

Natural Selections



Department of Defense Natural Resources Program

CONTENTS

- 1 Spotlight: Active-Duty Interns and College Students Work Together to Conserve Rare Species at Joint Base Lewis-McChord (JBLM)
- 2 Message from the Natural Resources (NR) Program
- 4 Designing and Implementing Volunteer Programs on Department of Defense (DoD) Lands
- 5 Veterans Volunteering to Protect Prairie Habitat Through the Veterans Conservation Corps (VCC)
- 6 Guardians of the Native Hawaiian Forest: Defending the Endangered Species Capital of the Nation Alongside the Army's Natural Resources Program
- 7 Giving Back to Soldiers Through the Fort Bragg Wildlife Branch
- 8 Volunteers Help to Protect Bats at Arnold Air Force Base (AFB)
- 9 Volunteers and DoD Partners in Amphibian and Reptile Conservation (PARC): A Winning Relationship
- 10 Vandenberg Volunteers - Supporting the Air Force Mission and Protecting Coastlines
- 11 How National Public Lands Day (NPLD) Boosts Volunteerism on DoD Lands
- 11 Announcements
- 12 Bird/Wildlife Aircraft Strike Hazard (BASH) Considerations When Planning Your Next Installation Volunteer Event
- 12 U.S. Geological Survey (USGS) Combats Invasive Species Through Citizen Science
- 14 Volunteers Support Birds and the Military Mission
- 15 DoD Project Highlights
- 16 Upcoming Events, Conferences, Workshops, and Training
- 17 Links of Interest



SPOTLIGHT: ACTIVE-DUTY INTERNS AND COLLEGE STUDENTS WORK TOGETHER TO CONSERVE RARE SPECIES AT JBLM

By Dennis Buckingham, Center for the Environmental Management of Military Lands (CEMML), Colorado State University (CSU)

JBLM is located in Washington State and encompasses more than 92,000 acres of contiguous habitat in an all but lost Puget lowland biome. It also is home to one of the nation's only two live-fire artillery ranges and is considered the Army's West Coast Power Projection Platform. For the last five years, the internship program at JBLM has paired active-duty servicemembers with projects that support habitat restoration, rare species conservation, and ecological science. Specifically, participants help with a variety of land management projects such as oak woodland restoration, timber cruising, prescribed fire, and species monitoring. These natural resources management tasks – including surveying fledgling successes, funnel trapping amphibians, and releasing captive reared butterflies – directly benefit JBLM's training mission while helping to maintain its extremely rare and imperiled species and their habitat.



Active duty interns search for federally threatened Oregon spotted frogs using submersible Passive Integrated Transponder (PIT)-tag readers. Source: Dennis Buckingham

To date, 84 active-duty service members have interned with the program that JBLM Public Works (Environmental Division, Fish & Wildlife Branch) and CSU's CEMML offer. Participants are typically in their last 180 days of military service and are working full-time with the program until they begin their terminal leave. This program provides

these personnel time to grow into field leadership roles and develop a management-tier resume while planning their future and applying for jobs and/or college admissions. Participants also help graduate students and university professors conduct ecological research on the installation. JBLM staff biologists identify restoration objectives to coordinate with the interns, who then carry out field projects with student volunteers from nine local colleges. This gives the active-duty servicemembers a smoother transition to civilian life while providing academic opportunities.



Combat veterans and college students place a baited tube to collect hair samples from resident squirrels at a woodland restoration site. Source: Dennis Buckingham

In addition to honing job skills and building resumes, the program offers interns job placement referrals as well as college application and scholarship support. Approximately 90% of program graduates are either employed or enrolled in college, with many working in or studying environmental science and natural resources management. Another benefit of the program is its ability to provide ecotherapy to combat veterans. Research shows that outdoor recreation and employment are effective in addressing the symptoms of post-traumatic

MESSAGE FROM THE NR PROGRAM

By Alison A. Dalsimer, Program Manager

Welcome to the Summer 2019 Edition of *Natural Selections*!

According to AmeriCorps, volunteerism in the U.S. has a value of over \$184 billion per year.¹ For DoD and other federal agencies, this value translates into significant benefit to the nation's public lands. Not only do volunteer efforts make large-scale and labor-intensive projects possible but, across DoD's 25 million acres, they help ensure that natural resources programs and management activities are protecting the environment and sustaining military readiness.



U.S. Fish and Wildlife Service (USFWS) biologists and volunteers from Resource Conservation Partners with Ventura High School students pull iceplant at Ventura Harbor Wetlands Preserve. Source: Ashley Spratt

In this edition of *Natural Selections*, we highlight a few of the many and versatile ways volunteers support the military mission, the installation community, and the natural and cultural resources that we have been entrusted to defend. We encourage you to read on and learn how volunteers are working with installations across our nation, such as the internship program for Service personnel at JBLM that's helping heal wounded warriors, or how working the land in Hawaii connects volunteers with their cultural heritage.

Whether it's at Fort Bragg in North Carolina or at Vandenberg AFB along the coast of California, volunteers are rolling up their sleeves and joining forces with DoD's natural resources managers to plant trees, pick up trash, remove invasives, monitor fish and wildlife, and more – all while sharing their experiences with fellow community members. Volunteering to help maintain installation landscapes and the species that reside on them is a rewarding experience, and great way to give back to your country.

If you're interested in volunteering on DoD or any federal agency lands, check out our article on *NPLD* on page 11. *NPLD* is the largest single-day volunteer program in the country. On the fourth Saturday every September, thousands of volunteers come out to improve parks, refuges, recreational areas, waterways and, of course, military lands. If you want to host an *NPLD* or other event, and need some advice on how to go about it, check out *Designing and Implementing Volunteer Programs on DoD Lands* on page 4 which provides a useful "how to" guide to help you get started, or *The BASH Considerations When Planning Your Next Installation*

Volunteer Event on page 12 if your volunteer event includes a BASH aspect. The National Environmental Education Foundation (NEEF) article on page 11 provides details and links to the *NPLD* application.

In the end, volunteering on public lands or elsewhere benefits both the environment and the volunteers. Not only do volunteers gain knowledge and experience, but working outdoors in nature can create a sense of relaxation, improve mental health, and even give a sense of self-satisfaction to the people who donate their time and efforts.

Whether you're thinking of volunteering or you're a natural resources manager planning to host a volunteer effort, I hope you find this edition of *Natural Selections* to be interesting, informative, and even inspiring. And, as always, no matter how small or large your volunteer effort is, safety should always be a primary concern for all participants.

On a personal note, by the time you read this, I will no longer serve as DoD's Natural Resources Program Manager, so this is my last *Natural Selections*. It has been an honor to support you and the Service personnel we all strive to enable. Thank you sincerely for your support of them and of me. I look forward to what lies ahead, and hope our paths continue to cross.

Our next newsletter will focus on the Cooperative Ecosystem Studies Units (CESU) National Network and will be published this fall. Please contact NaturalSelections@bah.com if you have any good CESU stories to share.

¹ Americorps & Senior Corps, National Service. *Service Unites Americans; Volunteers Give Service Worth \$184 Billion*, 15 Nov. 2016: <https://www.nationalservice.gov/newsroom/press-releases/2016/new-report-service-unites-americans-volunteers-give-service-worth-184>

Active-duty Interns and College Students Work Together to Conserve Rare Species at JBLM (continued from page 1)

stress disorder. Although not directly or outwardly visible, this benefit is crucial in helping our combat veterans heal and succeed after transitioning to civilian life.

The program's growing success resulted in volunteers logging over 12,500 total hours in 2018. JBLM interns work to directly maintain training lands while also helping meet priority habitat regulations to keep those areas open. This provides an invaluable labor source in a time of budgetary constraints and increased species listings. For example, participants work to obtain their National Wildlife Coordinating Group Type-2 Wildland Firefighter (Crewmember) certifications and participate in prescribed burn operations to maintain installation prairie habitat and forest resources during the summer months. Intern firefighting helps prevent large-scale wildfires that could impact military training activities and destroy native habitat. Participants also can study and test for state pesticide applicator licenses and conduct noxious weed control operations for 13 different species of invasive plants. Through these opportunities, the internship program has helped the JBLM Fish & Wildlife Program flourish. The program provides interns with experience in the field, which helps alleviate some of the workload for staff biologists, allowing them to focus on designing projects, conducting research, and using their advanced skillset to address high priority issues. In many cases, biologists can even meet urgent objectives and begin to address challenges on the horizon.



Participants work with veteran firefighters to conduct prescribed burn operations on one of the largest remaining Puget lowland prairies. Source: Dennis Buckingham

The JBLM internship program is putting extra hands to work, mending bodies and minds, and restoring habitat for rare species while simultaneously helping veterans transition into meaningful civilian careers. JBLM is actively working toward a new goal of determining how to build similar programs on other installations around the country. The [Department of Defense \(DoD\) Legacy Program](#) provided fiscal year 2018 funding for staff to develop a training manual to help other installation natural resources managers learn from JBLM's internship program experiences. Additionally, a former intern is founding a non-profit organization to support the work and help build future satellite programs. The hope is that other installations can model JBLM's success by building their own volunteer or internship programs that directly benefit the military mission while conserving the unique species and

habitats found on installation lands. The JBLM program has been successful in providing active duty servicemembers who are transitioning to civilian life with a varied skillset to conserve natural resources while sustaining the military mission. This program not only supports servicemembers' self-worth and mental health, but it also enables the installation to save money. Expanding this program to other installations across the country would benefit species and landscapes, servicemembers, and the installations both call home.

One intern, a mortarman who was injured in a Stryker rollover, said during his exit interview, "When I got back from Afghanistan, I was hurt bad and pretty depressed about my life. I couldn't go back to construction and didn't know what I would do. Now I feel like I found my passion and I wake up excited about my day for the first time I can remember." He now teaches forestry at an adjudicated youth facility in Arkansas.

After spending a full day on his hands and knees planting prairie plugs for an endangered butterfly reintroduction site, a staff sergeant, former drill instructor, and counter intelligence agent with three tours in Iraq and Afghanistan said, "When I get settled on my property in Tennessee, I'm gonna make some butterfly habitat like this on the hill slope behind my house." He has gone on to not only complete some of that work, but also start a dog rehabilitation program for veterans where troubled dogs and vets help each other heal.

Another intern just blurted out in the wood shop one day, "I think my memory's coming back. It's weird, you know? I've been having these peaceful dreams lately." Yet another said, "I've been going home happy and I've been playing with my kids more. Last night my wife said our marriage might work out after all. She was joking, but kinda serious, you know?"

These moments and the many others like it are what really define the program. At the end of the day, the cost savings and the acres of habitat restored are important, but these men and women are America's heroes. They've put their lives on the line to protect our country and, after all their injuries and deployments, they continue to serve. They are out spending all day in winter rain and summer heat, restoring habitat and conserving species.

If you're interested in discussing how to start your own internship program or would like to receive the training manual when it is complete, please contact: dennis.buckingham@colostate.edu.

DESIGNING AND IMPLEMENTING VOLUNTEER PROGRAMS ON DOD LANDS

By Chadwick McCready, CEMML, CSU

Natural resources management on DoD lands requires a significant investment of time and resources. Beale AFB in California overcomes this challenge by using volunteers to augment its workforce. By incorporating volunteers into natural resources management, Beale AFB can expand projects beyond the capabilities of its available resources, provide education and outreach opportunities, and enhance habitat for wildlife. Maintaining healthy habitat for testing, training, and operational activities is critical to carrying out Beale mission requirements.

Thanks to the hard work of volunteers, Beale AFB has executed a variety of projects to enhance and protect the natural landscapes the Air Force relies on for wildlife habitat and outdoor recreation. Projects include a volunteer-led wood duck (*Aix sponsa*) nest box project in collaboration with the California Waterfowl Association, riparian restoration plantings, creek clean-ups, trail maintenance, and pollinator habitat enhancement projects for native pollinators. When developing a volunteer program for any DoD landscape, volunteer coordinators and natural resources managers should consider the needs of the installation and its environment, the project scope and timeframe, the available volunteer pool, advertising for volunteers, and follow-up.



Volunteers install a wood duck nest box along a riparian corridor at Beale AFB. Source: Chadwick McCready

Needs of the Installation/Environment

Every installation is different, and not all installations will have the same natural resources management needs. DoD natural resources managers should think about the habitat and wildlife that are present at the installation and the projects that would be the most beneficial to the environment and installation. For example, a large installation with suitable habitat could conduct a large-scale waterfowl habitat enhancement project or a long-term monitoring program for wood ducks or other nesting bird species, whereas at a smaller or more urban installation, such a project would be unsuitable. Instead, a community volunteer project to create a native plant garden or install raised planter beds to create pollinator resources and



Volunteers install native Toyon shrubs as part of a pollinator habitat enhancement project at Beale AFB. Source: Chadwick McCready

habitat within an urban setting might be more appropriate. No matter what the conditions are at the installation, there are always opportunities for volunteer assistance.

Scope and Planning

First-time volunteer project planners should consider scope carefully before beginning any project. Large or long-term projects require considerably more planning and volunteer commitment. Organizing and leading any project requires a lot of hands-on management. When available volunteers are limited, or if you are new to organizing events, you may have more success completing a smaller project. Build on the work you've already started, slowly expanding projects as your experience and ability to draw volunteers grow.

Timeframe

Timeframes can determine whether a given project is feasible or manageable. Singular or short-term events, such as habitat enhancement, might need to take place at certain times based on climate or landscape conditions. For example, in the Mediterranean climate of California, the best time to plant trees is in late fall or early winter. Trees planted in the summer have a much harder time establishing themselves. This may not be the case on another installation with a wet summer season. For long-term monitoring or maintenance projects that require specific timeframes, leaders must clearly communicate the timeframe requirements to their volunteers.

Volunteer Pool

Your volunteer pool will vary depending on the installation. On installations where access to the public is heavily restricted, your volunteer pool may consist of enlisted personnel and their families. Other installations may be able to pull from the surrounding community, including from local nonprofit conservation or wildlife groups, which can be a great source of volunteers. Beale AFB has partnered with local land-trusts, the Audubon Society, state and federal agencies, the Boy Scouts of America (Scouts), and nearby schools to conduct volunteer events.



Volunteers from The Scout program conduct maintenance on a nature trail. Source: Beale AFB

Advertising

Advertising is crucial to making your volunteer project viable. Depending on the volunteer pool, there are several advertising methods you can use including the installation's Public Affairs Office, flyers, social media, off-base publications, and email lists of installation organizations. It is beneficial to use as many methods as possible, and to advertise well in advance of the event or project. Fliers and advertisements to public agencies will have different formats compared with formal installation announcements.

Follow-up

Establishing a good relationship with your volunteers is essential to maintaining and growing your volunteer pool. Experienced

volunteers may be more effective workers than fresh recruits, and may even be able to help teach and guide other volunteers. Volunteers who enjoy your program are more likely to tell their friends and family, and thereby grow your volunteer pool. Remember, volunteers are choosing to be at your event so be sure to connect with them before the event and show your appreciation afterwards. Also, collect volunteer contact information to thank them and to create an invitation list for future events.

Lessons Learned

Volunteer events do not always go according to plan. It is important to learn from past experiences, and adapt programs to deal with challenges. Weather can be an unpredictable factor and has led to more than one event occurring during storms or excessive heat. Identifying alternate event days is important if variable weather is possible. Even if you advertised extensively, planned and organized carefully, and have cooperative weather, there is always the possibility of poor volunteer turnout. The ability to be flexible with the scope and size of a project is crucial in times of low turnout or unexpected conditions. Finally, it's important to document your events and maintain records for all recurring projects. This will allow others to pick up what you started and continue to expand the volunteer program.

VETERANS VOLUNTEERING TO PROTECT PRAIRIE HABITAT THROUGH THE VCC

By Kim Pham, VCC Program

For over 20 years, the Center for Natural Lands Management (CNLM) and JBLM have worked together to protect the most pristine prairie habitat remaining in the Pacific Northwest, which happens to be located on JBLM land. JBLM prairies contain sensitive habitats for three federally threatened and endangered species: Taylor's checkerspot butterfly (*Euphydryas editha taylori*), streaked horned lark (*Eremophila alpestris strigata*), and Mazama pocket gopher (*Thomomys mazama*). The joint conservation efforts by CNLM and JBLM benefit the natural ecosystems of this land, as well as promote sustainable land management processes that ensure valuable military training lands on JBLM are available for current and future use.

In 2013, a partnership began between the Washington State Department of Veterans Affairs (WDVA), VCC, and CNLM. The VCC provides internship opportunities for veterans to volunteer and do meaningful work in conserving Washington State's natural resources with various environmental conservation and agricultural partner organizations. This partnership supports veterans in establishing and maintaining a healthy connection with nature and their community. Through their own efforts, participants also may increase their self-efficacy and resilience and realize a positive shift in their mental, emotional, and physical well-being. VCC interns receive training and resources on veteran-related topics that empower them to address and overcome any challenges they may experience in their transition from military to civilian life.

During the summer of 2018, two VCC interns had the opportunity to participate in CNLM's Conservation Nursery Program, which provides native plant seeds to its network of land managers, including JBLM, to enhance habitats that

are vital to prairie species that CNLM protects. Peter Gallant, who completed his second VCC internship term in November 2018, received advanced training on seed cleaning processes which included the set-up, maintenance, safety, and tear-down of the seed cleaning machines. Peter also was involved with the implementation of CNLM's nursery-wide safety program. He built two safety boards that were placed at the nursery program's main farm sites and included safety documents pertinent to each site, including fire extinguishers, personal protective equipment, and first aid/trauma kits. Peter also created hazardous communication binders that contained pertinent safety information and procedures for all chemicals that nursery program personnel use. His efforts ensured that the nursery program provided safe work spaces for all the program's staff and volunteers.



VCC intern Peter Gallant pre-processing seed with a thresher to reduce plant material. Source: Sierra Smith

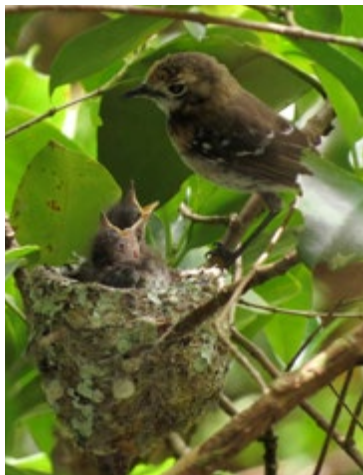
Andy Hopwood, who completed his first VCC internship term in November 2018, worked with the CNLM nursery farm crew daily, where he brought leadership, a great work ethic, an upbeat attitude, and a wonderful knowledge of the native plants with which his team worked. Andy received further education in the propagation of native plant species, as well as hands-on training in harvesting those plants. He also trained in agricultural equipment use and safety, and he became a skilled tractor operator. Andy started this internship with the desire to find employment working with native plants, and he became such a valuable member of the CNLM team that CNLM hired him as a permanent nursery farm employee in March 2019. He is happy to be working with CNLM, which he describes as an organization with "a good mission, great people, and hard work."

With spring already here, the VCC and CNLM nursery team are gearing up to start another productive internship season in 2019 that will offer opportunities for more veterans to engage in a meaningful mission to support endangered species, protect federal land, and connect to the resources that will assist them in their journey toward success and well-being as civilians. Through these volunteer opportunities, veterans can better themselves while also conserving the JBLM prairies and the species that depend on them. Protecting these species is essential to sustaining the military mission.

GUARDIANS OF THE NATIVE HAWAIIAN FOREST: DEFENDING THE ENDANGERED SPECIES CAPITAL OF THE NATION ALONGSIDE THE ARMY'S NATURAL RESOURCES PROGRAM

By U.S. Army Garrison-Hawaii (USAG-HI)

The Oahu elepaio (*Chasiempis ibidis*) is a native forest bird celebrated in Hawaiian culture. Known as the “guardian of canoe builders,” the elepaio, which feeds on insects, would forage on trees laden with bugs, signaling to canoe builders that the wood was unsuitable for making a Hawaiian voyaging canoe. Like many species in the Hawaiian Islands, the Oahu elepaio has faced increasing threats from invasive species, habitat loss, brushfires, and human encroachment, leading to its endangered species status.



An Oahu elepaio with its chicks.
Source: Philip E. Taylor

On Oahu, more than 80% of the island's endangered species occur on Army training lands, making USAG-HI's Natural Resources Program critical to protecting the installation's natural resources while supporting and enabling military training. One of the program's many successful efforts has been to cultivate a hands-on, service-learning approach to outreach that uses volunteers to support natural resources management and information sharing. In Hawaii, this kind of hands-on approach is culturally relevant. To say, “He Hawai'i au” or “I am Hawaiian” is more literally translated as “I am Hawaii,” or “I am the island from which I was born.” Because of this personal association with the land, volunteering in the native forest can embody a profound cultural experience and connection beyond the physical work of caring for natural resources. These deep community ties to place have allowed USAG-HI's Natural Resources Program to cultivate longstanding volunteer support from groups vested in Hawaii's cultural heritage, such as practitioners of *hula* dance and *lua* fighting traditions.

Volunteers ranging from Hawaiian cultural practitioners to school groups, Scouts, and avid hikers provide more than 4,000 hours of service annually to USAG-HI's Natural Resources Program. They help further the Army's stewardship mission by performing activities such as invasive weed control in the native forest, planting native species to improve habitat for endangered species, and watering and inspecting plants in the rare plant nurseries.

“As an avid hiker all my adult life ... [volunteering] provides a wonderful way for me to give something back to all the wilderness areas I've enjoyed,” said Roy Kikuta, one of several volunteers who annually contributes more than 100 service hours to the Natural Resources Program. “You get to see, touch, smell and hear what a native forest is like, and the volunteer efforts to weed, spray, cut, dig to rid these areas of invasive stuff is a small price to pay.”

Invasive plants are a huge problem in Hawaii. Weeds like Koster's curse (*Clidemia hirta*) and strawberry guava (*Psidium cattleianum*) outcompete native plant species and change native forests, negatively impacting the threatened and endangered species who live there. Not surprisingly, one of the Natural Resources Program's major stewardship efforts is invasive weed control. Volunteers with an interest in the natural environment are ideal candidates for supporting weed control efforts in the remote areas USAG-HI-manages. These native forests are home to some of the last remaining native habitat on Oahu.

Since 2010, volunteers have spent more than 34,000 hours in the field on weed control and outplanting activities, and approximately 4,900 hours in the program's rare plant nurseries and seed conservation lab. These volunteer efforts have provided invaluable support to Oahu's native species and a cost savings to the Natural Resources Program. While the work is tiring, volunteers enjoy the opportunity to see some of the unique native habitats on Oahu.



Volunteers help maintain a native Hawaiian interpretive garden at Schofield Barracks.
Source: USAG-HI

Sometimes not everyone can venture into the field, and that's when the outreach team gets creative in its education mission and uses technology. For example, the program works with school-aged students and, at times, it can be challenging to take them to remote mountain sites due to class size, time constraints, and transportation. The Natural Resources Program staff offers an alternative “virtual field trip” for students to see and interact with experts in the field via a live streaming platform. Students have the opportunity to ask questions about the Hawaiian forest in real time to staff in the field and learn about endangered species and the Army's efforts to protect them. Through these platforms, the personnel can share the Army's environmental mission with a wider audience, inspiring potential future volunteers or environmental staff.



Elementary school students learn about the Hawaiian forest and engage with Army natural resources program staff in the field through live stream video broadcasted at the school library. Source: USAG-HI

Building community relations and improving understanding is essential to the Army mission of continued readiness in the Pacific. The USAG-HI Natural Resources Program will continue tackling natural resource management objectives and strengthening community relations through its volunteer program. Thanks to volunteer *kōkua* (help), the USAG-HI Natural Resources Program will continue working to ensure that the Oahu elepaio and other species at risk of extinction can continue to carry the legacy of Hawaii's rich, inseparable biological and cultural history.

GIVING BACK TO SOLDIERS THROUGH THE FORT BRAGG WILDLIFE BRANCH

By Alan Schultz, Fort Bragg Wildlife

The Fort Bragg Wildlife Branch of Public Works (Wildlife Branch) is one of several public works branches at the installation, and it successfully runs numerous programs that give people the opportunity to simultaneously contribute to conservation, support Soldiers and their families, and advance outdoor traditions.

Fort Bragg is the largest Army installation by population, with over 50,000 active duty Soldiers. Many personnel rely on access to Fort Bragg's landscape for testing and training so, it is imperative that the Wildlife Branch helps ensure the installation's natural habitats remain healthy. As a part of this effort, the Wildlife Branch uses the help of both interns who are interested in a natural resources profession, and volunteers who want to contribute to conservation and give back to Soldiers. These dedicated individuals complete a variety of projects that provide support to Soldiers and their families, natural resources management, and the military's ability to train on lands with healthy ecosystems and abundant native floral and faunal populations. The Wildlife Branch has many partners including the Warrior Transition Battalion (WTB), Military Warrior Support Foundation (MWSF), and conservation groups such as the Fort Bragg Quail Hunters Club, Quality Deer Management Association (QDMA), Ducks Unlimited, the National Wild Turkey Federation, Scouts, and others. These groups engage in various projects that benefit DoD and its land management responsibilities.

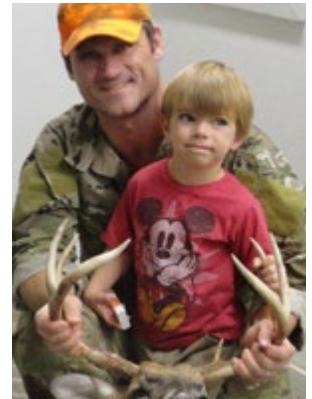
The principal mission of the Wildlife Branch is to manage fish and wildlife resources and direct their safe and legal recreational use. Interns and volunteers help staff facilitate Soldier, family, and public activities throughout the installation's forests, waterways, and training areas in collaboration with Fort Bragg's range and enforcement functions. In the last three years, over 11,000 people, consisting mainly of military personnel, have hunted and fished on the installation, with approximately 2,500 new sportspersons each year. Hunting and fishing activities on Fort Bragg provide revenue for fish, wildlife, and habitat management, which in turn support natural resources stewardship and a healthy ecosystem to support realistic training.

Fishing and hunting in the installation's forests, fields, lakes, and streams are beneficial to Soldier decompression and resilience. Soldiers, veterans, and their families benefit from the strong bonds and invaluable time spent hunting, fishing, and enjoying nature with family and other members of their support network. Soldiers new to hunting, with the help of volunteer mentors, learn how quiet reflection and observing nature, such as a sunrise from a deer stand or duck blind, can have strong therapeutic and restorative value to support mental health.



Soldiers spend valuable family time in the field, even before kids are old enough to hunt themselves. Source: Fort Bragg Wildlife Staff

Ensuring the safe and legal use of Fort Bragg's natural resources is critical to continued mission success. Interns and volunteers help oversee natural resources use on base through extensive face-to-face interactions with young, new, or "new to Fort Bragg" military sportspersons. These interactions educate users so they fully understand how to safely and legally enjoy Fort Bragg's resources. That education includes general hunter safety and hunter safety specific to Fort Bragg to ensure sportsperson activities do not interfere with military training or risk Soldier safety. QDMA and the MWSF conduct Wounded Warrior and Youth of Deployed Soldier mentored hunts, introducing personnel to hunting, gear, safety, and technical education for responsible resource use. These education programs are critical to the Wildlife Branch because fishing and hunting are so important to Soldiers, families, and conservation, to continue without infringing on military readiness.



Volunteers help with hunter education and ensure that sportsperson activities do not interfere with military training. Source: Fort Bragg Wildlife Staff

Fort Bragg interns and volunteers also promote environmental appreciation and awareness to Soldiers and families and support the broader Fort Bragg conservation mission to keep military training lands intact. Interns and volunteers find great satisfaction in their duties including face-to-face public outreach at the Hunting & Fishing Center, technical operations assistance, and the diverse work required of fish and wildlife management on a large, multiple-use military installation. Volunteer projects and intern involvement ranges from fish and wildlife monitoring, to building or maintaining nesting structures, to assessing and improving habitat.

Through these projects and public interaction, interns gain valuable hands-on experience in natural resources and public use career fields. The WTB and the Wildlife Branch internship program work with Soldiers to plan and prepare for employment in these highly desirable and rewarding career fields after their military service ends. Interns that are active duty or transitioning Soldiers can benefit from the academic and career exposure the program offers. They learn about various natural resources management careers and gain knowledge and skills relevant to those jobs. Wounded Warriors, whether pursuing a natural resources career or not, find Wildlife Branch internships to be very rewarding while they recuperate. DoD, Fort Bragg, and deserving Soldiers and families all enjoy diverse and substantial benefits through these partnerships and collaborations.

The Wildlife Branch has successfully given back to the environment while simultaneously supporting Soldiers through transitions that can be challenging. Also, educating, supporting, and enhancing the quality of natural area activities promotes Soldier resilience, and ensures the sustainable use of the base's resources. Thanks to volunteers, residents can enjoy all the base has to offer without any negative impacts to the military mission. We greatly appreciate and applaud all the efforts of these dedicated interns and volunteers.

For more information on these programs, see the Fort Bragg Wildlife Branch Facebook page or <https://bragg.isportsman.net/>.

VOLUNTEERS HELP TO PROTECT BATS AT ARNOLD AFB

By Leslie A. Hay, USFWS and U.S. Air Force (USAF) Liaison

In Tennessee, the USFWS protects bats and counts pollinators with the help of an ambitious group of young volunteers who are garnering field biology experience on DoD lands. These volunteers are creating homes for some very important residents at Arnold AFB – roosting

bats that are protected by the Endangered Species Act (ESA). Partnerships emphasize that volunteers and interns working for the USFWS on DoD lands gain excellent experience in endangered species conservation and for future natural resource agency jobs.

The USFWS protects many federally listed species of plants and animals on DoD lands across the U.S., including the Indiana (*Myotis sodalis*), gray (*Myotis grisescens*), and northern long-eared (*Myotis septentrionalis*) bats found on Arnold AFB. Bat populations have been declining in the eastern U.S. due to various factors, the most catastrophic being white-nose syndrome. White-nose syndrome is a fungal disease that is significantly reducing many populations of bat species - some by 90% since 2007. Other factors such as deforestation and increasing pesticide use also have contributed to bat population loss. As more bat species receive federal listing protections under the ESA, impacts to the military mission increase due to habitat modification restrictions. These restrictions can impact cost, timeliness, and mission capabilities.

To combat the threats faced by at-risk bat species, USAF, USFWS, and the Tennessee Wildlife Resources Agency (TWRA) are working together on projects to ensure that the agencies adhere to state and federal legislation and policies. They work together to comply with ESA regulations, such as USFWS issuing a Biological Opinion for Arnold AFB, Arnold AFB funding multiple research projects studying at-risk bats, Arnold AFB and TWRA participating in state and regional bat working groups, and the agencies working together to manage Arnold AFB for bat habitat. In March 2019, Duck River Electric joined USAF, USFWS, and TWRA to install 10 utility poles with 10 artificial bat roosts targeting endangered Indiana bats on Arnold AFB.



Setting artificial bat roost (Brandenbark) into the ground by Duck River Electric Equipment. The artificial bark is attached to the top of the Utility Pole. In the photo is: USFWS Wildlife Biologist (Leslie Hay), USFWS Volunteers (Jessica Davis and Ben Everett), and Duck River Utility lineman field crew (Sean Scheller, Matt Swan, Eric Burton, and Mitchell Gore). Source: Leslie Hay

“These partnership programs benefit the DoD/U.S. Air Force mission because volunteers provide additional support allowing multiple projects to run simultaneously; it is a win-win opportunity for all involved.”

Brandon Bailey, Arnold AFB Natural Resources Manager

The USFWS volunteers actively monitor the bat roosts by checking the guano catchers weekly and monitoring trail cameras to evaluate potential roost activity by bats or other wildlife. If guano is present, USFWS biologists and volunteers collect guano pellets and submit them for DNA analysis to determine which bat species are using the artificial roosts. Guano pellets also can be used to determine food preferences of local bats. Identifying species habits, such as food preference, can focus management plans and tools to effectively maintain healthy bat populations on site.

The USFWS volunteers also installed bat detectors on Arnold AFB that record the “calls” of bats as they hunt for insects at night. These recordings allow USFWS to identify bat species and their distribution across the Arnold AFB landscape.

Volunteers at Arnold AFB are doing important work for other wildlife species as well. For example, volunteers perform rare plant surveys and assist with white-tail deer camera surveys. These efforts have revealed new populations of state-listed plant species and contributed to less restrictive deer harvest due to high populations. Volunteers also conduct butterfly and bee surveys in pollinator habitat that was planted through another partnership between USFWS, USAF, and TWRA. Later this year, volunteers will help conduct botanical inventories across multiple areas of Arnold AFB. Tracking species data enables Arnold AFB to carry out the mission while minimizing impacts on threatened and endangered species by avoiding areas that serve as critical habitat to them.

“I am always learning something new. Recently, we installed bat guano [feces] catchers – which was very interesting.”

Johanna Smith, Volunteer



The “build it and they will come” bat project. The artificial bat roost sheet has been attached to the top of the utility pole, which is installed six feet deep into the ground by the utility company equipment. In the picture is: USFWS Biologist (Leslie Hay), USFWS Volunteers (Jessica Davis and Ben Everett), and Duck River Electric Corporation lineman field crew (Sean Scheller, Matt Swan, Eric Burton, and Mitchell Gore). Source: Leslie Hay

“It is great to see the federal agencies working together to apply biological knowledge and management. It’s an amazing experience to be part of something that may help imperiled bat species.”

Jessica Davis, Volunteer

“Working for the USFWS on DoD lands has provided me a wonderful opportunity to work with like-minded individuals. It is an adventure and a great learning experience that I will carry with me into the future.”

Jessi Vanatta, Tennessee Tech University (TTU) PhD student studying bats

Volunteers are an invaluable force that Arnold AFB and USFWS have used to research and conserve natural resources, especially threatened, endangered, and at-risk species. Volunteers increase the capabilities of existing personnel, provide additional expertise for studying plants and animals, and can assist in training the next generation of scientists. Arnold AFB hopes that the bat house project performed by the USFWS volunteers provides additional data for Indiana bat habitats and allows future foraging or migration studies by Arnold AFB if the bat houses are used. All the data gathered by volunteers guides DoD natural resources management decisions and reinforces the commitment of all partners involved. This commitment allows DoD to continue its mission as a partner, which results in a more productive relationship and better natural resources management. And that, in turn, benefits the mission.

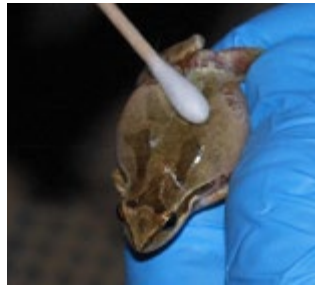
"It is great to get field biology experience, which could open the door to work for a federal natural resource agency and at the same time help to preserve wildlife for future generations."

Ben Everett, TTU Volunteer/Intern

VOLUNTEERS AND DOD PARC: A WINNING RELATIONSHIP

By [Chris Petersen and Robert E. Lovich, DoD PARC](#)

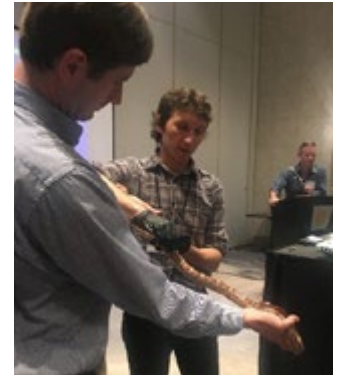
In an age of limited funding for natural resources programs, volunteer data collection has become a powerful and cost-effective tool for collecting data over large geographical areas and over extensive time periods. For this reason, volunteers have become the backbone of the DoD PARC network. Several of DoD PARC's large-scale projects, such as the 2013 chytrid fungus survey, 2018 Snake Fungal Disease (SFD) survey, and the ongoing HerpMapper inventory, have relied heavily on partnerships and volunteers to collect data on military lands across the country.



A volunteer swabbing a frog as part of a research survey. Source: DoD PARC

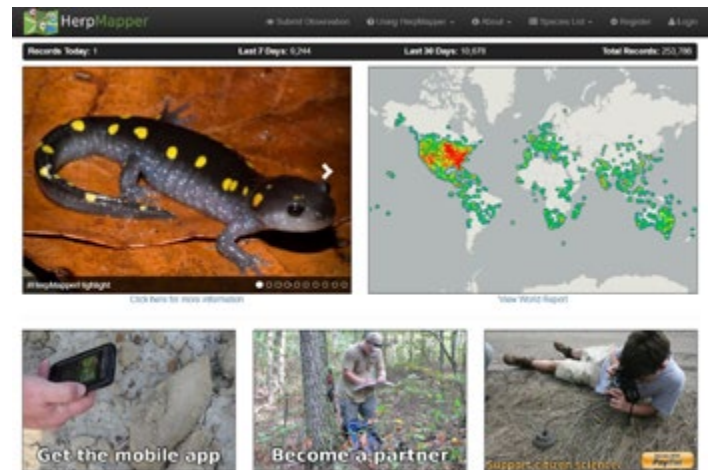
In 2013, the DoD Legacy Program funded DoD PARC to conduct a continental U.S. survey for the amphibian chytrid fungus (*Batrachochytrium dendrobatidis*) on military lands. It quickly became apparent that sending a biologist to collect data, or even a team of biologists, to each military installation that wanted to participate in the survey would be a costly and time-consuming process. Instead, DoD PARC reached out to volunteers at each military installation to collect data for the survey. To prepare volunteers, DoD PARC developed a training video, conducted online training workshops, and provided all the materials (swabs, gloves, ice packs, etc.) necessary to collect field data. This approach proved highly successful! In the end, volunteers from 51 military sites collected 925 samples from 58 amphibian species. The data they collected provided critical information on a disease that continues to threaten amphibian species on military lands. [Download the final report here](#) to see the full results.

Building on the success of the amphibian disease survey, DoD PARC implemented the same approach of soliciting volunteers across the nation's military installations to collect field data for an SFD survey in 2018. DoD PARC developed a [training video](#) and data sheet and provided all the supplies that volunteers would need to collect field data. Additionally, we held an in-person workshop to teach volunteers how to properly swab a snake for SFD. Once again, volunteers proved to be a reliable and valuable resource. Volunteers from 56 military sites collected 657 samples from 34 species of snakes. The final report for this project will be available this summer.



Chris Petersen and Mike Ravesi demonstrate how to swab a snake to detect SFD during the 2018 National Military Fish and Wildlife Association workshop. Source: DoD PARC

DoD PARC has been using [HerpMapper](#), a worldwide, volunteer-based amphibian and reptile inventory database, to document herpetofauna sightings on military sites. Volunteers have collected approximately 3,400 records on military lands over the past five years! Designated DoD leads can view recorded sightings within the property boundaries of military installations in real time. These records help document reptiles and amphibians that are present on specific military lands, facilitating DoD PARC projects and outreach, and as a tool to keep DoD's herpetofauna species database up to date.



HerpMapper.org gives citizen scientists the opportunity to contribute to a database of over 250,000 amphibian and reptile sightings. Source: HerpMapper

DoD PARC has discovered that, "many hands make for light work" and volunteers are essential to conducting large-scale projects across wide geographical areas at a reduced cost. The cost savings provided by volunteers make projects possible that would otherwise be deemed cost-prohibitive. The data collected for these projects contributes to the continued conservation of amphibian and reptile species on military lands. Conserving these species ensures that DoD has continued access to the intact habitat it relies on for testing and training. Using volunteers is mutually beneficial for DoD and the volunteers because it grows the DoD PARC network while giving volunteers hands-on training, education, and experience. DoD will continue to build on this relationship for future efforts, and we are thankful to all the volunteers who have contributed to our collective success.

VANDENBERG VOLUNTEERS – SUPPORTING THE AIR FORCE MISSION AND PROTECTING COASTLINES

By Rhys Evans, 30 Civil Engineer Squadron/Construction Engineering and Inspection (CES/CEI), and Tiffany Whitsitt-Odell, CEMML, CSU

Vandenberg AFB, located in Santa Barbara County, California, is proud of its multi-year, multi-faceted volunteer program. The program's primary focus is to manage Vandenberg AFB's undeveloped 42-mile Pacific Ocean coastline, a portion of which is open to the public. The natural resources staff at Vandenberg AFB manages these 99,565 acres and 18 federally listed threatened and endangered species with help from the volunteer program.

The Vandenberg AFB volunteer program supports many efforts along the installation's coastline, but its Docent Program typically attracts the most attention. The Docent Program began in 2014 and focuses on protecting the federally listed threatened western snowy plover's (*Charadrius nivosus nivosus*) habitat. Vandenberg AFB hosts about 15% of the entire population of the western snowy plover, which nest along 14 miles of the Vandenberg AFB coastline. The Docent Program began when residents wanted to get involved to help keep public beach access open. Maintaining public beach access that does not compromise the military mission is part of the installation's Sikes Act requirements. Public beach use is regulated by Vandenberg AFB's Beach Management Biological Opinion; which requires Vandenberg AFB biologists to analyze the population trends of the western snowy plover and identify any potential predators in the area. If the population of the western snowy plover continued to decline, public access to the beach could be restricted. Docents now act as voluntary guides to the local community to inform them of important sustainable practices to help protect the area's natural resources.



A Western Snowy Plover resting on the coastline of Vandenberg AFB. Source: Betty Hogan

Vandenberg AFB Docents attend a one-hour training to learn the basic biology of plovers and understand the role of a Docent. Docents inform beachgoers of beach rules and point out beach boundaries. It has proven highly effective to have a fellow community member who is serving as a Docent be the



CES Commander, LT Col Jason Aftanas, and his son participate in a monthly pinniped survey. Source: Tiffany Whitsitt-Odell

one to ask beachgoers to abide by the rules helps to reduce violations and keep Vandenberg AFB's beaches open for the community to enjoy. In 2017, 12 Docents logged 549 hours of volunteer time; in 2018, 13 Docents logged 621 hours. There are currently 41 Docents, including active duty personnel, Air Force retirees, community members, and occasionally students (Vandenberg AFB has trained Docents as young as five years old along with their parents). Serving as "eyes and ears," Docents often report the first annual sightings of migrating whales, injured pinnipeds, or plovers nesting within the open areas.

Because Vandenberg AFB's public access beach is located within the boundaries of an active military installation, not to mention one with several federally listed species, it can be especially important for beachgoers to follow the beach rules. Vandenberg AFB's Conservation Law Enforcement Officers (CLEOs) execute rules and citations, but they need cooperation and trust from volunteers. CLEO personnel attend Docent training to explain what support they need. This helps bridge the gap to ensure Docents are not intimidated by the officers and are able to work with them to properly carry out enforcement actions.

In addition to the Docent program, Vandenberg AFB volunteers help with many other coastal conservation efforts. Over the past two years, the Vandenberg AFB volunteer program has removed more than 7,000 pounds of trash from its coastal beaches, often attracting active-duty personnel to help. Not only do beach cleanups benefit the environment, sometimes units or full squadrons turn them into team-building exercises, competing to see who can collect the most trash or the strangest item (e.g., port-a-potty, message in a bottle). Volunteers also help count pinnipeds and overwintering monarch butterflies (*Danaus plexipus*) along the coastline in support of national monitoring efforts. These invaluable volunteer efforts are overseen by volunteer coordinator Tiffany Whitsitt-Odell, a CEMML employee.



Volunteers working to remove trash from Vandenberg AFB beaches. Source: Tiffany Whitsitt-Odell

Vandenberg AFB Docents and volunteers play a big part in both natural resource management and community relations. They help ensure that the species of Vandenberg AFB's undeveloped coastline can continue to thrive. These conservation efforts, in turn, allow for military testing and training activities that require healthy natural habitats to continue and keeps access open to the public to enjoy clean, thriving beaches. With the support of Vandenberg AFB Docents and volunteers, the Vandenberg AFB coastline will continue to serve as an important landscape for both the military and the local community.

HOW NPLD BOOSTS VOLUNTEERISM ON DOD LANDS

By Lisa A. Beach, NEEF

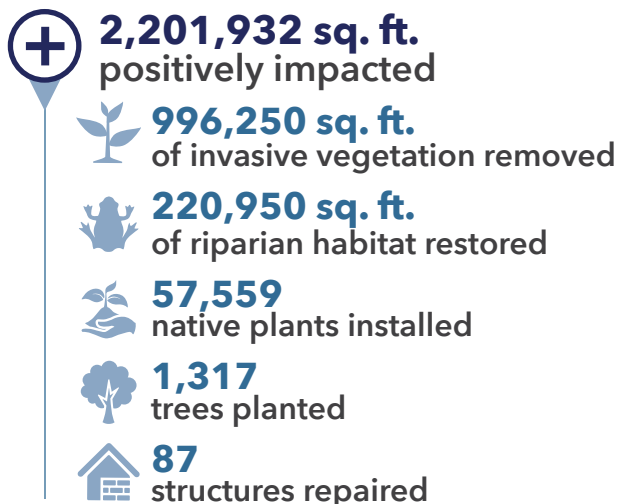
NPLD, a designated volunteer day that occurs the fourth Saturday of every September, is a great example of the mutual benefits that result when organizations join forces to achieve common goals. The [DoD Natural Resources Program](#) provides funds through the Legacy Resource Management Program to NEEF for NPLD partnership projects on military lands that are open to the public for recreation. Since 1999, NEEF has received nearly \$3 million to support almost 550 NPLD projects, that have directly benefitted military lands throughout the U.S. The goal of the partnership between DoD and NEEF is to improve the quality of public lands and educate the public about natural resources issues and stewardship – all while enabling military readiness.

“I hope that when people leave our NPLD events, they leave with three things: to feel more comfortable in the outdoors, to feel more connected to their community, and to be more knowledgeable about the environmental health and socio-economic benefits that America's public lands provide. Through our partnership with the Department of Defense, we check all of those boxes.”

Tony Richardson, NEEF's Director of Public Lands Engagement

NPLD celebrated its 25th anniversary in 2018, commemorating immense progress in its partnership with DoD. With 26 DoD sites receiving up to \$9,500 apiece through the NPLD DoD Award, 1,296 volunteers devoted more than 400 hours to a variety of natural and cultural resources improvement activities at 11 Army, 8 Army/Air National Guard, 5 Navy, and 2 Air Force sites. Many of these projects focused on natural resources conservation with volunteers completing tasks including improving pollinator species habitat, removing invasive plants, reducing environmental degradation caused by human use, enhancing sand dunes, maintaining trails, and planting native trees and wildflowers. DoD cultural resources projects included preserving burial sites, honoring war veterans, and providing educational programming around the history and culture of military installations.

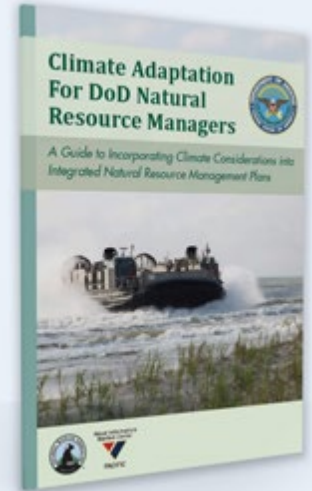
Here's a quick look at the DoD/NPLD partnership by the numbers:



ANNOUNCEMENTS

The *Climate Adaptation for DoD Natural Resource Managers* guide is now available!

This guide introduces installation managers to overarching adaptation concepts and principles, and is structured around a generalized, yet flexible, Integrated Natural Resources Management Plan adaptation planning process. The Assistant Secretary of Defense for Sustainment signed a memo releasing this guide to the Assistant Secretaries of the Military Departments on June 3, 2019. The guide, memo, summary fact sheet, and adaptation planning worksheets are available online at www.denix.osd.mil/nr/dodadaptationguide.



Due to training and public safety, DoD sites often limit the non-military personnel who can access installations. This makes NPLD a great occasion to invite not only military personnel and family members to volunteer, but also local groups, like Scouts, schools, or Audubon groups. The opportunity exposes volunteers to public lands they may not have been aware of, and creates enthusiastic stakeholders who can help spread the word about the natural resources conservation efforts taking place on DoD lands.

NEEF receives Legacy Program funding to distribute to organizations holding NPLD events on DoD lands. Funds are then used to facilitate volunteer events, which provide an enriching experience for everyone involved. This benefits DoD's mission by protecting and enhancing resources necessary for military readiness activities. Volunteers provide natural and cultural resources managers on DoD lands with the means and labor to complete small installation-specific projects that may not otherwise take place due to budget or staffing limitations. Truly, it's a symbiotic relationship.

This year, NPLD will be Saturday, September 28, 2019. There are a variety of ways to participate and volunteer your time. To encourage the public to get out and enjoy the natural resources that public lands have to offer, NPLD is also designated as a Free Entrance Day for most national parks, monuments, and other federal recreational areas. By partnering for NPLD, everyone wins.

Check out the [NPLD Event Locator Map](#) to find an event near you!

BASH CONSIDERATIONS WHEN PLANNING YOUR NEXT INSTALLATION VOLUNTEER EVENT

By Kyle Russell, USAF BASH Team

As the summer season quickly approaches at many Air Force installations across the nation, base personnel and their families are eager to get outside and enjoy the warmer weather. Personnel with base access are often willing to give back to the installation community by participating in various volunteer opportunities. Volunteers frequently participate in events such as NPLD and other initiatives organized by each installation's natural resources program, to comply with Sikes Act requirements.

Significant planning is necessary for effective volunteer project implementation, including safety considerations for volunteers. However, at Air Force installations, staff also must consider flight safety and the potential effect a volunteer project could have by creating BASH attractants on the installation. Additional BASH concerns can severely impact the mission by threatening human health/safety and/or damaging aircraft.

During the planning stages of a volunteer event, it's important to consider these important questions: Will your volunteer project create wildlife habitat in proximity to the airfield? Does the project allow easier access to open water for resident and migratory waterfowl? Could the project ultimately increase the abundance of wildlife hazards or introduce federally listed/candidate species onto the installation?

Another important step in planning is to contact your Wing Flight Safety Office. Implementing proactive flight safety is the purpose of [Air Force Instruction \(AFI\) 91-212 Bird/wildlife Aircraft Strike Hazard \(BASH\) Management](#). This policy ensures inclusion of proactive flight safety by providing guidance to develop installation specific BASH Plans, including BASH implications for proposed volunteer projects. Within a BASH Plan, installation personnel must designate a Wildlife Exclusion Zone (WEZ). A WEZ is a locally defined area, with a zero-tolerance goal of maintaining or attracting hazardous wildlife that will negatively impact the mission. The WEZ can include the airfield, approach/departure corridors, and other attractive land uses around the airfield.

Nest box deployment projects for target migratory bird species are common educational outreach opportunities for volunteers, and an accepted method to comply with Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, and the Memorandum of Understanding between the



Two bird boxes placed on an Air Force airfield for bluebirds, observed during a BASH site visit. Source: USAF BASH Team

DoD and USFWS, to promote the conservation of migratory birds. This is a prime example of a volunteer initiative that must take BASH planning into consideration. A nest box volunteer project must take place outside of the defined installation WEZ to comply with AFI 91-212, upholding flight safety while still benefiting the target species.

Volunteer opportunities also may exist through incomplete habitat management projects to reduce wildlife hazards on airfields. Some habitat management projects can be put on hold due to restricted resource availability, including a lack of funding or insufficient staffing. Coordination with your installation Flight Safety Office could help identify these habitat management projects within your community. Some programs encourage partnering with natural resources volunteers to complete these projects. These opportunities allow safety professionals and volunteers to have an effective educational exchange about the importance of flight safety and the role natural resources serves in supporting the Air Force mission.

Because BASH incidents threaten military readiness and human health/safety and can result in serious injury or death to involved aircrews, it is important to follow proper BASH protocols and safety practices when planning a volunteer event, such as establishing a WEZ. Ensuring volunteers support air personnel safety is vital to protecting the Air Force mission while allowing them to give back to DoD lands.

For more information about the Air Force BASH Program, visit: <https://www.safety.af.mil/Divisions/Aviation-Safety-Division/BASH/> or, for Air Force users, access the Air Force Safety Center BASH Organization Page on the Air Force Portal.

USGS COMBATS INVASIVE SPECIES THROUGH CITIZEN SCIENCE

By Dr. Wesley M. Daniel, Nonindigenous Aquatic Species Program, USGS

Invasive species cost the U.S. more than \$120 billion in ecological and human health damages every year.² The USGS created the Nonindigenous Aquatic Species (NAS) Database in 1991 as an unequalled source of invasive aquatic species data. The database focuses on tracking non-native species, or species that have been introduced to new areas, including more than 1,290 freshwater and marine species (fishes, crustaceans, mollusks, mammals, reptiles, amphibians, and plants) in the contiguous U.S., Alaska, Hawaii, and island territories. The NAS Database also has been a critical tool in tracking the movement of invasive species, which are non-native species whose introduction does or is likely to cause economic or environmental harm, or harm to human health. The NAS Database is built on contributions from both professional and volunteer/citizen scientists. Its goal is to provide timely, reliable data about the presence and distribution of non-native and invasive aquatic species. Invasive species can severely impact the military mission by disrupting ecosystems and damaging native species populations on military lands. The publicly available data from the NAS Database can provide DoD natural resources managers information to improve planning, and better prepare them to fight the spread of invasive species.

² Pimentel, D., R. Zuniga and D., Morrison. 2005. *Update on the Environmental and Economic Costs Associated with Alien-Invasive Species in the United States*. *Ecological Economics* 52: 273-288.

The NAS Database's interactive [website](#) allows users to access a variety of information about non-native species including occurrences, impacts, status at a location, and species identification tips. Some of the highly invasive species the NAS Database tracks include lionfish, snakeheads, Asian carp, zebra mussels, red swamp crayfish, and water hyacinth. The NAS Database provides a first line of defense to track non-native species introductions and analyze their ability to outcompete native species and spread to other areas. Animated maps are available within the NAS Database, showing the spread of each species across the U.S. The NAS data are downloadable, and users can create customizable maps that target a specific region or species. Anyone can volunteer and report an observation of a non-native species to the NAS Database using the website. Volunteers are encouraged to submit invasive species sightings because those data significantly help in the early detection of new invaders.

If a species sighting is submitted to the database in a region that the species has never been recorded before an alert is sent out through the NAS Alert System. The System sends an alert to any interested parties, including natural resource managers and biologists, particularly those working with federal agencies in surrounding areas that are at-risk for impacts from that species. This alert system has become an important active monitoring tool for natural resource managers to have a rapid response to invasive species sightings. DoD natural resources managers can then use the data to implement safety measures such as vehicle checks, equipment cleaning, and public outreach.

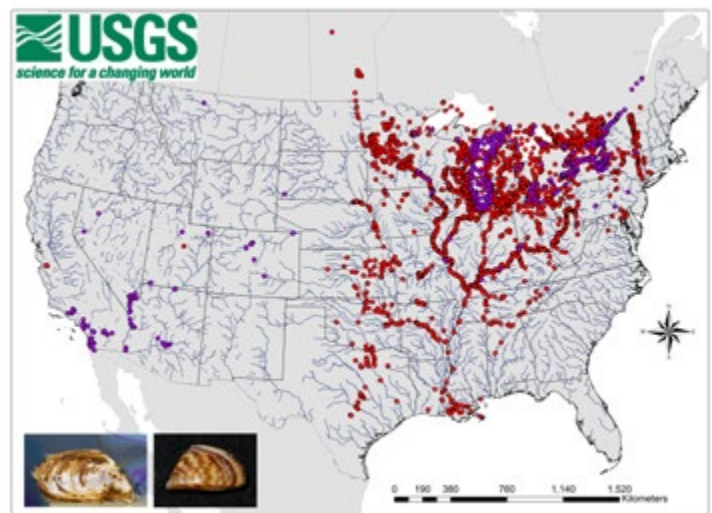
Volunteers and scientists have jointly collected vast amounts of data for the NAS Database. The NAS program focuses on transitioning these data into actionable tools and maps making the information easier to translate into management plans for natural resources managers. Some of these tools the program has created include the Flood and Storm Tracker (FaST) and Alert Risk Mapper (ARM).

In 2017, after Hurricane Harvey made landfall in southern Texas, the NAS program used FaST to track storm-related invasive species spread. Researchers have developed a collection of interactive web maps for every major hurricane and flooding event in the U.S. since then. These maps combine information on potential flood severity from a storm event with known locations of established or possibly established non-native species stored in the NAS Database. The FaST maps also include firsthand accounts from volunteers of species moving in flood waters. Natural resources managers have used the FaST maps to identify new locations for invasions and develop a watchlist of potential new species within a watershed. Both the Federal Emergency Management Agency and the United States Army Corps of Engineers have used FaST maps to develop hurricane and flood response plans.

In addition to FaST, the NAS program developed ARM to map and characterize waterbodies in the U.S. (e.g., lakes, rivers, swamps) at-risk of invasion from a new non-native species. The ARM tool develops short-term (i.e., within six months) risk-based scenarios of a non-native species' potential movement across a drainage system. The tool makes these predictions based on the species mobility and drainage barriers that are present (e.g., dams, waterfalls). The NAS program shares ARM maps with over 950 subscribers, volunteers, and natural resources managers to alert them of these potential threats. Maps are also publicly available on the NAS Database website.



Some of the invasive species tracked by the USGS Nonindigenous Aquatic Species Database. Clockwise from the top: lionfish (*Pterois volitans*); rusty crayfish (*Faxonius rusticus*); floating waterhyacinth (*Eichhornia crassipes*) and zebra mussel (*Dreissena polymorpha*). Source: Clockwise from the top: Mollie Schwartz; USGS; Wilfredo Robels; Amy Benson



Observation locations for quagga mussels (purple points, left photo) and zebra mussels, (red points, right photo) from the USGS Nonindigenous Aquatic Species Database. Source: Quagga mussel (Mike Quigley); Zebra mussel (Amy Benson)

The NAS program is on the cutting edge of non-native and invasive species detection and tracking. Volunteer data helps create a robust NAS Database with the capability to identify threats and inform natural resources managers of potential invaders. Volunteers also provide unbiased information from all over the country to the NAS Database within a short timeframe. The implications of having these valuable data are endless. FaST and ARM are just two of the many tools that can be developed using data from the NAS Database, and they are proving to be beneficial on large scales when developing management plans. The spread of invasive species threatens the intact, healthy habitats that the military relies on for testing and training. The NAS program's data and tools improve the ability to plan and react in a more proactive way when an area is at-risk or threatened by invasive species. The NAS program will continue to save time, money, and native species by using volunteer inputs to study the spread of invasive species and expand the NAS Database.

VOLUNTEERS SUPPORT BIRDS AND THE MILITARY MISSION

By: Richard Fischer, PhD, DoD Bird Conservation Program Coordinator

Some of the most important natural resources related mission-support efforts for DoD come from volunteer contributions within DoD Partners in Flight (PIF). DoD PIF directly supports the DoD Natural Resources Program, and relies on focused participation by dozens of installation natural resources managers. While natural resources managers address avian and other natural resources issues as part of their job, many DoD PIF activities, such as participating in working groups and developing written deliverables, sometimes require volunteer time to get the job done. No person is required to devote this additional uncompensated time, but DoD PIF members are passionate about birds, bird conservation, and ensuring that DoD PIF's work supports the military mission. Thus, DoD PIF works to be both relevant and responsive to avian issues that can impact the mission.



Many other activities on DoD installations are completed through the help of volunteers. Most natural resources managers likely can point to one project that was implemented locally on their installation at least partly by volunteers, whether it be from a Scout Eagle Project, avian surveys by a local birding group (e.g., local Audubon Society), or other individuals and organizations who willingly contribute their time for a worthwhile conservation project.

The DoD PIF Steering Committee has been involved in many volunteer efforts, such as the dune habitat restoration initiatives at Naval Air Station (NAS) Oceana in Virginia Beach, VA. The NAS Oceana natural resources program, through a Cooperative Ecosystem Studies Units [cooperative agreement](#)³ with the National Aquarium and support from both military and local community volunteers, restored approximately seven acres of dune habitat at NAS Oceana – Dam Neck Annex, and managed a Christmas tree recycling program, collecting over 400 Christmas trees to help rehabilitate the dunes on NAS Oceana – Dam Neck Annex's beaches. Staff placed the trees on dunes to help expedite sand collection and stabilization.



Volunteers plant a variety of native vegetation on NAS Oceana – Dam Neck Annex dunes to support bird conservation habitat and military training requirements. Source: Michael Wright

Additionally, staff organized a four-day NPLD volunteer⁴ event to plant native vegetation across the dunes on NAS Oceana – Dam Neck Annex's beaches to further protect the dunes from erosion, restore wildlife habitat, create realistic military training environments, and help protect facility infrastructure.

Staff provided volunteers with an educational and outreach briefing that described the importance of the dunes to wildlife and the military mission. Through this effort, approximately 122 volunteers volunteered ~900 hours to plant 35,825 native dune plants by hand and install approximately one mile of dune fencing. The project organizers strived to plant a range of diverse, native dune plants, versus a monoculture or single species of plant, to help create a suitable habitat for native bird populations while also maintaining realistic military training and protecting facility infrastructure.

Like staff at many installations, the natural resources program at NAS Oceana also has sponsored events celebrating Arbor Day, Earth Day, and World Migratory Bird Day. At Oceana, they've done this for 25 consecutive years! Most recently, children from the installation's Child Development and Youth Centers, installation personnel, and the State District Forester attended an event to learn about the importance of trees and how to properly plant them. The children were encouraged to identify how trees are important to humans and wildlife. Birds were used as an example to demonstrate the relationship between trees and wildlife, showing how each is equally important to the other: trees provide food, oxygen, and shelter to the birds; birds process and spread tree seeds, and remove pest species that harm trees. As part of this event, children helped the Installation Commanding and Executive Officers plant ceremonial trees. Each child received a sapling that was native to area to take home and plant.

On Joint Base Maguire-Dix-Lakehurst, trained volunteers with New Jersey Audubon conduct annual grassland bird surveys (point counts) at 57 survey points, four times per breeding season. Volunteers have completed surveys annually nearly every year since 1999. These same volunteers also conducted nightjar surveys from 2013-2017, and help the installation with Eastern Bluebird (*Sialia sialis*) nest box surveys during the nesting season by checking 100 nest boxes weekly. Through the valuable contribution of volunteer time, the program, which started in 1991 with 21 boxes, has resulted in the fledging of almost 10,000 bluebirds, along with a few thousand Tree Swallows (*Tachycineta bicolor*), Carolina Chickadees (*Poecile carolinensis*), and House Wrens (*Troglodytes aedon*)!

Naval Weapons Station (NWS) Seal Beach and Seal Beach National Wildlife Refuge hosted a NPLD volunteer event on September 29, 2018, that restored native vegetation to an upland area adjacent to salt marsh habitat. The property at Seal Beach is unique in that the Department of the Navy, through NWS Seal Beach, the Department of the Interior, through the USFWS's Seal Beach National Wildlife Refuge, and the Friends of the Seal Beach National Wildlife Refuge are in a formal partnership aimed at promoting the conservation of natural resources on the public lands encompassed by the installation. The [DoD Legacy Program](#) provided funding for this initiative, and over 160 volunteers from the local community planted approximately 700 native plants during the four-hour event. Volunteers included installation personnel, school groups, and a local youth academy. These upland restoration areas provide habitat and shelter for numerous species of migratory and resident bird species, including the federally-endangered light-footed Ridgway's rail (*Rallus obsoletus levipes*) and California

³ Dhalberg, Charmaine and Wright, Michael. *CHWA CESU Project Spotlight: Sand Dune Restoration at NAS Oceana*. Chesapeake Watershed CESU. April 2019: <https://chwacesu.al.umces.edu/chwa-cesu-project-spotlight-sand-dune-restoration-at-nas-oceana/>

⁴Spake, Isabel and Richardson, Tony. *How NPLD Boosts Volunteerism on DoD Lands*.

state-endangered Belding's Savannah Sparrow (*Passerculus sandwichensis spp.*). These areas also provide an important buffer between wetland habitat and agricultural lands.

The DoD PIF Outreach Working Group is always interested in learning more about how your installation uses volunteers for conservation projects or outreach with local conservation-related individuals and groups. Examples include completing Christmas Bird Counts with local volunteer assistance, conducting World Migratory Bird Day and NPLD events and any resulting tangible outcomes from those events (e.g., resulting volunteer participation and projects). Please contact Rich Fischer (Richard.A.Fischer@erdc.dren.mil) or Bob Schallmann (Robert.Schallmann@navy.mil), if you would like to contribute information from your installation.

DOD PROJECT HIGHLIGHTS

Following are a few project summaries that DoD installation natural resources managers may find of interest. Find more projects on the Natural Resources page of the DoD Environment, Safety and Occupational Health Network and Information Exchange (DENIX) site.

Legacy Project 18-086: National Public Lands Day 2018

NPLD is the nation's largest, single day volunteer effort for public lands. Each year, thousands of Americans come together on the fourth Saturday of September to volunteer their time by improving parks, refuges, local waterways, recreation areas, trails, community gardens, and historical sites. DoD joined the NPLD partnership, which is managed by NEEF, in 1999. Each year, through the Legacy Program, DoD provides funding to support small, installation-specific natural and cultural resources projects on military installations. NPLD celebrated its 25th anniversary in 2018 with activities held at 26 DoD sites where 1,296 volunteers contributed 411 hours to benefit our nation's military lands. Read more about NPLD in the article on page 11.

Strategic Environmental Research and Development Program (SERDP) RC-2434: Seed Dispersal Networks and Novel Ecosystems Functioning in Hawaii

Native species extinctions and invasive species introductions on the Hawaiian Islands have created some of the most volatile ecosystems in the world. This volatility creates management challenges because many of Hawaii's native plant species historically have depended on native bird populations to spread their seeds. With native bird populations rapidly declining, resource managers are considering non-native animals as an opportunity to keep healthy populations of native plant species within the ecosystem. This project investigated which non-native animals are major seed dispersers, how those animals may transform future plant communities in Hawaii, and how that may impact the overall ecosystem. Results will provide DoD land managers with information and tools to manage and maintain native plant communities on the Hawaiian Islands and other Pacific Island ecosystems. The project also will provide a model to predict plant recovery based on non-native species introductions into the ecosystem.

SERDP RC-201307: Demonstration and Validation of Better Assessment Science Integrating point and Nonpoint Sources (BASINS) Watershed Modeling System Enhanced for Military Installations

Managing sediment erosion and runoff on military installations is critical to maintaining healthy waterways and preventing sediment loading. This project set out to provide a management tool that monitors water quality impacts from different activities occurring on military installations. This effort focused on the main sources of sediment erosion/runoff to identify the needs of a military-enhanced watershed modeling system. Personnel achieved modeling simulations from the GIS-based U.S. Environmental Protection Agency's BASINS modeling system. The outcome of this project was the BASINS.MIL model, which can provide watershed modeling specific to military activity to maintain legal compliance and sustainability on military installations.

SERDP RC-2433: Recovery of Native Plant Communities and Ecological Processes Following Removal of Non-Native, Invasive Ungulates from Pacific Island Forests

Non-native ungulates, also known as mammals with hooves, are a growing threat to the Pacific Island ecosystem structure and native biodiversity. Common management practices currently involve removing ungulates or fencing them into controlled areas. These practices however, are labor and cost intensive. Also, very little research exists proving the long-term effectiveness of these practices on recovering and protecting ecosystems often involving threatened, endangered, and at-risk species (TER-S) in this region. This project quantified the impacts of ungulate removal in two major ecosystem types that are common throughout the Pacific Island region. More specifically the project looked at the impacts of ecological processes in plant communities after removing ungulates, focusing on changes in soil nutrients. This project also began developing a Decision Support Tool to help land managers prioritize decisions associated with TER-S on complex landscapes like the Pohakuloa Training Area, and better understand the impacts of non-native ungulate removal on plant communities and ecological processes. The project also will spatially prioritize land management decisions on those landscapes.

SERDP RC-2326: Restoration of Soil Microbial Function Following Degradation on Department of Defense Lands: Mediating Biological Invasions in a Global Change Context

This project investigated the impacts of non-native invasive (NIS) species and a changing climate on the diversity of soil fungi in Northeastern U.S. forests. The study focused on various management strategies for forests degraded by the highly invasive plant species, garlic mustard (*Alliaria petiolata*), and how those implications across various climates affect soil recovery. Soil fungi, which are microscopic cells necessary for overall soil health, are susceptible to environmental stressors. Decreasing soil fungi presence allows for more favorable conditions for NIS, such as garlic mustard. Results from this project can improve the scientific understanding of how NIS eradication efforts impact soil nutrients, as well as help guide soil restoration efforts.

UPCOMING EVENTS, CONFERENCES, WORKSHOPS, AND TRAINING

Western Association of Fish & Wildlife Agencies (AFWA) Summer Meeting

July 11-16, Manhattan, KS

The Western AFWA represents 19 U.S. states, 3 Canadian provinces, and 1 Canadian Territory. Its annual conference will feature speakers and workshops that promote sound natural resources management and partnerships at all levels to conserve wildlife for all citizens to use and enjoy.

Joint Meeting of Ichthyologists and Herpetologists

July 24-28, Snowbird, UT

The Joint Meeting of Ichthyologists and Herpetologists is an annual meeting of three scientific societies – the American Society of Ichthyologists and Herpetologists, the Herpetologists' League, and the Society for the Study of Amphibians and Reptiles – to share current research and network with professional peers.

2019 AFWA Annual Meeting

September 22-25, Saint Paul, MN

The 109th annual AFWA meeting will bring together more than 700 leaders from regional fish and wildlife agencies and conservation groups nationwide to discuss conservation policy, management issues, and accomplishments. Attendees include key decision makers in the field of fish and wildlife including directors, assistant directors, program managers, and others involved in fisheries, wildlife habitat, law enforcement, legal affairs, industry, and public affairs (information and education) from all 50 states, U.S Territories, Canada, and Mexico.

National Public Lands Day (NPLD)

September 28, Nationwide

NPLD is the nation's largest, single-day volunteer effort for public lands. In 2018, the 25th annual NPLD, volunteers donated their time and efforts at more than 2,500 public sites, including parks, refuges, local waterways, recreation areas, trails, community gardens, historical sites, and DoD installations. DoD joined the NPLD partnership in 1999. Check out the article at page 11 to learn more about DoD's involvement in NPLD and how you can participate.

American Fisheries Society and The Wildlife Society Joint Conference

September 29 – October 3, Reno, NV

The American Fisheries Society and The Wildlife Society are hosting their first-ever joint conference! The conference will be one of the largest gatherings of fish and wildlife professionals, students, and supporters, and will provide unprecedented opportunities for science-sharing and collaboration. The conference will feature more than 950 educational opportunities in wildlife management, research, and techniques through a wide variety of symposia, contributed research papers and posters, panel discussions, workshops, field trips, and networking events.

World Animal Day

October 4, Global

World Animal Day promotes the many ways we interact with animals to support wildlife conservation and animal welfare. Activities range from awareness events at zoos and aquariums to adoption and vaccination drives. Join one of the estimated 1,000 events in 100 countries that occur annually.

National Wildlife Refuge (NWR) Week

October 13-19, Nationwide

Wildlife refuges provide excellent opportunities to hunt, fish, hike, and watch birds and other wildlife. Refuges provide food and habitat to many native plants and wildlife, and also provide important ecosystem functions by filtering air and water pollution. Come out to visit one of the nation's 562 refuges to celebrate NWR Week.

Sustaining Military Readiness (SMR) Conference

August 10-13, 2020, San Antonio, TX

Representatives from DoD and military stakeholder groups can discuss lessons learned and best practices to support and enhance military readiness. More information will be available soon.

Volunteers served on National Trails Day in Rocky Mountain National Park working on projects ranging from trail work to vegetation projects, fire fuel reduction work and litter clean ups. Source: National Park Service



LINKS OF INTEREST

DoD Natural Resources Program (NR Program)

DoD's NR Program provides policy, guidance, and oversight to manage natural resources on approximately 25 million acres of military land, air, and water resources. Visit the NR Program website for more information on DoD's natural resources initiatives, policy updates, presentations, and links to other conservation and natural resources sites.

DoD Environment, Safety and Occupational Health Network and Information Exchange (DENIX)

The DENIX Natural Resources website is another resource that provides access to natural resources information. Specifically, the website includes DoD Legacy Resource Management Program (Legacy Program) fact sheets and reports, as well as other natural resources materials.

Armed Forces Pest Management Board (AFPMB)

AFPMB recommends policy, provides guidance, and coordinates the exchange of information on pest management throughout DoD. Their mission is to ensure that environmentally sound and effective programs are in place to prevent pests and disease vectors from adversely affecting natural resources and DoD operations.

Strategic Environmental Research and Development Program (SERDP) and Environmental Security Technology Certification Program (ESTCP)

SERDP and ESTCP are independent DoD research programs that use the latest science and technology to develop innovative solutions to DoD's environmental challenges. They promote partnerships and collaboration among academia, industry, the Military Services, and other federal agencies that support military readiness and mission capabilities, quality of life, compliance with legislation and policy, and natural and cultural resources management.

Readiness and Environmental Protection Integration (REPI)

Under REPI, DoD partners with conservation organizations, and state and local governments to preserve land around military installations to combat encroachment. REPI promotes innovative land conservation, which preserves the military's ability to train and test on its lands now and into the future.

Cooperative Ecosystem Studies Units (CESU) Network

DoD participates in the CESU Network, which is a national consortium of federal agencies, tribes, academia, state and local governments, and non-governmental organizations working together to provide research, technical assistance, and training to federal agencies and their partners. DoD's CESU projects have netted savings of approximately \$51 million through combined efforts and a pre-negotiated, lower overhead rate for federal agencies. The CESU Network also provides managers with the adaptive management approaches necessary to preserve installation natural resources.

DoD Partners in Flight (PIF)

DoD PIF consists of natural resources personnel from military installations across the U.S. and works collaboratively with partners throughout the Americas to conserve migratory and resident birds and their habitats. In addition, DoD PIF supports and enhances the military mission through proactive, habitat-based management strategies that help protect birds on DoD lands and maintain healthy landscapes and training lands. Visit the DoD PIF website for fact sheets, reports, and other materials with information about DoD's migratory bird conservation efforts.

DoD Partners in Amphibian and Reptile Conservation (PARC)

DoD PARC is a partnership dedicated to the conservation and management of herpetofauna (reptiles and amphibians) and their habitats on military lands. DoD PARC membership includes natural resource specialists and wildlife biologists from the Military Services, and individuals from state and federal agencies, museums, universities, and environmental consultants. Visit the DoD PARC website for information about herpetofauna management projects on DoD lands.

DoD Pollinator Initiatives

Visit this website for an overview of pollinators and why they are important to DoD. The website also contains information on how people can help protect pollinators and their habitat, including fact sheets, technical reports, and how-to guides.

DoD Invasive Species Outreach Toolkit

This toolkit has materials to help DoD natural resources managers communicate with agencies, organizations, and the public about invasive species issues on DoD lands. Specifically, the tool kit includes modifiable outreach materials, such as posters, brochures, reference cards, and a PowerPoint presentation.

DoD Biodiversity Handbook

The DoD Biodiversity Handbook contains a thorough introduction to biodiversity and how it is essential to support the military mission. It also details the scientific, legal, policy, and natural resources management contexts for biodiversity conservation on DoD lands, and includes 17 case studies with practical advice from DoD natural resources managers.

DoD PARC Photo Library, DoD PIF Photo Library, and DoD Natural Resources Photo Library

Visit these three websites to share pictures, news, information, and ideas with the DoD Natural Resources, DoD PARC, and DoD PIF communities. Please review the [photo policy](#) and [photo submission instructions](#) to contribute your images. In addition, account users can download photographs for reports, Power Point presentations, and educational materials such as brochures and posters.





DOD NATURAL RESOURCES PROGRAM

Enabling the Mission, Defending the Resources

www.denix.osd.mil/nr

<http://twitter.com/#!/DoDNatRes>

Program Director, DoD Natural Resources

Ryan Orndorff: ryan.b.orndorff.civ@mail.mil

DoD Natural Resources Program Support

DoDNatRes@bah.com

Natural Selections

Natural Selections is written and published by Booz Allen Hamilton with funding awarded by the DoD Legacy Resource Management Program under Washington Headquarters Services contract number HQ0034-18-F-0670.

All written information contained in Natural Selections is public and not copyrighted.

Information and ideas for future articles are always welcome. Please send comments and suggestions to: NaturalSelections@bah.com.

