

Natural Selections

Department of Defense Natural Resources Program



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STEPPINGSTONES CORNER: VIEW FROM THE EYRIE: THREATENED AND ENDANGERED SPECIES: A FRESH APPROACH TO SPECIES RECOVERY?

By Richard A. Fischer, PhD, DoD Bird Conservation Program Coordinator



I wear several hats with my job at U.S. Army Engineer Research and Development Center, including part-time Program Coordinator for DoD Partners in Flight, designing and implementing research and development projects, and leading the U.S. Army Corps of Engineers (USACE) Threatened and Endangered Species Team (TEST) initiative. The goal of TEST is to develop solutions to priority threatened and endangered species (TES) issues that will improve operational flexibility, reduce future costs, reduce adverse impacts to mission execution, and improve species conservation and recovery.

Last month at the National Military Fish and Wildlife Association Annual Training Workshop, I made two presentations relevant to conservation and recovery of TES. The first addressed bird conservation and mission support. This presentation provided qualitative and quantitative information from installations

about how our work with TES and Species at Risk (SAR) directly supports the ability of our troops to train. The second addressed Section 7(a)(1) of the Endangered Species Act (ESA), and how proactive conservation planning can promote species recovery. This Section of the ESA directs federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) or National Oceanic and Atmospheric Administration (NOAA) to use their authorities to advance the purposes of the ESA by carrying out programs for the conservation of TES. The section makes it clear that all federal agencies should participate in the conservation and recovery of listed TES.



The federally listed endangered interior least tern (*Sterna antillarum*). Source: USACE, Kansas City District

Collectively, if DoD can seek more proactive consultation and conservation activities under Section 7(a)(1) of the ESA, and investigate broader opportunities for proactive conservation of SAR, it is likely that we will reduce future impacts on the mission, which is our ultimate conservation goal.

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SPOTLIGHT: SPECIES AT RISK ON MILITARY LANDS – 2014 RESULTS

By Nancy Benton, Project Manager, NatureServe

It is critical for the Department of Defense (DoD) to base its conservation decisions on the most current and accurate scientific information available. The DoD Legacy Resource Management Program (Legacy Program) awarded funding to the nonprofit organization NatureServe to provide current information about species at risk (SAR) on military lands

(Legacy Project # 14-772). The Legacy Program has funded these NatureServe-led analyses of SAR on DoD installations since 2001, with periodic updates to provide current information (Legacy Project # 10-247). SAR are defined as native species that are not federally listed under the Endangered Species Act, but that are candidates for listing or are ranked by NatureServe as critically imperiled (G1) or imperiled (G2) throughout their range.

[Continued on page 3](#)

NATURALLY SPEAKING

From the Desk of L. Peter Boice, Deputy Director, DoD Natural Resources Program, Director, Legacy Program



Peter holding highly endangered *Cyanea* at Schofield Barracks propagation greenhouse. *Cyanea* are endemic to Hawaii; over 90% of *Cyanea* species are found only on one island in the Hawaiian chain. *Cyanea* flowers are pollinated by birds such as the Hawaiian honeycreepers, and the seeds are dispersed by birds that take the fruits.

These are challenging times for all who work natural resources issues for DoD – from technicians to installation natural resources managers to Headquarters policy makers.

To this, I expect some of my colleagues would respond – true, but we have faced similar challenges since Day One. It has never been easy to manage our double mandates of sustaining military readiness and minimizing testing and training restrictions while promoting sound stewardship of irreplaceable resources and ensuring compliance with the Endangered Species Act, the Sikes Act, and other laws and regulations. What is different now?

I am tempted to act the curmudgeon and respond tongue in cheek that things were never this bleak or complex when Aldo, Rachel, and I first started working. However, the answer may be as simple as only the details change—

- Budgets are tight and all individual installation projects are under increased scrutiny – yet, we start from a higher baseline natural resources budget than we had 25 years ago, and when unexpected requirements emerge, we usually find a way to address them.
- Our testers and trainers face potentially severe encroachment to their missions from an increasing number of fronts, including threatened, endangered and at-risk species – yet, we continue to avoid critical habitat designation because of our on-base management actions.
- The regulators see DoD as a cash cow, and ask for far more mitigation actions than our ‘fair share’ – yet, despite our very different core missions, our relationships generally are far more collaborative than they were.
- We are running out of space to train on our installations – yet, off-base partnerships have been successfully reducing on-base pressures through conservation easements, habitat improvements, and other innovative approaches.

Within the Office of the Secretary of Defense, we are working with the test and training communities to mitigate the various forms of encroachment that reduce and negatively impact military test, training and operational. We recognize that proactive, collaborative management of DoD’s land and maritime resources is key to addressing many environmentally related conflicts on and off military bases in ways that preserve both current and future mission readiness and flexibility. Moving forward, I personally believe that the key to successfully facing current and future challenges will require us to –

- Maximize testing, training, and operational capabilities through innovative and adaptive on-installation natural resources management activities that support resilience and maintain readiness,
- Engage in regional efforts that enhance on-installation mission capabilities by maximizing off-installation conservation opportunities, and
- Ensure that our civilian, contractor, and military personnel have the policies, tools, training, and other resources they need to carry out conservation activities on military lands in ways that maintain a realistic training foundation.

More simply, how can we help ensure that we continue to provide essential support for our military trainers and testers? Part of that answer lies with the new tools, training, and other resources that we continue to develop. Nancy Benton summarizes results from the soon-to-be-released updated Species at Risk Report produced by NatureServe. This analysis should help us determine where future ‘preventative’ dollars need to be focuses. Rob Lovich and Chris Petersen (DoD PARC) and Rich Fischer (DoD PIF) provide enhanced monitoring, webinar training, and other support on listed and at-risk herp and bird species, respectively. Other articles provide on-the-ground examples of the value of our mission-focused natural resources support.

Our office will provide additional tools over the next few months to enhance installation-level management actions, including *Guidelines for Streamlined INRMP Review* (coordinated with the US Fish and Wildlife Service), and guidance on how to implement Cooperative Ecosystem Studies Units projects. In addition, I am committed to working with NMFWA leadership to answer those questions that I had hoped to address in person in Omaha.

These are indeed challenging times. But working together, I am confident that we can continue to meet our dual mandate of sustaining military readiness and minimizing testing and training restrictions while promoting sound stewardship of irreplaceable resources.



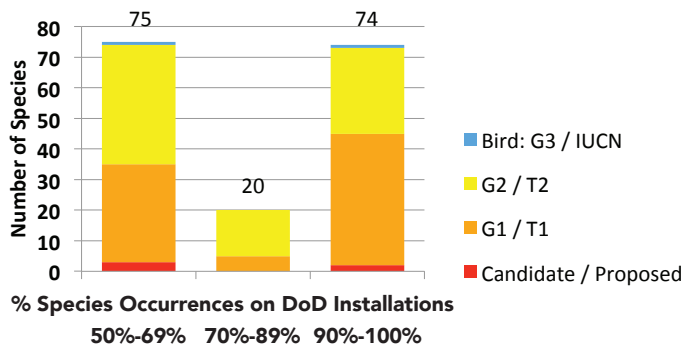
The flowers of the Saguaro cactus are open day and night so that bees, bats, and birds can pollinate them. Their most efficient pollinator? The Western White-Winged Dove!

For the 2014 analysis, at DoD’s request, we also included birds that are regarded by NatureServe as vulnerable (G3) or that have an International Union for Conservation of Nature (IUCN) status. NatureServe conducted a detailed GIS analysis by overlaying the best available U.S. military installation boundaries with NatureServe’s current species location data. SAR were considered on a DoD installation if one or more population occurrences for a species resided completely or partially within the boundaries of an installation or within a 2 kilometer (1.24 mile) buffer.

A key finding of the 2014 assessment was that the total number of SAR on DoD lands remained similar to the numbers from 2011 (555 SAR in 2014; 519 SAR in 2011), despite an increase of over 17,800 new SAR population occurrences in NatureServe’s databases since 2011. Upon closer inspection, although the total number changed very little, the actual species on the lists differ. These changes in species lists are due to several factors, including new population occurrences, more precise species location information, changes in federal status, changes in taxonomy, and changes in species conservation status assessment ranks. The addition of G3 and IUCN status birds was also new in 2014, though there was a small amount (24) which fit this category, which also contributed to the similar overall number of SAR on DoD lands.

Important findings of the 2014 analysis include:

- The majority of SAR on DoD lands are plants (57%) and invertebrates (29%).
- SAR are widespread across the U.S., but installations with the highest numbers of SAR are concentrated on military bases in California, Florida, and Hawaii.
- The Army has the highest number of SAR (over 250), followed by the Air Force (with over 200).
- Nearly 170 SAR have 50% or more of their known occurrences on or near DoD installations (as shown in figure).



NatureServe’s analysis can help the military focus its conservation efforts towards species that may warrant federal listing if population declines occur or continue. Proactive conservation of these imperiled species and their habitats on and around DoD installations can help preclude the need for additional species listings, which benefits the military by maintaining its lands for testing, training, and operations.

WHAT’S HOPPIN’ IN DOD PARC: ENDORSEMENT OF THE STRATEGIC PLAN FOR AMPHIBIANS AND REPTILES

By Rob Lovich, PhD, DoD PARC Technical Representative and Chris Petersen, DoD PARC National Representative



On February 19, 2015, John Conger, performing the duties of Assistant Secretary of Defense (Energy, Installations and Environment), signed a memo formally endorsing *The Strategic Plan for Amphibian and Reptile Conservation and Management on Department of Defense Lands* (“Strategic Plan”). This milestone transpired after five years of efforts to formalize conservation and management of these important taxa for the benefit of military training and testing. DoD Partners in Amphibian and Reptile Conservation (DoD PARC) thanks everyone who aided in the development and success of the Strategic Plan. Dozens of military personnel and staff contributed their time, and were instrumental to the Plan’s creation and ultimate endorsement.



Federally endangered Kemp’s ridley sea turtle (*Lepidochelys kempii*) at Point Lookout State Park, MD. Kemp’s ridleys face threats on nesting beaches and in the marine environment. The greatest cause of decline and the continuing primary threat to Kemp’s ridleys is incidental capture in fishing gear, primarily in shrimp trawls, but also in gill nets, longlines, traps and pots, and dredges in the Gulf of Mexico and North Atlantic. Photo by Seth Berry

The Strategic Plan provides technical guidance to help DoD’s natural resources managers, including:

- Implementing proactive, habitat-based management strategies that maintain healthy landscapes and training lands in ways that sustain and enable DoD’s mission activities;
- Promoting proven conservation partnerships to leverage financial and human resources to achieve common goals, such as preventing species from becoming listed as threatened or endangered under the Endangered Species Act; and
- Minimizing environmental encroachment, which continues to affect the military’s ability to conduct operations in once-remote areas.

The timing of this endorsement could not have been better, arriving just before the largest annual gathering of DoD natural resources personnel at the 2015 National Military Fish and Wildlife Association (NMFWA) Annual Training Workshop in Omaha, Nebraska. DoD PARC announced the Strategic Plan endorsement during the opening plenary session for the Annual Training Workshop and hosted an Implementation Workshop with about 40 attendees from DoD and other partner organizations to move forward with the goals and objectives of the Strategic Plan.

Members of National PARC also attended the Implementation Workshop to present and share ideas about how they can help DoD accomplish the goals and objectives outlined in the Strategic Plan. Implementation Workshop outcomes included (minutes available upon request):

- Finalizing inventory of herpetofauna species lists on Army and Air Force installations with Integrated Natural Resource Management Plans (INRMPs);
- Developing outreach and educational products;
- Discussing new ways to partner with National PARC; and
- Developing the DoD Herpetofauna library.

Another important discussion topic at the NMFWA Workshop was developing DoD PARC leadership. DoD PARC needs volunteers who have approval from their supervisors to help lead DoD PARC and implement the Strategic Plan, in accordance with DoD's *National Technical Representative Functions* for DoD PARC and DoD Partners in Flight representatives (available upon request). We currently have volunteers from the Navy, Marine Corps, and Army National Guard. All activities and information will support the military's testing and training mission, natural resource stewardship responsibilities, and be consistent with DoD Natural Resources Program and Secretary of Defense's priorities and objectives.



Federally endangered arroyo toad (*Anaxyrus californicus*) in San Mateo, CA. Loss or degradation of specialized coastal stream habitat from mining, urban development, and grazing cattle is a major problem for the toad. Exotic aquatic predators such as bullfrogs, fish and crayfish, also reduce toad populations. Photo by Rob Lovich

At the 2015 NMFWA Workshop, we also had the opportunity to attend and support the NMFWA Herpetological Working Group annual meeting. This group is a vital partner for DoD PARC, and we look forward to continuing this productive and mutually beneficial relationship.

DoD PARC will focus on printing the Strategic Plan in the coming weeks. For more information on DoD PARC or any of the information above, please contact [Chris Petersen](#) or [Rob Lovich](#) or visit the [DoD PARC website](#).



Most of the more than 200,000 animal species that serve as pollinators are insects—only about 1,000 are hummingbirds, bats, or small mammals.



Green sea turtle (*Chelonia mydas*) in Hawaii. Photo by Paul Block

On March 20, 2015, the National Oceanic and Atmospheric Administration Fisheries and the U.S. Fish and Wildlife Service proposed reclassifying the green sea turtle under the Endangered Species Act into 11 Distinct Population Segments (DPS) globally. The goal of making 11 DPS is to help ensure continued protections for all green sea turtles by allowing managers to develop more tailored approaches to address the specific threats that face each DPS. For example, after years of coordinated efforts in Florida and along the Pacific Coast in Mexico, nesting green sea turtle numbers have increased to the point where regulators can now recommend changing DPS status from endangered to threatened.

COST OF MAINTAINING LISTED SPECIES ON DEPARTMENT OF DEFENSE LANDS

By [Chris Khoury](#) and [Valerie Leone](#), DoD Natural Resources Program Support Team

DoD supports mission readiness by managing its natural resources to enable continued access to testing and training lands. DoD achieves this by complying with existing laws (e.g., the Endangered Species Act (ESA), Sikes Act) to ensure the long-term sustainability of our nation's natural heritage. In Fiscal Year (FY) 2014, there were over 400 threatened and endangered species (TES) known to reside on DoD lands. DoD has the highest density of federally listed species of all federal land managing agencies, and spent over \$112M in FY 2014 to protect these species.

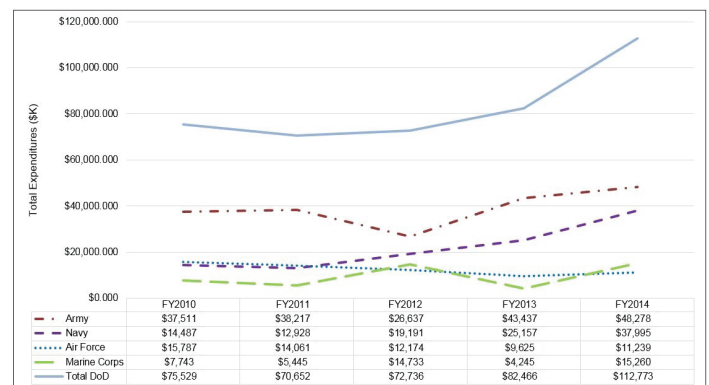


Figure 1. TES expenditures (\$K) by Military Service and DoD total from FY 2010 to FY 2014.

- From FY 2013 to FY 2014, Army funding increased 11% to make up almost half of DoD's total expenditures in FY 2014, (Figure 1). A portion of the Army's 11% increase included support for the Army Compatible Use Buffer Program and the Readiness and Environmental Protection Integration Program.

- Navy spending increased by 51% from FY 2013 due to critical habitat designations, data captured from previously unreported commands, and additional listings.
- In FY 2014, the U.S. Fish and Wildlife Service listed six new species for protection under the ESA that reside on U.S. Air Force (USAF) installations. As a result, the USAF programmed for additional surveying and monitoring requirements, resulting in a 17% increase in expenditures.
- United States Marine Corps (USMC) spending increased by 259%, primarily from land expansion and impacts to the desert tortoise. DoD spent more on the desert tortoise in FY 2014 than on any other TES, 90% of which was the USMC expenditure.
- DoD's desert tortoise expenditure is nearly twice the amount DoD spent on the red cockaded woodpecker, the protection of which causes the second largest amount of DoD's TES expenditures.

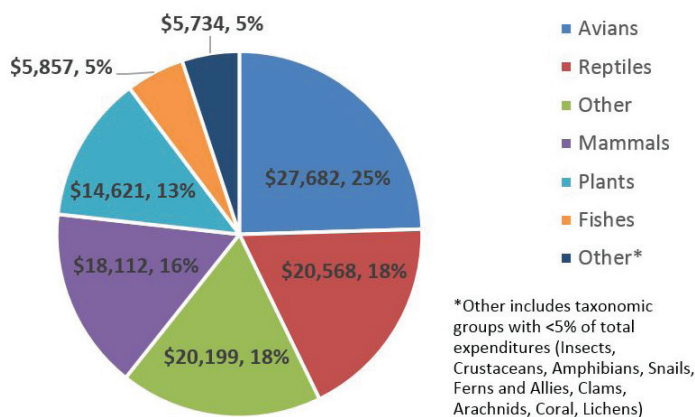


Figure 2. TES expenditures by taxonomic group from FY 2010 to FY 2014.

In FY 2014, DoD spending on avian TES, the taxonomic group with the greatest expenditures, reached almost \$28M, a 20% increase from FY 2013 (Figure 2). Increases in USAF (57%) and Navy (88%) expenditures on avian TES were the greatest contributors to this growth. Other notable changes from FY 2013 to FY 2014 include increased expenditures on corals (332%), reptiles (263%), and fishes (147%).

DoD continues to balance land use for military readiness, including training and testing, and conserving and protecting current TES in each taxonomic group. These expanding needs, combined with increasing protection requirements will force conservation costs to remain constant or continue to increase to manage properly TES in these taxonomic groups.

The Military Services have 95% or more of the total management burden for 12 TES:

- Saint Francis Satyr Butterfly, found almost exclusively at Fort Bragg, NC.
- Seven San Clemente Island TES managed by the Navy: the Loggerhead Shrike, Sage Sparrow, Woodland Star, Indian Paintbrush, Island Larkspur, Island Broom, and Island Bush Mallow.
- South Texas Ambrosia and Orcutt's Spineflower, also managed by the Navy.
- Small's Milkpea, which is present at Homestead Air Reserve Base and the adjacent Army Special Operations Command South, FL.
- The Vandenberg Monkeyflower (listed as endangered in FY 2014), which resides at Vandenberg Air Force Base, CA.

NEW SENTINEL LANDSCAPE PARTNERSHIPS ANNOUNCED

The Departments of Agriculture, Defense, and Interior on April 8, 2015, designated Fort Huachuca, AZ, and Naval Air Station (NAS) Patuxent River-Atlantic Test Ranges, MD, as Sentinel Landscapes. Both locations encompass vital military ranges needed to test and train with new and advanced aircraft and communications systems necessary to meet new threats as they arise. The Sentinel Landscapes Partnership aims to balance conservation activities with DoD's testing and training missions.

Within the Fort Huachuca Sentinel Landscape, more than 40 local, state, and federal partners priorities. Priorities include grassland and wetland restoration efforts around the Babocomari and Upper San Pedro Rivers – key habitat for the Chiricahua leopard frog, yellow-billed cuckoo, southwestern flycatcher, ocelot, and jaguar; implementation of the State of Arizona's Forest Action Plan; and conservation of nearly 5,000 acres of working ranchlands; all of which will buffer and protect Fort Huachuca's mission as the leading unmanned aircraft system training center in the western United States.

NAS Patuxent River, in the Chesapeake Bay region, has protected nearly 3,000 acres of surrounding agricultural, wildlife, and conservation lands using funding from multiple state and federal agencies. Protecting lands beneath its Atlantic Test Ranges reduces noise and safety concerns, preventing costly testing delays, and protects one of the most vulnerable wildlife corridors along the Nanticoke River, home to species such as the Delmarva Peninsula fox squirrel and the American burying beetle.

For more information, please visit the [Sentinel Landscapes Partnership](#).

CONGRATULATIONS VANDENBERG AFB ON THEIR 2015 MILITARY CONSERVATION PARTNER AWARD!

The U.S. Fish and Wildlife Service's (USFWS) Fish and Aquatic Conservation Program selected Vandenberg Air Force Base as the recipient of the 2015 Military Conservation Partner Award. This annual award acknowledges a military installation whose efforts represent notable conservation accomplishments often achieved in partnership with the USFWS and other conservation agencies.

(CONTINUED FROM PAGE 1)

STEPPINGSTONES CORNER: VIEW FROM THE EYRIE: THREATENED AND ENDANGERED SPECIES: A FRESH APPROACH TO SPECIES RECOVERY?

Under 7(a)(1), federal agencies often enter into partnerships and Memoranda of Understanding with the USFWS or NOAA for implementing and funding conservation agreements, management plans, and recovery plans developed for listed species. Biologists for USFWS or NOAA should encourage the development of partnerships and planning efforts to develop proactive approaches to listed species management, rather than reacting when a conflict occurs.

Does the process work? Over the past 10 years, I have worked very closely with American Bird Conservancy and USFWS to assess the conservation status of the federally endangered interior population of least tern, a species that is costly to, and directly affects the missions of, the USACE along interior U.S. rivers. By directing focused monitoring and management, and developing range-wide conservation plans under ESA Section 7(a)(1), USACE's efforts contributed to the recent USFWS recommendation in the Five-Year Status Review to delist the interior population. We are hopefully on the brink of a major conservation success story. Similarly, the Military Services have worked proactively with USFWS, using the power of the ESA, to conserve off-installation habitats for the red-cockaded woodpecker and ultimately increasing training opportunities on-base. Both of these examples should be models for future efforts.

DoD natural resources managers, as a whole, conduct large amounts of management activities that fall under Section 7(a)(1), both for TES and for species at risk (SAR). Integrated Natural Resource Management Plans provide many examples of this. The first task is to conduct an agency-wide assessment to determine those species for which DoD has substantial management jurisdiction throughout a large part of its range. By doing so, DoD can prioritize where to focus efforts for the biggest return on investment. Investing in piecemeal projects on a small scale or in a small part of a species range on individual installations can have local benefits for some species, and for the installations relationship with regulatory agencies, but we need to look for opportunities on a larger scale with bigger returns (both for the species and the mission). For TES, we can seek opportunities for recovery. For SAR, we can continue to work proactively to avert future species listings. Second, we can look for opportunities to collaborate with other agencies. Visit the [NRCs Working Lands for Wildlife website](#) for an example.



The entire world's chocolate depends on midges, tiny two-winged flies that pollinate the cacao flowers. If you love chocolate, thank a fly!

ANNUAL NMFVA TRAINING WORKSHOP EXCEEDS EXPECTATIONS

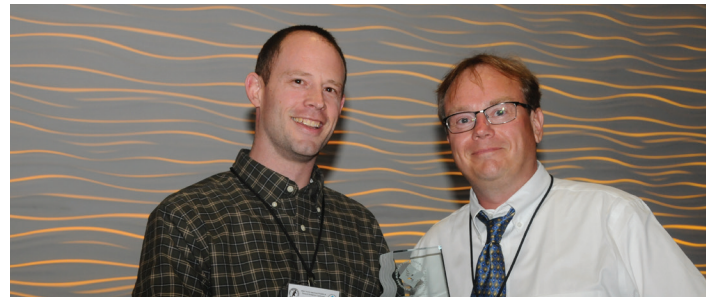
By Todd Wills, Immediate-Past President, National Military Fish and Wildlife Association



The National Military Fish and Wildlife Association (NMFVA) held its Annual Training Workshop March 9-13, 2015, in Omaha, Nebraska, in conjunction with the 100th North American Wildlife and Natural Resources Conference. The NMFVA training workshop is held in conjunction with the North American so military natural resources professionals have the opportunity to interact face-to-face with regulators, partners, and other stakeholders from state and federal wildlife agencies and various non-governmental organizations.

NMFVA provides an important and unique venue for DoD natural resources professionals to discuss issues, problem solve, and develop relationships with other installation personnel, as well as for leadership to interact with installation level personnel to discuss internal issues, upcoming policy changes, and answer questions. The NMFVA Training Workshop represents one of the few opportunities for DoD natural resources professionals and leadership to interact.

This year, in response to the identified need for natural resources training, natural resource professionals from installations across the globe worked with their leadership in the Military Services to gain support and invest resources. Because of this commitment, more than 220 DoD natural resources professionals converged on Omaha and spent a week immersed in DoD conservation and training issues, Sikes Act requirements, and discussing concerns related to best strategies to manage endangered species resources to most effectively meet mission objectives – the hot topic during the Workshop.



NMFVA President Todd Wills presents Shawn Stratton (representing the Fort Riley, KS Natural Resources Program), with the 2014 NMFVA Natural Resources Model Program Award. Photo by: Junior D. Kerns, CWB, Chief, Environmental Stewardship Branch, White Sands Missile Range, NM

The NMFVA also recognized excellence in natural resources management awarding the Fort Riley Natural Resources Program the 2014 NMFVA Natural Resources Model Program Award. This Award recognizes exemplary natural resources management on a military installation in support of the military mission by developing programs or projects that can serve as models for conservation on military lands.

Jack Markham, Natural Resources Specialist, Naval Facilities Engineering Command Mid-Atlantic, received the 2014 NMFVA Lifetime Achievement Award. This Award recognizes those who have contributed significantly over the course of their career to NMFVA's progress as an organization and to conservation on DoD lands in support of the military mission.

Due to the rousing success of this year's workshop, we are already planning for next year's annual workshop, which will be held March 14-18, 2016, in Pittsburgh, Pennsylvania. If you would like to learn more about NMFWA, download the presentations from the 2015 training workshop, or submit a technical paper for next year's training workshop, please visit the organization's website.

TENTH ANNUAL ENDANGERED SPECIES DAY ON MAY 15

By David Robinson, Endangered Species Day Director, Endangered Species Coalition

On May 15, 2015, we will celebrate the tenth annual Endangered Species Day, an annual holiday introduced by the U.S. Senate in 2006 to raise awareness of endangered plants and animals, and "promote species conservation worldwide." The purpose of Endangered Species Day is to educate the public about the importance of protecting the nation's rare, threatened, and endangered species; highlight species recovery success stories; and demonstrate everyday actions that people can take to help protect our disappearing wildlife and last remaining open spaces.



Endangered Species Day 2014. Source: David Robinson

Every year, wildlife refuges, national parks, zoos, aquariums, botanic gardens, community groups, schools and conservation organizations organize tours, exhibits, restoration projects, children's programs, field trips and other activities on Endangered Species Day (third Friday in May) and throughout the month. There were more than 200 events throughout the country last year.

Endangered Species Day offers military personnel and their families an opportunity to plan clean-up activities and other restoration projects for sensitive habitats that are home to rare, threatened, and endangered plant and animal species. We want to be sure to highlight all DoD-related activities in the Endangered Species Day Event Directory. To register an event (even if not open to the general public) and obtain resource materials, visit the [Endangered Species Day website](#). If you have any questions, please contact [David Robinson](#).



Most bees like warm areas, but there are bees that live in the Arctic and at high elevations in the Andes and Himalayas.



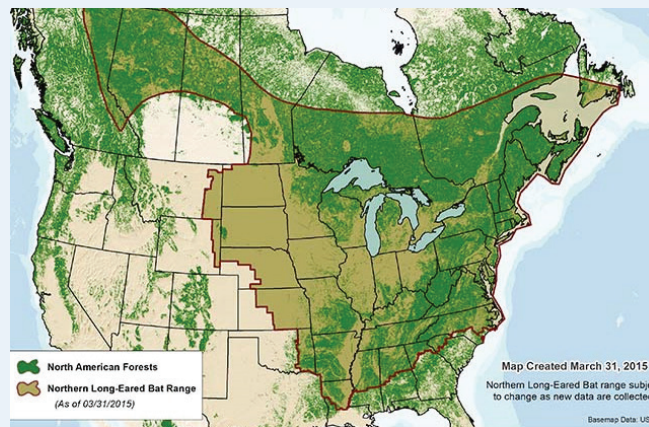
Northern Long-eared bat. Source: USFWS

USFWS PROTECTS NORTHERN LONG-EARED BAT AS THREATENED UNDER ESA

On April 1, 2015, the U.S. Fish and Wildlife Service (USFWS) listed the northern long-eared bat as threatened due to the spread of white-nose syndrome (WNS), a fungal disease that has devastated many bat populations. First discovered among bats in a cave near Albany, NY, in 2006, WNS has since killed millions of bats in the Northeast, South, and Midwest (WNS, USGS). The disease is highly contagious, spreading when bats congregate in caves, abandoned mines, or other hibernacula. WNS interrupts bat hibernation, causing 90-100% of bats in a given colony to starve or dehydrate (www.whitenosesyndrome.org).

At the same time, the USFWS issued an interim special rule that eliminates unnecessary regulatory requirements for landowners, land managers, government agencies and others in the range of the northern long-eared bat. The interim rule is open for public comment until July 1, 2015, as the USFWS considers whether modifications or exemptions for additional categories of activities should be included in the final 4(d) rule due by the end of the calendar year.

Throughout the United States, the northern long-eared bat is found from Maine to North Carolina on the Atlantic Coast, westward to eastern Oklahoma and north through the Dakotas, reaching into eastern Montana and Wyoming (as shown on the range map). Throughout the bat's range, state and local stakeholders have worked collaboratively to conserve the long-eared bat and address the challenges presented by WNS.



Northern Long-Eared Bat Range Map. Source: USFWS

LET'S TALK TRASH

By Christiana Boerger, Marine Biologist, Naval Facilities Engineering Command Southwest (NAVFAC SW)

The accumulation of marine debris, primarily plastics, is one of the major marine water quality issues facing the world. Marine debris causes substantial environmental and economic impacts in marine systems since, unlike some pollutants, plastics do not "go away," but break down into smaller pieces, becoming microscopic in nature. The sources of marine debris are both land and marine based, and their origins may be local or distant. Marine debris can pose a threat to Navy training and marine and terrestrial organisms through entanglement, ingestion, and habitat destruction.



Debris at the outfall on the North Island by the Fishing Pier. Photo by: Christiana Boerger

San Diego Bay and its nearshore waters are part of a highly urbanized ecosystem with intense coastal and water use. It is also home to a large naval complex and California's second largest incorporated city. Despite the anthropogenic influence on the bay, the area serves as a crucial ecosystem for several sensitive and federally listed species, such as the green sea turtle (*Chelonia mydas*) and California least tern (*Sterna antillarum browni*). Additionally, the shallow water habitats of the bay support seagrass beds (*Zostera marina*) that provide vital spawning, nursery areas and migration routes for nearshore marine fishes and invertebrates.

To study the magnitude of the marine debris issue in San Diego, a team of NAVFAC SW biologists (Arlene Arnold, Christiana Boerger, Jessica Bredvik, Greg Clune, Michelle Cox, Erica Cunningham, Aaron Hebshi, Jessica Palmer, Tiffany Shepherd, and Andy Wastell) joined a multi-agency coalition of stakeholders in the San Diego Bay Marine Debris Study. Participants are gathering plastic accumulation baseline data to help natural resources managers understand the current extent and magnitude of plastic-based debris accumulation across the bay; specifically its potential effect on sensitive species that use the bay.



Honeybees fly up to 15 mph and its wings beat 200 times per second or 12,000 times per minute.

Each year, millions of tons of trash enters the marine environment with the potential of harming ocean animals as well as the humans who are responsible for the problem. By understanding and educating the community about the detrimental effects caused by marine debris, we can help to keep the oceans clean and prevent this massive problem from getting worse. There are simple things we can do every day to mitigate the marine debris problem:

- use reusable bottles, bags and silverware,
- recycle,
- pick up trash on the ground, and
- participate in beach and installation clean ups.

By working together, we can make a life of trash free seas.

PARTNERSHIP SERVES AS A WINNING SOLUTION TO STUDY A STATE ENDANGERED RATTLESNAKE IN VIRGINIA

By Rob Lovich, PhD, DoD PARC Technical Representative and Chris Petersen, DoD PARC National Representative



Partnerships are critical for successfully managing and conserving listed species on DoD lands. After more than 18 years of partnership, the Navy, Old Dominion University (ODU), and the Virginia Department of Game and Inland Fisheries (VDGIF) have completed their investigation of a state endangered species, the timber rattlesnake, in southeastern Virginia. This project demonstrated the benefits of partnerships and how groups can come together to work on a common goal, share costs, and leverage expertise.



Timber rattlesnake in an ambush posture. Photo by: Chris Petersen, DoD PARC

The timber rattlesnake is a large, terrestrial, venomous snake ranging from southeastern Virginia to eastern Texas. The VDGIF recognizes the Coastal Plain population of the timber rattlesnake (a.k.a., canebrake rattlesnake) as a distinct population segment based on ecological, morphological, and behavioral differences, and listed it as endangered in Virginia in 1992, primarily due to habitat loss. Connecticut, Indiana, Maryland, New Hampshire, New Jersey, Ohio, Vermont, Illinois, New York, Minnesota, and Texas also list the species as state-endangered or threatened.

The research team's partnership began in 1995 when the Navy invited ODU and VDGIF to study the rattlesnake population on Naval Support Activity Hampton Roads-Northwest Annex (Northwest Annex) in Chesapeake, VA. At the time, very little was known about the snake's ecology, and the Navy wanted to learn what installation habitats the rattlesnake occupied, and how the species' decline could affect the installation's mission. The Northwest Annex was the ideal study site for the project due to its upland and wetland forests, emergent habitats, and agricultural fields that supported a healthy rattlesnake population.



Example of radio transmitter used to monitor the snakes. Photo by: Chris Petersen, DoD PARC

The project was one of the longest running studies ever performed on the species (which can live up to 25 years in the wild), and provided critical information on the ecology and life history of this diminishing species. The research team used radio telemetry as the primary method to study the snakes because it allowed the team to locate repeatedly the same snake in its natural environment with minimal disturbance. The study actively monitored 55 timber rattlesnakes at the installation and collected almost 15,000 snake observations. Results revealed the following life history attributes, movement patterns, and behavioral characteristics:

- rattlesnakes selects deciduous forests over pine forests;
- on average, males move twice as much as females;
- snakes prefer to hibernate in rotting tree stumps;
- snakes are ambush predators and their primary prey item is the gray squirrel; and,
- most surprisingly, each snake can move more than twelve miles annually and encompass an area of more than 700 acres.

In 2007, the VDGIF purchased a 3,800-acre land parcel adjacent to the Northwest Annex —the Cavalier Wildlife Management Area. This property benefits the snakes by providing more protected habitat for the timber rattlesnake as well as other wildlife. The VDGIF purchase of the property also benefited the Navy by providing a military mission-compatible encroachment buffer of natural habitat on the western side of the installation.

Overall, the partnership was a win-win for all parties involved. Students from ODU fulfilled undergraduate and graduate requirements while gaining practical field experience. The VDGIF collected necessary data on the habitat use and movement patterns of the snakes, helping their scientists to understand the snake's ecology and preventing the species further decline in Virginia. The Navy obtained site-specific data for this state-listed species that helped inform its natural resource management activities as well as an off-base buffer area that helps enable on-base training activities.

THE 2015 SECDEF AWARDS: SPOTLIGHT ON THE NATURAL RESOURCES CONSERVATION NOMINEES

By Taylor Phillips and Yasmin Shafiq, Booz Allen Hamilton

DoD has sponsored the Secretary of Defense Environmental Awards since 1962 to honor individuals, teams, and installations for their innovative work protecting the environment while sustaining mission capability.

The Natural Resources Conservation, Large Installation award recognizes installations larger than 10,000 acres that promote the conservation of natural resources, including the protection and restoration of biological resources and habitats, the long-term management and use of land and its resources, and the promotion of a conservation ethic while maintaining the military mission. The following are the 2015 nominees in this category:



Camp Blanding participates in aggressive habitat improvement projects for several federally and state listed imperiled species. To provide quality guaranteed habitat for one such species, the red-cockaded woodpecker, Camp Blanding's staff installs artificial nesting boxes in live longleaf pine trees. In this picture, a member of the installation's Environmental Division works to remove and replace one of the boxes damaged in the course of a wildfire. Source: Camp Blanding

- **Camp Blanding Joint Training Center, Florida Army National Guard**, achieved key milestones through cost-effective programming and collaborative research efforts. This included exceeding targets to establish stable populations of the endangered red-cockaded woodpecker and successfully negotiating the relocation of state-listed gopher tortoises to suitable habitat. The Center is also the home of a groundbreaking coalition that brings together the Florida Army National Guard, World Health Organization, U.S. Navy Entomology Center of Excellence, U.S. Department of Agriculture, U.S. Army Air Reserve, Florida Air National Guard, and the University of Florida, for a multi-year entomological project to study the control and elimination of disease-causing insects like sand flies, filth flies, mosquitos, and ticks.

- **Joint Base Pearl Harbor-Hickam (JBPHH), Hawaii**, collaborated with the U.S. Department of Agriculture and Hawaii Department of Agriculture to contain and eradicate the Coconut Rhinoceros Beetle (CRB), a federally actionable invasive species, using practical and cost effective solutions. Other Military Services are implementing JBPHH's CRB eradication efforts throughout Hawaii. JBPHH also improved habitat for endangered marine mammals, sea turtles, and waterbirds by providing habitat away from the airfield, which also protects them from vessel strikes.



The adult coconut rhinoceros beetle (*Oryctes rhinoceros*), first discovered on JBPHH in Dec 2013, is a destructive invasive pest that is native to Southeast Asia. The beetle caused the loss of more than 50% of all coconut palm trees on the island of Guam. Source: JBPHH

- **Marine Corps Air Ground Combat Center (MCAGCC)** **Twentynine Palms**, California, demonstrated exemplary implementation of its Integrated Natural Resources Management Plan by achieving no net loss of training area through monitoring established critical baselines and supporting habitat models. MCAGCC produced detailed gopher tortoise density estimates that were critical to the analysis in the Biological Opinion of the Land Acquisition Environmental Impact Statement. This data also supported climate change modelling for various at-risk species.



MCAGCC's headstart facility protects tortoise nests and juveniles from predators, and provides a plethora of information that would be extremely expensive and nearly impossible to measure in the wild. This research should help us recover populations of desert tortoises at MCAGCC and elsewhere. Protecting the desert tortoise, a keystone species, is a prudent and cost-effective means of ecosystem management at MCAGCC. Source: MCAGCC

- **Shaw Air Force Base (AFB)**, South Carolina, excelled in red-cockaded woodpecker recovery with a record of 27 clusters and 56 fledged in 2014 – a 540% increase since 2001. Shaw AFB also created a robust wildland fire program by establishing a regional team to implement prescribed burns and reduced wildfires by 95%. Additionally, Shaw AFB generated \$129,000 in forestry revenue by working with the cultural resources manager, State Historic Preservation Officer, and taking advantage of new fuel chip markets to sell small hardwoods and timber damaged in recent ice storms.

A panel of judges with relevant expertise representing federal and state agencies, academia, and the private sector evaluated all nominees to select one winner. The winner of the 2015 Natural Resources Conservation, Large Installation award is Camp Blanding Joint Training Center, Florida Army National Guard, FL. Visit <http://denix.osd.mil/awards/> to view all of the past and present Secretary of Defense Environmental Awards Winners!



Red-cockaded Woodpeckers (RCWs), an endangered species, thrive on Poinsett Range due to the habitat enhancement provided through prescribe fires and timber harvests. RCW recovery efforts include installing artificial cavities and banding nestlings. The increase in RCW population and improved habitat conditions will allow Shaw AFB greater flexibility for changes should mission requirements dictate. Source: Shaw AFB

IMPROVING PLANT REINTRODUCTION WITH REMOTE SENSING

By Erin Questad California State Polytechnic University, Pomona; Susan Cordell, USDA Forest Service, Institute of Pacific Islands Forestry; James Kellner, Brown University

Reintroduction of threatened, endangered, and at-risk plant species is commonly used to sustain plant populations at risk of extinction; however, outplanting programs for plant species recovery have had limited success in some areas. Unpredictable annual precipitation patterns, competition with invasive plant species, predation by non-native species, and poor habitat quality all contribute to low survival rates. In particular, desiccation and water stress are significant barriers to plant survival in most reintroduction programs.

With funding from the Strategic Environmental Research and Development Program (RC-1645) and the Environmental Security and Technology Certification Program (RC-201203), researchers from California State Polytechnic University - Pomona, the USDA Forest Service Institute of Pacific Islands Forestry, and Brown University have developed a tool to locate field sites where plants will experience lower water stress and thereby enhance plant growth. Their habitat suitability model (HSM) identifies topographic depressions that are protected from prevailing winds (high suitability sites) and contrasts them with ridges and other exposed areas (low suitability sites). Developed from airborne Light Detecting and Ranging (LiDAR), the HSM is data from the Carnegie Airborne Observatory uses to produce a Digital Elevation Model (DEM) with 2.2-meter ground sampling distance. Then, two criteria variables are modeled from the DEM to create the HSM leeward position and descending topography.



The HSM identifies high (shown in blue) and low (shown in orange) suitability sites. Photo by: Erin Questad.

The team compared growing conditions in high to low suitability sites at the Pohakuloa Training Area on the island of Hawaii. High suitability sites had better microclimates for growing (e.g., lower wind speeds), enhanced resource availability, and improved plant growth and survival. The research group is currently testing the use of the HSM for a number of federally-listed at-risk species in Hawaii, and is developing HSMs for other sites, including Pu'u Wa'awa'a, a lowland Hawaii site, and Vandenberg Air Force Base in California.

This modeling approach is especially useful for managing reintroduction programs over the large areas typical of many DoD installations. By using remote sensing, the model provides accurate data for the entire landscape, allowing managers to target plant reintroduction in high suitability areas. Remote sensing data can also identify off-installation sites for recovery efforts. The research team will evaluate how this guided approach to planting can reduce the costs of reintroduction programs. For more information, please contact [Erin Questad](#).



Examples of different types of tree damage caused by bullet strikes downrange of live-fire ranges. Photos by David Delaney.

USING ACOUSTICS TO DOCUMENT AND CHARACTERIZE MILITARY MUNITIONS WITHIN DOWNRANGE SENSITIVE WILDLIFE AREAS

By David Delaney and Michael White, U.S. Army ERDC/CERL

The DoD Legacy Resource Management Program awarded the U.S. Army Construction Engineering Research Laboratory funding via Legacy Project 13-643 to demonstrate the use of acoustics to quantify and characterize munitions entry into sensitive areas downrange of live-fire ranges. Regulatory agencies are concerned that downrange munitions (e.g., small/larger caliber rounds) might affect species at risk. Live-fire training exercises can affect wildlife habitat through physical damage, increased susceptibility to disease from exposed wounds, and cause direct mortality, but few studies have investigated this question and none have demonstrated a population-level impact.

Resource managers on DoD installations face many unique challenges that their counterparts on non-DoD state and federal lands do not. A large proportion of good quality wildlife habitat on military installations is located downrange of active live-fire training areas. Resource managers need access to these lands to survey/monitor animal populations and their habitats over time to meet conservation requirements, preferably without impairing military training. Without such detailed information, regulators may be more conservative in their findings, which can lead to disruptions in military training. Acoustical techniques offer managers a non-invasive method of assessing potential impacts from munitions on downrange natural resources, while providing an additional survey tool for detecting and identifying species of interest. Peak acoustic events can contain information about ricochet and impact, and call events can offer species identification.

Editor's note: View the [Winter 2013-2014 issue of Natural Selections](#) to read Dr. Richard Fischer's article *Balloons, Bombs, and Birds...*

CHANGING WITH THE TIDES: NAVY'S MARINE BIOLOGY TEAM LEADING ROCKY INTERTIDAL MONITORING ACROSS SOUTHERN CALIFORNIA INSTALLATIONS

By Jessica Bredvik, Naval Facilities Engineering Command Southwest (NAVFAC SW)

As the marine environment continues to change and more marine species are listed under the Endangered Species Act (ESA), the Navy's management of marine resources is intensifying. In response to the increased regulatory requirements, a team of Navy marine biologists from NAVFAC SW and Space and Naval Warfare Systems Center Pacific are working to ensure the Navy's compliance with federal regulations in the rocky intertidal community.

Recently, the team has been monitoring rocky intertidal sites to support the black abalone (*Haliotis cracherodii*) that call this habitat home. Black abalone is a species of large marine snail with a muscular foot to attach to rocks and a shell for protection. This species inhabits the shallowest waters of all abalone and live in intertidal and shallow water habitats on rocky shores. Black abalone were once abundant throughout California and the Channel Islands until the mid-1980s, when populations declined dramatically due to the spread of a disease called withering syndrome. Withering syndrome is a pathogen that causes an infection in the gut of the abalone and prevents the animal from digesting its food. Ultimately, the infected abalone's foot begins to wither due to starvation and it dies. Due to population declines, the National Marine Fisheries Service (NMFS) listed the black abalone as endangered under the ESA in 2009. Following the listing, NMFS proposed critical habitat at San Clemente Island (SCI) and San Nicolas Island (SNI); however, NMFS determined the Navy's management efforts for black abalone were sufficient to avoid designation of critical habitat at these two installations.

Part of the Navy's commitment to black abalone management is to monitor rocky intertidal habitat at SCI, SNI, and Naval Base Point Loma (NBPL) although, black abalone are currently not present on NBPL. Every spring and fall, the team surveys rocky benches and tide pools at each installation, implementing standard protocols from the [Multi-Agency Rocky Intertidal Network \(MARINe\)](#). This network is a partnership of government agencies, universities, and private groups with over 100 rocky intertidal sites between Baja, California and Alaska. Data collected as part of the MARINe organization allow for evaluation of large-scale spatial and temporal patterns of intertidal habitat and species, such as the black abalone.



Flowers that bloom at night are usually bat pollinated. Bats pollinate many cactus species and agave.

In 2009 and 2014, the MARINE intertidal monitoring programs were established at SCI and SNI, respectively. A partnership between the Navy and National Park Service established a monitoring program at two NBPL sites in 1995. The status of rocky intertidal habitat and black abalone populations vary across these three installations. However, with continued monitoring of these sites, biologists can detect changes in the intertidal habitat and compare them on a region-wide scale.



Ochre sea star (*Pisaster ochraceus*) on San Clemente Island. Photo by: U.S. Navy, Jessica Bredvik

For example, in June 2013, MARINE researchers noted several sea stars with lesions on their bodies and in various degrees of decay along the coast of Washington state. Since then, sea stars along much of the North American Pacific coast have been affected by what biologists are calling sea star wasting syndrome. Recent findings have linked this syndrome to a densovirus, but additional research is necessary (Visit www.seastarwasting.org for more information.). The Navy's participation in the MARINE program allowed managers to quickly respond to this epidemic and evaluate rocky intertidal habitat for the syndrome. Sea star wasting syndrome was detected at SNI but so far has not shown up in widespread numbers at SCI or NBPL. The impacts of this syndrome are still unknown as MARINE researchers continue to evaluate the immediate and long-term changes it may have on rocky communities.



Adjacent black abalone (*Haliotis cracherodii*) on San Clemente Island. Photo by: U.S. Navy, Jessica Bredvik

With inevitable fluctuations in marine communities and resulting regulatory requirements, the Navy's management of marine species and habitats will evolve. Continued monitoring in the rocky intertidal realm ensures the Navy's natural resource personnel are able to manage these sensitive resources.



WHAT'S THE BUZZ WITH THE BEES?

In honor of 2015's National Pollinator Week, June 15-21, we added bees to share fun pollinator facts. For example, only a few types of bees sting humans, and male bees cannot sting at all; bumblebees vibrate their flight muscles to knock tomato, blueberry, and cranberry pollen onto their stigma; and the color or markings on a flower helps attract and guide insects to them for pollination. Bees are often attracted to bright blue and violet colors, hummingbirds like red, pink, fuchsia, or purple flowers and butterflies prefer bright colors such as yellow, orange, pink and red, as well as fragrant ones!

Pollinators often are keystone species, meaning they are critical to an ecosystem. Worldwide, there are over 200,000 species that serve as pollinators (mostly insects) for 1,000 different plants which need to be pollinated to produce the food, beverages, fibers, spices, and medicines we use every day. In the U.S. alone, honeybees and other insects pollinate \$40 billion worth of products every year, and worldwide, their value is estimated at \$117 billion! Products they help us enjoy include apples, bananas, blueberries, chocolate, coffee, melons, peaches, potatoes, pumpkins, vanilla, almonds, tequila, and more!



Source: *The Nature Conservancy*

Many pollinator populations have declined precipitously in the last decades, primarily due to the wide use of pesticides, competition from non-native bees and wasps, and habitat destruction. Even though about 50 species are now protected by the Endangered Species Act, it is vital that people help care for these amazing creatures so they do not disappear forever. Please visit www.pollinator.org to learn more how you can help.

THE IMPORTANCE OF PARTNERSHIPS

By Robert Lovich, PhD, DoD PARC Technical Representative



Partnerships are a vital and effective means of doing more with less. Long regarded as a benefit to the Military Services, reaching out to, and engaging partners with similar interests avoids doing all those nasty things we call “reinventing the wheel,” and turns it into “many hands make for light lifting.”

The Endangered Species Act (ESA) is the highest law in the United States for conserving and recovering species. However, living in an era where more species are threatened with, and succumbing to extinction, makes application of the ESA costly to the military, and dilutes the ESA efforts across all of our nation’s at-risk biodiversity. That is exactly where partnerships come into play, now more than ever.

For example, in 1993, the Flat-tailed Horned Lizard, of California and Arizona, was petitioned for listing by the US Fish and Wildlife Service (USFWS). Stakeholders across hundreds of thousands of habitat and two nations (MX and US) banded together to manage the lizard in perpetuity. Eighteen years later, the lizard has withstood three trips through the federal courts without being listed under the ESA. The partnerships that have kept this species from being listed remains one of the greatest voluntary conservation efforts for a reptile to date. Through dedicated efforts and funding directed to on-the-ground conservation and management, rather than to compliance documents for the National Environmental Policy Act (NEPA), the partners have shown how working together can achieve success.



Flat-tailed horned lizard (*Phrynosoma mcallii*) on Barry M. Goldwater Range West, AZ. Photo by Richard Whittle - DoD PARC Library

A more recent example is the Dunes Sagebrush Lizard. In 2012, a voluntary conservation agreement replaced the ESA listing package for this species, even though it appeared it would be listed imminently. This partnership avoided impacts to private landowners and industry in Texas, while simultaneously brokering voluntary conservation agreements.

On April 10, 2015, the USFWS announced its 90-day finding of a petition to list the Western Pond Turtle and found that it warrants a status review for listing under the ESA. The turtle occurs on several military installations throughout the western United States, and such a listing would be an additional compliance hurdle to navigate for military testing and training activities. The stage is set for stakeholders, military and otherwise, to consider a proactive multi-agency agreement or management strategy to preclude listing this species.

Partnerships have also helped listed species be down- or delisted. For example, last May, the Island Night Lizard was removed from the ESA. This historic achievement could not have



Western pond turtle (*Actinemys marmorata*) at Beale Air Force Base, CA. Photo by Chuck Carroll - DoD PARC Library

been accomplished without significant partnerships between the U.S. Navy and other stakeholders from the California Channel islands, where this species lives. Long-term management and conservation activities will be required, but without the need for costly and time-consuming permitting activities that a listing under the ESA brings.

The Mohave Desert Tortoise has been listed under the ESA since 1980, and occurs on numerous installations throughout its range in California and Nevada. The USFWS only recently formed long-term Recovery Implementation Teams (RITs) as part of the revised Recovery Plan for the species. The revised Recovery Plan and RITs were formed after decades of further population declines and little gain in species recovery. RITs are partnerships of relevant stakeholders that work collaboratively to plan, implement, track, and evaluating recovery actions. Such partnerships are seen as providing a greater chance of success in the recovery of the Mohave Desert Tortoise.



Dunes sagebrush lizard (*Sceloporus arenicolus*). Source: USFWS



Desert tortoise (*Gopherus agassizii*) on the move. Source: USFWS

The examples listed above and many more demonstrate how essential partnerships are to the success of wide-ranging and long-lasting conservation efforts. There are numerous partnerships for at-risk or other taxa listed under the ESA that directly benefit the military mission. The importance of such partnerships is supported by DoD leadership as well, as demonstrated by the recent endorsement of DoD’s Strategic Plan for Amphibian and Reptile Conservation and Management on Department of Defense Lands (“Strategic Plan,” visit [What’s Hoppin’ in DoD PARC](#)). This endorsement is the first by a department of the U.S. government, and formalizes a proactive approach to managing and conserving these taxa to avoid and minimize conflicts to the military mission. Not only is this sort of partnership vital to DoD, but it is also an example to our fellow federal agencies in paving the way for effective partnerships.

For more information on the DoD PARC partnership or any of the information above, please contact Chris Petersen or Rob Lovich or visit the [DoD PARC website](#).

NATURAL RESOURCES DOCUMENTS

Highlighted here are reports, fact sheets, spreadsheets, and presentations on the Natural Resources page of the [DENIX site](#). These documents are designed to provide direct benefit to the mission and installation Natural Resource Managers by transferring knowledge and results of high priority natural resources efforts.

Assessing BASH Risk Potential of Migrating and Breeding Ospreys in the Mid-Atlantic Chesapeake Bay Region (Project 08-292) – Articles

This project embarked on an innovative research effort to assess bird aircraft strike hazard (BASH) risk of breeding and migrating ospreys (*Pandion haliaetus*). Researchers attached satellite transmitters to adult osprey to track their breeding and migratory flight patterns. Geo-spatial analysis was used to evaluate specific osprey location data that had the potential to penetrate military training airspace and pose a threat to aviation safety and aircraft missions.

Identification and Status of Sensitive Bat Habitat Resources on MCAS Yuma, Barry M. Goldwater Range, and Yuma Proving Ground (Project 10-143) – Final Report, Publication, & Technical Report

The objective of this project was to identify potential bat roost structures on three southwestern DoD installations. The research team developed a landscape-scale Geographic Information System model that predicts areas of potential roosting habitat. Team members visited potentially suitable bat habitats and noted population size and species. Installations were able to use the information to plan military exercises and munition testing out of the proximity of roost sites and reduce conflicts between at-risk bat species and military missions.

Bird Strike Hazards and Mitigation Strategies for Military Rotary Wing Aircraft (Project 11-944) – Article

Researchers analyzed wildlife strikes with military rotary wing aircrafts to understand the nature and extent of this issue. To avoid these issues, researchers identified important patterns within wildlife strike data and provided recommendations to aircrews, mission planners, aircraft engineers, and airfield managers.

Nest-scale Habitat Use by Pinyon-Juniper Birds on Department of Defense Land (Project 12-425) – Presentation

This three-year study examined pinyon-juniper habitat use by two Species at Risk, Pinyon jay, and Gray Vireo, at three scales (landscape, territory/colony, and nest) on three installations. Project results included GIS habitat models and management recommendations for both species with consideration to military activities and infrastructure. The PowerPoint presentation of their findings from their three-year study, as presented at the American Ornithologists Union meeting in August 2014, is now available.

Accessibility for Outdoor Recreation Programs & Facilities on Military Installations (Project 12-624/13-624) – Fact Sheet

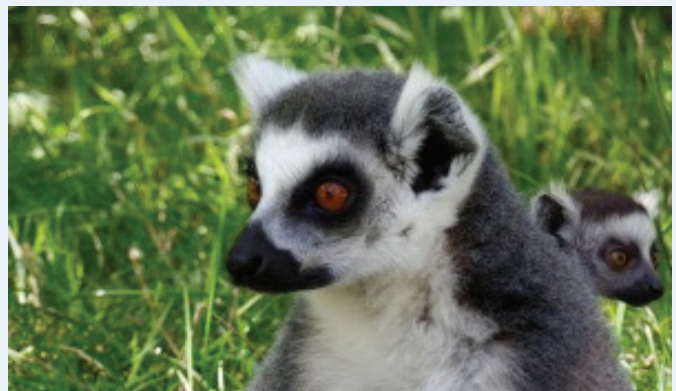
This three-day course provides a background and working knowledge of issues to address in order to increase accessibility to all people. Natural resource managers received instructions on how design and construction affect people with disabilities. The benefits of accessibility at developed recreation sites within military installations contribute to the mental and physical wellbeing of active duty personnel, families/dependents of military personnel and veterans. View the [Winter 2014-2015 issue](#) of *Natural Selections* to read about the training.

Evaluation of NSGL Proposed Actions for NEPA-NHPA Coordination Suitability (Project 13-520) – Fact Sheet & Technical Notes

This follow-on effort was based on the results of Legacy project 12-520 (Two for the Price of One: Integration of NEPA and NHPA Procedures) which was completed in September 2013. Project 12-520 examined how DoD installations combined the National Historic Preservation Act (NHPA) Section 106 and National Environment Policy Act (NEPA) processes. Project 13-20 tracks a case study on Building 103 at Naval Station Great Lakes as it follows recommendations and proposed guidelines for combining the processes.



The world's largest known pollinator is the Black-and-white ruffed lemurs. They open the flowers of the Traveller's Palm with their fingers and push their long snouts into the opened flowers to get that sweet nectar. When they do that, the flowers' pollen coats their fur. The lemur then transports the pollen to other flowers and fertilizes them.



Source: <http://www.coolkidfacts.com/pollination-for-kids/>

UPCOMING EVENTS CONFERENCES, WORKSHOPS, AND TRAINING

Most of the National Military Fish & Wildlife Association (NMFWA) 2015 Conference Workshop presentations are now available on the [NMFWA website](#). Visit the website and to explore the presentations.

Introduction to Remote Sensing for Conservation Managers

May 5, 12, 19, 26, and June 2, Web-based

Sponsored by NASA and free to participants, Applied Remote Sensing Training offers an overview of remote sensing, details on how to access and visualize relevant NASA Earth science data, and how to use these data for conservation and biodiversity issues. The five one-hour training sessions will focus on decision-making for land management professionals, and will discuss and demonstrate how satellite sensors, aircraft platforms, and access tools can be applied to habitat monitoring, animal movement and near-real time monitoring.

International Migratory Bird Day

May 9, Global

Celebrate the many ways in which birds matter to the earth, to ecosystems, and to us. Some bird species provide practical solutions to problems, such as the need for insect and rodent control. Others disperse seeds, helping to re-vegetate disturbed areas. Others are pollinators, ensuring that we have flowering plants, trees, and shrubs. Look for an [International Migratory Bird Day event](#) near you.

National Adaptation Forum

May 12-14, St. Louis, MO

The National Adaptation Forum is a biennial gathering created by a group of professionals from the private and public sectors concerned about the need to respond to, and prepare for, the effects of climate change.

Endangered Species Day--10th Anniversary

May 15, Nationwide

Recognize the national conservation effort to protect our nation's endangered species and their habitats. Zoos, aquariums, botanic gardens, wildlife refuges, conservation groups, national parks, museums, and schools throughout the country will hold tours, open houses, special presentations, exhibits, milkweed plantings/butterfly garden installations, habitat clean-ups/other restoration events, children's activities and more on May 15, that weekend and throughout May. See article [page 7](#), or [find an event near you](#).

International Day for Biological Diversity 2015

May 22, Global

The United Nations created the International Day for Biological Diversity to increase understanding and awareness of biodiversity issues. The theme for 2015 is *Biodiversity for Sustainable Development*, which reflects the importance of efforts made at all levels to establish a set of [Sustainable Development Goals](#) as part of the United Nations [Post-2015 Development Agenda](#) for the period of 2015-2030, and the relevance of biodiversity for achieving sustainable development.

National Fishing and Boating Week

June 6-14, Nationwide

This week highlights the importance of recreational fishing and boating. To learn about free fishing days in your state and other events, visit the [Recreational Boating & Fishing Foundation](#) website.

Pollinator Week

June 15-21, Nationwide

Pollinator Week promotes the importance of pollinators in our ecosystem. Events highlight and share the importance of pollinators, including bees, birds, butterflies, bats, and beetles.

Conference on Ecological and Ecosystem Restoration (CEER)

July 28-August 1, New Orleans, LA

CEER is a Collaborative Effort of the leaders of the National Conference on Ecosystem Restoration and the Society for Ecological Restoration. At the conference, ecological and ecosystem restoration scientists and practitioners address challenges and share information about restoration. CEER is an interdisciplinary conference that brings together scientists, engineers, policy makers, restoration planners, partners, non-governmental organizations, and stakeholders from around the world actively involved in ecological and ecosystem restoration.

LINKS OF INTEREST

AFPMB

The Armed Forces Pest Management Board (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 DoD operations.

CESU Network

The Cooperative Ecosystem Studies Unit (CESU) Network is a national consortium of federal agencies, tribes, academic institutions, state and local governments, and nongovernmental conservation organizations working together to support research, technical assistance, education, and capacity building. There are 17 CESUs which link DoD and other federal agencies, a host university, and partner institutions. One of the benefits of joining a CESU is a reduced, Network-wide Finance and Administration (i.e., overhead) rate of 17.5% for federal agencies.

DENIX

The DENIX Natural Resources home page is an electronic environmental network and information exchange that provides access to natural resources information, such as Executive Orders, policies, guidance, INRMPs, fact sheets, and reports.

DoD Biodiversity Handbook

On this website you will find a thorough introduction to biodiversity and how it applies to the military mission; the scientific, legal, policy, and natural resources management contexts for biodiversity conservation on DoD lands; and practical advice from DoD natural resources managers through 17 case studies.

DoD Invasive Species Outreach Toolkit

This site provides education and outreach materials to help DoD land managers communicate about invasive species. It contains modifiable outreach materials such as posters, brochures, reference cards, and a PowerPoint presentation. A list of resources to help identify information and funding sources also is included.

DoD Legacy Resource Management Program Tracker

The DoD Natural Resources (NR) Program funds high priority natural and cultural resources projects that have regional, national, and/or multi-Service benefits through the DoD Legacy Program. The Legacy Tracker lets users download fact sheets and reports for completed Legacy-funded projects.

DoD Natural Resources Program

DoD's NR Program provides policy, guidance, and oversight for management of natural resources on all land, air, and water resources owned or operated by DoD. The website offers information on DoD's natural resources initiatives, programs, presentations, and links to other DoD conservation and natural resources sites.

DoD PARC

DoD Partners in Amphibian and Reptile Conservation (PARC) is an inclusive 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.

DoD PARC Group and Photo Site, DoD PIF Photo Library, DoD Natural Resource Photo Library

The three sites are designed to share pictures, news, information, and ideas with the DoD Natural Resources, DoD PARC, and DoD PIF communities. Members may use the websites to download photographs for reports, Power Point Presentations, and educational materials such as brochures and posters. There is also a forum for posting questions to group members, a calendar listing upcoming events, and a library where reports and documents are stored.

DoD Partners in Flight

The DoD Partners in Flight Program supports and enhances the military mission while it works to develop cooperative relationships to ensure a focused and coordinated approach for the conservation of resident and migratory birds and their habitats.

DoD Pollinator Initiatives

This website provides an overview of pollinators and the reasons they are important to DoD. It contains fact sheets and technical reports, how-to guides, resource lists, and more describing some of the simple ways that people can help pollinators and their habitats.

REPI

Under Readiness and Environmental Protection Integration (REPI), DoD partners with conservation organizations and state and local governments to preserve buffer land and habitat around military installations and ranges as a key tool for combating encroachment. By promoting innovative land conservation solutions, REPI supports the military's ability to train and test at its lands now and into the future.

SERDP and ESTCP

Strategic Environmental Research and Development Program (SERDP) and Environmental Security Technology Certification Program (ESTCP) harness the latest science and technology to improve environmental performance, reduce costs, and enhance and sustain mission capabilities. They are independent DoD programs managed from a joint office to coordinate the full spectrum of efforts, from basic and applied research to field demonstration. SERDP and ESTCP, in conjunction with the Legacy Program, support readiness, quality of life, adherence to legal mandates, and responsible environmental stewardship of natural and cultural resources.



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