

Natural Selections



Department of Defense Natural Resources Program

CONTENTS

- 1 [Message from the DOD Natural Resources Program](#)
- 2 [Sikes Act Memorandum of Understanding Enhances Natural Resource Management on Military Installations](#)
- 2 [Mule Deer Migration and Wildlife Corridors of Eagle Mountain City, Utah](#)
- 3 [SASMI Partners Protect Salt Marsh for Coastal Communities and Wildlife](#)
- 4 [The Kittatinny Ridge: A Vital Corridor for Wildlife, Climate Resilience, and Military Readiness](#)
- 5 [Legacy Habitat Connectivity Project Highlights](#)
- 5 [SERDP/ESTCP Habitat Connectivity Project Highlights](#)
- 6 [Funding Milestone for Mission Priority Species & Biodiversity](#)
- 7 [Upcoming Events, Conferences, Workshops, and Trainings](#)
- 8 [Links of Interest](#)
- 9 [Contact Information](#)

MESSAGE FROM THE DOD NATURAL RESOURCES PROGRAM

By Ryan Orndorff, Director, Environmental Planning and Conservation

Welcome to the Fall 2024 Edition of *Natural Selections*! As human development continues to grow and expand, many critical natural habitats have become fragmented by roads and highways, dams, neighborhoods, and fences that can leave wildlife trapped and isolated from the resources they need to thrive. When wildlife is cut off from its natural habitat, many challenges arise that affect animals and humans. This edition of *Natural Selections* explores the challenges that habitat fragmentation causes for wildlife, communities, and military installations, highlighting the partnerships that exist to provide conservation corridors and mitigation efforts in support of wildlife and to sustain the military mission.

Connectivity in nature is an intricate chain that provides large ranges of habitats for wildlife where they are free to migrate, breed, eat, drink, and rest. As habitats are increasingly lost and fragmented by human development, these long-standing natural processes and spaces are also lost, causing widespread wildlife suffering, increased risk of extinction, decreased resiliency, and altered ecosystems. Humans are impacted by habitat fragmentation through increased human and wildlife conflict, water contamination, loss of agriculture productivity, zoonotic spillover, increased invasive species, competition for resources, and other cascading environmental impacts.



A desert tortoise crossing the road near the rifle range at Marine Corps Logistics Base Barstow. Source: Laurie Pearson

To address these impacts, U.S. Department of Defense (DOD) natural resource personnel research and implement a range of strategies to implement conservation corridors and protect natural landscapes through various mitigation efforts that increase habitat connectivity. These efforts are vital for protecting DOD installations, personnel, and the effectiveness of its mission.

In this newsletter, we explore the issues that are unfolding at the places where human development and natural habitats converge, highlighting the solution-driven work that is occurring both on and off the installation to combat these challenges. We highlight the work DOD is doing to protect the critical mule deer migration route in northwest Utah from increased development, breed and reintroduce the eastern regal fritillary butterfly at Fort Indiantown Gap (FTIG), and provide a substrate that oysters and other species can colonize in salt marshes to create living shorelines on Marine Corps Recruit Depot (MCRD) Parris Island.

We are excited to provide you with articles that spotlight some of the DOD projects that are bringing connectivity to fragmented habitats through the DOD Legacy Resource Management Program, Sentinel Landscapes Partnership, Strategic Environmental Research and Development Program (SERDP), and Environmental Security Technology Certification Program (ESTCP).

Enjoy reading this edition of *Natural Selections* as we highlight the many ways the Department is working to address the complex challenges that habitat fragmentation poses to our communities and installations.

Look for our next newsletter in Winter 2025. Please contact NaturalSelections@bah.com if you would like to share any DOD success stories or contribute an article.



In northwest Utah, DOD lands intersect important mule deer migration routes, with efforts to balance military needs and wildlife conservation. Source: Todd Cromar



SIKES ACT MEMORANDUM OF UNDERSTANDING ENHANCES NATURAL RESOURCE MANAGEMENT ON MILITARY INSTALLATIONS

A new Memorandum of Understanding (MOU) has been signed between DOD, the U.S. Fish and Wildlife Service (USFWS), and the Association of Fish and Wildlife Agencies (AFWA) to strengthen cooperative efforts in managing and conserving natural resources, including fish, wildlife, plants, and their habitats on military lands.

Authorized under the Sikes Act, which ensures that military lands support both national defense and conservation, this MOU continues the partnership aimed at maintaining resilient ecosystems that sustain military readiness. Building on the previous 2013 agreement, this MOU supports a forward looking, proactive approach to conservation efforts, using Integrated Natural Resource Management Plans (INRMPs) to protect species, their habitats, and ecosystems while safeguarding the military mission.

This agreement reaffirms the commitment to protect critical landscapes and ensure the long-term sustainability of military installations and their surrounding environments. The MOU is available [here](#).

MULE DEER MIGRATION AND WILDLIFE CORRIDORS OF EAGLE MOUNTAIN CITY, UTAH

By Todd Black, Wildlife Biologist and Planner, Eagle Mountain City

When Eagle Mountain City adopted the Wildlife Overlay Zone code in 2020 to protect a wildlife corridor and mule deer (*Odocoileus hemionus*) migration route, it likely had little idea how implementation would unfold. Four years later, the picture is becoming clearer, and mitigation measures are already in place to support a migrating mule deer herd. The herd travels from the northwestern corner of Utah County, beginning at the Oquirrh Mountains and the Army National Guard training facility at Camp Williams, passing through the city of Eagle Mountain, and ending at their wintering grounds on Lake Mountain.



Since Eagle Mountain City passed the Wildlife Overlay Zone in 2020, efforts to protect the mule deer migration route through Camp Williams have advanced. Fencing and detection systems help reduce deer-vehicle collisions along SR73 with ongoing partnerships between local stakeholders working to preserve this vital wildlife corridor. Source: Todd Black

Back in 2016, when Secretarial Order 3362 was signed, deer-vehicle collisions (DVCs) along Utah State Route 73 (SR73) were already a growing issue due in part to more frequent conflict between humans and wildlife as a result of the rapid development of Eagle Mountain City and increasing traffic. With reliable data, the Utah Division of Wildlife Resources approached

Eagle Mountain in 2018 to address the growing problem and protect the critical mule deer migration route. As a result, new regulations were passed, the installation of fencing began, and the state's first-ever thermal infrared detection system was installed at the SR73 wildlife crossing.

This has been and will continue to be a work in progress, and none of it would be possible without the support of private landowners, Camp Williams, the West Traverse Sentinel Landscape, the Utah Division of Wildlife Resources (UDWR), the Utah Department of Transportation, The Mule Deer Foundation (MDF), and the Eagle Mountain Nature and Wildlife Alliance. While the project has made significant strides, this will remain a long-term endeavor due to the project's limited funding and extensive scope. The effort will continue to move forward until the 50 miles of eight-foot-high wildlife impermeable fencing is installed and two wildlife bridges/overpasses, one wildlife underpass, and at least six at-grade crossings on city streets are completed.

The mule deer project team finds itself in a unique situation, having been tasked with implementing this project in an urban setting, which is unprecedented. There are limited funding options available, and many elements, including the design of at-grade crossings, have yet to be developed. However, their strong working relationships with landowners, Camp Williams, MDF, and the UDWR, and other partners are helping push the project forward. According to Eagle Mountain City's acting administrator, Steve Mumford, the project team has taken on the challenge and is progressing faster than expected by securing grants and other funding options, alleviating the city's financial burden.

Camp Williams and the West Traverse Sentinel Landscape program have been collaborating with the project team and the city to fence the north end of the mule deer migration route. The project can be envisioned as casting a large net west of Camp Williams, stretching along its

eastern border where it meets Redwood Road, a major north-south commuter route in Utah County. In 2024, Camp Williams replaced about one half mile of five-strand barb wire fence with a deer-proof fence. Along with helping to keep the mule deer out, this new fence improves security near the training facility by preventing people from accessing the installation through nearby backyards. More upgrades are planned and budgeted to replace the remaining outdated fencing with a secure, wildlife impermeable barrier, helping Camp Williams meet both its security and conservation goals.

The recent designation of the Great Salt Lake Sentinel Landscape brings new opportunities for collaboration and resources to support the project. This designation strengthens conservation efforts across the region, including the protection of key wildlife corridors like the one in Eagle Mountain. With the added support and partnerships facilitated by this national partnership, the project team can access broader funding and expertise to advance its goals. This collaboration ensures that conservation and military readiness can coexist, benefiting the community, wildlife, and Camp Williams and accelerating the completion of key infrastructure like wildlife crossings and fencing.

"We're eager to partner with Eagle Mountain, and we're excited to see how this project develops. If we can help save a few deer and keep people off base, it's a win-win for everyone," said Paul Raymond, Deputy Director of the West Traverse Sentinel Landscape.



During the Natural Resources Offsite Meeting in September 2024, military service representatives met with landowners and conservation leaders at Camp Williams. The trip included a tour of the mule deer migration routes led by Todd Black. Source: Sgt. Bryton Bluth

As development continues to grow through vital wildlife corridors, the collaboration of local governments, state and federal agencies, installations, and other partners working to find mutually beneficial solutions can help to mitigate impacts to humans and wildlife.

SOUTH ATLANTIC SALT MARSH INITIATIVE (SASMI) PARTNERS PROTECT SALT MARSH FOR COASTAL COMMUNITIES AND WILDLIFE

By Amanda Gobeli, SASMI Coordinator, Texas A&M University Natural Resources Institute

The southeastern coast of the United States harbors approximately one million acres of salt marsh that provides essential habitat for wildlife, preserves biodiversity, and ensures ecosystem connectivity. These coastal wetlands that fill and drain with the tides help stabilize and safeguard shorelines (and the communities and military installations they support) against storm events, flooding, and erosion.

As critical wildlife corridors, salt marshes enhance habitat connectivity by allowing species to move between ecosystems, supporting genetic diversity and linking fragmented habitats. Specifically, they support connectivity by linking coastal ecosystems both laterally along the shoreline and perpendicularly between marine and terrestrial environments, allowing species to move, feed, and reproduce across these interconnected habitats. They also provide natural filtration services, removing pollutants and excess nutrients from runoff that would otherwise degrade water quality. While supporting vulnerable and commercially important fish and wildlife species, salt marshes also protect critical infrastructure and historically important, irreplaceable cultural sites.



An aerial view shows salt marsh adjacent to the runway at Naval Station Mayport in Jacksonville, Florida. Source: Mark Bias

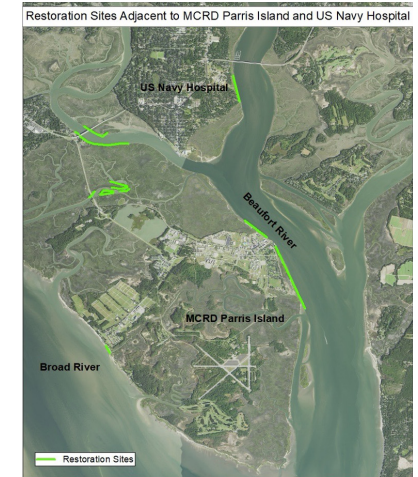
Protecting salt marshes in the face of climate change, rising sea levels, and encroaching development will require a concerted effort from stakeholders all along the southeast coast. These stakeholders have come together to do just that under the banner of the South Atlantic Salt Marsh Initiative, or SASMI. Founded in 2021 by the Southeast Regional Partnership for Planning and Sustainability and The Pew Charitable Trusts, SASMI is a voluntary, collaborative partnership of more than 350 individuals and organizations across a four-state geography—North and South Carolina, Georgia, and south to East Central Florida—who are working to protect their million acres of salt marsh and the many benefits they provide. Its diverse membership includes representatives from federal, state, and local agencies; non-governmental organizations; universities; DOD; community leaders; and cultural groups. SASMI partners have worked together to craft one of the only landscape-scale regional salt marsh protection plans in the nation. It is the first to prioritize actions directly benefiting fish and wildlife, communities and cultures, and national defense within the South Atlantic states.

One example of this collaborative work is among the South Carolina Department of Natural Resources (SCDNR), the non-profit organization South Carolina Coastal Conservation

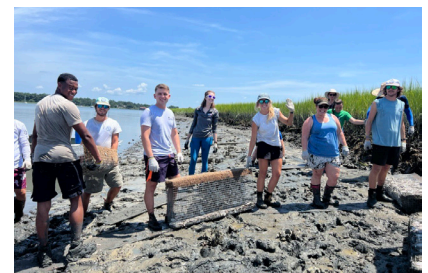
League (SCCCL), and military installation MCRD Parris Island. These organizations are working together to enhance coastal resilience by constructing living shorelines. Living shorelines are a nature-based solution to coastal erosion that fosters an uninterrupted transition between terrestrial and marine ecosystems, which is essential for supporting species that rely on both environments throughout their life cycle. These projects provide a substrate that oysters and other species can colonize, resulting in a structure that holds sediment in place, protects the edge of the salt marsh, and serves as habitat for aquatic life. Using funds provided by the DOD Readiness and Environmental Protection Integration (REPI) Program, a grant through the National Fish and Wildlife Foundation National Coastal Resilience Fund, and funds from the South Carolina Department of Veteran Affairs Military Enhancement Fund, these partners are creating over four miles of living shorelines at up to 24 sites located on and adjacent to the base.

The project is not only protecting the South Carolina coastline and the salt marsh it supports, but also mobilizing community volunteers to create the wire-based substrate, designed by the SCDNR, that oysters will colonize to form the stabilizing structure. Volunteers know the living shorelines will help protect the nearby Navy hospital and Fort Fredrick Heritage Preserve—two major economic drivers for the area—and provide habitat for more than 130 different species. The many benefits of this work are why SASMI has attracted such a wide diversity of supporters all committed to safeguarding the salt marsh.

The effort at MCRD Parris Island is just one of the many initiatives led by SASMI members throughout its four-state geography. Protecting the marsh also means guarding its migration corridors—areas where existing marsh is likely to shift as sea levels rise—which is often achieved through conservation easements or land purchases. Securing these migration spaces helps ensure a future for neighboring marsh, preserving habitat for vulnerable species like the endangered saltmarsh sparrow (*Ammadramus caudacutus*) and black rail (*Laterallus jamaicensis*), as well as commercially important shrimp, oysters, and finfish. The migration space also provides a buffer against encroaching development to help maintain habitat connectivity.



Map showing living shorelines under construction across all funding sources in the MCRD Parris Island effort. Source: Michael Hodges, South Carolina Department of Natural Resources



Volunteers deploying Manufactured Wire Reef substrate to construct a living shoreline. Source: Rachel Hawes, South Carolina Coastal Conservation League.

Without protection for these corridors, the marsh has no way to escape rising waters, eventually drowning and leading to the loss of this essential habitat.

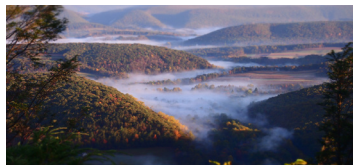
SASMI's goal to protect one million acres of salt marsh is ambitious but achievable through continued collaboration. The Parris Island effort showcases collaboration in action across multiple organizations, each with its own purpose, working to enhance coastal resilience for the benefit of the military mission, fish and wildlife, and the people who call the coast home.

The SCDNR and SCCCL would like to thank their partners at DOD and The Sustainability Institute for their collaboration and willingness to prioritize coastal resilience.

THE KITTATINNY RIDGE: A VITAL CORRIDOR FOR WILDLIFE, CLIMATE RESILIENCE, AND MILITARY READINESS

By Rose McCarthy, Special Projects Liaison, Pennsylvania Governor's Office of Policy and Planning

Located in eastern Pennsylvania's Appalachian Mountains, the Kittatinny Ridge, also known as the Ridge, stretches over 185 miles along the historic Appalachian Trail. Serving as a vital wildlife corridor, the Ridge supports a diverse range of species, from migratory birds to butterflies, and plays a key role in maintaining biodiversity and ecological balance in the region. Its forested ridges and fertile valleys are essential for supplying clean water, sequestering carbon, and contributing to Pennsylvania's working lands and outdoor recreational economies.



The Kittatinny Ridge is the gateway to Pennsylvania's Ridge and Valley Region. Source: Kittatinny Ridge Conservation Landscape

The [Kittatinny Ridge Sentinel Landscape](#) (KRSL) brings together stakeholders from different sectors to protect the Ridge's military assets, preserve ecological integrity and climate resiliency, and support local economies. According to data from The Nature Conservancy, the

Ridge's connected forests make it one of the [most climate-resilient landscapes](#) in the nation. These forests help buffer the impacts of climate change by storing carbon, reducing temperatures, supplying clean drinking water, and absorbing stormwater to mitigate flooding. The Ridge's designation as a sentinel landscape supports the conservation of high-quality freshwater resources that contribute huge volumes to local rivers and the Chesapeake Bay, providing areas for wildlife to migrate along the Ridge and find refuge from the changing climate. These climate adaptation benefits extend to Ridge installations, reducing training time lost due to extreme weather.

The Ridge provides continuous habitat for [migratory birds](#), with thousands of raptors, songbirds, and other avian species traversing its expanse each year. It is recognized as the premier northeast raptor migratory route, supporting six monitoring sites, including at [Hawk Mountain Sanctuary](#), renowned for birdwatching and research. In 2015, the National Audubon Society designated the Ridge as a Globally Important Bird Area for its role as a migratory corridor and breeding site for declining forest birds, such as [cerulean warblers](#) (*Setophaga cerulea*).

The Ridge is a critical preserve for hundreds of wildlife species. The [Eastern Regal Fritillary Butterfly Program](#) at FTIG is a shining

example of successful wildlife management. This butterfly species (*Argynnis idalia idalia*) has seen dramatic population decline due to habitat loss and other environmental pressures. However, FTIG has become a sanctuary for this rare species as

it hosts the only known population of this butterfly in North America. The perseverance of the eastern regal fritillary butterfly (regal) at FTIG is no coincidence. Military training activities at FTIG, the busiest National Guard training center in the nation (2023), create disturbances that maintain rare [early successional grassland habitat](#), which is essential for the regal's survival.

In the mid-1990s, FTIG biologists began implementing strategies to monitor and expand the regal population. The captive rearing program, launched with Zoo America in 2011, aims to breed and reintroduce the butterflies into suitable habitats, increasing chances of survival and recovery. With the U.S. Fish and Wildlife Service recently proposing to [list the regal as an endangered species](#), these conservation efforts are expected to intensify, offering greater protection for this species.

In 2017, Letterkenny Army Depot (LEAD), a major explosives storage facility along the Ridge, partnered with the Pennsylvania Game Commission (PGC) to create a [Bobwhite Quail Focus Area](#) at LEAD. In 2014, the PGC deemed bobwhite quail (*Colinus virginianus*) extirpated in Pennsylvania. Extensive habitat management efforts began in 2017, and in March 2024, the PGC worked with other states to translocate 87 wild bobwhites to LEAD. In July 2024, the first wild Pennsylvania bobwhites were born at LEAD.

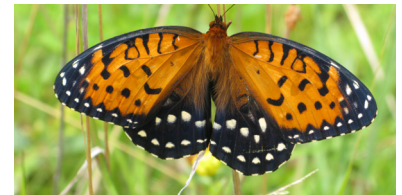
While the efforts at FTIG and LEAD have been successful, the Ridge faces ongoing conservation challenges, including incompatible development, climate change, and habitat fragmentation. With only 20 percent of the Ridge currently protected, a myriad of partners have come together to expand efforts. The successes at FTIG and LEAD highlight the unique and unexpected synergy between active military operations and calculated conservation activities and demonstrate the potential for innovative strategic action in the landscape.

Pennsylvania is a leader in farmland preservation through permanent agricultural conservation easements, which protect corridor lands from development. The Pennsylvania Department of Agriculture, with the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) and a coalition of other entities, leverages funds toward [land preservation investments](#) throughout the Ridge. From 1996 to present, the NRCS funding has protected nearly 55,000 acres through 483 easements in the priority area. KRSL designation ensures further protection.

KRSL partners will continue working together to enhance habitat connectivity and climate resiliency to ensure that one of the most biodiverse regions in eastern North America remains a haven for species and a source of inspiration for all who cherish the natural world.



The Ridge is an important breeding area for a declining migratory forest bird, the cerulean warbler. Source: Gary Robinette



Caption: A female eastern regal fritillary butterfly at Fort Indiantown Gap. Source: PA DMVA/PAARNG

LEGACY HABITAT CONNECTIVITY PROJECT HIGHLIGHTS

The DOD Legacy Resource Management Program (Legacy Program) is committed to enhancing habitat connectivity and wildlife corridors across landscapes, supporting biodiversity and conservation efforts. Through partnerships with organizations like the U.S. Forest Service International Programs (USFS IP), the Legacy Program is involved in a range of projects aimed at restoring habitats and improving the movement of species across military lands and beyond. These efforts include expanding migration corridors for monarch butterflies and studying the migratory patterns of at-risk grassland birds to ensure effective conservation strategies. These projects represent just a few of the many ways the Legacy Program is working to protect and connect critical habitats.

[1. Legacy Project: USFS Monarch-23 US Forest Service and Department of Defense Cooperation on Monarch Butterfly Conservation](#)

Points of Contact:

U.S. FOREST SERVICE, INTERNATIONAL PROGRAMS:

Beth Lebow, PhD elizabeth.lebow@usda.gov

Michael Rizo, michael.rizo@usda.gov

ENVIRONMENT FOR THE AMERICAS:

Susan Bonfield, PhD sbonfield@environmentamericas.org

Carina Ruiz, cruiz@environmentamericas.org;

DESCHUTES LAND TRUST:

Amanda Egertson, deschuteslandtrust.org

WESTERN MONARCH ADVOCATES

Robert Coffan, rcoffan@gmail.com

The USFS IP and the Legacy Program are supporting six monarch butterfly conservation projects that were initiated in a fiscal year 2022 interagency agreement and continued through additional support during fiscal year 2023. Below is a summary of highlighted partner activities.

- Environment for the Americas, Internships for Monarchs and Pollinators

Through this partnership, Environment for the Americas (EFTA) is expanding its internship program to focus on monitoring and habitat assessment for monarch butterflies on and near military installations and DOD lands. EFTA has launched outreach, education, and training programs along the western and eastern flyways that connect military families and community level groups to monarch conservation. The program emphasizes habitat connectivity, promotes conservation actions, and raises awareness about monarchs and other pollinators.

- Deschutes Land Trust, Plants for Monarchs

The Deschutes Land Trust (DLT) and Western Monarch Advocates (WMA) have implemented flood plain restoration and community education and engagement projects in both central and western Oregon. Additionally, DLT and WMA expanded the distribution of native milkweed (*Asclepias* spp.) and other native pollinator-friendly plants throughout Central Oregon to build western monarch migration corridor connectivity, increase monarch conservation awareness, and inspire community engagement.



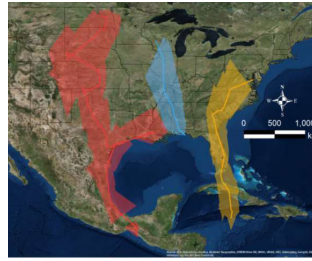
Adding a diverse species mix of grasses, forbs, and shrubs—including native milkweed and other pollinator friendly plants—to Ochoco Preserve restoration area. Source: DLT

[2. Legacy Project: NR-16-764 Migration Ecology and Connectivity of At-Risk Grassland Birds](#)

Point of Contact:

VERMONT CENTER FOR ECOSTUDIES

Rosalind Renfrew, PhD



Examples of probable fall migration routes (dark lines) and the uncertainty of location estimates (shaded regions) for three grasshopper sparrows fitted with geolocators in North Dakota (red), Wisconsin (blue), and Maryland (orange), respectively. Source: Rosalind Renfrew and Jason Hill

The upland sandpiper (*Bartramia longicauda*), grasshopper sparrow (*Ammodramus savannarum*), and eastern meadowlark (*Sturnella magna*) are three designated at-risk migratory grassland bird species that occur on many military installations supporting grasslands. All three species have experienced population declines in all or parts of their breeding ranges. To allocate resources more efficiently and effectively, it is essential to understand the events affecting these migratory birds during

their entire life cycle rather than only during their three- to four-month breeding season. This project provided the basis for understanding the movements of these species throughout the year, with the objective to provide support to installations managing any of the three at-risk migratory grassland bird species. Specifically, this project provided a continental and hemispheric-wide view of bird movements and bird connectivity between breeding, migration, and wintering locations. Understanding the entire annual cycle of migratory birds across their breeding range offers avenues for sharing the burden of protecting declining populations and provides insights applicable to other installations supporting grassland birds.

Published reports and fact sheets are available on the [Legacy Program DENIX website](#).

SERDP/ESTCP HABITAT CONNECTIVITY PROJECT HIGHLIGHTS

SERDP and ESTCP are DOD initiatives focused on advancing environmental research and technology solutions that enhance the military mission while promoting ecosystem sustainability. SERDP and ESTCP have a broad portfolio of conservation and research initiatives, and habitat connectivity is a critical component of that larger framework. Through collaborative efforts, SERDP and ESTCP projects address the challenges of habitat fragmentation, climate change, and species conservation by developing innovative tools and strategies to protect threatened species, enhance cross-jurisdictional management, and ensure the functionality of vital habitat corridors. This work is essential for maintaining biodiversity and ecological resilience, while also balancing the operational needs of the military.

FUNDING MILESTONE FOR MISSION PRIORITY SPECIES & BIODIVERSITY

Since 2014, SERDP and ESTCP have invested **\$45 million** in projects within the Mission Priority Species and Biodiversity focus area, emphasizing the management and sustainment of rare wildlife habitats found on military installations. This funding has supported advancements in species conservation, habitat restoration, and ecosystem resilience, strengthening efforts to protect biodiversity essential for mission sustainability. For more details on species conservation project accomplishments, please visit the [SERDP/ESTCP Conservation Focus Area page](#).

[Managing Metapopulations of Threatened Species Across Jurisdictional Boundaries: Quantifying Effects of Climate Change, Environmental Synchrony, Dispersal, and Corridors](#)

William Morris, PhD



David Lavender, a supervisor and biologist for the Fort Stewart Fish and Wildlife Branch, holds a female red-cockaded woodpecker after a successful capture at Fort Stewart, Georgia, Dec. 5, 2023. Source: Pvt. Santiago Lepper.

DOD lands are home to many threatened and endangered species, including the red-cockaded woodpecker (RCW, *Leuconotopicus borealis*) and St. Francis satyr butterfly (SFS, *Neonympha mitchellii francisci*), which also inhabit lands managed by other organizations like national forests and state lands. These species are

often managed independently, which misses opportunities for coordinated conservation. This project, led by Dr. William Morris with Duke University, aimed to improve cross-jurisdictional management by providing tools to help land managers collaborate more effectively.

By analyzing long-term demographic data, dispersal patterns, and population trends, the project developed spatial tools to guide land acquisition and habitat restoration efforts. Key findings showed that RCW populations benefit from maintaining dispersed populations, and SFS habitat requires periodic restoration. The new models account for climate and land-use changes, allowing managers to make data-driven decisions to protect these species across multiple jurisdictions.

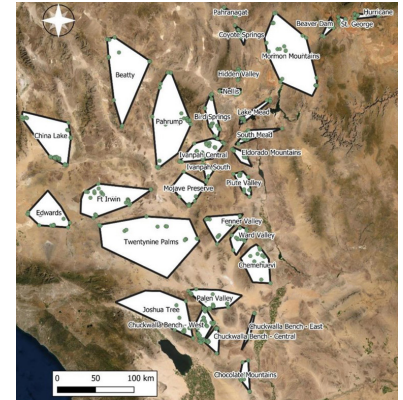
[The Impacts of Land Use and Climate Change on Mojave Desert Tortoise Gene Flow Dynamics and Corridor Functionality](#)

Kenneth Nussear, PhD

Another featured project, led by Dr. Kenneth Nussear with the University of Nevada, aims to understand how land use and climate change will impact the Mojave Desert tortoise (*Gopherus agassizii*), focusing on gene flow and habitat corridor functionality. The project examines how the movement of tortoises and other species across military and federal lands is influenced by environmental changes, including climate shifts and habitat fragmentation. Through a multi-phase approach, researchers are modeling current and future tortoise habitats, assessing corridor functionality, and exploring the broader

implications for species connectivity across the Mojave Desert. By integrating genetic data and multi-species interactions, the study seeks to guide future conservation efforts and land management strategies.

The benefits of this project are significant for DOD, helping to balance mission requirements with conservation needs. By understanding how desert tortoise populations are influenced by habitat fragmentation and climate change, DOD can make informed decisions to protect these species while maintaining operational readiness. This research also emphasizes the importance of strategic partnerships among land management agencies to ensure landscape-scale connectivity in the face of evolving environmental pressures, providing valuable insights for both scientific and management communities.



This map shows where 697 tortoise DNA samples were collected (points) and the areas they came from (white outlines). The samples were chosen to get the best quality DNA and cover as many different locations as possible, helping researchers study how tortoise populations are connected across the Mojave Desert. Source: Kenneth Nussear, PhD



UPCOMING EVENTS, CONFERENCES, WORKSHOPS, AND TRAININGS

DoD Energy & Environment Innovation Symposium

December 3-6, 2024
Washington, DC

This event is hosted by the environmental research and energy innovation programs under the Office of the Deputy Assistant Secretary of Defense for Energy Resilience & Optimization (DASD ER&O). The Symposium is the nation's largest conference focusing on DOD's priority environmental and energy issues, and it will offer a variety of technical sessions and short courses, over 500 technical poster presentations, and networking opportunities.

Navigating Military Readiness Through Responsible Project Execution

December 11, 2024
Virtual

The REPI Program ensures responsible, sensitive, and collaborative project execution by aligning with regulatory requirements for environmental compliance, cultural preservation, and tribal consultations. Join the REPI Program and the Sentinel Landscapes Partnership to learn about projects that involve compliance with the National Environmental Policy Act, National Historic Preservation Act, and Tribal consultations to effectively balance military readiness with environmental stewardship and cultural preservation.

National Invasive Species Awareness Week (NISAW)

February 24-28, 2025
International

NISAW is an international event to raise awareness about invasive species, the threats they pose, and what can be done to prevent their spread. NISAW is powered by The North American Invasive Species Management Association, which supports local, state, tribal, federal, regional, and national organizations to promote NISAW with educational webinars, Congressional briefings, individual meetings, and local events.

North American Wildlife and Natural Resources Conference

March 9-14, 2025
Louisville, KY

The 90th North American Wildlife and Natural Resources Conference will bring together natural resources professionals from all sectors to exchange knowledge and best practices on issues such as endangered species, migratory birds, and landscape management through workshops and meetings. The event serves as the annual forum to set conservation policy in North America and includes conference sessions, workshops, and more than 150 separate meetings and functions.

National Military Fish and Wildlife Association (NMFWA) Annual Meeting and Training Workshop

March 9-14, 2025
Louisville, KY

Held in conjunction with the North American Wildlife and Natural Resources Conference (above), the 42nd NMFWA annual meeting and training workshop is the primary event where installation natural resources managers meet to discuss key concerns and opportunities, recent policy and legislative changes, ongoing activities and recent accomplishments, and emerging issues and potential new challenges.

DoD Environmental Planning and Conservation (EP&C) Webinar Series

Virtual

The EP&C team hosts webinar presentations from Legacy Program project principal investigators, Natural and Cultural Resources Program partners, and other stakeholders on relevant topics for the Military Services, federal and state agencies, non-governmental organizations, and other interested groups. Webinars are held monthly via Microsoft Teams. To join the mailing list to receive notifications about these webinars, contact DODNatRes@bah.com or DOD_CRProgram@bah.com.

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

Virtual

The SERDP and ESTCP Webinar Series promotes the transfer of innovative, cost-effective, and sustainable solutions developed through projects funded in five program areas. 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. Most webinars will feature two 30-minute presentations and interactive question and answer sessions.

Readiness and Environmental Protection Integration (REPI) Program Webinar Series

Virtual

The REPI Webinar Series highlights best practices and provides knowledge sharing tutorials on REPI partnership efforts that support military missions, accelerate the rate of conservation, and promote military installation and community resilience.

LINKS OF INTEREST

DOD Environmental Planning and Conservation (EP&C)

DOD aims to preserve military readiness by ensuring access to 27 million acres of resources for operations. The EP&C portfolio supports environmental conservation, cultural stewardship, justice, and emergency planning, enhancing resilience through innovation. EP&C's coordination ensures effective management of national resources and community health, supporting the DOD's defense mission.

DOD Natural Resources Program

DOD's Natural Resources Program provides policy, guidance, and oversight to manage natural resources on approximately 27 million acres of military land, air, and water resources. Visit the Natural Resources Program website for more information on DOD's natural resources initiatives, policy updates, presentations, and links to other conservation and natural resources sites.

DOD Legacy Resource Management Program

Congress established the DOD Legacy Resource Management Program (Legacy Program) in 1990 and modified it under the Fiscal Year 1997 National Defense Authorization Act. The Legacy Program funds natural and cultural resources projects that support military readiness and enhance conservation objectives. Projects eligible for Legacy Program funding must have regional or DOD-wide significance and involve more than one Military Service; be necessary to meet legal requirements or to support military operations; be more effectively managed at the DOD level; and not be an assigned responsibility of a Military Service.

Armed Forces Pest Management Board (AFPMB)

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

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

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

Readiness and Environmental Protection Integration (REPI)

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

Cooperative Ecosystem Studies Units (CESU) Network

DOD participates in the CESU Network, which is a national consortium of federal agencies, tribes, academia, state and local governments, and non-governmental organizations working

together to provide research, technical assistance, and training to federal agencies and their partners. The CESU Network also provides managers with the adaptive management approaches necessary to preserve installation natural and cultural resources.

DOD Wildland Fire Management

DOD manages 27 million acres across its land portfolio. These are not only mission-critical training lands, but they also support a vast natural landscape with dynamic ecosystems, valuable habitat for threatened and endangered species, as well as outdoor recreation for military personnel and local communities. The occurrence of well-managed wildland fire on the landscape plays a significant role in the structure and function of these natural systems. Website visitors can learn more about wildland fire operations on installations, explore interagency wildland fire operations, and find a list of resources for wildland fire managers.

DOD Partners in Flight (PIF)

DOD PIF consists of natural resources personnel from military installations across the United States 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 NRMs 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.

Conserving Biodiversity on Military Lands: A Guide for Natural Resource Managers

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 10 case studies with practical advice from DOD NRMs.



DOD NATURAL RESOURCES PROGRAM

Enabling the Mission, Defending the Resources

www.denix.osd.mil/nr

<https://twitter.com/DODNatRes>

<https://www.linkedin.com/company/ousd-as>

Director, Environmental Planning and Conservation

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

DOD Natural Resources Program Support

DODNatRes@bah.com

Natural Selections

Natural Selections is published by Booz Allen Hamilton with funding awarded by the DOD REPI Program under Washington Headquarters Services contract HQ0034-23-D-0008, call number HQ0034-24-F-0309. 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.

