

PENNSYLVANIA ARMY NATIONAL GUARD



NATURAL RESOURCES CONSERVATION, TEAM

INTRODUCTION AND BACKGROUND

Fort Indiantown Gap National Guard Training Center (FTIG) is the most important training site for the Pennsylvania Army National Guard (PAARNG) as well as one of the region's most ecologically important areas. FTIG is located within a day's drive of large population centers and strategic facilities, home to the Headquarters of the Pennsylvania National Guard and provides training and other facilities for over 130,000 personnel each year from PAARNG, other state Guard and Reserve units, and other military branches on its 17,150 acres. In FY16-17, FTIG was the busiest Guard training site with over 700,000 man-days annually and 2,100 fulltime people (economic impact of is \$575M). It is also the only live fire, maneuver military training facility in the state, as well as a critical habitat location for numerous rare species of plants and wildlife.

With 5,500 acres of grassland and scrubland habitat, 2,000 acres of improved and semi-improved grounds, 112 miles of streams, 1,000 acres of forest and 127 rare species of concern, the installation provides unique management challenges. It has proven to be a challenge to have more personnel in the PA National Guard than acres at the Training Center. The support of the Training Site Command and the dedication of the installation's Natural Resources Conservation (NRC) Team maintain the post's remarkable environmental quality in coordination with its military use. The capacity to train more personnel than training sites with over 50,000 acres is due to the ability to mesh expertise, programs, funds, and staff experience in all offices to meet all the challenges, requirements, doctrine changes, and ancillary missions that emerge.

The PAARNG NRC Team is:

John Fronko, PAARNG DMVA Environmental Program Manager	John Verscharen, PAARNG DMVA Real Estate Specialist
Patricia Rickard, PAARNG DMVA Environmental Planning Manager	David Weisnicht, PAARNG Fort Indiantown Gap Deputy Commander
Daryl Valley, PAARNG DMVA Environmental Specialist	Chris McDevitt, (Former) Director Construction Facilities Management Office (CFMO)
Joseph Hovis, PAARNG DMVA Wildlife Program Manager	Ward Burton, Chairman/Founder Ward Burton Wildlife Foundation
Mark Austin, PAARNG DMVA Director Office of Facilities and Engineering	Tom Inge, Executive Director Ward Burton Wildlife Foundation
PAARNG DMVA Conservation Division Staff	FTIG Plans, Operations, Training Staff

The NRC team’s expertise in managing habitat and wildlife in balance with the installation’s training needs is augmented by the specialists in the Environmental Office, the biologists, foresters, the Geographical Information Systems (GIS) program and the Integrated Training Area Management (ITAM) program. The NRC Team works hand-in-hand with the ITAM office to best manage lands for both training and environmental quality, leading to excellent coordination among trainers, facilities staff, engineers and the NRC program. The NRC and ITAM staffs also meet monthly with training, maintenance and National Environmental Policy Act (NEPA) staff to determine project priority, timing and budgeting with the full support of training center Command.

NRC activities are guided by the Integrated Natural Resources Management Plan (INRMP). The plan has been revised entirely in-house and incorporates advances in wildlife and habitat management as well as other research investments made for the upcoming 5-year period. The INRMP, in conjunction with excellent relationships with other state agencies help to

maintain the installation’s excellent record for NRC compliance.

Partnerships have been critical to the Team’s success, particularly for their potential to leverage resources and expand PAARNG’s reach beyond the limits of the environmental budget. While the Team conducts many activities in-house (INRMP revision, native plant propagation, prescribed fire, seed collection and more) these projects benefit from the donation of resources and expertise of partners.





Over the past 2 years, the NRC Team has made impressive strides in the successful propagation of the rare Regal Fritillary Butterfly (RFB), a butterfly species recently petitioned for protection under the US Endangered Species Act (ESA). Its only home in the eastern US is on training ranges at FTIG. A partnership with Zoo America at Hershey Park hit a new milestone 2015, developing a new technique for successfully rearing the RFB that far surpasses conventional lab techniques used in the past. This success has also allowed NRC Team to begin establishing localized satellite populations of RFB’s on state and federally owned properties beyond FTIG in FY16 and FY17.



Regal fritillaries (*Speyeria idalia*) have been released at PA state game lands in cooperation with PA Game Commission (PGC) staff. NGTC-FTIG and ZooAmerica staff raise and care for lab reared regals while the PGC maintains and manages the land used as release sites. Initial releases have been successful at multiple locations.

The RFB repatriation project was initiated in 2007 and has been awarded nearly \$300,000 in research funding from DoD Legacy, PA Department of Natural Resources (DNR) Wild Resources Conservation Program (WRCP), and State Wildlife Grant funded by the United States Fish and Wildlife Service (USFWS) and the PA Game Commission (PGC). Research has

taken place on nearly 150 acres across four state parks and two national parks and includes experimental releases of lab-reared caterpillars and adult butterflies as well as land management activities and habitat studies. Additionally, a budding partnership with Dickinson College over the past 3 years has provided the NRC Team with a free greenhouse resource to propagate host plants and other vegetation RFB rely on.

 RFB population monitoring and research on prescribed fire use in habitat management over the past 20 years has led to a cooperative effort between the Team and  Temple University to interpret and identify factors that allow this rare species to thrive at FTIG. Beginning in  FY16, Temple University research staff have assisted with work on other threatened and endangered species.  Currently, the NRC Team is closely monitoring and measuring populations of rare bat species on post in 2006 was most common on post), particularly the federally threatened Northern Long-eared Bat (NLEB), via audio survey techniques and mist-netting surveys. Surveys for the species-threatening fungus that causes white-nose syndrome are also being implemented. Temple University has assisted in creating a habitat management plan for NLEB and other bat species of concern at FTIG.

After spending millions of dollars to upgrade and expand its training ranges, FTIG is now protecting its investments by preserving the rural nature of surrounding lands from development pressures of neighboring cities and townships through the Army Compatible Use Buffering (ACUB) program. Much of the land buffering FTIG is underneath helicopter training areas and is agricultural, forested or wetlands located within important bird areas of the Kittatinny Ridge ecosystem. The past 2 years have been pivotal for the ACUB, as the Team partnered with Ward Burton Wildlife Foundation (WBWF) to acquire 8500 acres of priority parcels through conservation easements. These lands are owned by the Harrisburg Capital Regional Water Board (CRWB) and will be conserved in perpetuity for a total cost of around \$10M. The Team secured this funding in two stages, with half the easement completed in FY16 and half this summer. This is the largest single ACUB project in DoD. These conservation easements benefit the military, environment, and local communities.

The NRC Team’s comprehensive management approaches the installation at the ecosystem level so all activities mutually reinforce each other to accomplish the highest quality habitat—and by extension, the highest quality of training opportunities. Prescribed fire is perhaps the most critical technique in the NRC Team’s land management toolbox, supporting wildlife habitat, native plant communities and training access. The Team burns 2,000 to 3,000 acres each year (more than any other landholding in PA) to establish and maintain native grasslands and meadows dense with native vegetation dominated by wild flowers, forbs and grasses that provide high quality food and habitat for a wide array of wildlife, including insect, avian pollinators and game species (i.e., deer, bear, turkey). This diverse community of plants and invertebrates is the bedrock of ecosystem diversity. Following fires, the Team enhances habitat recovery by planting seedling plugs or hand-seeding, which requires much less labor. Actively propagating native plants offers additional competition that can help minimize the spread of invasive plants as well.



The Team uses prescribed fire to manage a diverse mosaic of habitat types, ranging from forests to scrubland to grasslands. Management efforts are tailor-made to accommodate the military mission by maintaining open areas, line of sight, reducing fuel loading and removing uncontrolled or invasive vegetation but, at the same time, accommodates sensitive species and environments that depend on fire for survival.

The Team conducts in-house seed collection using installation grassland fields and a dedicated seed increase plot on post, focusing on native grasses and butterfly host plants, especially milkweed, native thistles, and violets (a particular favorite for the RFB). The seed increase plots also serve as testing

grounds for the Team to determine best practices in creating more diverse meadows. The Team harvests seed each year and sends it to the largest native seed dealer in the region, Ernst Seed Company, for cleaning and packaging at no cost to PAARNG. In exchange, the company can keep a portion of the cleaned seed to propagate for their own efforts and to encourage native plantings by other conservation agencies throughout the region. Aside from the seed program, the Team also uses a multi-million-dollar greenhouse supplied by Dickinson College to propagate seedling plugs. The greenhouse is a particularly important resource for maintaining caterpillar host plants (violets) year-round and to grow out nectar plants for lab reared adult RFB. Violets are the primary food source for young RFB caterpillars and need to be available in the early spring after the overwintering phase. The greenhouse host plants have been essential to the Team's success with new hatching techniques at the Zoo America facility.

Since 2011, the NRC Team has partnered with Zoo America to rear RFB's in captivity for release at sites beyond FTIG. Conventional laboratory techniques have produced few surviving individuals; RFB caterpillars were reared under refrigerated conditions to mimic overwintering, but realistic conditions were hard to approximate in the lab. Out of thousands of caterpillars, often only a dozen or so would survive, yielding only a few actual butterflies. The NRC Team deviated from this approach beginning in FY13, creating rearing structures out of mosquito-netted carports. These structures were placed at Zoo America in areas dominated by violet plants and were planted with little bluestem grass. The change was dramatic: simply by rearing under outdoor conditions, the Team went from having a handful of surviving butterflies to just over 100 in the first year alone. Based on this success, a second outdoor enclosure was constructed to further expand the rearing program. Over the past 2 years, the Team has begun repatriating both adult butterflies and caterpillars in violet patches on PGC lands. Also, the NRC Team and the PGC have implemented a land management plan that uses a 3-5 year burn rotation in conjunction similar to FTIG with native plant seeding (from FTIG) for the PGC sites. This will attempt to replicate FTIG grasslands. It is important to

establish RFB populations elsewhere in the state to take the pressure off of FTIG as the sole location for RFBs in the eastern United States.

Temple University is currently facilitating a postdoctoral research program at FTIG that directly relates to prescribed fire and RFB management and the installation's 20-year data archive. This research program is helping the Team to identify trends and limiting factors that may affect the health and stability of the FTIG RFB population as well as 22 other butterfly species that inhabit grasslands at the post. This research is relevant to preservation of training on FTIG, as the local RFB population appears to respond differently to land management activities than their counterparts in the Midwest. There, some data suggests that RFB populations are negatively affected by disturbances such as prescribed fire, but the opposite trend has been observed at FTIG, where fire impacts on habitat has promoted population growth. This research validates the NRC Team's approach and demonstrates the compatibility of the PAARNG training mission with habitat enhancement.



Acoustical monitoring equipment is used to record and document bat calls from dusk to dawn with mist net in background FTIG has multiple species of bat on post including the federally listed Northern Long-eared Bat (*Myotis septentrionalis*) and several state-tracked species. Identifying locations of occurrence is critical to creating sound management plans to that facilitate training needs while conserving this species.

The Northern Long-eared Bat (NLEB) is the only federally listed species at FTIG and on connecting properties. When FTIG was conducting surveys in the support of \$125M of MILCON on 1,200 acres of forest in 2007 the NLEB was the most common bat on Post. The NRC Team has been working proactively over the past 2 years to assess population size and health by conducting acoustical surveys

using microphones at staged locations to detect bat presence or absence. Subsequently, state-of-the-art software is used to analyze the bat calls for species-specific identification. Mist netting is also used across flight paths, allowing the Team to assess relative abundance and to test for white-nose fungus, a disease that has decimated this species throughout its entire range. The postdoctoral research project with Temple University involves establishing protocols for identifying bat habitats and population management. Reptiles and amphibian species have been researched at FTIG for the past 13 years. Two species of concern, the Spotted Turtle and the Wood Turtle, are currently being reviewed for ESA listing and are present on post. The Team has been proactive in monitoring population size and stability via mark-recapture surveys each year.

At the core of the Team's activities is the recognition that goals for enhancing the quality of training lands are indistinguishable from the goals to enhance habitat; that is, butterfly habitat is also ideal soldier habitat. Because the RFB has not become a listed species, the USFWS has not produced guidance that restricts training at FTIG. This lack of restriction allows for proactive management of the early successional grassland habitat this species requires. An ESA listing of the regal fritillary (DoD high priority Species-at-Risk) would have a negative impact on military training on an order of 3- to 5-times greater than if Indiana bats were found on post. All currently occupied habitat is on operating range land (to include Artillery Impact Area and Bollen Air-to-Ground Range) and most of the grasslands in the Cantonment (~1,100 acres; to include Muir Army Airfield, the second-busiest helicopter facility in the world and home to the Eastern Army Aviation Training Site that averages 75,000 aircraft movements annually). In the absence of the Team's habitat management efforts, all of these resources would face potential restriction or designation as Critical Habitat, thus slashing PAARNG's training access to around 3,827 acres of FTIG's full 17,150 acreage. Now that NLEB has become a listed species, the Team's management expertise has been essential to protecting the viability of training capacities. To conserve and potentially expand bat habitat, the Team has identified limitations on prescribed fire and logging activities at certain times of the year; it also helps the installation to examine

proposed actions for compatibility with bat conservation. Active habitat creation, like conservation of snag trees rather than removal, is the other side of the equation.

The Team's accomplishments in the ACUB program stand out for their protection of the PAARNG mission from encroachment; the Team established permanent easements on 8,500 acres associated with the DeHart Reservoir site, one of the largest parcels ever acquired in the ACUB program's history. With the support of WBWF, the Team was able to negotiate the easement under continued ownership by CRWB, allaying community concerns about the loss of public lands through fee simple acquisition. The ACUB also directly supports the Team's conservation goals, serving as undeveloped habitat space with no construction or military use to impact it. The Team is designing a forest management plan for the parcel with assistance from The Nature Conservancy (TNC), which will establish a carbon credits structure to benefit CRWB. Because DeHart Reservoir is adjacent to PGC lands, the ACUB parcel is now part of one of the largest greenspaces in the state, providing public recreation and preserving wildlife and water quality. With this initiative's success, the Team's expansion of the targeted ACUB buffer has been approved, expanding from 13,722 acres to nearly 62,000 acres to be incorporated over the next 20 years. This expansion will protect PAARNG training from development related to wind turbines, agriculture and more in the aviation corridors around FTIG; the Team is also in the early stages of creating a Sentinel Landscape incorporating the ACUB buffer and the wider Kittatinny Ridge ecosystem (Global Important Bird Area).

The NRC Team's expertise is well-established in the military and conservation communities. The Team organized sessions and/or gave presentations on Bats for Non-biologists, Bats for Biologists, Emerging Topics and Pollinators at the 2016 NGB NEW Conservation Workshop. Partnership with Zoo America has similarly expanded the reach of the Team's expertise, particularly through captive rearing innovations. Their success is reflected in the PGC's willingness to cooperate with reintroduction efforts and development of land management and prescribed fire protocols for non-PAARNG lands. The NRC Team is quite literally the leader in establishing RFB



populations for the entire region. Team members have presented their techniques and results to the North American Military Fish and Wildlife Association and collaborated directly with other installations working on similar repatriation efforts with other closely related butterfly species, such as the Oregon Army National Guard (ORARNG) and The Oregon Zoo. These partnerships, research programs and the integration of the Team's activities within the installation INRMP also help to ensure the continuity and longevity of NRC operations at FTIG. The collection of data on NRC operations has long been automated and rendered accessible with PAARNG enterprise databases and the GIS program. The repository for NRC information is centralized and standardized to ensure that other users within the PAARNG and on the installation can acquire relevant material even in the event of NRC program staffing changes.

The NRC Team has been involved in recent academic publications involving rare species and habitat, helping to advance knowledge in the field. University of Pennsylvania researchers worked with the Team last year to identify some rare native grasses; the researchers then submitted a manuscript on differential elemental uptake in C4 grasses to the *Journal of Plant and Soil* that characterized FTIG as a native plant hotspot.



The Wounded Warrior Turkey Hunt is one of the annual hunting and fishing events hosted by the Team on FTIG. The installation is a popular recreation resource for the local community.

FTIG has an active outdoor recreation program that caters to over 1,000 members annually. Hunting and fishing is the driving force of the installation's

outdoor recreation program, and the Team administers this program in conjunction with Range Operations. Special hunt and fishing events are offered for youth and disabled veterans (Keystone Wounded Warriors) and maintains five handicap-accessible hunting platforms. Recently, the entire registration and administrative process was upgraded from paper forms and hand-processing to an entirely automated system whereby the general public and military personnel can register online or via iSportsman kiosk centers located on post. FTIG is the 21st installation to implement this digital system and first in the ARNG. This project saves 2.3 person-years of labor, integrates outdoor recreation information into digital data systems (NRC databases, GIS, and RFMMS) and provides better MWR services to personnel, employees, and public.

The Team collects data on game species as part of overall ecosystem management. Last year, the NRC Team initiated aerial survey efforts to support an increase in permits for a controlled deer hunt outside of normal season to protect population health. In the process of this research, the PAARNG was able to mount the survey as a training exercise for Airborne ISR COIN operations; the aircrew used Wescam (IR) equipment, seeking out deer as correlates to insurgents, and provided flight data and video to Team biologists, allowing them to estimate the number of deer per square mile.

The NRC Team has been exemplary in its establishment of partnerships to support mutual conservation goals. In terms of education, the creation of postdoctoral positions is significant, providing researchers an unparalleled opportunity to conduct novel work with important ramifications for threatened and endangered wildlife such as the RFB and NLEB. The Team has also welcomed the contribution and research of student interns in supporting program goals and providing valuable field experience to others. Working with Zoo America, the NRC Team has been able to dramatically expand its sphere of influence and outreach, raising awareness of RFB propagation while improving the approaches in achieving those goals. The partnership also provides the Team with resources not typically available to a military NRC program.

Each year, FTIG hosts several Regal Fritillary habitat tours that allow the public on post to learn more about the RFB and other grassland dependent species. It is also popular with professionals in the conservation community. On average, over 600 people each year attend the events, drawing visitors from Pennsylvania as well as throughout the United States and internationally. The last day of 2017 tours was a busy one as 313 attendees and 160 vehicles (parking spot is the Forward Arming Refueling Point (FARP) and Range 23E Machine Gun Range.



Annual guided nature tours at FTIG draws visitors from all over the US. This event offers the general public a chance to witness the ecology of the region and learn about how NGTC-FTIG NRC Staff manage the environment. It also provides a great opportunity for wildlife photographers and naturalists to observe rare species and ecological communities.

Over the past 2 years, the NRC Team hosted seasonal bird tours for local nature groups and the public. The Team assists with events for its partners as well; in the summer, Team members install light-trapping equipment at the state park adjacent to FTIG for “Moth Night,” a public event highlighting the state’s entomological diversity. The NRC Team coordinates with local media to promote all public events. Since 2004, wildlife staff has assisted and led events at the Ned Smith Center Nature and Arts Festival (one of largest of its kind in the region).

At FTIG Outreach Day, the NRC Team hosts environmental activities and presentations for visitors. They also give many presentations each year to area clubs, conservation groups, garden groups and science foundations, in both

Pennsylvania and neighboring states. FTIG’s Team also provides leadership and support to local, regional, statewide and national groups including the Pennsylvania Prescribed Fire Council, the Entomological Society of Pennsylvania, the National Military Fish and Wildlife Association, The Wildlife Society and its Chapters, the Central Appalachian Fire Learning Network, Wildlife Management Institute and many others.

FTIG has the second most active prescribed burning program in PA, PGC (1.4M total acres) surpassed FIG acreage in 2016. FTIG continues to partner with PGC and PA DCNR as on aerial burns 1/3 of the burn crew (12-15) are partners. PGC was able to build Rx Fire capacity by partnering with FTIG to provide training classes and burns to train their staff.

Significant milestones over the last 2 years include the 1) ACUB Conservation Agreement with the Harrisburg Capital Regional Water Board to conserve, in perpetuity, 8,200 acres for a total cost of \$11 million; 2) major publication on RFB habitat research and initial success of having wild RFB at partner sites; and 3) becoming the first National Guard site to implement online iSportsman Outdoor Recreation registration and computer kiosks.

NRC management is long-term and often it takes years for success to be become apparent. By partnering with other agencies and NGOs on one project leads to collaboration and more importantly support on other projects. Of note, DeHart Reservoir has been a project that was initiated in 2002 and 14 years later the mission space above it will be protected under ACUB. A new ACUB outreach initiative is being launched now to encourage private landowners to participate in the program. The ACUB easements achieved over the past 2 years help to preserve public access and protection of a segment of the Appalachian Trail and the Chesapeake Bay watershed. Learning, leading and sharing are a critical means of keeping external support, while also engaging and elevating Defense’s highly decorated reputation.