

**FLORIDA ARMY NATIONAL GUARD  
SECRETARY OF DEFENSE ENVIRONMENTAL AWARDS FY15  
ENVIRONMENTAL RESTORATION—INSTALLATION**

**Introduction and Background**

Camp Blanding Joint Training Center (CBJTC) is a 73,000-acre military training installation located in northeast Florida with a primary mission to support military training. Owned and managed by the State of Florida Department of Military Affairs, on behalf of the Florida Army National Guard (FLARNG), CBJTC specializes in training for light infantry exercises and serves as a logistical support base during federal and state emergencies, such as hurricanes and wildfires. Of the post's total acreage, about 3,000 acres comprise the Cantonment Area, 15,267 acres comprise the artillery Impact Area, and about 10,686 acres are leased for sand mining and mineral recovery by the DuPont Corporation. The remaining 42,000 acres are used for military training, forestry operations, wildlife management operations, and public recreation opportunities.

The mining operations, particularly previous mining sites that were in use between the 1950s and the early 1970s, are at the core of the installation's current restoration accomplishments. Within the formerly mined area, a swath of around 1000 acres, including a 500-acre parcel of land mined prior to 1973 regulations, had declined to a sandy, dune-like expanse, unable to support any vegetation or mission use. Early iterations of techniques to mine titanium dioxide in that area had essentially created something like a moonscape amidst Camp Blanding's tremendous biodiversity and thriving natural habitat communities. At the same time the restoration staff looked to confront these formerly mined sites, the installation began participating in a multi-agency effort to protect and repair the St. John's River watershed, with Camp Blanding taking responsibility for a share of the total maximum daily load (TMDL) in the river, that is, the volume of nutrients and potential contaminants that may enter the river day-to-day. In an innovative approach to meeting the goals of both these projects, the restoration staff at Camp Blanding developed a plan to bring both initiatives together, solving the problems of the mine site soil while also preventing potential stormwater and soil runoff that could contribute to river basin contamination.

**Accomplishments**

The past two years have represented a critical leap forward in restoring formerly mined sites on the installation; though this project has been in various stages of implementation for several years, the combination of watershed protection with site restoration allowed for a dramatic leap forward in the restoration timeline. The project is well on track to achieving its dual goals: remediation of the watershed landscape to prevent swale dirt from entering the river and establishment of a Florida-type ecosystem on the former mine sites that support vegetation and fire management. Last year, the first round of new tree plantings were completed at the mine site, and based upon early surveys, they are thriving with a remarkable survival rate of around 80 percent. The second round of trees are being planted this year; while the installation is pursuing a grant that could allow for 100,000 trees to be planted, a minimum of 25,000

trees are currently being planted at the site. Also over the past two years, the installation has recaptured the soil from 88 miles' worth of swales, small ditches or basins that route stormwater through a watershed. The soil is being directly employed in the remediation of the mining sites, and its utilization has sped up the recovery of those sites threefold over previous remediation techniques, shortening the projected recovery timeline by ten years in those areas treated with swale dirt. Though the swale project was instigated by a regulatory driver, Camp Blanding's restoration staff has been extremely adept at making those mandates fully align with the installation's needs.

Led by two specialists in the environmental office, this project entailed several years of coordination and implementation, with notable support from the Department of Public Works at Camp Blanding and cooperation with the Florida Department of Environmental Protection (DEP). The heavy equipment operators at Camp Blanding have provided the essential on-the-ground support and expertise that has made the mine restoration so successful. To ensure full compliance, the restoration staff obtained DEP approval for the proposed combination of remediation projects, an innovative approach that could be replicated at other sites where watershed management and site remediation interact. The original plan of action at the mining site is being completed under a 10-year permit issued by DEP; the swale soil reclamation was completed well ahead of the three-year response time permitted by the agency. The restoration of the mining site has also been incorporated into the installation Integrated Natural Resources Management Plan (INRMP).

What is perhaps most impressive about these efforts is that they have been completed within the sphere of normal operations and have made use of free and reusable remediation resources. Whereas a conventional mining site restoration can cost anywhere from \$2000 to \$10,000 per acre remediated, the restoration staff has achieved restoration on 500 acres of some of the most depleted land at no external costs. Now in the phase of re-establishing vegetation, the restoration staff is making use of existing tree planting budgets as well as pursuing grant funds that will triple Camp Blanding's current planting resources for the project. Through a grant program designed to promote longleaf pine restoration, Camp Blanding will be able to leverage its state and federal funds employed in planting 25,000 each year; the grant program will then match and enhance those resources, providing the installation with an additional 75,000 trees to plant each year for four years.

Before it was transferred to the FLARNG in 1993, a significant portion of the western section of the installation had supported mining of titanium dioxide since the 1950s. Those areas that were mined prior to new regulations in 1973 had been particularly degraded by the conventional processes of the time. Approximately 500 acres of pre-1973 mining sites had been rendered to deep sand depleted of all organic matter; these sandy areas resemble dunes, but no vegetation had ever been reestablished, in large part because of the sterility of the sandy soil. What is more, those acres could not support any significant training use. Since the early 2000s, Camp Blanding's restoration staff has developed a strategy and techniques for remediating these sites into a Florida-type ecosystem that can be managed with prescribed fire as other sites



on the post are. In completing this remediation, the sites will also become functional for training activities for the first time.



Mined area before remediation. Mining had created deep pockets of sands 30 to 40 feet deep with virtually no organic material or nutrients to support plant life. The key to reclaiming these sites was reintroduction of organic material.

To contextualize the dramatic advances made in the past two years on this project, some history of the mine site restoration is helpful. Mining had created deep pockets of well drained sands 30 to 40 feet deep with virtually no organic material or nutrients to support plant life. The key to reclaiming these sites was reintroduction of organic material. One unexpectedly positive outcome of a particularly severe hurricane season in 2004 was a tremendous volume of tree and plant debris

that overwhelmed county landfills following the storms. At this point, Camp Blanding's restoration staff recognized an opportunity: working closely with the installation's county and with DEP approval, Camp Blanding collected this organic material, spreading it over 217 acres between 2004 and 2007. Spreading the mulch, however, was only the first step; to create functional soil horizons, the top layer of the site had to be regularly tilled as the mulch broke down, driving nutrients below the surface to render the sand into functional soil. While effective, this process is slow, necessitating a period of five to ten years before the organic matter will support plantings.

As the storm debris stockpiles were eliminated, however, and the incorporation of biomass energy production became more prevalent, thus making organic debris a commodity rather than a waste stream, the restoration staff recognized the need to innovate its approach. That opportunity arose with Camp Blanding's participation in efforts to protect the St. Johns River and watershed last year. Based on DEP calculations of the TMDL of nutrients and particulates that could be sustained for the river, Camp Blanding was tasked with remediating 88 miles of swales on post. These swales capture runoff soils during rain events, but these soils can not only themselves increase turbidity in the river if they are swept into the water, but also contain nitrogen and phosphorous associated with agriculture in the region. When levels of nitrogen and phosphorous grow too high, algae blooms occur in the river, harming water quality and wildlife. To protect the sustainability of the installation, Camp Blanding needed to address its potential stormwater impacts on the watershed within a three-year period.





The restoration staff quickly realized that while the dirt needing excavation from the swales would be harmful to the river, it was also uniquely rich soil essentially infused with potent fertilizers. Rather than remediate the swales in a conventional manner and disposing of the soil, the restoration staff proposed immediately transferring the swale soil to the mining site restoration. Following testing to ensure that the soils were suitable and not contaminated with other materials, this project began; swale soil was tilled into the sand in untreated areas. The richness of this sand-soil combination also means a dramatic reduction in the time between tilling and planting, cutting the wait time by three to six years over the wait time for mulch to naturally break down.

In FY14, the installation commenced the first round of planting trees on the mining sites. The first planting was a pilot effort, reintroducing longleaf pine on a two-acre section using leftover seedlings from forestry projects elsewhere on post. Based on initial surveys, the site has achieved a remarkable 80% survival rate. This year, planting was accelerated, expanding pines on an additional 15 acres (ten mulched acres and the five acres treated with swale soil); the restoration and forestry staff intends to

continue scaling up planting goals over the next three to four years to ensure that the site continues to support vegetation at the anticipated levels. Future management of the newly forested sites will involve reintroduction of fire management and eventually even timber harvesting to support forest health and training use. As the initial plantings take hold, the restoration staff is also managing for invasive or exotic species that may emerge from seed bed in soil or mulch, preventing those species from taking root.

Water and soil sampling at the mining site restoration demonstrates no issues with contaminants or adverse effects from the sand reclamation. The use of swale soil in this effort, moreover, has allowed Camp Blanding to fully address its 88-mile swale remediation allotment well ahead of DEP timelines and in a mutually beneficial and virtually cost-free way. The installation staff is now pursuing grant funding that will triple the number of trees available for planting on the site—up to 100,000 trees each year in



This is an example of a treated area. Previous to the project this expanse was nearly bare sand - and had been since pre-Vietnam Era mining. Sprouting grass can be seen across the project area a month or so after the soil was spread.



total—over the next four years, and at no additional cost to the FLARNG or Camp Blanding.

Restoration of the mining sites is reflective of Camp Blanding's long-term view to sustainability and training support. This project's success will not be apparent, for example, overnight. Rather, over the next 12 to 15 years, the new forests being established will be supported until fire can be reintroduced. Across the site, it will be 15 to 30 years before a fully functional ecosystem will emerge—but it will emerge from what was a virtual wasteland. For Camp Blanding's soldiers, these areas were unusable as well; now that they are becoming forested, these sites can be opened up to new training activities. This acreage is planned to support soldier-to-soldier movement and contact exercises that will allow for engagement and battalion-level activities under forested conditions.

Camp Blanding's innovative approach to remediating its swales is also critical to the training site's viability. While the nutrient and fertilizer loads in those swale soils cannot be attributed to Camp Blanding's operations, the installation could nonetheless be held accountable by DEP for watershed impacts. If Camp Blanding had not found a solution to reusing these soils, the installation may have faced compliance issues or, at the very least, the costs of storing of those soils under leach-proof conditions or outright disposal costs.

The approach of the restoration staff on this project is a model for any installation faced with similar mining site conditions. Because titanium dioxide mining did not create significant contamination in the soil, Camp Blanding had some greater flexibility in designing a plan to resurrect the mined sites. The key to the installation's success was partnership: first with the local counties that needed help in disposing of organic debris, and later with DEP to approve the simultaneous solution to both mining and swale remediation.

Camp Blanding has truly demonstrated itself as a partner in the goals of watershed protection. As part of a multi-agency, multi-landowner group working under DEP's guidance and oversight, Camp Blanding was assigned a certain share of the TMDL nutrient loads entering the river basin throughout a multi-county region and charged with reducing those levels. Given that the installation does not have the option of reducing fertilizer use (since none was being used in the first place), those reductions required more creativity. Recognizing that soil system repairs could be the solution, the restoration staff cooperated with DEP to set a target of soil elimination that would match its TMDL targets: the 88 miles of swales on post, which fulfills Camp Blanding's full obligation within the rivershed partnership. The success in enhancing water quality while restoring mining sites also represents one more exemplary project that Camp Blanding and the FLARNG can share with their community. Restoration staff participate in environmental events each year to present their work and enhance public awareness. The annual EcoFest in Jacksonville is one such opportunity, at which the environmental section hosts a booth and conducts demonstrations on the installation's environmental work with other area conservation groups and agencies. The installation also supports

Youth ChalleNGe events, which provide environmental projects and education to at-risk youth sponsored by the FLARNG. As planting proceeds, these students will assist in bringing the restored areas back to flourishing ecosystems.