceptional level of professionalism contribute significantly to the overall success of Fort Stewart and Hunter Army Airfield's Natural Resources Conservation Program. Through strong partnerships, sound community outreach and good stewardship, Mr. Bryce has helped build a positive public image for the two installations. His mission-focused programs have preserved training while minimizing the impact of military operations to the environment. Likewise, Mr. Bryce's commitment to the sustainability of the installations' natural resources has created a legacy that is likely to long outlast his presence there. The positive impact that Mr. Bryce continues to leave on the environment and specifically on the installations' Fisheries Management Program provides the community and future generations of soldiers and their families a fuller quality of life at Fort Stewart and Hunter Army Airfield.

> ***"Mr. Bryce's tireless dedication and exceptional level of professionalism contribute significantly to the overall success of Fort Stewart and Hunter Army Airfield's Natural Resources Conservation Program."***

[6] *The EPAS program is a merge between the Army's Environmental Compliance Assessment System (ECAS) and the Environmental Management System (EMS).*

EXCELLENCE IN WEAPON SYSTEM ACQUISITION

# PROJECT MANAGEMENT OFFICE—BRIGADE COMBAT TEAM

*WORKING TOGETHER TOWARD A COMMON GOAL*

## INTRODUCTION

In October 1999, the Department of the Army announced their vision for what is now known as the Stryker Brigade Combat Team, the vanguard for Army transformation. The concept quickly became the Army's first fully-versatile fighting force. For the Project Management Office of the Brigade Combat Team (PMO BCT), merging design specs of the Army's newest family of combat vehicles with environmental responsibilities was not only a challenge, it was their mission. Under the guidance of Colonel David Ogg, Project Manager for the Brigade Combat Team (PM BCT), the Environmental Management Team (PM BCT EMT or Environmental Team), took a comprehensive approach to ensure that environmental issues were being addressed throughout development of the Stryker Family of Vehicles (FoV). Through pollution prevention techniques, waste minimization innovations, the implementation of an Environmental Management System (EMS) as well as environmental compliance strategies, the Stryker FoV program fully incorporated environmental, safety and occupational health regulations.

## BACKGROUND

This versatile and fast-paced combat vehicle, which is named after two Medal of Honor winners, PFC. Stewart F. Stryker and SPC Robert F. Stryker, has rugged mobility, lethal firepower, and a full range of combat capabilities.

The Stryker FoV consists of two variants, the Mobile Gun System and the Infantry Carrier Vehicle. The Mobile Gun System serves as the direct fire platform that provides maneuver and infantry fire support for the Stryker Brigade Combat Team. The Infantry Carrier Vehicle serves as an infantry or mission vehicle platform. The remaining eight configurations are based upon the Infantry Carrier Vehicle configuration and include: the Commander's Vehicle; Fire Support Vehicle; Engineer Squad Vehicle; Nuclear, Biological, Chemical Reconnaissance Vehicle; Medical Evacuation Vehicle; Reconnaissance Vehicle; Mortar Carrier Vehicle; and the Anti-Tank Guided Missile Vehicle. The Stryker FoV allow the Army to adapt and maneuver with ease, which are key elements of survival on the battlefield.

▲ 6 Strykers in the National Training Center (NTC) Box.

All of the PMO BCT Divisions[1] worked as a team to ensure that functionality, costs, and scheduling remained a coordinated effort throughout the Stryker FoV's development. The Environmental Team proved to be a valuable asset to the PMO BCT by providing input from their expertise on environmental considerations. Together, they used the knowledge and skill of manufacturers, environmental engineers, soldiers and maintenance crew to identify pollution prevention opportunities. The Environmental Team included representatives from:

- BCT Technical Management, Acquisition Support, and Integrated Logistics Support Divisions
- Program Executive Office—Ground Combat Systems
- Tank Automotive Research, Development and Engineering Center Materials/Environmental Team

> ***"This is a tremendous combat vehicle, and it is totally appropriate that we name it after two great soldiers who gave their last full measure of devotion on the battlefield in defense of our nation."***
>
> ***—Jack L. Tilley, Sergeant Major of the Army***

[1] *The PMO BCT is part of the Program Executive Office – Ground Combat Systems (PEO-GCS), a tenant of U.S. Army Tank-automotive and Armaments Command (TACOM), based in Warren, Michigan.*

- Tank Automotive Research, Development and Engineering Center/Safety Office
- Tank-automotive and Armaments Command—General Law Division
- U.S. Army Acquisition Pollution Prevention Support Office (currently renamed Environmental Support Office)
- U.S. Army Research Laboratory
- U.S. Army Environmental Center
- General Dynamics Land Systems (General Dynamics)
- Anniston Army Depot
- Fort Lewis Environmental Natural Resources Division
- Fort Polk Environmental Natural Resources Management Division
- U.S. Army Forces Command

## PROGRAM SUMMARY

The PMO BCT, alongside with the Environmental Team, proactively eliminated hazardous materials and resolved environmental concerns associated with the Stryker FoV. The PMO BCT worked closely with Fort Lewis and Fort Polk, two installations associated with fielding the Stryker FoV. PMO BCT strictly followed the Department of Defense (DoD) 5000.5 guidance to address life cycle environmental requirements for the weapon system while managing program cost and performance. The PMO BCT and Environmental Team proactively implemented innovative pollution prevention techniques and eliminated the use of several types of hazardous material such as hexavalent chromium ($Cr^{+6}$) and Cadmium (Cd). By PMO BCT and Environmental Team working as a team, every aspect of the Stryker FoV's development and testing remained in compliance with all environmental regulations.

▲ Engineer Squad Vehicle

As a result of PMO BCT efforts, the Stryker FoV is the first fielded United States Army ground combat vehicle system to:

- Eliminate the use of Class I and Class II Ozone Depleting Compounds (ODC) as fire suppression agents in both engine and crew compartment vehicle areas. ODCs were replaced with Fire Master 200 (containing sodium bicarbonate) in the crew area, and FE 25 in the engine compartment
- Eliminate the use of Class I and Class II Ozone Depleting Compound refrigerants
- Prohibit the use of highly toxic chemicals in production and vehicle support
- Require government review and approval prior to use of cadmium, hexavalent chromium, or other highly toxic or carcinogenic materials
- Implement an Environmental Management System (EMS)

> ***"We must provide entry forces that can operate jointly, without access to fixed forward bases, but we still need the power to slug it out and win decisively. Today our heavy forces are too heavy and our light forces lack staying power. We will address these mismatches."***
>
> ***—General Eric Shinseki U.S. Army (retired)***

## Incorporating Environmental Analysis into the Acquisition Decision Making Process

The PMO BCT and the Environmental Team integrated environmental analysis throughout the Stryker's development. Through a coordinated effort, the team developed documents that were integral in identifying and

resolving environmental issues. These documents include:

- ***Interim Armored Vehicle Developmental Test and Evaluation Environmental Assessment (EA), March 2002.*** This EA helped identify known and potential impacts the Stryker FoV has on the environment during vehicle testing;
- ***Stryker Family of Vehicles Programmatic Environmental Assessment (EA), February 2003.*** This EA helped identify known and potential environmental impacts associated with the Stryker FoV's manufacture, operational testing, deployment, and demilitarization/ disposal during the Program's Low Rate Initial Production Phase;
- ***Stryker Environmental Quality Life Cycle Cost Estimate (EQLCCE), May 2003.*** Identified for PMO BCT and Department of the Army costs operation and maintenance costs as well as environmental costs throughout the system's life cycle and was integral in helping fielding installations summarize projected environmental costs; and
- ***Final Draft Stryker Programmatic Environmental Safety and Health Evaluation (PESHE), September 2003.*** This document helped PMO BCT gauge its progress in eliminating, mitigating, and resolving environmental, safety, and occupational health issues and provided resource direction in eliminating environmental safety and health risks.

Each of the documents helped PMO BCT reduce the Stryker FoV's impact on the environment. For example, during preparation of the programmatic EA, the team discovered that the vehicle hull could contain water with traces of petroleum, oils or lubricants (POL). The PMO BCT quickly amended technical manuals to include a warning directing that suspected contaminated hull water only be drained into installations' approved containers. This action eliminated contaminated wastewater from entering the environment.

▲ Mobile Gun System

The Environmental Team developed a system engineering methodology to ensure all environmental impacts were resolved and to implement pollution prevention opportunities where feasible. They also provided direct input on environmental issues and pollution prevention alternatives. Based on this input, the PMO BCT made critical decisions, where appropriate, to modify design and handling procedures for the Stryker FoV. This two-way exchange was important in developing a set of lessons learned that was shared across the Army and DoD.

The Stryker Environmental Quality Life Cycle Cost Estimate (EQLCCE) was selected as the EQLCCE model for the Army's Future Combat Systems.

## Material Substitution

### Contractual Requirements

Eliminating or reducing hazardous material from the Stryker program was a mission requirement. The PMO BCT addressed this requirement up-front during the contracting phase of development. The PMO BCT made certain that their contracts with General Dynamics, their prime contractor and an Environmental Team member, stressed the elimination or reduction

of hazardous materials during the Stryker's development. This action eliminated the need to redesign any vehicle component or implement any after-the-fact pollution prevention fixes. By taking this action, the PMO BCT successfully eliminated hazardous materials that could cause future environmental impacts.

The Stryker Requirements Contract specifically restricted the use of highly toxic materials identified in the Registry of Toxic Effects of Chemical Substances[2]. The PMO BCT allows the use of some materials that are mission critical providing there are no feasible alternatives available and that it does not impact system performance. They ensured that any such materials used strictly followed Occupational Safety and Health Administration Standards preventing personnel from excess exposure[3]. The PMO BCT also prohibited the use of highly toxic or carcinogenic materials such as hexavalent chromium, cadmium, and other hazardous materials without government approval, and restricted the use of radioactive or asbestos materials during manufacture or assembly of the Infantry Carrier Vehicle, excluding pre-approved Government Furnished Equipment. The BCT directed General Dynamics to eliminate ozone-depleting substances from the Infantry Carrier Vehicle as well. Since the Infantry Carrier Vehicle serves as the Stryker FoV's baseline vehicle, any requirements placed on it are automatically applied to the entire Stryker FoV.

Through active contract management and aggressive enforcement of pollution prevention measures, the PMO BCT addressed concerns listed in the Army user requirements for metal pretreatment, painting and fire suppression agents.

**Environmental Team's Participation in Stryker FoV's Life Cycle**

**Stryker FoV Design**
- PMO BCT
- TARDEC M/E Team
- TARDEC Safety Office
- TACOM General Law Division
- AAPPSO/ESO
- ARL
- General Dynamics

**Stryker FoV Manufacturing**
- PMO BCT
- TARDEC M/E Team
- TACOM General Law Division
- General Dynamics
- ANAD
- LATP
- ARL

**Stryker FoV Logistics Support**
- PMO BCT
- TARDEC M/E Team
- TARDEC Safety Office
- General Dynamics
- USAEC
- ARL
- Fort Lewis
- Fort Polk
- AAPPSO/ESO

**Stryker FoV Test and Evaluation**
- PMO BCT
- TARDEC M/E Team
- TARDEC Safety Office
- General Dynamics
- USAEC

**Stryker FoV Operations**
- PMO BCT
- TARDEC M/E Team
- TARDEC Safety Office
- AAPPSO/ESO
- USAEC
- Fort Lewis
- Fort Polk
- AAPPSO/ESO

**Stryker FoV Disposal**
- PMO BCT
- TARDEC M/E Team
- TARDEC Safety Office
- TACOM General Law Division
- USAEC
- General Dynamics
- ANAD

**Stryker Life Cycle Costs**
- PMO BCT
- General Dynamics
- ANAD
- USAEC
- Fort Polk
- Fort Lewis

## Material Substitutions within the Stryker Family of Vehicles

Since the Stryker FoV is a new vehicle system program, the PMO BCT did not need to revise technical data packages and technical manuals; instead, alternative materials were substituted for commonly used hazardous materials during the technical data packages' and technical manuals'

*[2] National Institute for Occupational Safety and Health (NIOSH) registry categorizes these types of materials as substances that will produce toxic effects via inhalation, ingestion, or absorption via the eye or skin.*

*[3] 29 Congressional Federal Record 1910*

initial preparation. Rather than trying to "reinvent the wheel" and develop new alternatives for commonly used hazardous materials, PMO BCT and the Environmental Team used government and commercial information sources such as pollution prevention databases, joint service organizations and equipment manufacturers to identify existing alternative materials. The PMO BCT approved commercially available alternative materials that provide equal-to-superior performance over the hazardous materials they were replacing. Furthermore, every replacement material demonstrated lifecycle cost savings/cost avoidance to the Army and was previously validated, from outside studies, for use in the field.

The PMO BCT's proactive pollution prevention approach resulted in the Stryker FoV Program's continual environmental compliance and military readiness, and is easily transferable to other DoD weapons systems programs yet to be developed.

Actions taken to successfully implement alternative materials into the Stryker Program Technical Data Packages and Technical Manuals include:

- Eliminated use of DoD-P-15328 wash primer application to Stryker hull structures. The wash primer contains hexavalent chromium ($Cr^{+6}$) as well as high concentrations of volatile organic compounds (VOCs). The wash primer replacement involved the use of a direct-to-metal primer application technology
- Replaced $Cr^{+6}$ containing aluminum pretreatments on non-electrical aluminum vehicle components with alternative aluminum pretreatments that do not contain $Cr^{+6}$
- Replaced cadmium (Cd) plating on fasteners and hardware with zinc plating
- Replaced $Cr^{+6}$ post rinse treatment on zinc plated hardware with trivalent chromium post treatments
- Replaced Halon 1301, a halogenated fire suppressant, with Fire Master 200 plus sodium bicarbonate in the crew compartment and Fire Extinguisher 25 in the engine compartment. Both of the alternative fire suppressant agents do not contain Class I or II Ozone Depleting Compounds
- Replaced commonly used Class I and II Ozone Depleting Compounds based refrigerants with the R-134a refrigerant in the Commander's Vehicle and Nuclear, Biological Chemical Reconnaissance Vehicle. R-134a is neither a Class 1 nor Class 2 Ozone Depleting Compound
- Replacement of P-D-680 dry cleaning solvents with MIL-PRF-680 solvents in TMs. MIL-PRF-680 solvents have lower concentrations of VOCs and hazardous air pollutants than P-D-680 solvent mixtures

▲ Mortar Carrier Unit

## Improved Program Management

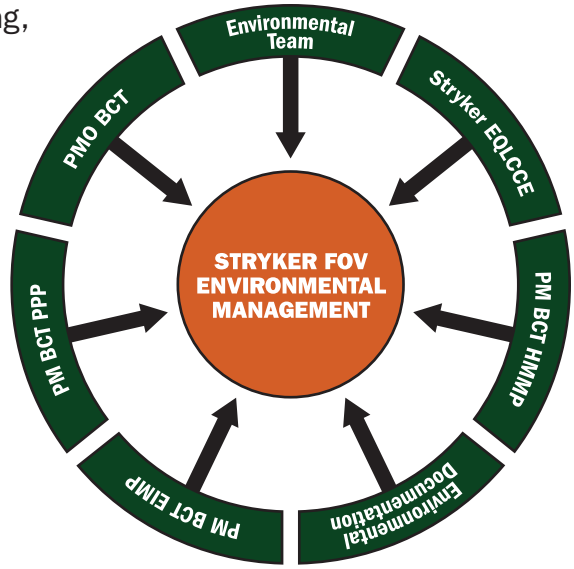
### Environmental Management within Project Management Office Brigade Combat Team

In accordance with Executive Order 13148, the PMO BCT adopted an EMS

in fiscal year 2003 that successfully integrated environmental concerns and issues into the entire Stryker Program. The EMS identifies PMO BCT environmental management responsibilities, provides a process to prepare and update environmental documentation, and coordinates DoD 5000.2 requirements. By utilizing the EMS, the PMO BCT can now track environmental issues more efficiently and can resolve those issues while maintaining schedule. The Environmental Team also implemented the EMS within their responsibilities, resulting in a well-maintained and fully coordinated improved management program.

The PMO BCT established the PM BCT Hazardous Materials Management Plan (HMMP) and PM BCT Pollution Prevention Program. The PM BCT HMMP focuses on managing and documenting the use of hazardous materials in the Stryker FoV Program. Functionally, it breaks up the Stryker FoVs' life cycle into three general areas: manufacturing and vehicle integration activities; hazardous material requirements in technical manuals and Depot Maintenance Work Requirements; and Stryker vehicle demilitarization and disposal. This separation of Stryker FoV's life cycle results in a more focused effort for eliminating hazardous materials from the Stryker program. For example, the PMO BCT regularly reviews semi-annual lists of hazardous materials from each life cycle section that cannot be eliminated from the Stryker program. These reviews help correlate how a hazardous material use and elimination in one life cycle phase impacts the remaining cycles.

The PM BCT Pollution Prevention Program provides guidance on prioritizing, evaluating, and implementing pollution prevention opportunities into the Stryker FoV program. PMO BCT and Environmental Team utilize the PM BCT Environmental Impact Management Program to manage, track and resolve potential and real environmental impacts from the Stryker program. For example, the Fort Polk representatives to the Environmental Team notified fellow team members regarding potential improper disposal of contaminated internal vehicle hull water. Through the Environmental Impact Management Program and interaction with the Environmental Team members, PMO BCT has included additional text into the Stryker FoV technical manuals regarding disposal procedures of contaminated hull water.




▲ Contributing elements to the environmental management of the Stryker family of vehicles

## Management of Non-hazardous Waste Streams

The Stryker FoV was designed with several features to help reduce and improve the management of non-hazardous waste streams. These design features included:

- Use of remote weapon station catch bags. Catch bags are positioned beneath the Remote Weapon System and function to trap empty shell casings ejected from the Remote Weapon Systems' M2 0.50 caliber machine gun or Mark 19 grenade launcher. Use of these bags eliminates the ejection of the empty

▲ Reconnaissance Vehicle

casings to the environment during vehicle weapon firing exercises.

- Use of the Stryker FoV on-board oil exchanger. The exchanger automatically injects used engine oil into the vehicle fuel tank. When this occurs, the fuel and used oil are mixed and burned as a reformulated fuel. Except for unscheduled maintenance activities, the apparatus eliminates the waste stream generated from engine oil draining.

The PMO BCT maintained and used an Integrated Digital Environment and an Internet File System to reduce the volume of office paper generated from making copies of important information and documents. The Integrated Digital Environment is an electronic network of Stryker FoV vehicle information such as presentations, technical and performance reports, meeting minutes, and technical specifications. The BCT created the Internet File System to electronically store this information. The Internet File System facilitates easy retrieval and controlled manipulation of all data in the system. For example, only one paper copy of each BCT environmental document is made with additional copies provided in only electronic format. PMO BCT personnel only used office paper that contained recycled fiber.

## Research, Development, and Technology Demonstration/ Validation

Through focused Research, Development and Technology Demonstration/Validation the PMO BCT and Environmental Team successfully eliminated an application of $Cr^{+6}$ and Cd from the Stryker FoV. Due to unavailability of commercial alternatives, some uses of $C^{+6}$ still occur. For example, $Cr^{+6}$ post treatment on fasteners such as bolts could not be replaced. The Environmental Team spearheaded the evaluation of a non-hazardous experimental trivalent chromium process developed by U.S. Naval Air Research Laboratory. Through a collaborative effort between the Naval Air Research Laboratory and Environmental Team members from General Dynamics and the Army Research Laboratory, the trivalent chromium process is being tested for use on the Stryker FoV and other ground combat vehicles. If that evaluation proves successful, the Naval Air Research Laboratory trivalent chromium process will be applied to fasteners, which will undergo further testing to verify performance of the trivalent chromium process. Successful testing will result in changes to technical data packages to incorporate the trivalent chromium process.

▲ Medical Evacuation Vehicle

▲ Fire Support Vehicle

## Process Modification and Improvement

The PMO BCT and General Dynamics proactively added several process modifications and improvements into the Stryker FoV designs that help to eliminate potential sources of pollution generating activities. For instance, currently fielded ground vehicle systems have several locations where vehicle fluids such as engine oil and coolant can leak from vehicle components. These contaminants can have adverse affects to the environment. The PMO

BCT and General Dynamics designed the Stryker FoV to have a seamless lower hull that contains any fuel spills or leaks. Drainage holes have also been incorporated into the lower hull. These holes allow personnel to safely remove any spilled or leaked material in a controlled environment. Additionally, the PMO BCT added instructions on the proper draining method to all technical manuals. This design feature had no cost impact to the PMO BCT or to any of the installations fielding Stryker Program components. This seamless hull design feature can be transferred to designs for future ground vehicle systems.

## Education and Outreach

The Environmental Team routinely shares its lessons learned in pollution-prevention and health risk mitigation methods throughout the Army and DoD. Initiatives in which the Environmental Team were involved include:

- Assisted the U.S. Army Program Management Office for Combat Systems and the Program Management Office for Future Combat Systems in reviewing coating technologies and metal pretreatments that PMO BCT used in the Stryker program
- Shared valuable information with U.S. Army Installation Management Agency as well as with testing and fielding installations that have not joined the Environmental Team. For example, the PMO BCT participated in the 2002 and 2003 Interim Force/ Stryker National Environmental Policy Act (NEPA) Process Coordination Meetings. At these meetings the PMO BCT gave installation personnel Stryker vehicle information to help in preparing their NEPA documents. PMO BCT presence at these meetings provided direct contact with installation personnel that resulted in a two-way exchange of information on the fielding and impact the Stryker would have to the environment
- The PMO BCT conducted public announcements and corresponded with newspapers local to manufacturing, testing, and fielding installations. Through this correspondence, the PMO BCT notified the public of the availability of Stryker related NEPA documents
- Environmental Team members are representatives of organizations that are spread throughout the nation. In a coordinated effort, this team is in the process of sharing Stryker program successes with state and local agencies, academic institutions, and industrial and civic organizations

▲ Stryker in the field

▲ NBC Reconnaissance Vehicle

## ACCOMPLISHMENTS

With assistance from the Environmental Team, the PMO BCT coordinated the environmental efforts for the entire Stryker program. These efforts included:

- Reviewing requirements for hazardous materials and evaluating alternative materials from outside studies for feasibility;
- Evaluating alternative material use impact to vehicle operation and maintenance and potential financial consequences thereof;
- Ensuring that reduction of environmental issues and implementation of pollution prevention methodologies occurred at the earliest possible time in the Stryker FoV's life cycle, reducing cost and schedule conflicts; and

- Verifying that any alternative material did not decrease the Stryker FoV's military readiness nor result in new environmental, safety or occupational health issues.

The PMO BCT successfully coordinated all environmental activities in the Stryker program with federal agencies, contractors and military users. This included the preparation of the Interim Armored Vehicle Developmental Test and Evaluation Environmental Assessment, Stryker Family of Vehicles Programmatic Environmental Assessment, Stryker Environmental Quality Life Cycle Cost Estimate, and the Final Draft Stryker Programmatic Environmental Safety and Health Evaluation. The EMS that the PMO BCT implemented was successful in identifying and resolving potential environmental issues. The following table highlights these successes.

The Stryker FoV is a completely new vehicle program that required engineers to design, manufacture and test the system without the benefit of referencing lessons learned, cost histories or design manuals belonging to predecessors. The entire program was efficiently run to identify and eliminate or reduce potential hazardous materials up-front. These factors contribute to the difficult task of estimating exact cost savings obtained from alternative material trade-offs and process changes for the overall Stryker program. However, the PMO BCT, with the help of its partners, incorporated innovative pollution prevention techniques and eliminated materials from the Stryker that pose a threat to human health and the environment. The Stryker FoV is the fighting combat force of the future that will defend both our nation and our environment.

▲ Infantry Carrier Vehicle

| Targeted Hazardous Material/ Pollution Source | Alternative Material/Process | Result |
|---|---|---|
| DoD-P-15328 wash primer application to Stryker hull structures | Direct-to-Metal application | Eliminated use of wash primer that contains 6.5 pounds per gallon VOC. Also eliminated approximately 2 pounds of $Cr^{+6}$ pigment per vehicle |
| Halon 1301 (Class I ODC) | FM200 with sodium bicarbonate in occupied area and FE25 in engine compartment | Eliminated Class I ODC usage in Stryker FoV |
| Class I and II ODC based refrigerants | R-134a | Eliminated Class II ODC usage in Stryker FoV |
| $Cr^{+6}$ aluminum pretreatments | Non-$Cr^{+6}$ aluminum pretreatment | Impacted approximately 450 components/ items per vehicle |
| Cd plating | Zinc plating | Impacted approximately 400 components/ items per vehicle |
| $Cr^{+6}$ post treatment on zinc plating | Trivalent chromium process | Impacted approximately 400 components/ items per vehicle |
| Vehicle POL spills | Seamless lower hull | Eliminated POL spills |

CULTURAL RESOURCES MANAGEMENT—
INSTALLATION

# U.S. ARMY GARRISON ALASKA

*"A GIANT LEAP FORWARD...INTO THE PAST"*

## INTRODUCTION

Between fiscal years 2001 and 2003, U.S. Army Garrison Alaska's (USAG-AK) cultural resources program leapt from chasing compliance to setting cultural resources management precedence. Within that time frame the program grew from a single part-time position to a seven-position, in-house staff with full capabilities to inventory, protect, and manage prehistoric and historic heritages that come with the nation's lands.

### Military Mission, Population, and Acreage

USAG-AK's mission is to provide the services, facilities, and infrastructure to support power projection and training to rapidly deploy Army forces from Alaska in the conduct of contingency operations within the Pacific theater and elsewhere as directed.

The 172nd Infantry Brigade, the primary combat unit stationed at USAG-AK, is one of four Army units in the process of transforming into a Stryker Brigade Combat Team, the vanguard of U.S. Army restructuring. Stryker Brigade Combat Team tactics emphasize dismounted engagement and rapid movement between sites. Army restructuring includes changes in equipment and tactics, which will have different impacts upon the USAG-AK land and, potentially, its cultural resources.

Alaska is, by far, the nation's largest state, and so is the land mass that USAG-AK manages. Totaling nearly 1.7 million acres, it represents roughly 10 percent of Army land nationwide. The sheer acreage, harsh winter climates and long distances between installations make inventorying and managing cultural resources a significant challenge.

▲ Chinooks deploy troops and equipment during training exercises.

### Historical Context

Alaska is one of the last great frontiers, rich in both natural resources and history. For at least 12,000 years, mankind has reveled in Alaska's beauty and explored its almost limitless forests and tundra. Since 1867, when the United States purchased Alaska from Russia, the region's demography and economy has changed dramatically. Communities grew out of the gold rush era, and cities such as Anchorage sprung up from tent camps during construction of the railroad.

Fort Richardson, Fort Wainwright (formerly Ladd Field and Ladd Air Force Base), and Donnelly Training Area (formerly Fort Greely) were established between 1939 and 1942 during

▼ The table below indicates the tracts of land involved at USAG-AK and military and civilian populations at the various training sites within the garrison.

| Installation | Acreage | Military Population | Civilian Population |
|---|---|---|---|
| Donnelly Training Area | 649,234 | 0 | 0 |
| Fort Richardson | 61,000 | 2,184 | 3,862 |
| Fort Wainwright | 927,732 | 4,393 | 7,633 |
| **Totals** | **1,637,966** | **6,577** | **11,495** |

mobilization for World War II. This, combined with the discovery of major oil reserves, reshaped Alaska's culture and economy.

It is for these reasons that the cultural resources team at USAG-AK works diligently to preserve and protect Alaska's rich heritage while enhancing the Army's primary mission of training.

### Cultural Resources Tradition

Cultural resources under the stewardship of USAG-AK include prehistoric and historic archeological sites and districts, historic architectural properties and districts, and curated artifacts and associated collections. Consultation is underway to identify traditional cultural properties, sacred sites or other resources of cultural significance to Alaska Native Tribes.

## BACKGROUND

### Organization and Staffing

The cultural resources team has significantly expanded from one part-time supporting member in 2001 to seven strong members and a full staff. The annual budget has increased from $60,000 in 2001 to $1.2 million. Environmental program requirements and the un-resourced requirement program constitute the funding sources the cultural resources team utilizes to manage their program.

At the beginning of fiscal year 2001, the one part-time employee that then made up the cultural resources team, supported the garrison's conservation program by managing National Historic Preservation Act (Section 106[1]) projects. Section 106 projects dramatically increased as the garrison's 172nd Infantry Brigade began its transformation into a Stryker Brigade.

▲ Valerie Houser, Advisory Council Historic Preservation, leads Section 106 training for local tribe members.

The command quickly realized the need for a fully funded, stand-alone team capable of managing cultural resources for all the garrison's installations—Fort Richardson and Fort Wainwright & Donnelly Training Area[2].

The garrison commander appointed a cultural resources program manager, who in turn hired three archaeologists, two cultural resources specialists and a historian through the Center for Environmental Management of Military Lands (CEMML)[3].

One of the team's first actions was to develop a 2002-2006 Integrated Cultural Resources Management Plan (ICRMP) for Fort Richardson[4]. The new ICRMP reflects the garrison's program and operations, supports command initiatives toward sustainability and enhances the training mission while protecting Alaska's cultural heritage.

The cultural resources program currently operates under the Public Works Environmental Division. The USAG-AK cultural resources team actively participates in the Fort Wainwright Cultural Resources Working Group and the Alaska Department of Defense Cultural Resources Working Group.

*[1] Section 106 requires federal agencies to take into account the effects of their actions on historic properties and afford the Advisory Council of Historic Preservation an opportunity to comment.*

*[2] Donnelly Training Area is formerly Fort Greely. Under the latest round of Base Realignment And Closure activities, Fort Greely closed but transferred use of its training lands to Fort Wainwright.*

*[3] CEMML is a cooperative agreement with Colorado State University. More information can be found at www.cemml.colostate.edu*

*[4] The 2001-2005 ICRMP for Fort Wainwright and Donnelly Training Area was already in place (implemented in 2000)*

## Partnerships

By leveraging the knowledge and resources of numerous partners and coordinating their efforts with the garrison command structure, the cultural resources team gains more flexibility to focus on mission enhancement and resource management.

One such partnership is with the Tanana-Yukon Historical Society which helps document historic buildings. The Native Village of Eklutna (Fort Richardson) helps the team to identify traditional cultural properties and sites that have sacred significance. Through its consultation with the Native Village of Eklutna, the cultural resources program fosters a framework to partner with other tribes near Fort Wainwright.

To aid in general program implementation, the cultural resources team partners with the Alaska Department of Natural Resources Office of History & Archaeology (2001); the Tanana Chiefs Conference, Inc. (Fort Wainwright); and the Tanana-Yukon Historical Society (2002). Other partners include the Alaska State Historic Preservation Officer National Park Service, Bureau of Land Management, local governments, local historic societies and preservation groups, and Alaskan Tribal Governments and organizations.

The cultural resources team also works closely with Colorado State University. In fact, almost all in-house full-time staffing is done through a cooperative agreement with the university's CEMML. The team employs summer and winter interns, typically graduate students from the University of Alaska, Fairbanks and University of Alaska, Anchorage. This innovative approach to staffing saves valuable program dollars and provides an on-site "working" education for students. All staff members are fully trained in every aspect of cultural resources management and related fields.

▲ Archaeology crew places concentration pin flags at a newly discovered site on Donnelly Training Area.

## Plans

The integrated Cultural Resources Management Plan, 2001-2005, Fort Wainwright and Donnelly Training Area (prepared in 2000), and the Integrated Cultural Resources Management Plan, 2002-2006, Fort Richardson (prepared in 2001), provide the basis for inventory and management of cultural resources at Fort Wainwright/Donnelly Training Area and Fort Richardson, respectively.

> *"The cultural resources team developed standard operating procedures (SOPs) to guide the immediate mapping, surveying, and care of newly discovered historical or cultural sites."*

## PROGRAM SUMMARY

The overarching objective of the U.S. Army garrison's cultural resources program is to preserve the Army's primary mission of training by locating, studying and protecting the installation's historic sites and artifacts. In support of this objective, the program provides legal structure and coordination to support military

operations. Additional achievements attained during fiscal years 2001, 2002 and 2003 include:

- Increased annual funding by over $1 million;
- Increased staffing from one part time to seven professional staff positions;
- Functioned under approved ICRMPs;
- Conducted, published, and distributed seven historic studies;
- Completed its historic building survey and managed those resources;
- Surveyed 55,200 acres for cultural resources, equaling more than 95 percent of the total survey to date;
- Evaluated properties and sites for National Register of Historic Places (NRHP) eligibility;
- Significantly improved coordination with Native Alaskan Tribal governments;
- Developed curation capabilities with the University of Alaska, Fairbanks;
- Provided community outreach and began development of an interpretive program;
- Supported USAG-AK's role in local communities, particularly those portions interested in cultural resources;
- Enhanced the local general environment by increasing cultural resources awareness;
- Supported the military mission by efficiently and effectively inventorying and managing cultural resources with minimal impacts on the mission;
- Increased annual Section 106 consultations by about ten-fold;


▲ Building 1024, once a radio transmitter station, now a Ladd Field National Historic Landmark.

- Helped pioneer the new Army Alternative Procedures[5] (AAP) process to develop a Historic Properties Component for the next combined ICRMP; and
- Enhanced relationships and/or contacts with regulatory agencies, local interest groups, and Alaskan Tribal Governments and organizations.

> ***"Of 316 buildings surveyed between 2001 and 2003, 95 of these structures are eligible as NRHP facilities."***

## ACCOMPLISHMENTS

### Overall Cultural Resources Management

USAG-AK's cultural resources program is far more integrated with the garrison's master plan than when the program first began. Team members attend regular meetings with garrison staff to coordinate tribal participation and the drafting of new ICRMPs. The cultural resources team developed standard operating procedures (SOPs) to guide the immediate mapping, surveying and care of newly discovered historical or cultural sites. These procedures are completed in a manner that does not negatively affect the

[5] *The AAP is a streamlined alternative to National Historic Preservation Act regulations. Installations wishing to use the AAP must work with state historic preservation officers, Indian tribes, and the local community to prepare a Historic Properties Component and integrate it with the installation's ICRMP. This is not a mandatory program for installations.*

historic site or have an impact on the training mission.

## Integrated Cultural Resources Management Plan

The 2001-2005 Integrated Cultural Resources Plan for Donnelly Training Area and Fort Wainwright was implemented in Fiscal Year 2000. The cultural resources team prepared the 2002–2006 Fort Richardson ICRMP in Fiscal Year 2001, and now looks ahead to preparing a combined ICRMP this year.

## Historic Buildings and Structures

Historic buildings and structures are continually being inventoried and assessed to determine if they are eligible for inclusion in the National Register of Historic Places and appropriate management. Garrison staff use the U.S. Army Environmental Center's Layaway Economic Analysis program to make renovation decisions for NRHP-eligible facilities. They also use this program for building assessments and to conduct economic analyses of historic sites such as the Ladd Field National Historic Landmark. A total of 316 buildings were surveyed between 2001 and August 2003; 95 of these structures were deemed eligible as NRHP facilities. Several buildings have been renovated for reuse by garrison command. One example is the garrison headquarters, which once served as an installation hospital.

The cultural resources manager and team historians completed a comprehensive study on the garrison's historic-era resources. During the course of this research the team completed an inventory of all the garrison's architectural properties more than 50 years old. To better understand the importance and value of USAG-AK's numerous historical buildings, the team's historians also studied the impact of military operations on the garrison's cultural resources.

▲ Ladd Field National Historic Landmark educational poster supports CRM efforts.

***"Since fiscal year 2001 more than 55,000 acres over the garrison's two posts and training areas have been surveyed, equaling 95 percent of the total area surveyed at USAG-AK to date."***

## Cultural Resources Inventory

| | Donnelly Training Area | Fort Richardson | Fort Wainwright | Totals |
|---|---|---|---|---|
| **Archaeological Survey and Inventory** | | | | |
| Acres accessible for archaeological survey[1] | 600,271 | 59,542 | 814,073 | 1,473,886 |
| Total acreage surveyed (% surveyed)<br>Acreage surveyed during 2001—August 2003 | 38,406 (6.4%)<br>37,000 (6.2%) | 11,841 (19.9%)<br>11,200 (18.8%) | 7,758 (0.1%)<br>7,000 (0.1%) | 58,005 (3.9%)<br>55,200 (3.7%) |
| Total archaeological sites (eligible for NRHP[2] listing)<br>Sites recorded during 2001—August 2003 | 316 (19)<br>200 (5) | 8 (0)<br>0 (0) | 71 (45)<br>0 (0) | 394 (64)<br>200 (5) |
| **Historic Building Survey and Inventory** | | | | |
| Percentage of buildings evaluated | 100% | 100% | 100% | 100% |
| Buildings 50 years or older (eligible for NRHP listing)<br>Buildings surveyed (determined eligible) during 2001—August 2003 | 10 (0)<br>9 (0) | 322 (75)<br>206 (55) | 233 (104)<br>101 (40) | 565 (179)<br>316 (95) |
| Historic Districts/Landmarks | 0 | 2 | 2 | 4 |

[1] *Impact areas are the major reason some acreage is not available for survey.*
[2] *NRHP (National Register of Historic Places)*

Studies included:

- Homesteads on Fort Richardson (2001)
- Early Mining History, Fort Wainwright and Donnelly Training Area (2001)
- Northern Defenders: Cold War Context of Ladd Air Force Base, Fairbanks (2001)
- Early Electrification of Anchorage (published in 2002)
- Homesteads on Fort Wainwright (2002)
- Early Transportation Routes, Fort Wainwright (2003)
- Haines-Fairbanks Pipeline (2003)

On-going studies include World War II History of Ladd Air Force Base, Fielding of the Nike Hercules Missile in Alaska, and Influence of Defense Systems on Strategic Landscapes.

## Archaeological Resources

Since fiscal year 2001, more than 55,000 acres over the garrison's two posts and training areas have been surveyed, equaling 95 percent of the total area surveyed at USAG-AK to date. NRHP eligibility determinations for sites found during the surveys are routinely accomplished.

As part of the ICRMP's SOP, the cultural resources team ensures that artifacts are not removed from historic sites unless they are in danger of being damaged or if they could significantly impact military operations. In this capacity, the cultural resources team adheres closely to federal regulations, specifically regarding the National Historic Preservation Act (NHPA). In fact, six professional conservation officers yielding cultural resources enforcement authority protect all garrison historic sites.

▲ Kristy Hollinger, team historian, interviews a Nike site veteran.

## Native American Program

The cultural resources team believes that partnerships with local tribes are mutually beneficial. As a result, the garrison's Native American Program is integrated with nearly every aspect of the cultural resources team's activities. Working together, team and tribe members identify sacred sites and traditional cultural properties. When sites are found, they are mapped and surveyed to determine the measure of protection each site requires. Additionally, team members provided 85 tribe members from 42 tribes with NHPA Section 106 training to help them better understand the new AAP program. Currently, the cultural resources team seeks to foster a stronger relationship with the tribe members and provide more opportunities for collaboration.

Local tribes show a great deal of interest in the garrison's every day operations. They question how garrison

activities will impact their lives. Currently, local tribes are involved with the garrison decision-making process as members and are reviewing a Historic Properties Component (HPC) and SOPs, which they helped draft.

Fort Wainwright and Donnelly Training Area are historically important areas in regards to traditional subsistence[6] practices. The garrison and cultural resources team actively identify properties of traditional religious significance that may also be important to historical subsistence customs. Native Alaskans are able to participate in these subsistence activities on the garrison with state-issued hunting and fishing licenses and permits.

## Curation

The curation of artifacts from USAG-AK grounds is coordinated with the University of Alaska Museum. Presently the University maintains 16 cubic feet of artifacts found at Fort Wainwright, dating 4,000 to 10,000 BP[7]. Artifacts found include micro-blades, micro-cores, and various bi-face fragments. The university recently reached storage capacity; therefore, USAG-AK is temporarily storing 2.5 cubic feet of artifacts on-site until the university procures more room.

## Cultural Resources Awareness and Education and Community Relations

Cultural resources awareness, education and community relations are key components of the cultural resources program. Native Alaskan tribes take great interest in the historic property studies the team publishes, as they represent a piece of their own history. The cultural resources team prints at least 500 copies of each study to keep up with public demand.

Additionally, the team has been involved in several public outreach and education initiatives, including:

- Lectures to anthropology departments at University of Alaska, Anchorage; University of Alaska, Fairbanks; and local historical societies. Presentations included discussions on tribal coordination and the USAG-AK cultural resources program
- Presentations to historical societies regarding cultural resources studies
- Staff presentations to local community groups
- The development of Fort Wainwright Cultural Resources Working Group to interact and educate the community on their progress
- The program manager's participation in the National Trust for Historic Preservation Board of Advisors as an active member
- The participation of team members in the Society of American Archaeology, Alaska Anthropology Society, the Alaska Association for Historic Preservation, and Alaska Historical Society


▲ Artifacts from the 2003 field season, discovered on Donnelly Training Area.

*[6] The hunting, fishing, and gathering activities that traditionally constituted the economic base of life for Alaska's native people.*

*[7] BP stands for "years before the present." It is an archaeological term which is generally a rough generalization of the number of years before 1950 and not necessarily based on radio carbon dating methods.*

- The development of a multi-faceted program geared to the public. The program provides information products such as brochures, websites and historical context documents as well interpretive panels on post

## Environmental Enhancement

The USAG-AK and neighboring communities directly benefit from the garrison's commitment to cultural resources management. The team provides historic context studies as well as other program products that help the public comprehend aspects of Alaska's history that have not previously been addressed.

## Mission Enhancement

Mission enhancement is the ultimate goal of every cultural resources program. The USAG-AK cultural resources team supports this goal by inventorying garrison resources, developing the means to manage them, and minimizing the impact of cultural resources management requirements on military activities.

The cultural resources team improved several historic buildings that support many garrison and mission related operations. An example of this includes the historic MARS building on Fort Wainwright that has been restored and now housing the Army's Red Cross and MARS operations. The team also surveyed 55,200 acres of garrison land to clear several sites for military training.

Working with installation range planners and managers, the cultural resources staff identifies archaeologically sensitive areas on the training areas. They actively coordinate troop projects and assist in determining which initiatives impact cultural resources, allowing the troops to move ahead with their mission.

▲ Archaeologist Kirsten Anderson takes a site measurement.

## Cultural Resources Compliance

Cultural resources compliance is considered during every project and ensured through the AAP. The cultural resources team established the AAP program to ensure compliance is fully integrated with the Army's operational mission, garrison activities, and training exercises. The HPC piece of AAP gives the team greater flexibility to make management decisions during the planning process by defining cultural resource issues and the steps to avoid or mitigate those issues to best support the mission. The SOPs and HPC are specifically tailored to the installation's operations by providing guidelines from monitoring and reviewing installation activities to managing installation resources. The Advisory Council on Historic Preservation[8] certifies the HPC and instructs the garrison to operate under that HPC for five years. Ultimately, the HPC and SOPs are integrated with the garrison's ICRMP.

*[8] The Advisory Council is an independent federal agency established by the NHPA in 1966. It is the only federal agency with the legal responsibility to balance historic preservation concerns with federal project requirements.*

Through the AAP program, the cultural resources team was able to set cultural resource management precedents. In fiscal year 2001, the team submitted 90 property assessments[9] that addressed eligibility of buildings and archaeological sites for inclusion in the National Register of Historic Places and findings of effect for undertakings that may affect eligible properties to the Alaska State Historic Preservation Office (ASHPO) for Section 106 review[10], which is an 800 percent increase from the 10 submissions made in fiscal year 2000. Submissions to the ASHPO exceeded 100 in fiscal year 2002 and 85 in fiscal year 2003[11].

▲ Stryker, Donnelly Training Area.

## CONCLUSION

Through their perseverance over the last three years, the cultural resources team at USAG-AK has positioned the garrison as one of the first installations to implement the new AAP process. The team's Historic Building Survey initiative is complete, and USAG-AK's draft HPC is currently being reviewed for inclusion in the 2004 combined ICRMP. Additionally, the garrison is actively seeking additional partnerships with more than 60 tribes. Managing 10 percent of the Army's total land is no easy task; however, the cultural resources team at the U.S. Army Garrison Alaska has proven that a team of seven dedicated individuals can accomplish many goals while preserving one of the nation's most unique terrain.

***"A Giant Leap Forward… Into The Past"***


▲ Hangar 3, a remnant of World War II and the Cold War, was formerly used by the 55th Weather Recon Squadron and is now used by the Commander, Administration, and Maintenance and Operations activities for Blackhawk helicopters.

*[9] These assessments consisted of "Determination of Eligibility" and "Finding of Affects" for archaeological sites and historic buildings.*

*[10] In fiscal year 2000 only 10 submissions had been made for review.*

*[11] 2003 106 consultations were lower due to changes in policy to only submit funded projects, Program Comments eliminating Section 106 on Caphart/ Wherry era housing, and a Section 106 learning curve for a new Public Works contractor.*

NATURAL RESOURCES CONSERVATION—
SMALL INSTALLATION

# NEWPORT CHEMICAL DEPOT

# FY 2003 SECRETARY OF DEFENSE ENVIRONMENTAL AWARD
# NATURAL RESOURCES CONSERVATION: SMALL INSTALLATION

## INTRODUCTION

Newport Chemical Depot's (NECD) mission is as follows:

- Ensuring continued safe and secure storage of nerve agent VX.
- Enacting measures for the implementation of the Chemical Treaty Compliance Program.
- Supporting the construction and operation of the Chemical Stockpile Disposal Program for nerve agent VX.
- Administering the Chemical Stockpile Emergency Preparedness Program.
- Maintaining required plant facilities.
- Training soldiers.
- Maintaining environmental compliance with State and Federal laws.

Established in 1941, NECD is a government-owned, contractor- operated facility under the administration of the **U.S. Army Chemical Materials Agency** and the **U.S. Army Installation Management Agency – Northwest Region**. LTC Joseph F. Marquart serves as Depot Commander and Contracting Officer's Representative (COR), assisted by a Civil Service staff. **Mason & Hanger Corporation** (a **Day & Zimmermann** company) has been the operating contractor for the Depot since 1986. Tenants include the **Tennessee Valley Authority** (Non-Stockpile Project for the Disposal of Chemical Agent Manufacturing Facilities), **Program Manager for Alternative Technologies and Approaches** (PMATA) consisting of Parsons Infrastructure and a Government Team (Newport Chemical Agent Disposal Facility (NECDF) Support Project), and the **U.S. Coast Guard** (LORAN-C Station). In addition, NECD has coordinated with several National Guard Reserve Units that have rotated through NECD as the **Chemical Site Defense Force** required since 2001.

NECD is located in west central Indiana, 70 miles west of Indianapolis. The land base is divided into the following uses:

| Land Use | Acres |
|---|---|
| Improved Grounds | 72.75 |
| Semi-Improved Grounds | 785.50 |
| Misc. Wildlife Areas | 762.01 |
| Agricultural Leases; crop/hay | 2,871.20 |
| Agricultural Leases; grazing | 62.00 |
| Forests | 2,075.60 |
| Prairie Restoration | 255.40 |
| Wetlands | 213.20 |
| Total | 7,097.66 |

The unimproved grounds are managed for multiple-uses which include agriculture, wildlife habitat, wetlands, timber, hunting and other outdoor recreation activities.

NECD is in a unique area of west central Indiana, in terms of local natural features. NECD is located between two natural regions once common to the west central Indiana climate – the Grand Prairie and the Central Till Plain. The Grand Prairie is characterized by its dark and fertile soils and the Central Till Plain is known for its nearly flat to gently rolling landscape.

The Depot lies along the borders of the Entrenched Valley section, which is a part of the Central Till Plain and the Grand Prairie. The Wabash River dominates the area where these regions meet; however, the boundary is not well defined, but rather a mosaic of bluestem prairie and oak-hickory forest. This edge effect has increased the diversity of flora and fauna at NECD. Unfortunately, since the invention of the steel plow, no undisturbed remnants of the original 1,900 acres of NECD's pre-settlement Grand Prairie remains.

Less than one-half of 1% of Indiana's original prairie remains. In recognition of the Grand Prairie's importance to Indiana's history – and more specifically, the ecology of NECD – we are successfully restoring a portion of NECD to pre-settlement prairie conditions through a series of prairie restoration projects begun in 1994. Continued support to our prairie restoration projects will result in the restoration of one of the largest tracts of tall-grass prairie in Indiana.

NECD has completed surveys of 2,619 acres in which 262 archaeological sites have been identified. These sites consisted mainly of hunting and gathering areas. No known Native American villages or burial grounds are located at NECD. Sixteen of the archaeological sites have been identified as potentially eligible for the National Register of Historic Places.

## BACKGROUND

NECD's Integrated Natural Resources Management Plan (INRMP) was implemented in 1991 and revised in 2001. Cooperators that support the INRMP include: U.S. Fish & Wildlife Service, Vermillion County Soil & Water Conservation District, U.S. Army Corps of Engineers and the Indiana Department of Natural Resources.

The COR's Chief Engineer oversees natural resource issues with both the U.S. Army Chemical Materials Agency and the U.S. Army Installation Management Agency – Northwest Region. The Natural Resources Management Program is implemented through Mason & Hanger Corporations Natural Resources Administrator. A Natural Resources Conservation and Beautification Subcommittee meets quarterly to address natural resources issues.

## PROGRAM SUMMARY

The overall goal for the NECD Natural Resources Management Program is to maintain ecosystem viability and to ensure the sustainability of military lands  The following objectives have been established to achieve this goal:

- Implement a natural resources management program that reflects the principles of ecosystem management.
- Use adaptive management techniques based on increased knowledge and data gained from monitoring programs and scientific literature.
- Seek to maintain or increase biodiversity of native species.
- Ensure protection of Federally listed threatened and endangered species and species of special concern and undertake management measures that support conservation and recovery of these species.  Implement similar measures for state-listed species to the fullest extent possible, consistent with the military mission.
- Prevent the degradation of water quality.
- Protect aquatic and riparian habitat and identify and restore degraded habitats when practical.
- Manage forest resources in a sustainable fashion that maintains both the military mission and ecological functions and values.
- Protect forest resources from unacceptable losses to damage agents and degradation resulting from insects and disease, invasive species, and wildfire.
- Manage soil resources in a sustainable manner and protect soils from erosion and destabilization through preventative and restoration efforts.
- Protect and preserve cultural resources in accordance with all Federal laws.
- Protect unique plant species identified as rare statewide or locally, but without legal protection status, to the extent practical without restricting key mission operations.
- Protect sensitive and ecologically significant habitats.
- Manage wildlife and fisheries resources within the principles and guidelines of ecosystem management to maintain productive habitats and viable populations of native species.
- Provide outdoor recreational opportunities to the extent that they do not conflict with the military mission or compromise environmental values.
- Provide outdoor recreational opportunities to the extent that they do not conflict with the military mission or compromise environmental values.
- Make a positive contribution to local conservation efforts and the community by participating in educational opportunities and providing information on issues affecting NECD and the region.

The degree of attainment of these objectives will be described in the remainder of this nomination.

The most outstanding program features over the past three years are as follows:

- An Agricultural Out-leasing Program that generated more than $1.4 million in cash rent total. The cash rent per acre, for NECD agricultural tracts, always significantly exceeds the average cash rent for top quality private farmland in Indiana. This is due to the fact that the prairie soils slowly developed the richest legacy of black soil known to man. Ironically, the very richness of these prairie soils was their greatest liability, as the richest prairies became the most bountiful of croplands. Best management practices that we implement include: restrictions on plowing (for soil conservation benefits), requiring crop rotation to reduce pesticide usage, and planting conservation buffers for Indiana Bat conservation.

- A Forest Management Program that planted 60.3 acres of marginal farm land to native hardwoods. We incorporated cover crop planting into our reforestation areas in order to conserve soil and provide wildlife habitat while the trees mature.

- A Deer Hunting Program that provided recreation of nearly 400 days and a harvest of 74 deer, despite that no hunting was allowed in FY 02 due to the security concerns after the September 11 terrorist attacks.

A successful Archery Hunt

- A Native Tallgrass Prairie Restoration Program that planted 128.8 acres (increasing the total Prairie Restoration to 255 acres) of native grasses and forbs in an area identified as pre-settlement prairie. By planting a mix of more than 40 native prairie plant species (that were originally plowed under before Army ownership), NECD has significantly enhanced its biodiversity.

Restored Tallgrass Prairie

- An Outdoor Recreation Program that provided thousands of hours of wildlife watching, shed antler and mushroom hunting, nut and berry picking, and bicycling, walking and jogging opportunities for employees.

## ACCOMPLISHMENTS

### Overall Conservation Management

NECD practices multiple-use integration of forestry, outdoor recreation, fish and wildlife, agricultural out-leasing, cultural resources, pest control, aesthetics and endangered species management. All of the aforementioned concerns usually interact with one another in some way. Therefore, a holistic approach is required on all natural resources projects to maximize the effects of ecosystem management. For instance when trees are planted multiple benefits of erosion control, timber production, wildlife habitat improvement, and aesthetics are seen. Whereas, when native prairie species are planted multiple benefits of erosion control, wildlife habitat improvement and aesthetics are also observed.

The state endangered Henslow's Sparrow found a grazing tract to be suitable habitat. This prompted NECD to change the date for allowing cattle to graze in order to allow the Henslow's Sparrow to be able to fledge a brood. In addition, a former industrial pond has proved to be a good home for the State endangered Virginia Rail.

Other areas of the Depot provide suitable habitat for transient State endangered species, such as Osprey, American Bald Eagle, Sandhill Crane, Upland Sandpiper and breeding habitat for the State Endangered Sedge Wren. Three other State bird species of special concern can also be found here.

Outdoor recreation enthusiasts can participate in a variety of activities in conjunction with various other programs. We have integrated deer, small game, and turkey hunting, mushroom hunting, berry and nut picking, shed antler hunting, wildlife watching, walking, jogging, and bicycling into our Natural Resources Management Program. The mix of wetlands, forests, cultivated fields and grasslands provide a tremendous amount of biodiversity for the nature buff.

NECD recognizes that some activities are not compatible. These activities require additional coordination with a variety of agencies and organizations. When timber is harvested and other ground disturbing activities are proposed, the Indiana Department of Historic Preservation and Archaeology is consulted to ensure compliance with the National Historic Preservation Act. NECD also coordinates agricultural drainage projects with the Natural Resources Conservation Service and Farm Services Agency to ensure compliance with the Clean Water Act and the Food Security Act, respectively.

NECD consults with the U.S. Fish and Wildlife Service concerning Federally endangered and threatened species to ensure compliance with the Endangered Species Act. In addition, the Indiana Department of Natural Resources is consulted concerning the State's endangered species, our annual deer harvest, and other concerns as needed. Finally, all of NECD's projects are completed in accordance with the National Environmental Policy Act.

NECD budgets agricultural reimbursable funds to complete natural resources projects in accordance with the Military Construction Authorization Act. Some of these funds are used for tree planting and prairie restoration to improve wildlife habitats. In order to continue baseline studies of the fauna at NECD several projects have been in progress during the last three years, including:

- *Ectoparasites of Small Mammals from the Newport Chemical Depot, Vermillion County, Indiana*, (published in the Northeastern Naturalist) documented 32 new ectoparasitic host records for Indiana, of which 16 were new records for respective hosts throughout their entire range. This study complimented *Mammals of the Newport Chemical Depot, Vermillion County, Indiana* (previously published in the Proceedings of the Indiana Academy of Science) which documented 33 species of mammals, including the Federally endangered Indiana Bat and the State species of special concern, the Western Harvest Mouse, that inhabit NECD.

- *Monitoring of Avian Productivity and Survivorship (MAPS) at the Newport Chemical Depot, Vermillion County, Indiana* field work and reports were completed for the 2001 breeding season. This continued the MAPS station work started in 1997, 1999 and 2000.

- The *Wetland Inventory for Newport Chemical Depot, Vermillion County, Indiana* (U.S. Fish and Wildlife Service) documented 213 acres of wetlands.

- The *Rapid Biological Assessment of Aquatic Macroinvertebrate Communities in Little Raccoon Creek, Newport Chemical Depot, Newport, Indiana* was completed in 2001.

- *Wintering Bald Eagles Along the Wabash River in West Central Indiana* (Indiana Division of Fish and Wildlife and Indiana University – Purdue University Fort Wayne) was completed in 2001.

- *A Second Season of MAPS at the Mary Gray Bird Sanctuary* (Chipper woods Bird Observatory) compared observations with NECD MAPS station for research purposes.

- In addition, NECD has cooperated with Eastern Illinois University (Seasonal Activity and Movements of Northern Long-eared Bats), West Virginia University (Evaluation of Management Options for Wild Harvested American Ginseng Populations Based on Demographic Consequences), Indiana University (A Case Study of the Winter Diet of Long-eared Owl in Western Indiana) and the Indiana Audubon Society (annual Christmas Bird Counts) to expand NECD's natural resources baseline data.

**In order to comply with the Endangered Species Act of 1973, several projects were completed as follows:**

- *A Summer Mist Net Survey for the Federally Endangered Indiana Bat (Myotis sodalis) at the Newport Chemical Depot, Newport, Indiana* documented the continued use of NECD for Indiana bat summer maternity colonies.

- The *Newport Chemical Depot Pre-Approved Pesticide List* was revised as required.

- In addition, annual reports concerning Indiana bat conservation efforts at NECD have been prepared for the USFWS and the Department of the Army.

## Land Use Management

### Agricultural Land Use

Drainage pipe was installed on 109 acres of leased agricultural land during the last three years. The corrugated polyethylene drainage systems control the water table, thereby reducing erosion and increasing crop production. This, in turn, increases the agricultural out-lease income that supports our Natural Resources Management Program. Conservation tillage is required on all agricultural out-leases and fall tillage is only allowed for corn stubble. In addition, 91 acres of conservation buffers were planted in grasses and clover.

These practices protect our agricultural lands from water and wind erosion and exceed the requirements of the Food Security Act restrictions for soil conservation. NECD coordinates the Agricultural Out-leasing Program with the Parke/Vermillion and Fountain County Natural Resources Conservation Service and the Farm Services Agency offices.

**Agricultural Out-Leasing Program**
NECD's Agricultural Out-Leasing Program benefits wildlife by providing an ample food supply of corn and soybeans for deer, raccoons, mourning doves, pheasants, quail, turkey and many other fauna. In addition, our hay and grazing fields make excellent habitats for sedge wrens, dickcissels, grasshopper sparrows, turkeys and Henslow's sparrows.

**Prairie Restoration**
NECD has planted 129 acres of native prairie during the last three years (increasing the total Prairie Restoration to 255 acres). When possible, NECD uses prescribed burning to enhance the native prairie species since they have adapted to fire over thousands of years. Prescribed burning also reduces herbicide use in prairie restoration areas because the exotic weed species usually cannot survive fire.


Prescribed Burning

**Forest Management**
As previously mentioned, NECD reforested 60 acres of marginal farm land during the last three years. Native species planted included black walnut, red oak, shingle oak, black cherry, white ash, redbud, dogwood, pawpaw, sugar maple, black oak, tulip tree, white oak and shellbark hickory. These plantings serve multiple purposes including: timber production, erosion control, buffers for exceptionally natural areas, and the reduction of forest fragmentation for wildlife habitat – especially neotropical birds and Indiana bats. Site preparation includes planting cover crops for erosion control and quality wildlife habitat during the succession to forest. Timber harvests are not conducted on a set rotation age; instead, NECD uses uneven-aged silviculture for group selection, along with single-tree selection between groups, to maintain mixed-species, all-age stands. This increases the opportunity for biodiversity. Most recently 114,900 board foot of standing, mixed, hardwood sawtimber was sold for $25,000.

**Fish and Wildlife**

***Biodiversity of Fish and Wildlife***
The biodiversity of fish and wildlife at NECD is tremendous for west-central Indiana. Recent inventories have identified 155 bird, 32 fish, 30 herps and 33 mammal species. In addition, 422 species of vascular plants have been identified. The flora species have increased because of the ongoing planting of more than 40 native prairie species.

***Endangered and Threatened Species***
The Indiana bat (*Myotis sodalis*) is the only Federally listed endangered species that breeds at NECD. However, wintering Bald Eagles have occasionally been observed along the Wabash River and most recently near NECD's administration building area. NECD does not cut any trees along the banks of the Wabash, thereby preserving potential Bald Eagle habitat. The Indiana Division of Fish and Wildlife conducts an annual eagle census along the Wabash River. This census provides us with important information concerning eagle activity. Several State endangered birds have been observed at NECD. For security reasons and in order to protect Henslow's sparrow a grazing lease was cancelled. We also protect our five watch list species of flora by not allowing any plant picking or digging on NECD property.

### *Habitat Improvements*

Habitat improvements for game and non-game wildlife during the past three years include planting 60 acres of mixed hardwood seedlings with cover crops, 129 acres of native forbs and grasses, and 91 acres of conservation buffers. These plantings enhance the biodiversity of NECD. In addition, NECD maintains bluebird and purple martin houses and a Clemson Beaver Pond Leveler.

### *Hunting*

Employees were allowed to hunt deer (and the general public), turkey, squirrels, rabbits, pheasant, quail, and crows in FY 01. Prior to September 11, 2001, an annual Memorandum of Understanding with the Indiana Department of Natural Resources was agreed upon for general public deer hunting. Currently only employees are allowed to hunt due to increased security requirements.

### *Wildlife Resource Improvements*

Indiana Bat With Transmitter

Eight obsolete industrial ponds, associated with the former TNT Production Facility, as significant wildlife resources. These ponds are identified in NECD's Environmental Restoration Program and will be saved for continued wildlife use. Approximately $644,000 was saved by sampling these sites instead of unnecessary remediation of these 8 acres. We continue to keep an old warehouse (Building 121C) in order to conserve the only locally known maternity colony of Northern Long-eared bat (*Myotis septentrionalis*) to inhabit a building. NECD has allowed Indiana State University and Eastern Illinois University to conduct research on this colony of bats.

Newport Chemical Depot has implemented innovative technologies to environmentally remediate the 4-acre TNT Burning Ground. Explosive residues and various types of explosive-contaminated solid waste were burned at the TNT Burning Ground during the mid-1970s. During 2001 and 2002, NECD, SAIC, and the US Army Corps of Engineers working in conjunction with the Indiana Department of Environmental management treated 6989 cubic yards of explosive contaminated soils using windrow composting. The contaminated soil was mixed with agricultural amendments and treated in windrows. This technology does not generate any residual hazardous waste. An additional 310,000 gallons of explosives-contaminated groundwater was treated using a Granular Activated Carbon unit. The TNT Burning Ground is being considered as an area where native prairie grasses can be planted.

Composting TNT contaminated soil

### *Outdoor Recreation*

Due to the sensitive nature of nerve agent VX stored at NECD and the associated high level of security, access for outdoor recreation is restricted. Currently only employees may hunt mushrooms and shed antlers, pick berries and nuts, watch wildlife, bicycle, and walk/jog.

### *Conservation Education*

Deer hunters attend annual safety/security orientation meetings at NECD. During these meetings hunters are informed what is expected in order to protect themselves and NECD's natural resources. In addition, programs concerning bat education have been conducted at Rosedale Elementary School. NECD has also participated in the annual 4-H Wetlands Day held at the Cinergy's Cayuga Generating Station. International Migratory Bird Day was celebrated with bird watching tours in FY 01. Girl Scouts enjoyed seeing birds close up and even an American bald eagle near the Wabash River. Various conservation-related groups have toured NECD prior to September 11, 2001. The Natural Resources Administrator also has participated with South Vermillion High School for job shadowing.

### *Community Relations*

Prior to September 11, 2001, NECD hosted an annual 4-H sponsored benefit horse ride for St. Jude's Children's Research Hospital, Volksmarch, and Mini-Marathon. NECD has also worked with the Vermillion County Economic Development Council and actively participated in the Open Space/Recreation Task Force concerning the future re-use of NECD. The Natural Resources Administrator also participated in South Vermillion High School's proposal for a FY 01 Indiana Department of Education High Tech Library Grant.

### *Environmental Enhancement*

The Natural Resources Management Program has improved the quality of life for the installation and surrounding community by allowing multiple uses of the natural resources, while being a good environmental steward. Local farmers are allowed to reap an income from land that they lease; employees are allowed to participate in hunting and other outdoor recreation activities that can not be found elsewhere on public land in Vermillion County; and the wildlife base at NECD serves as a quasi-stocking area because of controlled hunting.

Scouts at International Migratory Bird Day

### *Mission Enhancement*

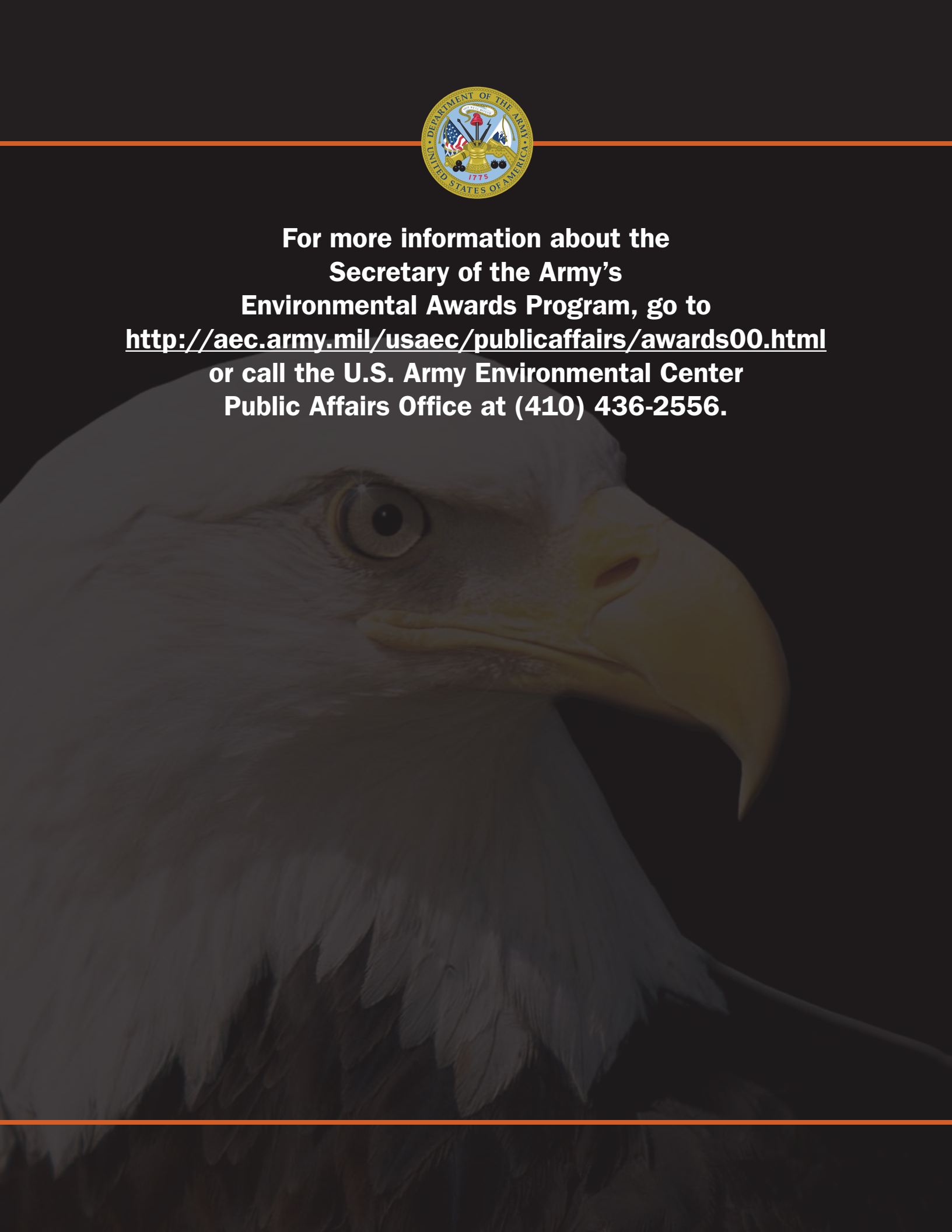
The Natural Resources Management Program enhances the NECD mission by featuring positive activities rather than controversial ones like nerve agent VX disposal. In addition, natural resource inventories provide valuable information for ecological assessments being conducted as part of environmental investigation/restoration activities.

### *Natural Resources Compliance Program*

The Natural Resources Program is in compliance with the Endangered Species Act; the Clean Water Act; Sikes Act Improvement Act; Migratory Bird Treaty Act; Fish and Wildlife Coordination Act; Food Security Act; and the National Environmental Policy Act. No natural resource notices of violation have been received. NECD receives funding from the agricultural, forestry, and fish and wildlife reimbursable accounts.

## Conclusion

NECD personnel have accumulated a wealth of valuable natural resource information, implemented several initiatives, including community outreach that will help to shape the environmental future of the Newport Chemical Depot.



**For more information about the Secretary of the Army's Environmental Awards Program, go to http://aec.army.mil/usaec/publicaffairs/awards00.html or call the U.S. Army Environmental Center Public Affairs Office at (410) 436-2556.**