

Natural Selections

Department of Defense Natural Resources Program



CONTENTS

- 1 Spotlight: Camp Blanding Wins the 2018 Military Conservation Partner Award
- 2 Message from the NR Program
- 3 San Clemente Island (SCI): A Rare-Plant Success Story
- 4 Dynamic Recovery Plan Documents for Improved Regulatory Efficiency and Conservation Outcomes
- 5 Recovering Plants and Animals on DoD Lands
- 6 Conservation Partnership Celebrated as Black-Capped Vireo (BCVI) is Delisted
- 6 The Flat-Tailed Horned Lizard (FTHL): Example of a Lasting Partnership for DoD and Partner Stakeholders
- 7 New Collaborative Initiative Kicks Off with Workshop to Recover Least Bell's Vireo
- 8 Do You Know Where Species Live? Mapping Habitat of At-Risk Aquatic Species at Fort Pickett
- 8 Species Status Assessments (SSAs): A New Way of Conducting Business Under the ESA
- 9 Announcements
- 10 Biodiversity of Amphibians and Reptiles on DoD Lands
- 11 Coordinated Multi-Species Management Plans for High Priority Species at Risk on or Near DoD Lands
- 12 Golden-Winged Warblers (GWWA) on Fort Drum, NY
- 13 Managing Strategies for Species at Risk
- 13 DoD Project Highlights
- 14 Upcoming Events, Conferences, Workshops, and Training
- 15 Links of Interest



SPOTLIGHT: CAMP BLANDING WINS THE 2018 MILITARY CONSERVATION PARTNER AWARD

By Daniel Chapman and Marshall Williams, U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) awarded its 2018 Military Conservation Partner Award to Camp Blanding, Florida Army National Guard. Blanding earned the award for its exceptional conservation initiatives to help recover the endangered red-cockaded woodpecker (RCW) (*Leuconotopicus borealis*) and nearly two dozen other species at-risk of being listed under the Endangered Species Act (ESA). USFWS created this award in 2004 to recognize military installations that have accomplished outstanding work in cooperation with USFWS to promote stewardship goals on military lands. The award highlights the outstanding achievements resulting from collaborative conservation among DoD and USFWS. The May 30 award ceremony at the Camp Blanding Joint Base Center attracted leadership from DoD, USFWS, and the State.

"We are honored to be recognized for our efforts in military conservation at Camp Blanding," said Major General Michael Calhoun, the Adjutant General of Florida. "Our partnership with the U.S. Fish and Wildlife Service and Florida Fish and Wildlife Conservation Commission allows Camp Blanding to maintain its position as the premier training installation in the southeast while the Florida National Guard maintains its combat readiness and conserves Florida's native wildlife."



Representatives from USFWS and Camp Blanding at the 2018 Military Conservation Partner Award ceremony. Source: Marshall Williams

The Florida Army National Guard uses Camp Blanding, a 73,000-acre installation near Starke, FL, for light infantry training. The installation also houses non-flying units of the State's Air National Guard. Camp Blanding has successfully executed several wide-ranging and community actions to support stewardship and readiness objectives at the installation.

There also are initiatives at Camp Blanding focused on conserving flora and fauna, including longleaf pines, that serve as important habitat for various species. Installation personnel scrub and carefully burn more than 10,000 acres of longleaf pine to benefit fire dependent flora and fauna. Annual prescribed fires transform the thicket-laden, pine-heavy forests into a more natural and healthy habitat prized by tortoises, woodpeckers, and indigo snakes. Prescribed burning also provides a safer, more manageable environment for training.

By carving out cavities in trees for RCWs and routinely conducting prescribed burns to sustain the bird's longleaf pine habitat, the installation increased its number of RCW clusters from 14 in 2000 to more than 25 in 2018, exceeding its recovery goal for the species, and doing so ahead of schedule. Because Camp Blanding now has a stable population of federally endangered RCWs on base, personnel



RCW, like the one pictured here, occupy the longleaf forests of Camp Blanding. Source: USFWS

MESSAGE FROM THE NR PROGRAM

By Alison A. Dalsimer, Program Manager

Welcome to the summer 2018 edition of *Natural Selections*! In this issue, we highlight some of the many diverse efforts underway to manage threatened, endangered, and at-risk species (TER-S). Regular readers will know this but, for new readers, DoD has about 25 million acres of land across approximately 420 large military installations. Of these, 340 installations have resources significant enough to require active management through an Integrated Natural Resources Management Plan (INRMP). INRMPs allow installations to balance mission, stewardship, and recreational land use while ensuring that personnel manage the resources to enable readiness activities and maximize operational flexibility.



The coastal marshes of Camp Lejeune in North Carolina are home to valuable natural resources that enable military readiness.

So, why the emphasis on TER-S? Well, globally, one in four mammals, one in eight birds, one third of all amphibians, and 70% of the world's plants are considered biologically rare or endangered. For DoD, whose lands contain a wide variety of increasingly rare ecosystems, the biological cornucopia includes nearly 450 federally-listed plants and animals, and over 550 more species at-risk of needing listing protections. Of these 1,000 species, over 60 exist only on DoD lands. Balancing conservation objectives with mission requirements can be challenging.

To face this challenge, the DoD Natural Resources Program has made it a priority to recover listed species and prevent new species listings. By working collaboratively with partners both on and off our installations, we have engaged in numerous efforts to help achieve these goals.

We also are working to promote proactive and innovative conservation and regulatory solutions that provide greater mission flexibility, while continuing to achieve significant conservation outcomes. For example, last month, the Assistant Secretary of Defense for Energy, Installations & Environment, Mr. Lucian



DoD conservation efforts can help prevent federal listing of at-risk species like the Washington ground squirrel. Source: Washington Department of Fish and Wildlife

Niemeyer, signed a Memorandum of Understanding with the Department of the Interior establishing the Recovery and Sustainment Partnership (RASP) Initiative – recovering species to sustain our mission. Through this new partnership we will work with Department of the Interior and U.S. Fish and Wildlife Service leadership to promote and enable collaborative partnerships to benefit DoD's mission and species conservation and recovery.

The bottom line is that healthy natural landscapes are critical to DoD's mission success since our testers, trainers, and operators require high quality, natural areas, free of legal and environmental encumbrances, to conduct readiness activities. This edition of *Natural Selections* features actions that have facilitated de-listings, others that are working proactively to prevent species listings, and initiatives that highlight the incredible importance of partnerships. All these efforts support our warfighters, and those efforts make a difference – as do the dedicated natural resources staff who do the work.

If you are interested in finding out more about DoD's conservation efforts and how they support the military mission, I hope you will attend the upcoming Sustaining Military Readiness conference (August 13-16) in St. Louis. The event, which is free to attend, will bring together personnel from across the pillars – range and operations, test and evaluation, and conservation – to share ideas, information, technology, and perspectives (www.smrconference.org).

As always, thanks for all your hard work!

(Camp Blanding Wins the 2018 Military Conservation Partner Award, continued from page 1)

are donating juvenile birds to other wildlife areas and helping translocate additional birds to regions across the South that haven't met their USFWS-suggested goals. Camp Blanding and its partners also helped boost RCW populations in neighboring, off-base forests, which further helps the species recover.

Another species at-risk, the gopher tortoise (*Gopherus polyphemus*), also resides on Camp Blanding. Nearly two-thirds of the Florida Army National Guard base is prime habitat for the gopher tortoise. To protect the tortoises, Camp Blanding personnel translocated individuals from live-fire zones to a nearby conservation preserve where individuals can safely live out their days.

Florida, and particularly Camp Blanding, helped create conservation corridors to allow wide-roaming species suffering from habitat reduction, such as the Florida black bear (*Ursus americanus floridanus*), to expand its population and habitat range. Camp Blanding is a key component linking the Ocala National Forest in central Florida to the Osceola National Forest and Okefenokee National Wildlife Refuge in northern Florida, and further north into eastern Georgia.



Camp Blanding bear cubs examined by FWC biologists. Source: Florida Fish and Wildlife

DoD, USFWS, and the Florida Fish and Wildlife Conservation Commission (FWC) signed a Candidate Conservation Agreement with Assurances (CCAA) last year to boost Camp Blanding's conservation efforts and keep nearly two dozen at-risk fish and wildlife species off the ESA's list of protected species. Landowners near the installation, under the CCAA, voluntarily commit to conservation actions to help stabilize or restore a plant or animal which helps to preclude the need to list a species as threatened or endangered under the ESA. In return, DoD gets regulatory certainty and a promise that even if a plant or animal is added to the threatened or endangered species list, training may continue.

Camp Blanding provides consistent recreational access to fishermen and women and hunters, especially those with disabilities and wounded military veterans. This is one of the top priorities for the Secretary of the Interior, Ryan Zinke. Those who visit the installation can seek whitetail deer, wild hogs, and turkeys.

"Camp Blanding truly understands that wildlife conservation and military readiness are indeed compatible," said Michael Oetker, USFWS's Acting Regional Director in the Southeast. "This award underscores the base's commitment to protecting nature and the American people."

SCI: A RARE-PLANT SUCCESS STORY

By Bryan Munson, Naval Base Coronado

San Clemente Island (SCI) is one of the eight Channel Islands located off the coast of Southern California. These islands are often called the "Galapagos of North America" due to the dozens of rare and endemic species found nowhere else on earth. Due to its isolation and geographical orientation, SCI is botanically the most unique of the eight islands, with 15 plant taxa found only on that island. SCI is also the only Military installation in the contiguous U.S. that supports ship to shore, air to shore, and ground to shore live fire training exercises. For years, the Navy has actively managed SCI to maintain the realistic habitats that these military activities require by promoting recovery of the endemic taxa and restoring SCI's unique biodiversity,

SCI's sensitive and endemic taxa came under assault in the early 19th century when settlers released goats and other herbivores on the island. These animals ate virtually all accessible plants, obliterating the endemic and sensitive plant taxa. When the Navy acquired the island in 1934, it began removing the feral herbivores to minimize threats to native plants and animals. Navy personnel removed over 29,000 feral goats and pigs, eradicating them from the island by 1991.

Since the removal of the goats, the Navy continues to fund soil erosion control, invasive non-native plant species control, and restoration projects to augment the dramatic recovery of the six federally listed plant taxa on SCI and federally and state listed wildlife that had declined due to habitat loss and degradation inflicted by more than a century of overgrazing. Rare plant surveys document a recovery that has been remarkable in its success. For example, the SCI Indian paintbrush (*Castilleja grisea*) and the SCI bush mallow (*Malacothamnus clementinus*) were some of the first plants listed under the ESA in 1977.



Once at-risk of extinction, the SCI Indian paintbrush is now widespread across SCI. Source: Anna Braswell/USFWS

At the time of its listing, the SCI Indian paintbrush was only found on steep cliffs that were inaccessible to goats. Today, although the SCI Indian paintbrush is still listed as threatened under the ESA, it is widespread across the island. The plant is so numerous it is difficult to count, but surveyors estimate there are roughly 40,000 SCI Indian paintbrush across the island.

In 1977, the federally endangered SCI bush mallow was known from only one individual in the entire world! Today, this plant is found across the island, with about 5,000 individuals documented. These two species, along with the SCI larkspur (*Delphinium variegatum* ssp. *kinkiense*) and the SCI lotus (*Acmispon dendroideus* var. *traskiae*), have recovered so significantly in the past four decades that the Navy is hoping to have them delisted from the ESA in the near future.



USFWS has recommended downlisting the SCI bush mallow due to its recovery and ongoing Navy management. Source: San Diego State Soil Ecology and Restoration Group

Another remarkable recovery on SCI is the rediscovery of California dissanthelium (*Dissanthelium californicum*). Researchers presumed this small, diminutive grass had been extinct for almost 100 years; it was not seen on SCI from 1912 until it was rediscovered in 2010 in a training area used by Navy Sea, Air, and Land Teams (SEALs). The grass appeared to benefit from the moderate disturbance that the training provided since it was found in areas of vegetation that were recently opened by foot traffic. At the time of its rediscovery, the plant was found only in two small locations on SCI. To help ensure the long-term survival of this species, the Navy proactively funded restoration projects that created additional populations. The projects were highly successful, and there are eight self-sustaining populations on the island today.

These remarkable recoveries are happening in conjunction with increased training on SCI. As ranges around the world are closing, training on SCI becomes increasingly important. Navy SEALs, U.S. Pacific Fleet, Marine Corps, Coast Guard, and many other organizations rely on SCI to meet their training requirements. Much of this training requires large tracts of open

space. In fact, a vast majority of SCI is open space or buffer areas for the multiple training areas on the island. This open space not only supports training initiatives, but also provides a refuge for these plants to continue their recoveries. The Navy continues to fund erosion control, invasive plant control, and native plant restoration efforts, and conducts ongoing monitoring of sensitive, endemic species. The continued recovery of at-risk plants and native plant communities on SCI is a win-win situation. In addition to providing ecosystem-wide benefits, it enhances training realism by providing diverse vegetation conditions that support a broader range of training scenarios and reduces regulatory encumbrances on the military mission by easing training restrictions.

DYNAMIC RECOVERY PLAN DOCUMENTS FOR IMPROVED REGULATORY EFFICIENCY AND CONSERVATION OUTCOMES

By Jacob Malcom, Center for Conservation Innovation, Defenders of Wildlife; and Ya-Wei Li, Environmental Policy Innovation Center

The eastern indigo snake (*Drymarchon couperi*) is the largest native snake in the U.S., reaching up to 9 feet in length. It lives on over a dozen military installations in the Southeastern U.S. and has been listed as a threatened species under the ESA since 1977. In 1982, scientists compiled information about the species, including threats against it, into a recovery plan. The USFWS has not updated the plan even though threats to the species and its conservation status have changed substantially.

The outdated recovery plan for the eastern indigo snake is not an anomaly. The median ESA recovery plan is over 20 years old, and every plan to-date is a static hard copy document. Additionally, one quarter of listed species have no recovery plan. Natural resources managers can maximize opportunities by integrating up-to-date information into recovery plans to inform conservation management and decisions. Modernizing species recovery plans facilitates communication and information sharing, making species management more adaptive and cost effective.



An eastern indigo snake (*Drymarchon couperi*) at Fort Stewart, Georgia. Source: Chris Peterson

With funding from the Department of Defense (DoD) Legacy Program, and in collaboration with staff at USFWS, Defenders of Wildlife is developing the first web-based recovery plan for a listed species, the eastern indigo snake. The core recovery plan, which will be a 10- to 15-page document laying out the recovery criteria, estimated cost, and timeline, will remain static once the public has commented on it, but will be readily available in web format. The other components of the recovery plan, the Species Status Assessment (SSA) and the Recovery Implementation Strategy (RIS), are dynamic, and will change as new information is added.

The SSA, which summarizes the known biology and status of the eastern indigo snake, is the first portion of the plan. It will be tightly integrated into all parts of ESA implementation for the species, such as ESA Section 7 consultations. This means that agencies like DoD will have access to the most up-to-date information - the exact same information on which USFWS bases their decisions - to plan species management actions for greatly improved efficiency. The RIS is the second living component

of the online dynamic recovery plan; it provides an up-to-date, detailed multi-step list of the actions needed to recover a species. In addition to specifically laying out recovery details, the RIS will offer a simple way for conservation partners to share what they have accomplished. For example, the installations will be able to more easily document for USFWS the conservation measures it carries out for the eastern indigo snake, and receive recognition for those actions.

The next-generation, three-piece dynamic recovery plan that is now under development will support ESA requirements, provide near real-time information about a species to the public, and facilitate stronger partnerships among all stakeholders. Dynamic web-based recovery plans will enable DoD natural resources managers to connect with their conservation partners to proactively manage and recover listed species. A win-win for all vested parties: the eastern indigo snake, DoD, and USFWS will all benefit from this new approach to creating and using recovery plans. These plans are a model for conservation and species recovery across the country in coming years.

RECOVERING PLANTS AND ANIMALS ON DOD LANDS

Thanks in large part to the ongoing work of DoD natural resources managers, the USFWS is proposing the downlisting or delisting of several listed species while keeping others free of federal listing protections. These actions reflect DoD's continued commitment to species protection while also representing a huge win for military readiness. For example, the Army opened access to 50,000 acres of training lands at Fort Hood as a result of the BCVI (*Vireo atricapilla*) delisting.

Strong partnerships at installations where DoD natural resources managers work closely with USFWS to manage species at a landscape level have been integral to species recovery. For example, DoD and USFWS are working cooperatively across installation lines at Eglin Air Force Base (AFB) where DoD is relocating gopher tortoises onto the installation grounds to prevent the species from being listed. Meanwhile, Fort Huachuca natural resources managers have prioritized management of the agave, saguaro (*Carnegiea gigantea*), and organ pipe cacti (*Stenocereus thurberi*) that lesser long-nosed bats (*Leptonycteris yerbabuena*) rely on to help the bats rebound.



DoD efforts contributed to the downlisting of species like the Hawaiian goose (Nene) (*Branta sandvicensis*). Source: Jorg Hempel

Below is a list of species and installations benefiting from DoD's conservation efforts.

SPECIES	ACTION	INSTALLATIONS
Hawaiian Goose (Nene)	Proposed downlisting to threatened	Koikee Air Force Station, Keaukaha Missile Range, Pohakuloa Training Area, Schofield Barracks, Ukumehame Firing Range, and Pacific Missile Range Facility Barking Sands
BCVI	Delisted	Joint Base San Antonio Camp Bullis, 63rd Reserve Center, Camp Bowie, Fort Hood, Fort Sill
Kirtland's Warbler	Proposed delisting	Camp Grayling
Lesser Long-nosed Bat	Delisted	Barry M. Goldwater Range, Fort Huachuca, Marine Corps Air Station Yuma
Washington Ground Squirrel	ESA Listing prevented	Naval Weapons Systems Training Facility Boardman
FTHL	ESA Listing prevented	Naval Air Facility El Centro, Barry M. Goldwater Range
Island Night Lizard	Delisted	Naval Auxiliary Landing Field San Clemente Island

CONSERVATION PARTNERSHIP CELEBRATED AS BCVI IS DELISTED

By Lesli Gray, USFWS; and Heather Graham-Ashley, Fort Hood Sentinel

Fort Hood and its conservation partners celebrated the black-capped vireo (BCVI) removal from the list of federally endangered and threatened species on May 16, 2018. The resurgence of this small song bird that nests and breeds in the shrublands of the installation's training areas illustrates the benefits of conservation partnerships that sustain military readiness and promote sound habitat stewardship.

The BCVI is the smallest member of the vireo family. It occurs regularly in the U.S., and winters exclusively in Mexico along the Pacific Coast. Sporting a namesake black cap and white face mask, BCVIs build intricate nests two to four feet above the ground using spiderweb strands to attach their nests to shrub branches. They return to the same breeding site year after year.



Black-capped Vireo. Source: Fort Hood DPW, Natural and Cultural Resources branch

The USFWS listed the BCVI as endangered in 1987 primarily due to the impacts of habitat loss and nest parasitism by brown-headed cowbirds (BHCO). BHCOs dupe BCVIs into raising BHCO chicks at the cost of their own young's survival. Robust conservation efforts led by USFWS and Fort Hood led to the vireo's recovery. Across Texas and Oklahoma, USFWS worked with the U.S. Army, U.S. Department of Agriculture, Oklahoma Department of Wildlife Conservation, Texas Parks and Wildlife Department, The Nature Conservancy, Environmental Defense Fund and others to conserve BCVI habitat and address primary threats to the species. Natural resources managers at Fort Hood manage BHCO populations and use prescribed fire to restore BCVI habitat.



A brown-headed cowbird egg laid in a songbird nest. Source: Missouri Department of Conservation

There are now more than 14,000 individual vireos across the bird's breeding range in Oklahoma, Texas, and Mexico. Because of the vireo population increase, USFWS fully lifted training restrictions that it had previously imposed on Fort Hood to protect the formerly-endangered songbird. Fort Hood soldiers now have access to more of the training land necessary to maintain readiness.

Using a SSA, which is a focused, repeatable, and rigorous assessment of a species' ability to maintain self-sustaining populations over time, researchers found that management efforts have adequately supported the BCVI. To ensure populations remain healthy and stable, USFWS developed a post-delisting monitoring plan with Fort Hood, Fort Sill, the states of Texas and Oklahoma, and The Nature Conservancy of Texas. The plan describes methods to cooperatively monitor the vireo and its habitat for 12 years. It also provides a strategy for identifying and responding to any future population declines or habitat loss.

At Fort Hood, balancing the Army's needs with sound environmental stewardship is critical for maintaining the BCVI population and recovering other endangered species (e.g., golden-cheeked warbler). Natural resources managers at the installation will continue prioritizing species conservation so Soldiers can continue training with maximum flexibility.

FTHL: EXAMPLE OF A LASTING PARTNERSHIP FOR DOD AND PARTNER STAKEHOLDERS

By Rob Lovich, Naval Facilities Engineering Command Southwest

We live in an era when biodiversity declines are unrivaled in human history, with as many as 30%-50% of species at risk of extinction by mid-century. Globally, plants and animals are disappearing faster than scientists can catalogue and understand them. DoD is tasked with balancing species diversity, despite species declines, and providing healthy landscapes for military testing, training, and operations. To meet this objective, DoD has found that innovative and lasting partnerships are required to manage and conserve species. One successful partnership focuses on the flat-tailed horned lizard (*Phrynosoma mcallii*) (FTHL), an icon of the lower Sonoran Desert of southern California, Arizona, and Baja California, Mexico.

The FTHL has the smallest range of any horned lizards in the U.S., and occurs in some of the lowest, hottest, and driest desert habitats in the southwestern United States. It is thin-bodied with long legs and the longest horns of any horned lizards, all adaptations for regulating temperature. A stout, large-bodied horned lizard would trap too much heat to survive where ambient temperatures commonly exceed 120 degrees Fahrenheit. The FTHL range is also home to significant agricultural industry in the lower Coachella Valley and Imperial Valley of California, off-highway vehicle recreation areas, state parks, municipalities and, of course, military lands. The FTHL occupies approximately 153,000 acres of training lands on Naval Air Facility El Centro and the Barry M. Goldwater Range West.

In the 1980s, the conservation community was concerned that the vast areas of desert where FTHL occur were declining, and characterized the FTHL in danger of becoming threatened or endangered. The FTHL became a category 2 candidate for listing under the ESA in 1982. Concurrently, stakeholders in the region began conversations about how to manage multiple land uses and sustain the FTHL in perpetuity.



An FTHL in the Sonoran desert. Source: Paul Block

In 1997, the USFWS, Bureau of Land Management, Bureau of Reclamation, Marine Corps Air Station Yuma, Naval Air Facility El Centro, Naval Facilities Engineering Command Southwest, Arizona Game and Fish Department, and the California Department of Parks and Recreation signed a voluntary long-term Interagency Conservation Agreement (ICA) to implement a FTHL Rangewide Management Strategy (RMS). These agencies comprise the Interagency Coordinating Committee (ICC) and the Management Oversight Group (MOG), both of which implement the RMS. The overall goal of the RMS is to “maintain self-sustaining populations of FTHL in perpetuity.”

Fast forward 20 years, and the FTHL RMS and member agencies have successfully reached their conservation goals. Population monitoring indicates there are robust populations throughout the species’ range, and land disturbance impacting the FTHL habitat has been minimal. In addition, several stakeholders have incorporated the management strategy into National Environmental Policy Act and land use plans. As a direct result of this collaborative partnership, the FTHL has not been listed under the ESA despite three listing petitions. RMS members monitor the species annually, devote significant resources to and enforcement of the RMS, and conduct a wealth of science and research for the benefit of management and understanding of FTHL conservation. Throughout the inter-agency partnership, DoD’s testing, training, and operational activities continue in tandem with FTHL management and conservation.

The FTHL is a tremendous example of what partnerships can accomplish. Leadership support, including training and resources for technical experts, was integral to this partnership’s success. Additionally, successes can be attributed to the continuing support of ICC and MOG personnel, as well as member passion and involvement. DoD intends to continue supporting the FTHL and to meet challenges of species conservation. The FTHL’s success can serve as a template for implementing proactive partnerships with real conservation goals for other imperiled species across DoD lands.

NEW COLLABORATIVE INITIATIVE KICKS OFF WITH WORKSHOP TO RECOVER LEAST BELL'S VIREO

By Tad McCall and Stephanie Hertz, Texas A&M Natural Resources Institute

The Collaborative Wildlife Protection and Recovery Initiative (CWPRI) is a voluntary, informal partnership among federal agencies and non-governmental partners to recover listed species and prevent new species listings. DoD is actively participating in CWPRI, focusing on maintaining military readiness by leveraging the conservation programs of other CWPRI parties working beyond installation boundaries.

CWPRI began with a verbal agreement of cooperation in 2016 between the Army Corps of Engineers and the Office of the Secretary of Defense. Between mid-2016 and 2018, CWPRI developed its approach, added members, and vetted locations and species for collaborative engagement. By early 2018, the CWPRI roster had grown to include the Army, Navy, Marine Corps, Air Force, Bureau of Land Management (BLM), Bureau of Reclamation, Forest Service, Natural Resources Conservation Service, USFWS, National Fish and Wildlife Foundation, Defenders of Wildlife, and the American Bird Conservancy.



CWPRI Conservation Workshop on Least Bell's vireo in Carlsbad, CA, 2018. Source: Stephanie Hertz

The collective conservation authority and scope of land interests held by CWPRI’s partners facilitates species protection across both public and private lands while also enabling each of the partners to effectively execute its mission. The collective authority within CWPRI will help DoD protect testing, training, and operational space by targeting recovery actions on non-DoD lands and linking those conservation gains to DoD.

The Southwestern U.S., home to many important military installations and riparian species, became the focal point for CWPRI’s initial collaboration. The least Bell’s vireo (*Vireo bellii pusillus*) is a high priority species in the region for many of the partners, so that species became the logical pilot species for the partnership.

The first CWPRI field workshop at the USFWS Carlsbad Field Office in Carlsbad, California, took place April 24-26. At the workshop, the CWPRI partners discussed approaches to maximize their collective efforts including the benefits of a habitat suitability model, species status assessment, range-wide monitoring program, and cowbird and invasive species management plans. The workshop generated agreement amongst partners to pursue an integrated blend of short-, middle-, and long-term actions to support the least Bell’s vireo population and recover the species. The short-term actions will include contacting additional partners, identifying funding available to support the effort, and assigning leads for early actions that can quickly “move the needle” towards species recovery.

Another short-term early action that will guide the partners throughout is an ESA Range-wide Section 7(a)(1) Framework for the least Bell's vireo. CWPRI has chosen the ESA Section 7(a)(1) framework to increase regulatory flexibility, decrease regulatory conflict and delays, and streamline the ESA Section 7(a)(2) consultation process for individual agency projects. The framework will serve as a landscape-level strategic plan that can benefit other species that share habitat with the least Bell's vireo and serve as a template for collaborative conservation efforts across the U.S. The goal is to prove that by acting together, federal partners can effectively and efficiently recover species by selecting approaches that simultaneously strengthen each agency's capacity to meet its mission.

DO YOU KNOW WHERE SPECIES LIVE? MAPPING HABITAT OF AT-RISK AQUATIC SPECIES AT FORT PICKETT

By Paul Ayers, University of Tennessee

Species at-risk require habitat-based protection to survive. However, agencies can provide habitat protection only after identifying the existence and location of such habitats, which is not always easy. For example, in the case of the Roanoke logperch (*Percina rex*) and the Atlantic pigtoe (*Fusconaia masoni*), researchers developed novel techniques to locate the species' aquatic habitat.



The Roanoke logperch (*Percina rex*) is found in the Nottoway River at Fort Pickett. Source: North American Native Fishes Association

The endangered Roanoke logperch and at-risk Atlantic pigtoe are found within the Nottoway River that runs through Fort Pickett in Virginia. Fort Pickett personnel rely on the intact river habitat for testing and training activities. Access limitations caused by the further decline of either species could adversely impact military readiness on the installation. Installation personnel need to understand the aquatic habitat of these fish to protect them and maintain full access to the river. Researchers designed DoD Legacy Program project 15-776 to help map every foot of the river system, identifying site-specific and total amounts of optimal species habitat.

The researchers used technology on their watercraft to collect data on water depth and determine riverbed material and flow characteristics (e.g., speed, direction, uniformity) of portions of the Nottoway River. Documenting conditions along the river allowed researchers to identify aquatic habitat supporting the Roanoke logperch and Atlantic pigtoe. Researchers also used a kayak-mounted underwater video mapping system to collect georeferenced video images. Each video recorder captured real time video footage simultaneously with GPS data. Video

mapping provided researchers with an image of river bed and water characteristics (e.g., pool, run, riffle). From these maps and data, researchers can identify stretches of river that have the clear, rocky characteristics preferred by the species.



Researchers mapped the Nottoway River with the help of kayak-mounted cameras. Source: Paul Ayers

Through the project, researchers created a comprehensive database of information pertaining to the aquatic habitat conditions on the Nottoway River through Fort Pickett. The wealth of data collected will help the Army determine how to avoid compromising these at-risk species while continuing to use the Nottoway River. Additionally, DoD natural resources managers can access this database to inform species planning and management decisions. This model of river-wide planning and data sharing can be applied to other rivers on DoD lands and elsewhere, furthering a holistic management approach that helps DoD sustain readiness.

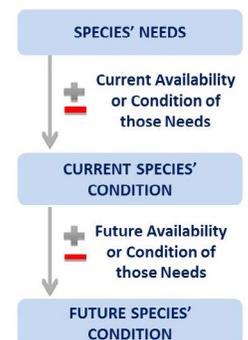
This DoD Legacy funded effort provides a new method for natural resources personnel to observe aquatic species habitats and record data. The Military Services can use this approach across any installation to better manage these habitats, ensuring species at-risk have the resources they need to survive, which, in turn, better enables installations to sustain the testing, training, and operational mission.

SSAS: A NEW WAY OF CONDUCTING BUSINESS UNDER THE ESA

By Michael E. Marshall, Region 4, USFWS

USFWS developed the Species Status Assessment (SSA) framework, an analytical tool to communicate scientific information necessary to inform decisions for specific fish, wildlife, and plants protected under the ESA. DoD can use this framework to better understand and inform species management activities. USFWS is confident that focused, repeatable, and rigorous scientific evaluations conducted through the SSA framework will lead to better assessments; clearer and more concise documents; and improved, transparent decision-making.

Species Status Assessment Framework



The steps of the SSA framework. Source: USFWS

continued on page 10

ANNOUNCEMENTS

Just Released — Legacy Program RFP!

The DoD Legacy Resource Management Program (Legacy) released its Fiscal Year (FY) 2019 Request for Pre-Proposals (RFP). Legacy provides funding to high priority projects that foster mission sustainment while promoting long-term stewardship of our nation's natural and cultural heritage. All projects must address at least one of the specified Areas of Emphasis and support the mission-relevant priorities that form the basis of DoD's Natural and Cultural Resources Programs. The FY19 RFP solicits projects that will support mission priority species (listed in Appendix A of the RFP) and focuses on plans of action.



Because the Legacy Tracker is offline and will not be functional until January 2019, applicants should populate a [fillable form](#) and submit it by August 24, 2018 via e-mail to dodlegacy@azimuth-corp.com. For more information, visit <https://www.denix.osd.mil/legacy/home/>. The full RFP is available at <https://www.denix.osd.mil/legacy/home/homepage-documents/fy18-request-for-pre-proposals-and-areas-of-emphasis/>.

WEBINAR: Informing Restoration Programs for Threatened and Endangered Plant Species

Dr. Erin Questad and Matthew Hohmann will present their projects, *Habitat Suitability Modeling for Restoration and Reintroduction and Operational-Scale Demonstration of Propagation Protocols and Comparative Demographic Monitoring for Reintroducing Five Southeastern Endangered and At-Risk Plants*. These projects examined the threats to listed plants and the management tools natural resources managers can use to increase species success.

Presenters will discuss how their research can help natural resources managers delay or preclude the need for ESA listing and help with species delisting/down-listing.



The Habitat Suitability Modeling was used to guide reintroduction efforts at the Pohakuloa Training Area on the island of Hawai'i. This Hawaiian mintless mint (Haplostachys haplostachya) is listed as a federally endangered species and is currently found only within the Pohakuloa Training Area. Research scientists hope to find ways to restore and protect this and other threatened species on the Hawaiian Islands. Source: Amanda Uowolo, Forest Service

This webinar is part of the SERDP/ESTCP webinar series. The webinar series targets DoD and Department of Energy practitioners, the regulatory community and environmental researchers with the goal of providing cutting edge and practical information that is easily accessible at no cost.

The webinar will be held September 6, 2018 at 12PM ET (9AM PT). To register visit the [SERDP/ESTCP webinar site](#).

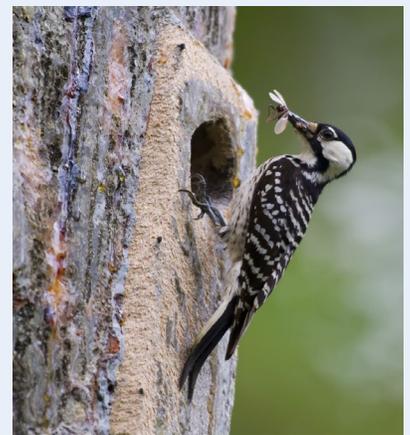


An operational-scale demonstration was executed of recently developed protocols for propagating and reintroducing an endangered (Lysimachia asperulifolia) plant species found on multiple southeastern installations. Source: James Henderson, Gulf South Research Corporation

ESA Implementation Online Training Course

The ESA Implementation Online Training Course highlights the DoD Components' responsibilities for complying with ESA requirements on installations. During the course, participants learn about important topics such as [ESA Section 7 consultations](#), critical habitat designations, and major sections of the ESA. The course also explains how the ESA relates to the [Marine Mammal Protection Act](#), [National Environmental Policy Act](#), and [Administrative Procedure Act](#), including creating and maintaining a complete Administrative Record.

Through case studies, course participants learn strategies for facilitating regulator and stakeholder cooperation while protecting natural resources in ways that ensure no net loss in mission capability. Specific case studies include red-cockaded woodpecker management on Army lands, a USFWS consultation for U.S. Marine Corps build-up on Guam and the Mariana Islands, and Air Force coordination with a USFWS liaison to manage forest structure and expand red-cockaded woodpecker colonies.

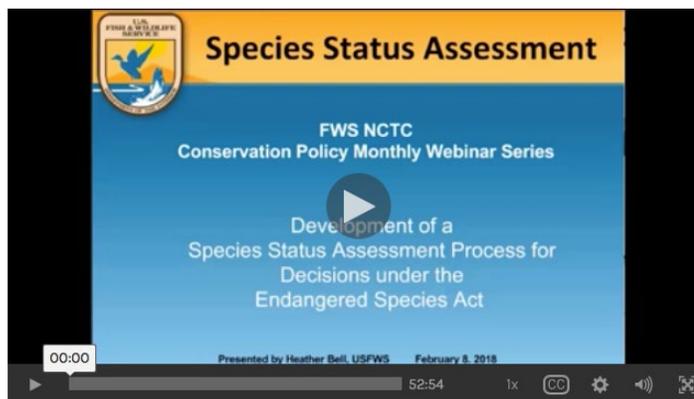


An RCW feasts on a bug. Source: USFWS

This course is approved by DoD, the Military Services, and the Deputy General Counsel (Environment, Energy & Installations), and is available online to those with access to the secure side of the [DoD Environment, Safety and Occupational Health Network and Information Exchange](#).

(SSAs: A New Way of Conducting Business Under the ESA, continued from page 8)

The SSA is a biological risk assessment that provides rigorous scientific information to decision makers about specific species needs. It provides decision makers with a description of species status, focusing on the likelihood that the species will sustain populations under current conditions, and describes uncertainties the species face. The SSA is a living document that follows each plant and animal over the course of its time on the ESA list. When new information becomes available, there is no need to start over as USFWS can now update the existing SSA. The SSA does not directly result in a decision, but it enables decision makers to evaluate each species against procedures outlined in the ESA. This new process can help DoD and other agencies get species information more quickly, and adjust management strategies as necessary.



Video presentation of the Development of the SSA process. Source: USFWS

Using the SSA framework, USFWS considers what a species needs to maintain viability. In a nutshell, a viable species has highly resilient populations distributed across its range, and within areas known to be important for future adaptation. To determine viability, USFWS characterizes the species in terms of its resilience, representation, and redundancy (the 3 Rs).

Resilience describes the ability of populations to withstand random disturbances. For example, the more active RCW clusters there are in a population, the more likely that population is to withstand a fire.

Representation describes the species' ability to adapt to changing environmental conditions, as characterized by the amount of genetic and environmental diversity within and among populations. For instance, different ecoregions have different dominant pine trees and vegetative communities. These ecoregion features have the potential to exert different adaptive pressures on RCWs.

Redundancy is about spreading risk, and describes the species' ability to withstand catastrophic events. For the RCW, it would help to have many small to moderate populations, or one or two large populations in south Florida that could withstand the effects of a catastrophic hurricane.

Collaboration is key to the SSA framework. Outside experts provide input and review documentation at multiple points during the drafting process. Experts come from local, state, and federal agencies, as well as from academia and industry. All must have some level of expertise with the particular plant or animal they are evaluating.

All current and future ESA decisions now must rely on information from an SSA. USFWS expects to see even greater benefits from this process as they determine exactly how to prioritize and write SSAs for ESA products that do not necessarily end in a decision point. For example, USFWS can simply insert the SSA with any additional details for a Biological Opinion rather than rewriting all components when new details become available.

The SSA framework will facilitate DoD readiness and help ensure uninterrupted testing and training. Understanding a species' status and its potential for listing means DoD and other agencies can begin pre-listing and recovery management actions while the plant or animal is still at risk, but not yet listed. For the already listed RCW, DoD and USFWS co-funded researchers at Virginia Tech to lead the development of an SSA for the RCW in Region 4. The SSA will offer USFWS a fresh look at the RCW's status, and perhaps provide a new vantage point from which to base future conservation and management to provide greater mission flexibility at installations.

BIODIVERSITY OF AMPHIBIANS AND REPTILES ON DOD LANDS

By Chris Petersen, Rob Lovich, Sarah Stallings and John Himes; DoD Partners in Amphibian and Reptile Conservation (DoD PARC)

DoD plays a critical role in maintaining biodiversity on its lands. Even though DoD lands comprise only 5% of the total federal land area, they include 82.6% of the diversity of ecosystems in the contiguous U.S. To protect the herpetofauna (amphibians and reptiles) biodiversity found on these lands, DoD PARC provides leadership, guidance, and support for the conservation and management of amphibians and reptiles. Their work provides the tools to protect species, operational activities, and the logistical flexibility necessary for testing and training exercises.

In 2017, DoD PARC completed an inventory of the amphibians and reptiles on 415 DoD properties in the continental U.S. Researchers found that 66% of all native herpetofauna species in the continental U.S. are present on DoD lands, a total of 440 species confirmed and 86 species unconfirmed but potentially present on installations. In addition, military lands are home to 24 species/subspecies of federally-listed and 70 at-risk amphibian and reptile species.



Gopher frogs on several southeastern DoD installations. Source: Chris Peterson

The DoD PARC data also show that 24 of the 58 (41 percent) federally-listed species/subspecies of amphibians and reptiles in the continental U.S. are confirmed present on 61 DoD properties. The most frequently documented federally-listed species on DoD sites is the loggerhead sea turtle (*Caretta caretta*); however, the eastern indigo snake (*Drymarchon couperi*), green sea turtle (*Chelonia mydas*), leatherback sea turtle (*Dermochelys coriacea*), Kemp's ridley sea turtle

(*Lepidochelys kempii*), and Agassiz's desert tortoise (*Gopherus agassizii*) are also common species. Eglin AFB has the most federally-listed endangered or threatened herpetofauna species/subspecies confirmed present (six species), followed by Cape Canaveral Air Force Station, MacDill AFB, Marine Corps Base Camp Pendleton, and Tyndall AFB (five species each). Furthermore, at least one at-risk species, (i.e., gopher frog [*Rana capito*]) is confirmed present on 130 DoD properties (31 percent of all sites included in our inventory). For more information on the amphibians and/or reptiles confirmed present (or are unconfirmed and potentially present) on specific DoD sites, go [here](#).



This federally listed green sea turtle lives of the coast of Guam. Source: Paul Block

The DoD PARC inventory confirms that DoD lands support a high diversity of amphibians and reptiles, including over half of all U.S. species confirmed present on military lands. As DoD natural resources managers plan for the future, this inventory will provide information that they can use to prioritize relevant conservation and management actions on their installations, and support planning and budgeting activities. In addition, the inventory will help support increased communication and partnering. For example, DoD PARC brings together federal and state agencies, tribes, non-governmental organizations, and industry groups to manage herpetofauna. This inventory is a database that these groups can use to efficiently and cost-effectively develop species conservation plans and strategies that support common species (i.e., snapping turtle [*Chelydra serpentina*]) and ultimately prevent listings under the ESA.

COORDINATED MULTI-SPECIES MANAGEMENT PLANS FOR HIGH PRIORITY SPECIES AT RISK ON OR NEAR DOD LANDS

By Nancy Benton, NatureServe

Conserving species at-risk (SAR), which are rare or threatened but not yet federally listed under the ESA, enables DoD to avoid restrictions on military lands resulting from ESA listings. DoD has found that proactive conservation and management of high priority SAR is a major benefit to the military in maintaining its lands for training and other purposes.

NatureServe is testing a multi-species management plan approach to help DoD more cost effectively protect, manage, and monitor SAR on its lands. Working with DoD and other partners, NatureServe selected SAR from Western states that will significantly impact military training and operational activities if listed under ESA. Researchers also identified species

that have similar locations or habitats so they could develop and test multi-species management guidelines to see when these guidelines could provide efficient and cost-effective conservation measures.

NatureServe scientists in New Mexico developed detailed habitat maps and a single coordinated management plan for several high priority SAR on pinyon-juniper habitat on New Mexico military installations, including the pinyon jay (*Gymnorhinus cyanocephalus*), Oscura Mountains Colorado chipmunk, and Organ Mountains Colorado chipmunk (both *Tamias quadrivittatus* subspecies).

The coordinated plan recommended regional and DoD conservation actions to benefit these species where they occur in New Mexico. For example, the pinyon jays and both chipmunk species would benefit from DoD avoiding over-thinning of pinyon-juniper woodlands and retaining large mature pinyon trees because pinyon trees are the best seed producers.



The Pinyon Jay (*Gymnorhinus cyanocephalus*) occurs at Kirtland Air Force Base and White Sands Missile Range. Source: Dave Menke, USFWS

In Arizona, NatureServe scientists completed four distinct management plans for SAR on Fort Huachuca including the Arizona treefrog (*Hyla wrightorum*), Huachuca springsnail (*Pyrgulopsis thompsoni*), giant skipper (*Megathyminae*), and Huachuca lupine (*Lupinus huachucanus*). Despite the similar location for these species, the habitats and management needs for each species are different. Scientists documented lessons learned about the proposed multi-species management plan and explain why the approach didn't work at Fort Huachuca due to different habitats and management needs.

Multi-species management plans, while beneficial in some circumstances, will not work for every installation. For example, Fort Huachuca is part of the "Sky Islands" of southern Arizona, which are isolated mountains surrounded by desert or grassland.

The natural landscape complicates multi-species management efforts because there are many different habitats created by extreme elevation ranges across a small area. Even in cases where natural resources managers use common management techniques (e.g., fire management, changes in grazing intensity, mowing frequency), they also must consider that each species can respond in different ways (positively or negatively) to conservation practices.



Researchers completed a distinct management plan for species on Fort Huachuca like the Arizona treefrog (*Hyla wrightorum*). Source: Jeff Servoss

The multi-species management plan will be successful if the species selected have multiple similarities. This conservation approach offers DoD a way to manage for multiple species at-risk more efficiently and effectively, while continuing to balance both training and conservation on military lands in cases where a multi-species management plan is feasible.

GOLDEN-WINGED WARBLERS ON FORT DRUM, NY

By Jeff Bolsinger, Wildlife Biologist

The boldly patterned golden-winged warbler (*Vermivora chrysoptera*) (GWWA) has experienced severe population declines across its range in the eastern U.S. in recent decades, including a 98% decline in the Appalachian forests. A related species, the blue-winged warbler (*Vermivora cyanoptera*) (BWWA), is one of the primary causes of the GWWA's population decline. The BWWA both competes and hybridizes with GWWA, diluting and replacing the at-risk species in its habitat.



A GWWA on Fort Drum. Source: Tim Burr

The USFWS is currently considering listing the GWWA under the federal ESA because of these declines. Listing the GWWA could limit testing, training, and operations on DoD's installations which may impact readiness.

At Fort Drum, New York, DoD natural resources managers are taking steps to avoid a federal ESA listing, prevent future land restrictions, and ensure the continued integrity of natural habitats for DoD personnel and GWWA. Fort Drum biologists monitoring GWWA populations found that the species has declined from 51% of the installation GWWA/BWWA population in 2008 to 28% in 2017, with a corresponding increase in BWWA. The biologists are currently working to determine how these two species interact and if they are, in fact, distinct species worthy of individual protections.

To understand the hybridization occurring between GWWA and BWWA, Fort Drum personnel worked with the Cornell Lab of Ornithology to examine the genetic makeup of GWWA and BWWA populations on the installation. Biologists took blood samples from 44 GWWA, 57 BWWA, and 20 hybrids, as well as photos of each sampled bird in the field. With this information, researchers compared what species the birds looked like to its corresponding genetic makeup. At the same time, colleagues at Cornell mapped the genome of the two species, discovering that GWWA and BWWA are 99.6% genetically identical, with only a few differences in plumage traits. Researchers assigned numeric scores to each potential combination of genetic markers, with "0" being a genetically pure GWWA, "12" being a genetically pure BWWA, and all intermediate numbers representing varying degrees of genetic mixing.

Of all the birds sampled on Fort Drum that had usable genetic samples, only seven of 36 GWWA and 12 of 50 BWWA were genetically pure members of each species, with the rest showing some degree of genetic mixing. This finding was especially interesting because most birds did not appear to be hybrids at first glance; it was only with genetic testing that researchers found most birds to be "cryptic" hybrids.



A hybrid GWWA/BWWA on Fort Drum. Source: Jeff Bolsinger

USFWS is expected to decide in 2023 whether to list GWWA. Determining whether GWWA and BWWA are truly two distinct species will likely be a consideration in the listing decision. Current trends suggest that a near total replacement of GWWA by BWWA that has occurred in other areas is now happening at Fort Drum.

Responding to this detrimental species dynamic, the DoD Partners in Flight (PIF) Golden-winged Warbler Working Group created habitat management guidelines intended to benefit GWWA, but not BWWA. These guidelines were successful in creating occupied GWWA habitat in the Appalachians at elevations where BWWA do not occur. However, results were mixed where GWWA and BWWA habitat overlaps. DoD natural resources managers continue to study this complex species relationship to determine how to effectively manage these warbler species. Warbler management is critical for DoD installations because this allows natural resources staff to improve GWWA habitat and reduce threats from BWWA in an effort to prevent restrictions to testing, training, and operations that could occur if the GWWA is listed.

MANAGING STRATEGIES FOR SPECIES AT RISK

By Roy Cook, Lee Grunau, and David Jones; Colorado State University

The Front Range Urban Corridor, stretching from Cheyenne, Wyoming, to Pueblo, Colorado, is one of the fastest growing regions in the United States. Numerous DoD installations are located in this corridor or nearby. Population growth, urban and exurban development, energy development, and land-use conversion are threatening habitats and species found in this corridor, including areas surrounding DoD lands. As the natural habitats on DoD installations become important refuges for SAR, DoD shoulders more conservation responsibility and must increasingly work with developers to ensure compatibility.

To help natural resources managers meet these pressures, the DoD Legacy Program funded the project, *Threats and Stressors to SAR and Ecological Systems, Practical Implications, and Management Strategies for Installations in Colorado and the Western U.S.* This project identified potential impacts and developed management recommendations for three ecological systems (shortgrass prairie, pinyon-juniper woodlands, cliffs and canyons) and five SAR (pinyon jay, gray vireo, golden eagle, meadow jumping mouse, burrowing owl [*Gymnorhinus cyanocephalus*, *Vireo vicinior*, *Aquila chrysaetos*, *Zapus*

hudsonius, *Athene cunicularia*) at three DoD installations (Fort Carson, Piñon Canyon Maneuver Site, and the U.S. Air Force Academy).



Looking out toward Purgatoire Canyon from a pinyon-juniper woodland typical of the region at Piñon Canyon. Source: David Jones

Researchers found that all the ecological systems and SAR that they studied were vulnerable to the impacts of habitat encroachment. They also discovered that regional and external threats to SAR, such as land-use conversion and extreme weather events, may be more pronounced than threats on the installations. To help mitigate impacts, researchers recommend continuing collaboration among federal, state, private, and nonprofit partners; improving internal DoD communication on best management practices and data sharing; implementing installation-wide monitoring; and managing for resilience in the context of drought.

Other U.S. landscapes that are near large DoD land areas are undergoing similar population increases, and the installations near these expanding population centers will have similar environmental pressures and concerns. This research provides a flexible framework for DoD natural resources managers in other ecoregions to assess the vulnerability of their habitats and SAR, helping them understand, anticipate, and respond to encroachment threats to better ensure mission readiness. For example, placing buffer zones to limit high-intensity training around golden eagle nesting sites eliminates the need for broader training restrictions by avoiding harassment, and minimizes future impacts to military training.



Burrowing owl (*Athene cunicularia*). Source: Nicole Beaulac, Flickr Creative Commons

The information generated by this project, including examples to protect SAR, will allow DoD to maintain operational readiness under increasingly challenging conditions. For additional details, see the full technical report available [here](#) or contact Lee Grunau, Colorado Natural Heritage Program, at Lee.Grunau@colostate.edu.

DOD PROJECT HIGHLIGHTS

Following are summaries of a few projects that DoD installation natural resource 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.

DoD Legacy Project 16-764: Migration Ecology and Connectivity of At-Risk Grassland Birds

This project determined the movements and connectivity between breeding, migration, and wintering locations for three at-risk grassland bird species: upland sandpiper (*Bartramia longicauda*), grasshopper sparrow (*Ammodramus savannarum*), and Eastern meadowlark (*Sturnella magna*). Researchers deployed GPS monitors on birds to determine DoD and non-DoD lands used by these at-risk species. Increasing understanding of the full habitats of these species will facilitate partnerships between land managers. These partnerships allow natural resources managers to more effectively manage for these at-risk species; share conservation responsibility with other entities; identify potential off-site threats to species; and understand the relative role and importance of management at installations that support these species.



Upland sandpiper (*Bartramia longicauda*). Source: Johnathan Nightingale, Flickr Creative Commons

SERDP RC-2245 Defense Coastal / Estuarine Research Program (DCERP)

Critical military training and testing on lands along the nation's coastal and estuarine shorelines are increasingly placed at risk because of encroachment pressures in surrounding areas, impairments due to other anthropogenic disturbances, and changes in climate and sea level. To address these risks, DoD completed a 10-year effort on Marine Corps Base Camp Lejeune (MCBCL) to develop and apply an innovative ecosystem-based management program. The research, monitoring, and modeling efforts conducted as part of this effort resulted in a greater understanding of MCBCL's diverse ecosystems and their interactions with respect to the carbon cycle, management of carbon, and plausible future climate conditions. In addition, the research results provided an understanding of which on- and off-installation activities are currently affecting these ecosystems and what management actions could be implemented to best sustain the military's training mission and natural resource assets of MCBCL. For more information on this project, see our full spotlight in the [Winter 2018 issue of *Natural Selections*](#)



UPCOMING EVENTS, CONFERENCES, WORKSHOPS, AND TRAINING

Sustaining Military Readiness Conference

August 13-16, St. Louis, MO

This conference will provide a unique forum in which representatives from DoD and military stakeholder groups can discuss emerging challenges and new opportunities to enhance and support the military mission. Hear from top military, government, and industry leaders about natural resources management, and how DoD and its partners plan to conserve the environment while maintaining readiness and enhancing the Department's capabilities.

2018 Association of Fish & Wildlife Agencies (AFWA) Annual Meeting

September 9-12, Tampa, FL

The 108th 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

September 29, Nationwide

National Public Lands Day (NPLD) is the nation's largest, single-day volunteer effort for public lands. In 2017, during the 24th annual National Public Lands Day, volunteers celebrated at more than 2,500 public land sites, including parks, refuges, local waterways, recreation areas, trails, community gardens, historical sites, and DoD installations. DoD joined the NPLD partnership in 1999 and has awarded nearly \$2.8 million through the DoD Legacy Program to fund over 500 NPLD projects that have directly benefitted military lands across the U.S. You can register an event or volunteer at an existing event at the NPLD [website](#). Your work will help ensure our public lands continue to be beautiful places for all to enjoy!

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.

The Wildlife Society 25th Annual Conference

October 7-11, Cleveland, OH

The Wildlife Society's annual conference is one of the largest gatherings of wildlife professionals, students, and supporters in North America. The conference features 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.

National Wildlife Refuge (NWR) Week

October 14-21, Nationwide

Wildlife refuges provide excellent opportunities to hunt, fish, and hike. These special places feature not only native plants and wildlife habitat, but 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.

Saguaro cacti (Carnegiea gigantea) dot the landscape at the Barry M. Goldwater Air Force Range. Source: Paul Block



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.

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.

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.

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 \$33 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 Manager, DoD Natural Resources

Alison Dalsimer: allyn.a.dalsimer.civ@mail.mil

Program Director, DoD Natural Resources

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

DoD Natural Resources Program Support

NaturalSelections@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 HQ0034-12-A-0032-0002.

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.

