

Natural Selections

Department of Defense Natural Resources Program



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WILDLAND FIRE MANAGEMENT AND RESILIENCE ON MILITARY INSTALLATIONS—TAKING ACTION

By Anne Jewell, Office of the Deputy Assistant Secretary of Defense for Environment and Energy Resilience

DoD's landscapes exhibit some of the most diverse and unique ecosystem and species associations and most extensive cultural resource collections found in the United States. DoD's dedicated land, wildlife, and cultural resource managers guide the Department to these stewardship successes. Additionally, DoD natural and cultural resource managers have become adept in adaptation and innovation to incorporate the disturbance regime and land use demands that are unique to military testing and training. With an average of 1 million acres that burn due to wildfire or prescribed fire on military installations each year, wildland fire undoubtedly impacts your local landscape whether it is a management tool or an unwanted threat.



Firefighters from the Air Force Civil Engineer Center's Wildland Fire Branch, along with a specialized team of fire experts from the U.S. Fish and Wildlife Service, U.S. Forest Service, Albuquerque Fire Department, and others, came together to execute a series of prescribed burns at Kirtland Air Force Base on March 9, 2023. Photo by Master Sgt. Wolfram Stumpf, 377th Air Base Wing Public Affairs

The term "unprecedented" is now a common descriptor for wildfire activity, fire behavior, high-risk fire weather days, extents of burned areas, loss and recovery expenses, and the level of resources needed to manage wildland fire. The fire spread models and management strategies that were once suitable for predicting and responding to the fires experienced on the ground are now challenged or falling short, and climate models coupled with recent weather trends indicate that "unprecedented" fire experiences will only increase.

The highest policy and legislative decision makers recognize the impacts of wildfire. This recognition has led to a demand for focused, collaborative assessment and reporting on fire management challenges and opportunities. It has also resulted in a surge of funding capacity dedicated to wildfire risk mitigation and firefighter recruitment, retention, and well-being through the Bipartisan Infrastructure Law for the U.S. Department of Agriculture (USDA), U.S. Forest Service (USFS), and U.S. Department of the Interior (DOI). These agencies own the preponderance of federally managed lands and fire management capabilities.



A Fort Sill firefighter watches a prescribed burn near the West Range on March 15, 2022. Photo by Christopher Wilson, Fort Sill Public Affairs

The changing fire environment, combined with ever-shifting air quality regulations, also creates challenges for proactive fire use. These factors decrease the number of days on which and locations where organizations can use prescribed fire to augment ecosystem and species habitat management or reduce hazardous fuel loads. Each of these considerations signals the need for intentional understanding, foresight, planning, and action to adapt to this new "unprecedented norm" to

maintain the beneficial use of fire and reduce the negative impacts of wildfires on mission, ecosystems, values-at-risk, and our communities. These shifts, impacts, challenges, and opportunities are just as prevalent on DoD lands as they are on lands managed by USDA and DOI.

The cross-jurisdictional nature of wildfire response and wildfire hazard mitigation demands an interagency approach. Similarly, the challenges presented in the current era of wildland fire activity impact all land ownership types, fire management stakeholders, and fire science contributors. All of those who are engaged and impacted understand that partnerships are key to wildfire planning, prevention, response, and recovery. This reliance on cross-boundary integration also shapes and informs DoD's approach to effective fire management, but where does the national focus on USDA and DOI leave DoD? How can we move more fully into the national wildland fire conversation and initiatives to garner beneficial outcomes for wildland fire management on our installations?

I'm thrilled that this issue of the *Natural Selections* newsletter is dedicated to exploring various facets of wildland fire management, wildfire resilience, and partnerships that support and influence military land, species, cultural resources management, installation resilience concepts, and collaborative partnership initiatives. It will outline how DoD is more actively leaning into our own strategic planning by participating directly in the national conversations, policy decisions, and proposed fire management solutions while also showcasing our own successes and unique initiatives. The articles in this issue of *Natural Selections* feature actions and initiatives within DoD that bring the tenets of the National Cohesive Wildland Fire Management Strategy (National Cohesive Strategy) to life: (1) Fire Adapted Communities, (2) Resilient Landscapes, and (3) Safe, Effective, Risk-Based Wildfire Response.



John Crain, 23rd Wing forester, second from right, explains burn plans before a prescribed burn at Moody Air Force Base on April 21, 2022. Photo by Senior Airman Jasmine Barnes, 23rd Wing Public Affairs

► To learn more about the National Cohesive Wildland Fire Strategy, visit: <https://www.forestsandrangelands.gov/strategy/>

Some background to set the stage: a 2023 review and update of the National Cohesive Strategy reaffirmed that the three core tenets remain relevant and applicable for guiding an "All Hands, All Lands" approach in policy and implementation actions. The 2023 National Cohesive Strategy Addendum went on to outline specific implementation challenges to hone and prioritize action plans. DoD commits to supporting and complementing the National Cohesive Strategy through our own management actions directed at mission sustainment, ecosystem health, and

installation resilience. This commitment aligns with the Defense Climate Adaptation Plan, which identified wildfire as a mission threat and will be formalized through DoD's own Cohesive Strategy, mirroring the concepts and key tenets of the National Cohesive Strategy within our own Lines of Effort (LOE). The DoD Cohesive Strategy will translate into implementation plans for sound wildland fire management supporting and protecting installations, military mission values, and our surrounding Defense Community.



Camp Ripley Environmental Team sets fire to natural vegetation during a prescribed burn on November 3, 2020, near the amphitheater and prairie restoration area on Camp Ripley, Minnesota. Photo by Sgt. Mahsima Alkamooneh, Camp Ripley Training Center

► The Wildland Fire Leadership Council (WFLC), established in 2002, is the steward of the National Cohesive Strategy and has been at the center of adaptive change in wildland fire management for nearly two decades. WFLC has continued to provide the key leadership to adapt and implement policies that address these wildland fire challenges. DoD is a represented member on WFLC. <https://www.forestsandrangelands.gov/documents/leadership/wflc/WFLC-MOU-2016.pdf>

Approaches to Fire Adapted Communities for DoD involve engaging an increasing variety of stakeholders, on and off the installation, to effectively address wildfire planning, prevention, response, and recovery. This concept is addressed more fully in the wildfire resilience article included in the Winter 2023 *Natural Selections* newsletter and is also addressed in this issue's articles describing the Community Mitigation Assessment Team (CMAT) and a Fort Huachuca case study on the partnerships enabled through the Readiness and Environmental Protection Integration (REPI) program (<https://www.repi.mil/>).

Resilient Lands for DoD center around the capability of the landscape, ecosystems, and other resources-of-value to recover from unanticipated fires or increase in function and biodiversity through the proactive use of fire. This requires understanding the role of fire and its impacts, positive or negative, on any given species, natural system, or cultural resources we steward. This issue highlights actions being taken to better understand or address positive and negative impacts of wildland fire on wildlife species and their habitats, invasive species, and cultural resources, and it also defines the role of nature-based solutions within wildland fire management.





Bureau of Land Management Alaska Fire Service specialist Matt Kilgriff shoots a stream of flaming gel from the Terra Torch to burn piles of brush and trees as part of a prescribed burn project in U.S. Army Alaska's Donnelly Training Area near Fort Greely on November 4, 2016. Photo by John Pennell, United States Army Alaska

► In addition to the Wildland Fire Leadership Council, DoD has national representation on the National Wildfire Coordinating Group (NWCG), multiple NWCG Committees, the Wildfire Resilience Interagency Working Group, the National Prescribed Fire Training Center, and the Coalition of Prescribed Fire Councils. These multi-agency partnerships enhance DoD integration.

Safe, Effective, Risk-Based Wildfire Response addresses the capability, capacity, strategy, tactics, and science that enable informed decision making and action prioritization within wildfire response activities on and around DoD installations. Effective response requires a trained, professional workforce and high-level interoperability with partners when additional resources are required to respond to a wildfire incident.

DoD recently joined NWCG to support workforce development and increase access to standardized training, partner interoperability, and personnel qualifications. Membership enables a common approach to fire management standards and supports the goals of the National Cohesive Strategy. In turn, DoD provides subject-matter expertise and direct support for the training and operational standards and guidelines developed and maintained by NWCG. NWCG staff members graciously contributed to this issue to outline its current priority actions focused on modernizing wildfire response strategy and workforce development. Additionally, Marine Corps Installations West shows how it has moved from applying standards to internal operations and evolved to true, extensive, multi-partner interoperability through a fire school hosted at Camp Pendleton. These articles convey the shifting strategy for large-scale incident management, workforce development, and increased interoperability for wildfire response.



A U.S. Forest Service firefighter monitors a prescribed burn at Naval Submarine Base Kings Bay, March 1, 2023. Photo by Petty Officer 3rd Class Cory Rose, U.S. Navy

► NWCG provides national leadership to enable interoperable wildland fire operations among federal, state, local, tribal, and territorial partners. "A key function of NWCG is the establishment of standards for the wildland fire community," said Shane McDonald, NWCG Executive Board Chair. "With the addition of DoD to the NWCG Executive Board, they will now be a part of the process to help create the common operating framework for wildland fire resources." <https://www.nwcg.gov/>

Read the official announcement about DOD joining the NWCG at <https://www.defense.gov/News/Releases/Release/Article/3236529/national-wildfire-coordinating-group-welcomes-dod/>

Woven through each effort to understand and address Fire Adapted Communities, Resilient Landscapes, and Safe, Effective, Risk-Based Wildfire Response is the science and technology that enable informed decision making and augment the development and training of wildland fire practitioners. The DoD Wildland Fire Science Initiative (WFSI) serves a critical role within the broader realm of fire science research and applied technology. Wildland fire management agencies recognize that there is a gap between emerging science and technologies and field personnel managing fire and making decisions. In a concerted effort to bridge this gap, agency science and tech developers are spearheading a new multi-partner integration opportunity to establish collaboration across agencies and facilitate the integration of fire scientists with fire managers for increased tech transfer.

This National Innovation Landscape Network initiative will facilitate establishing the credibility and co-production of emerging capabilities, while expediting the integration of new tech in existing processes. In this issue, you'll be introduced to the efforts of the WFSI, the Innovation Landscape pilot, and actions implemented through DoD's Strategic Environmental Research and Development Program (SERDP) and Environmental Security Technology Certification Program (ESTCP) (<https://serdp-estcp.org/focusareas/26abb3ae-46e9-48ea-b83b-d20b735954ac>) and its Legacy Resource Management Program (<https://www.denix.osd.mil/legacy/>), as well as the wildland fire model available in the Defense Climate Assessment Tool (DCAT).

DoD successfully uses and manages wildland fire in dynamic ways to adapt to shifting conditions, enhance ecosystem and species values, and protect the military mission, values, facilities, and communities on and around installations. The DoD Cohesive Strategy will set the foundation for a coordinated, collaborative approach to the current wildland fire mission and provide for resilience within this new "unprecedented norm." The Department's increased presence in highest-level partnerships ensures that DoD, as an agency, remains informed, acknowledged, and relevant within national policy and strategy while also leading on the cutting edge in fire science and technology. These initiatives empower all DoD programs to effectively manage all aspects of the current and future wildland fire management challenges and directly support the National Cohesive Strategy through DoD's own Fire Adapted Communities, Resilient Landscapes, and Safe, Effective, Risk-Based Wildfire Response. Enjoy learning more in this edition of *Natural Selections*.



► Did we miss an opportunity to tell a wildland fire story, address a challenge, or clarify a topic? We would love to hear more. Contact us at: osd.wildland-fire-mgmt@mail.mil



A prescribed fire crewmember from the Eglin Natural Resource Department lights a controlled fire at a range located on Hurlburt Field, Florida, April 20, 2012. Photo by Airman 1st Class Christopher Callaway, 1st Special Operations Wing Public Affairs

MESSAGE FROM THE DOD NATURAL RESOURCES PROGRAM

By Ryan Orndorff, Director, Environmental Planning and Conservation

Welcome to the Summer 2023 Edition of *Natural Selections*! This issue of *Natural Selections* calls attention to wildland fire management on DoD lands. Wildland fire is a complex challenge: on one hand, it’s a keystone process for maintaining ecosystems, yet it also has the potential to be catastrophic by destroying ecosystems, degrading training lands, and impacting installations and communities. Wildland fire management requires a holistic approach, engaging all levels of stakeholders from the installation and local community. Additionally, we must build on our current successes and prepare for a future of wildland fire management that is shaped by our mission and climate change, to ensure a resilient built and natural infrastructure.

In August 2022, Anne Jewell joined the Office of the Deputy Assistant Secretary of Defense for Environment and Energy Resilience as the Resilient Lands and Wildland Fire Program Manager to provide direction, guidance, and expertise on wildland fire management across the Department. Anne took the lead for this edition, setting the stage in the spotlight article with a detailed overview of DoD’s wildland fire management and a brief introduction to other articles you’ll find in this newsletter.

We will publish our next edition in Winter 2024. Please contact NaturalSelections@bah.com if you would like to share any DoD success stories or contribute an article.

COMMUNITY MITIGATION ACTION TEAM (CMAT): OPPORTUNITIES FOR DOD WILDFIRE MITIGATION

Fire Adapted Communities

In 2015, USFS began deploying CMAT to assist communities with wildfire mitigation planning. These teams are multidisciplinary and focus on holistic community approaches to wildfire mitigation. If you meet any member of CMAT, you quickly learn what the team purposely doesn’t do: on-the-ground mitigation operations. Instead CMATs are there to “embed themselves within a community, listen, learn, and guide positive action.” When deployed to a community, the CMAT uses the SWOT analysis—Strengths, Weaknesses, Opportunities, and Threats—to help identify common themes about the local mitigation efforts. These SWOT analyses help pinpoint programs and stakeholders that need to be connected, as well as areas that need programs and further support. Linking communities and programs is key to the success of wildfire mitigation programs.

Military installations are self-contained communities within communities. Wildfires off the installation frequently impact the installation, and fires on the installation have the potential to impact the local defense community. CMAT looks holistically at the communities to which they deploy, and, for DoD, that means looking inside the fence, outside the fence, and at the installation boundary itself.

As we look at ways to improve wildfire mitigation across DoD, we must take recommendations from its approach. We should assess an installation’s wildfire mitigation from the holistic view by including all installation stakeholders and the local community. To measure the impact of mitigation projects, CMAT focuses on outcomes, rather than outputs, which is vitally important to DoD wildfire mitigation projects. Often we focus on “bang for the buck” and maximize the volume of work done with the money at hand, typically conducting work in the less challenging parts of our installations. However, the best outcomes from mitigation funds are frequently in the most challenging sites, where one acre of treatment might cost more, but the value of mitigating the fire intensity on that acre is substantially higher than in other locations.

Working in these challenging areas is a way to begin mitigating the potential wildfire effects inside and outside installation boundaries. The more we focus on mitigating impacts on the installation, in the local community, to training, to habitat, and to infrastructure, the more our wildfire resilience will increase and support the Department’s core missions. Wildfire mitigation requires long-term planning and commitment to ensure resilience for future fires, not just the fire burning on the horizon. As such, one of CMAT’s principal concerns before deploying



The beginning stages of a prescribed burn as the wind guides it, causing it to grow larger in the LE training area, Marine Corps Base Camp Lejeune on January 30, 2023. Photo by Lance Cpl. Ashley Gomez



is a community's ability to commit to long-term mitigation and continue building from CMAT's recommendations.

DoD can benefit at all levels from CMAT methodologies and philosophies when it comes to wildfire mitigation, the most important of which is looking holistically at wildfire mitigation and focusing on strategic outcomes, rather than output volumes. CMAT is a valuable tool for DoD to model in our efforts to create resilient natural and built infrastructure.

► CMAT and MCAS Cherry Point

Fire Adapted Communities

On April 19, 2023, a wildfire ignited in the Croatan National Forest (NF) near New Bern, North Carolina. The Croatan NF surrounds Marine Corps Air Station (MCAS) Cherry Point, and the fire had significant potential to impact the installation. Thankfully, prescribed fire treatments conducted by the Croatan NF over the years, coupled with favorable weather conditions, mitigated the fire's spread as well as impacts to the installation.

Due to the potential impacts to New Bern and other communities including MCAS Cherry Point, leaders at Croatan NF ordered CMAT to help with mitigation efforts. During the deployment, the CMAT worked with the NF and local communities to find programs and initiatives to support their mitigation efforts for future fires. The CMAT quickly determined the value of the REPI program and REPI's Sentinel Landscapes Partnership to help the community and MCAS Cherry Point mitigate the impacts of future fires. CMAT developed many recommendations and tools for the local communities based on its deployment. The full report can be found through the following link: [One More Day \(arcgis.com\)](https://arcgis.com).

REPI WILDFIRE MITIGATION PROJECT AT FORT HUACHUCA

By Amber Morin, Fort Huachuca Sentinel Landscapes Partnership

Fire Adapted Communities

U.S. Army Fort Huachuca anchors Arizona's Sentinel Landscape. Key activities conducted on Fort Huachuca include joint military intelligence training, aircraft and Unmanned Aerial Systems (UAS) training, and electronic testing. Two essential resources that enable this important and unique training on Fort Huachuca are the Buffalo Soldier Electronic Test Range (BSETR) and the R2303 military airspace. The BSETR is a mountainous, high-altitude bowl that produces an electromagnetically quiet testing environment that cannot be replicated at other installations. Although fire is important for maintaining ecosystem structure and function, the BSETR's topography, land cover, and location in an arid climate make it particularly susceptible to wildfire, which has been identified as the most significant environmental threat to Fort Huachuca. Therefore, Fort Huachuca's participation with the Sentinel Landscape Partnership—which enables partners to leverage and attract climate resilience funding and advance sustainable land management—is critical to its mission sustainability and wildfire preparedness.

The collaborative wildfire mitigation grant efforts within the Fort Huachuca Sentinel Landscape began in 2019 with a submission to the Joint Chiefs' Landscape Restoration Partnership. The proposal identified forested acres within the sentinel landscape footprint that were in the moderate- to high-risk categories based on the Interagency Fuel Treatment Decision Support

System (IFTDSS). The results showed that approximately 11%, or 189,000 acres, fell into those categories, but targeted acres were those that reduced fire starts, decreased spread, and reduced the intensity of wildfires. Furthermore, the Natural Resources Conservation Service prioritized funding for vegetation, or fuels, management activities based on fire risk assessment and grassland restoration potential. The work increased wildfire resilience at Fort Huachuca and in the surrounding rural and agricultural communities of Sierra Vista, Hereford, and Huachuca City.

The following year, the Joint Chiefs' award was used to leverage a REPI Challenge Grant. Identifying innovative investment stacks like this is essential for REPI Challenge applications. The REPI Challenge application advanced Fort Huachuca's "conservation ranching" strategy by funding the acquisition of a working ranch easement. Conservation ranching sustains long-term agricultural productivity by maintaining grass cover, increasing soil moisture, and enhancing wildlife habitat. In addition, the natural resource management projects on nearby forest lands mitigated the threat of wildfires. Fuels reduction treatments included hand thinning, chemical applications, mastication of biomass, and prescribed burns. Fire mitigation efforts in the national forest can also be more successful if forest inholdings remain largely undeveloped, as was the case for the conservation easement funded. REPI Challenge wildfire projects are also complementary to capacity-building, compliance, and post-monitoring efforts.

The two grant efforts have led to more than 30,000 acres of fuel reduction treatments, ensuring the military mission and protecting local communities.

NATIONAL WILDFIRE COORDINATING GROUP: PURPOSE, PRIORITIES, AND DOD INTEGRATION

Safe, Effective, Risk-based Wildfire Response

On December 1, 2022, NWCG welcomed DoD as a primary member. Historically, there has been broad federal agency interest in DoD becoming an NWCG member, with initial actions and proposals surfacing years ago. Now that all members have provided support for adding DoD as a primary member, it is worth understanding the implications and opportunities for DoD installation wildland fire management.

The name "National Wildfire Coordinating Group" has led many to think that NWCG coordinates and deploys resources to wildfire incidents across the country. Wildfire resource coordination happens through the National Multi-agency Coordinating Group (NMAC) and the National Incident Coordination Center (NICC), both housed at the National Interagency Fire Center (NIFC) in Boise, Idaho. Comparatively, the NWCG develops the standards and training for wildland fire qualifications, equipment, and operations to enable collaborative federal wildfire response. Interoperability and interagency cooperation require a common set of standards and procedures so that all agencies convening on one incident understand roles, responsibilities, capabilities, and tactics—as enabled by standards developed by NWCG. Additionally, NWCG standards can be adopted and applied within any given agency or organization that manages fire for other local, state, or national objectives.

NWCG "Primary Member" agencies are those that are most directly impacted by any adopted personnel or operational



standards and, therefore, participate in the consensus process of approving/adopting wildland fire standards. Primary Members include the USFS, Bureau of Land Management, U.S. Fish and Wildlife Service (USFWS), National Park Service, Bureau of Indian Affairs, National Association of State Foresters, Intertribal Timber Council, U.S. Fire Administration, International Association of Fire Chiefs, and DoD. NWCG Associate Members also include the DOI's Office of Wildland Fire and the National Weather Service, which round out a diverse group of perspectives, priorities, and areas of expertise. DoD benefits from its membership through agency autonomy in training and personnel certification, and also the opportunity for its unique staffing and fire management strategies to be considered when developing standards. As DoD adopts NWCG standards for its internal personnel and operations, it also paves the way for increased cross-jurisdictional wildland fire activities. In turn, membership creates an opportunity for NWCG to leverage operational and leadership expertise from across DoD to inform the development of standards for the wildland fire community.

Operationally, there are challenges to adopting NWCG standards and ensuring a continuous stream of qualified and experienced wildland fire personnel to meet the increasing wildland fire challenges. Many NWCG qualification standards require personnel to be evaluated as a trainee on a wildfire incident before becoming fully qualified. Most DoD personnel, whether Natural Resources Managers, or Fire and Emergency Services, have limited ability to participate in cross jurisdictional wildfire incidents outside of an installation. This is where the NWCG's Incident Performance and Training Modernization (IPTM) effort become critical to DoD's qualification process. With IPTM, NWCG is working to streamline the personnel qualification process while still ensuring individuals have developed the knowledge, skills, and abilities they will need in an assigned role.



Huffman Prairie, where the Wright brothers learned to fly, burns in a prescribed fire conducted by Wright-Patterson Air Force Base, Ohio, to help the prairie grass thrive and discourage woody vegetation on February 21, 2020. Photo by R.J. Oriez, 88th Air Base Wing Public Affairs

■ Incident Performance and Training Modernization

NWCG began an effort to assess its wildland fire training system to improve effectiveness and efficiency. NWCG's IPTM effort is designed to ensure relevance and necessity in wildland fire training and to standardize incident positions, qualifications, and evaluations while modernizing training and operational tools.

IPTM builds effectiveness and efficiency through incident position standards, Next-Generation position task books, and training that ensures relevance for positions in the NWCG Standards for Wildland Fire Position Qualifications, PMS 310-1. An instructional design contract will assist NWCG with building the incident position standards, developing

an integrated performance-based training system, and modernizing training materials.

NWCG is recruiting highly qualified individuals to participate as subject-matter experts from multiple agencies and geographical areas to incorporate their valuable skills and experience into the IPTM initiative.

IPTM efforts will:

- Increase speed to competency by improving the quality and consistency of training materials, as well as streamlining training by reducing redundancy and increasing effectiveness of on-incident training opportunities.
- Ensure incident position-specific training is necessary and relevant.
- Build position training and qualifications based on incident position standards to enhance support for trainees, evaluators, and qualified individuals.
- Transition as much training to on-the-job, as appropriate, through incident position standards and Next-Generation position task books.
- Develop an integrated performance-based training system that is easier to update and maintain.
- Modernize training materials and operational tools.

IPTM is a national effort and a top priority of the NWCG Executive Board, as providing quality training to firefighters and support personnel is critical. Learn more at www.nwcg.gov/iptm.

The likelihood of DoD experiencing more frequent or more complex wildfire incidents is increasing. As the anticipated frequency, size, complexity, and duration of wildfires increase, so does the demand for responding resources and highly experienced Incident Management Teams (IMT). Increasing flexibility in the type, size, and capability of IMT also increases the number of IMT available for incident management at any given time. NWCG is supporting the development and integration of the new Complex Incident Management Teams (CIMT) that are replacing the previous Type I and Type II IMT. The integration of CIMT and large-scale wildfire incident management concepts are important for DoD installations to understand to improve interoperability and readiness by allowing personnel with existing qualification to keep pace with these changes.

■ Complex Incident Management

Complex Incident Management (CIM) is an effort to adapt to the continually changing and increasing complexity in wildland fire management. CIM is designed for an IMT to respond to large or complex fires and expand or decrease resources to meet the needs of the incident.

Current Type 1 and Type 2 IMTs will transition to CIM qualifications resulting in one configuration of IMTs for all large or complex fires above the Type 3 complexity level ([NWCG Wildland Fire Risk and Complexity Assessment, PMS 236](#)). CIM is designed to help stabilize IMT participation and rotations, ensure overall availability of IMT members, reduce fatigue, and increase the resiliency of our interagency IMTs



and their members.

In 2022, IMTs began transitioning to CIM with the projected full implementation by 2024. This change requires commitment and coordination among agencies, partners, and cooperators to align qualifications, expectations, and standards. The transition to CIM will allow IMTs to be managed more efficiently to support the national wildland firefighting efforts.

DoD's adoption of NWCG standards is one of the many proactive measures DoD is taking to build our workforce; protect landscapes, communities, and infrastructure; and sustain military readiness. To learn more about NWCG and its role and current priority focus areas, visit: <https://www.nwcg.gov/>.

WILDLAND FIRE MANAGEMENT AND INTEROPERABILITY FOR MARINE CORPS INSTALLATIONS WEST

By Gabe Goodman, Marine Corps Installations Command West

Safe, Effective, Risk-based Wildfire Response

In the simplest terms, wildland fire in the U.S. Marine Corps Installations West (MCIWEST) Area of Operations is dynamic. This is due to the unique and varied weather, fuels, and topography across the MCIWEST installations. Meeting this challenge requires a dynamic wildfire management program with specialized wildland fire knowledge, skills, and abilities staffed among various internal departments and external agencies. Exercising these organic resources along with a robust mutual aid system allows MCIWEST installations to share information, take immediate action, and suppress wildfires before they impact local communities.

To account for this dynamic setting, it is critical to look at the program in terms of understanding the wildland fire environment, making informed decisions, and taking action to meet military readiness, public safety, and environmental objectives. This process scales from national-level program development to on-the-ground wildland firefighting.

MCIWEST provides direct support to Marine Corps Base Camp Pendleton, MCAS Pendleton, MCAS Miramar, Marine Corps Logistics Base Barstow, MCAS Yuma (including the Chocolate Mountain Aerial Gunnery Range and Barry M. Goldwater Range West), Marine Corps Air Ground Combat Center 29 Palms, Marine Corps Mountain Warfare Training Center Bridgeport, and Marine Corps Recruit Depot San Diego. Each of these installations has a unique mission and unique wildland fire requirements.



Firefighters from many Southern California firefighting agencies participate in the annual Wildland Fire School on Marine Corps Base Camp Pendleton, California on June 3, 2019. Photo by Sgt. Gabino Perez, Marine Corps Base Camp Pendleton

Managing these lands, and the highly valued military assets on them, requires an understanding of fire behavior and operational resources at both the local and regional level. In doing this, partnerships are developed and solidified for a wide range of wildland fire program requirements. Such partnerships include, but are not limited to:

- U.S. Navy for calculations of daily adjective fire danger ratings and live fuel moisture sampling.
- Bureau of Land Management for Remote Automatic Weather Station (RAWS) equipment and maintenance.
- USFWS for review and opinion of wildland fire projects and activities.
- Various federal, state, and local fire agencies for initial response and mutual aid services, including:
 - State and Federal Interagency cooperation for Type 2 or Type 1 IMTs.
 - State and Federal Interagency cooperation for Burned Area Emergency Response Teams.

As one of the most active military installations and wildland fire environments in the nation, Marine Corps Base Camp Pendleton's Fire Department hosts a wildland fire school each June. The school provides training in live-fire initial attack and extended incident management for more than 1,200 wildland firefighters throughout California. The fire school not only provides an unparalleled opportunity for training but is also carefully designed to implement prescribed fire projects in support of military training, hazardous fuels reduction, and natural resource management objectives for the year.

This level of wildland fire interoperability is not limited to external agencies during large-scale exercises or incident response. The entire wildland fire program is founded on the integration of internal Marine Corps offices with a wide range of staffing from environmental, facilities, operations and training, and fire and emergency services. By leveraging qualified individuals throughout MCIWEST, we accomplish a mission that spans local department and installation boundaries to manage military lands, respond to wildland fire, and, above all, maintain warfighter readiness.



Mustard flowers highlight firebreaks along ridgelines at Marine Corps Base Camp Pendleton in April 2023.

► Wildland Fire Leadership Council Announces Addendum to the National Cohesive Wildland Fire Management Strategy

Resilient Landscapes

On May 1, 2023, WFLC announced an addendum to the National Cohesive Wildland Fire Management Strategy, or Cohesive Strategy. This update includes input from all WFLC members, and many other stakeholders, including the three WFLC regions. The addendum highlights four critical emphasis areas that were not identified or addressed in depth in the 2014 Cohesive Strategy Framework:

1. Climate change.



2. Workforce capacity, health, and well-being.
3. Community resilience (preparation, response, and recovery).
4. Diversity, equity, inclusion, and environmental justice.

Additionally, five key implementation challenges were identified, highlighting issues that have arisen, or have not improved, since the 2014 Cohesive Strategy effort:

1. The existing wildland fire management system has not kept pace with demands.
2. There is still a need for the significant increase in the use of proactive fire (prescribed and managed wildfire for resource objectives) across the country.
3. Science, data, and technology has not kept pace with the extent of wildland fire and postfire impacts, or been fully integrated into decision-making for fire, land, and community managers.
4. Markets, infrastructure, and skilled human resource capacity are inadequate to utilize biomass and other wood products from ecosystem management or hazardous fuel treatments.
5. Education, communication, and marketing are insufficient to inform stakeholders and decision makers about Cohesive Strategy implementation.


Finally, WFLC updated the goals of the Cohesive Strategy:

- **Fire Adapted Communities.** Human populations and infrastructure are as prepared as possible to receive, respond to, and recover from wildland fire.
- **Resilient Landscapes.** Landscapes, regardless of jurisdictional boundaries, are resilient to fire, insect, disease, invasive species, and climate change disturbances, in accordance with management objectives.
- **Safe, Effective, Risk-Based Wildfire Response.** All jurisdictions participate in making and implementing safe, effective, efficient, and risk-based wildfire management decisions.

Through the development of the DoD Cohesive Wildland Fire Management Strategy, the Department will continue to build on these concepts across the enterprise and increase interoperability and safety internally, and with interagency partners. DoD will also continue to maximize interagency collaboration, providing expertise gained through years of prescribed fire and wildfire response for mission support and ecosystem resilience to benefit all partners in the wildland fire community. For more about the Cohesive Strategy and this addendum, go to: [National Cohesive Wildland Fire Management Strategy \(forestsandrangelands.gov\)](https://forestsandrangelands.gov).

DOD'S WILDLAND FIRE SCIENCE INITIATIVE DELIVERS PROVEN FIRE SCIENCE TOOLS TO NATURAL RESOURCE MANAGERS

By Tracy Mallard and Colin Hardy, Noblis contract support to SERDP and ESTCP; James Furman, U.S. Forest Service; and Kevin Hiers, SERDP and ESTCP

 Applied Science and Technology

In March 2023, over 75 wildland fire researchers—each wearing a hardhat, gloves, and fire-resistant shirt and pants as personal protective equipment (PPE)—dispersed across a nearly 1,000-acre unit for a research prescribed burn at Eglin Air Force Base,

Florida. Researchers meet at collaborative prescribed burns, hosted by the WFSI, to test and deploy novel instruments and methods that measure a breadth of fire characteristics, including fuels, fire behavior, fire effects, and smoke production. Fifteen separate studies were demonstrated at this event representing over a dozen institutions and organizations. These research campaigns facilitate an environment of collaboration and harmonization, which multiplies the efficiency and safety of fire research and expedites the pace with which new technology, tools, and knowledge can be delivered to natural resource managers.

Despite this impressive diversity of research objectives, personnel, and logistical requirements, all studies were executed under a set of shared agreements intended to emphasize safety, minimize impacts on the host installation, share as much data and observations as possible, conform to a common metadata standard, and delegate authorities to a single command-and-control team. This innovative model for collaborative wildland fire research has been successfully deployed at multiple DoD installations as well as other locations such as Hitchiti Experimental Forest, Georgia; Osceola National Forest, Florida; USFWS sites; state forests; and non-governmental organizations such as Tall Timbers Research Station, Florida, and The Nature Conservancy's Sycan Marsh Preserve, Oregon.

WFSI Background

Recognizing that climate change and wildfires threaten the military mission, the WFSI was established through DoD's environmental research programs, SERDP and ESTCP, and has positioned DoD as a national leader in wildland fire research. Through a portfolio of more than 30 SERDP and ESTCP research projects specific to wildland fire, and with total funding exceeding \$55 million, the WFSI emphasizes co-production of management-relevant science between fire managers and researchers with a focus on next-generation fire behavior and smoke dispersion models. WFSI research experiments range from bench-scale laboratory experiments to field-scale studies on landscapes exceeding 1,000 acres. Ultimately, desired outcomes from SERDP projects are vetted, tested, and delivered through training and formal guidelines in the form of ESTCP-supported application projects.

Co-production of science with managers is imperative in achieving research and application outcomes, rather than solely providing science outputs or meeting management targets, as noted in Anne Jewell's article in the Winter 2023 issue of this newsletter.

Eastern Innovation Landscape Network Pilot (EILNP)

EILNP, the newest regional hub in the growing Innovation Landscapes Network, is an initiative intended to facilitate adoption and integration of WFSI research outcomes into resource management. EILNP will implement and evaluate validated tools and technologies from the WFSI at installations and other federally owned lands that rely on prescribed fire for conservation and wildfire risk reduction in the Eastern United States. This effort creates a pilot network of natural resource managers and research teams providing feedback on new technologies to speed refinement and adoption of emerging technology. This pilot will include new monitoring technology as well as fire modeling tools to track prescribed fire outcomes.

¹ <https://www.usgs.gov/special-topics/wildland-fire-science/science/innovation-landscape-network#:~:text=The%20USGS%20and%20DOI%20land%20management%20agencies%20are,risks%20and%20climate%20resilience%20with%20fuel%20treatment%20strategies>





Morning briefing for a prescribed fire/research burn at Eglin AFB, in March 2023. Credit: Susan Wilder

Through the launch of EILNP and other regional hubs, the Innovation Landscapes Network seeks to collaborate across the federal government to increase the relevance and pace of innovation in conservation management, reduce duplicative efforts, and develop and transfer new technologies across the federal landscape portfolio. This initiative is coordinating with existing landscape-scale partnerships and represents an opportunity to align with federal priorities and agency missions to confront threats to mission sustainment such as climate change and the nation's wildfire crisis. The partnership(s) will invest in deliberate efforts to accelerate technology transfer for science and modeling at a landscape level and provide proof of concept and scalability across ownership boundaries and jurisdictions to support collective landscape stewardship opportunities.



Research staging area and the burn's smoke plume at Eglin AFB, in March 2023. Credit: Colin Hardy, Ph.D., Noblis




Fuel sampling and terrestrial lidar scanning of a research plot at Eglin AFB after a prescribed burn in March 2023. Credit: Mary Neil Armstrong, Southern Fire Exchange.

Wildland fire science is fundamental to all aspects of successful fire management and, as such, the WFSI and EILNP augment DoD and other agencies' current wildland fire science efforts and management capabilities to support fire adapted communities; resilient landscapes; safe, and effective wildland fire management; and enhanced interoperability.

LONGLEAF PINE MANAGEMENT AND RESILIENT NATURAL INFRASTRUCTURE

By Forrest Cobb, Texas A&M Natural Resources Institute, and Emma Ross, U.S. Army Corps of Engineers

 Resilient Landscapes



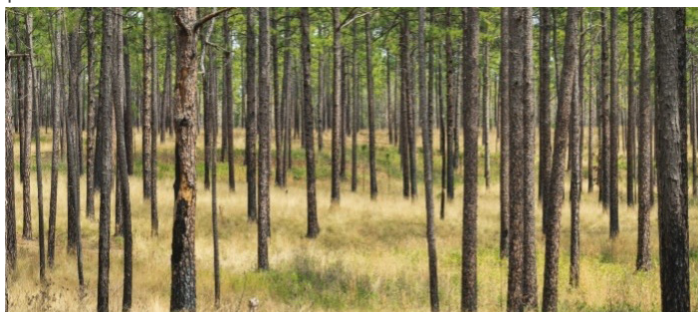
Prescribed fire burning in a mixed pine stand at Joint Base Charleston South Carolina's Naval Weapons Station 2015.

Although longleaf pine (*Pinus palustris*) was once the dominant forest type in the Southeast United States, conversion to other land uses or forest types reduced total longleaf pine forests from a historic 90-million-acre range to fewer than 3 million acres by the 1990s. These native longleaf pine forests are well adapted to the frequent low-intensity fires that occur naturally from lightning strikes across their range as well as from application of fire by Native Americans starting roughly 10,000 years ago. This regular fire regime prevented the buildup of ground level fuels and midstory density, which would otherwise increase the risk of catastrophic wildfires. With climate change expected to result in more frequent and extended droughts, the likelihood of catastrophic wildfires will increase and can be exacerbated when forest types are not as fire adapted, leading to greater risk of severe property damage and loss of life.

Integrating climate change adaptation into DoD natural resources management is key to achieving the resilient landscapes needed to support installations in the future. Nature-based solutions (NBS) provide co-benefits such as enhancing resilience, promoting biodiversity, enhancing carbon sequestration, and mitigating risk of wildfire. NBS are a priority under Executive Order (EO) 14072 (Section 4), and DoD is currently creating guidance for military installations, as well as developing an official DoD definition for NBS. While the term "nature-based solutions" has many different definitions, practices associated with the term are commonly implemented as part of natural resources management and conservation programs. For example, prescribed fire and ecosystem restoration as wildfire mitigation tools can reduce the risk of catastrophic fires while providing co-benefits for biodiversity, water quality and quantity, and outdoor recreation.

DoD manages more than 725,000 acres of longleaf pine habitat on 36 installations from Virginia to Louisiana. Longleaf forest management supports military readiness by providing optimal

terrain and cover for military training and operations and acting as a buffer against incompatible development. When managed through prescribed burning, longleaf pine habitat provides a climate-resilient forest type for installations. Additionally, through its REPI program, DoD established partnerships with the America's Longleaf Restoration Initiative (ALRI), a coalition devoted to restoring longleaf pine forest, and the Longleaf Landscape Stewardship Fund (LLSF), a public-private partnership to expand, enhance, and accelerate longleaf pine restoration across its historic range. Through the efforts of the ALRI partnership, more than 1.6 million acres of new longleaf stands have been planted and millions of acres of existing longleaf forests are now managed with prescribed fire. The LLSF, meanwhile, leveraged over \$7.4 million in DoD funds to protect and manage longleaf forests across the historic range. By partnering with these organizations, DoD supports and preserves the missions of 14 installations.



Grassy groundcover becomes dominant in a frequently burned longleaf pine plantation at Fort Liberty, North Carolina. Photo by Andrew Kornylak, Photographer and Filmmaker

Through continued application of climate-informed practices, DoD is working to build climate-resilient landscapes that preserve the missions of its installations while providing numerous co-benefits to the military and its surrounding communities.

The views, opinions, and findings contained in this article are those of the authors and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other official documentation.

► **National Invasive Species Council and Wildland Fire Leadership Council Partner for Wildland Fire and Invasive Species Management**

 Resilient Landscapes

In 2020, the National Invasive Species Council (NISC) and WFLC partnered to identify opportunities for coordination related to invasive species and wildland fire management. The partnership strives to leverage federal actions across the wildland fire and invasive species communities while building collaboration and engagement with federal and non-federal stakeholders. In October 2022, the NISC and WFLC Co-Chairs published a memo outlining 13 opportunities to advance the integration of invasive plant and wildland fire management. Federal agencies involved with the NISC-WFLC partnership and its interagency task team include the Departments of Agriculture, Commerce, Defense, and the Interior.

Highlighted opportunities from the NISC/WFLC memo include:

1. Proactive and pre-fire management.
2. Wildfire response.

3. Wildfire recovery and restoration.
4. Funding.
5. Information, data, and management tools.
6. Research and development.

These opportunities can be integrated into operations across DoD in various ways. The Department will continue to engage in partnerships such as the NISC-WFLC collaboration to increase interoperability and maximize the effectiveness of operations, creating resilient natural infrastructure.

Click here to see the full NISC-WFLC memo: [nisc-wflcmemo-final-10-12-2022.pdf \(doi.gov\)](https://www.doi.gov/nisc-wflc-memo-final-10-12-2022.pdf).



A controlled burn is conducted during wildfire investigation training hosted by Guam Department of Agriculture, also helping in the eradication process of an invasive plant species in the future Marine Corps Base Camp Blaz forest enhancement area in Dededo, Guam on March 1, 2020. Photo by Staff Sgt. John Ewald, Marine Corps Base Camp Blaz

NFWF ANNOUNCES RECORD \$18 MILLION IN CONSERVATION GRANTS TO RESTORE ICONIC LONGLEAF PINE ECOSYSTEM

 Resilient Landscapes

NFWF Announces Record \$18 Million in Conservation Grants to Restore Iconic Longleaf Pine Ecosystem The National Fish and Wildlife Foundation (NFWF) has announced \$18 million in new conservation grants from the Longleaf Landscape Stewardship Fund (LLSF) to restore, enhance, and protect longleaf pine forests in nine southern states. This year's grant slate, the largest in the program's history, will leverage over \$14.7 million in matching contributions to generate a total conservation impact of \$32.7 million. Longleaf pine forests are some of the most biodiverse in the world, providing habitat for 29 species listed as threatened or endangered under the Endangered Species Act while also providing clean water, outdoor recreational opportunities, and forest jobs. The forests also support our national defense by maintaining natural landscapes around military installations and providing realistic training environments. The LLSF is guided by and provides key financial support for on-the-ground public and private partners working to implement projects that contribute to the larger America's Longleaf Restoration Initiative (ALRI).

The LLSF exemplifies the power of collaboration, bringing together different funders to support landscape-scale conservation, including DOD. For every dollar DOD invests, approximately \$14 in matching partner funds will help establish more than 4,200 acres of new longleaf pine, implement



prescribed fire on more than 200,000 acres, and enhance an additional 15,000 acres of existing longleaf pine through management treatments. Altogether, seven military installations in the Southeast will directly benefit from LLSF projects.

"The Longleaf Landscape Stewardship Fund continues to be a valuable partner with the Department of Defense, supporting sustainable military readiness. This collaborative conservation effort benefits longleaf pine ecosystems while also sustaining the operations of military installations and test and training activities in the Southeast important to our national defense," said Mr. Michael McGhee, Acting Deputy Assistant Secretary of Defense for Environment and Energy Resilience. "Working with partners to restore the longleaf pine ecosystem supports national defense by enhancing landscape resilience, promoting compatible land uses near our military installations, mitigating wildfire risk, supporting biodiversity, and enhancing carbon sequestration through land management practices. We are proud to be a part of these endeavors and continue to support the protection, creation, and enhancement of longleaf pine forests through these collective efforts."

To read NFWF's full press release, [click here](#).



A prescribed fire in a longleaf pine stand at the Poinsett Electronic Combat Range in Winter 2016.

AIR FORCE CREATING RESILIENT ECOSYSTEMS AND INFRASTRUCTURE THROUGH WILDLAND FIRE MANAGEMENT

By Bradley Shoemaker, U.S. Fish and Wildlife Service, formerly Air Force Wildland Fire Branch

Resilient Landscapes

DoD's recognition of wildland fire as both a critical ecosystem management tool and a source of potential negative impact to military missions and surrounding communities resulted in an increased focus on wildland fire management in recent years. The Air Force and Space Force complete wildland fire management through the Air Force Civil Engineer Center's (AFCEC) Wildland Fire Branch (CZOF). The Branch is operated in an interagency manner, through partnerships with USFWS, the Bureau of Land Management, and university partners to give the Air Force access to a dedicated staff and, as needed, nationally trained and qualified personnel to implement prescribed fire and mechanical fuels management projects across the Air Force and Space Force. The Wildland Fire Branch has three regions and 14 Wildland Support Modules (WSM)—each of which has an Area of Responsibility (AOR) with multiple installations. WSMs complete projects within their AOR and bring decades of experience and qualifications in meeting NWCG standards.



A spring prescribed fire ignited by AFWFB personnel burns in a mixed pine stand at Eglin AFB in April 2022.

Installation wildland fire management begins through collaboration to identify a need for prescribed fire or mechanical fuels work for the protection of built and natural infrastructure. In addition to Integrated Natural Resource Management Plans (INRMP), a Wildland Fire Management Plan (WFMP) is prepared to look at installation-specific conditions. The WFMP identifies fire management objectives to protect built and natural infrastructure and outlines roles and responsibilities between the Wildland Fire Branch and the installation—including installation leadership, the Natural Resource Program, and Fire and Emergency Services (F&ES). From here, individual projects are planned and completed, most commonly through prescribed fire and/or mechanical fuels management, which reduces fuels (vegetation) within a unit to alter fire behavior if there were to be a fire. Prescribed fire is the preferred method of treatment since it is more cost-effective on a landscape scale and best replicates natural ecosystem processes. Prescribed fires are generally combined with mechanical fuels reduction at key control points to reduce fire behavior. Prescribed fire is not always appropriate due to individual project locations and conditions. Mechanical fuels reduction is used when fuels are too heavy to burn, in locations or ecosystems that would have adverse impacts if burned, or in urban or other sensitive areas where smoke impacts cannot be mitigated.



AFWFB firefighters ignite a spring prescribed burn at Eglin AFB in April 2022.

The Wildland Fire Branch annually executes 350 prescribed fires totaling 145,000 acres, completes nearly 4,000 acres of mechanical fuels treatments, directly trains 800 Air Force personnel and an additional 130 DoD personnel through a Joint Air Force/Army Training Academy, supports F&ES suppression work when requested—generally on large fires—and works with installation natural resources on post-fire rehabilitation of burned areas to ensure the establishment of a resilient ecosystem after wildfire impacts. The Wildland Fire Branch is available to assist installations at all stages of wildland fire management.

► **Joint Army and Air Force Wildland Fire Training Academy**

 **Safe, Effective, Risk-based Wildfire Response**

In 2015, U.S. Army Installation Management Command, the Air Force Wildland Fire Branch, and Region 4 of USFWS formed a unique partnership to provide, and improve access to, NWCG training courses for installation personnel. This program is co-funded between the Army and Air Force, and USFWS provides the training through an interagency agreement. Every year, the course needs and requirements are coordinated and formed into 10 to 13 weeklong academies to maximize content delivery and success.



Pre-burn briefing at the Avon Park Air Force Range during the April 2022 Rx Fire Workshop.

Although the Army and Air Force have priority for course attendance, local, state, and federal partners are encouraged to apply and may attend with no tuition cost. To date, more than 1,400 DoD personnel, and 800 interagency personnel, have received critical NWCG training. This unique partnership is enhancing operational safety and interoperability across the Department and our interagency partners.



MITIGATING CULTURAL RESOURCES IMPACTS FROM WILDFIRE ON THE ORCHARD COMBAT TRAINING CENTER

By Tessa Amend, Idaho Army National Guard

 **Resilient Landscapes**

The occurrence of intense wildfires as a result of climate change is expected to pose a challenge in managing cultural resources at the Orchard Combat Training Center (OCTC), the Idaho Army National Guard's (IDARNG) primary training facility located on the Snake River Plain in southwest Idaho. The IDARNG has an extensive cultural resources program that provides management and protection for these sites, but the threat of wildfire was not a primary factor in the program's design.

Low-intensity, short-lived fires may cause cosmetic damage to artifacts, but hotter, longer-burning fires have the potential to cause extensive damage and data loss. Stone tools, pottery, and glass may experience breakage, spalling, crazing, pitting, smudging, and discoloration. The solder and labels on late 19th- and early 20th-century cans can be destroyed. Organic materials



Buildup of hazardous fuels around a historic dam.

are most susceptible to fire and may be lost altogether. At higher temperatures, plant and animal residues can be eliminated from artifacts, altering objects in ways that limit future research.

Fire management activities and surface alterations made by fires can also have negative impacts on cultural resources. Increased ground visibility after a fire makes artifacts more vulnerable to looting. Large equipment used in fire management, like dozers and graders, cause significantly more ground disturbance than hand crews and are more likely to displace or destroy materials. Some artifacts may also be damaged by rapid cooling from water, fire retardants, and chemical products.



Post fire near Christmas Mountain on the OCTC.

Given the environmental context and the types of cultural resources found at the OCTC, a number of suitable actions have been identified to increase resiliency to wildfires:

- Establishment of a clear protocol for reporting wildfire to the Cultural Resources Manager (CRM).
- Prompt and consistent reporting of wildfire to the CRM is critical. The CRM should be contacted immediately and briefed throughout the life of the fire so the area can be assessed to determine if further mitigation is needed and so a survey can be conducted to record any newly exposed materials.
- Integration of cultural sites into the Fuels Management Program.
- Many of the cultural sites that are considered eligible for listing on the National Register of Historic Places have been fenced off. These fences collect large amounts of tumbleweeds, creating hazardous fuel loads. Integrating these sites into the Fuels Management Program helps clear fuels along the fence lines, reducing the likelihood of future damage.
- Planting fire-resistant vegetation.
- Fire-resistant vegetation should be planted in "green strips" around sites in areas with a high risk of fire ignition or at sites that do not have a firebreak nearby.
- Unmanned aerial vehicle (UAV) monitoring of sites.
- Collaborating with geographic information systems (GIS) staff helps identify ways to integrate the IDARNG's UAV



training program into site monitoring. Using approaches like aerial photogrammetry can make it easier to identify changes at sites and to assess risks.

- Non-invasive research projects.

Little archaeological research has been conducted at the OCTC. Data loss from wildfires and other effects of climate change can be mitigated through research projects to collect information that can contribute to an improved understanding of the past.

Effectively mitigating the effects of wildfires on cultural resources will require collaboration with the Fire Management Unit and other environmental personnel, as well as ongoing evaluations of individual sites. Having these practices in place before intense fires occur puts the IDARNG in a better position to protect the integrity of these invaluable resources.



Aerial imagery of a cultural site on the OCTC, taken from a UAV.

BAT CONSERVATION PROJECT UPDATES

By David McNaughton, Naval Facilities Engineering Systems Command Southwest, and Eric Britzke, U.S. Army Environmental Research and Development Center-Environmental Laboratory

Resilient Landscapes

With more than 300 installations potentially affected by at least one bat species listing under the Endangered Species Act (ESA) in the next five years, bat conservation efforts continue to be a top priority for natural resources programs. The DoD bat subject-matter experts are a small committee of Defense employees with prior knowledge and experience in bat conservation as it relates to both planning and science, led by Eric Britzke and David McNaughton with a team of seven other



David McNaughton and Eric Britzke setting up a harp trap near a mine entrance at Twentynine Palms, California. Photo credit: Sheri Shiflett, National Parks Service Yosemite

natural resource professionals. The team is still seeking a formal name but has been nicknamed “DoD Bats and Rats.”

The bat subject-matter expertise team completed the Northern Long-Eared Bat (*Myotis septentrionalis*) Programmatic Biological Evaluation and sent it to USFWS for review in March. The DoD working group began the informal consultation effort between DoD and USFWS for the tricolored bat in May, and USFWS is expected to make a listing determination for the species in September 2023. Tricolored bats (*Perimyotis subflavus*) are expected to be the second DoD bat programmatic biological evaluation to follow soon after the proposed rule. The little brown bat (*Myotis lucifugus*) listing determination has been officially postponed until Fiscal Year (FY) 2024, and three additional DoD-priority bat determinations have been added to the USFWS national listing workplan: hoary bat (*Lasiurus cinereus*) (FY27), Pacific sheath-tailed bat (*Emballonura semicaudata*) (FY25), and Florida bonneted bat (*Eumops floridanus*) (FY24).

The DoD Bat Conservation Strategy and the DoD Bat Inventory and Monitoring Guide will provide a framework for long-term bat strategies focused at the installation level, including systematic guides towards answering bat-specific questions, performing surveys, and preparing for bat-related management objectives. Generic scope and contracting templates for bat survey efforts are also in development. Both documents are in draft, though they are unlikely to see distribution until FY 24.

DoD has identified several key knowledge gaps for research priorities that its working group on mammals has put forward for funding mechanisms to consider when open requests are made. These include military training impacts to bats (specifically, smokes and obscurants and vertical aircraft rotor/enginewash); sampling refinement (automated bat call identification software improvements, range modeling efforts, sampling protocols for non-breeding season populations, study of non-maternity habitat use); and white-nose syndrome detection and impact analysis for the coast, desert, and southern (non-hibernating) ranges of several species. For those entities capable of answering these gaps, please consider them when developing proposals.

As always, we look forward to working with the DoD natural resources community to prepare our warfighters and restore our nation’s bat populations.

LEGACY PROGRAM PROJECT HIGHLIGHTS

Applied Science and Technology

Climate change is increasing the risk of catastrophic wildfires, and prescribed fires are as important as ever for wildland fire and natural resource managers. To ensure the continued evolution of DoD’s wildland fire operations, the Legacy Program supports applied science and technology through numerous projects focused on wildland fire. These projects help inform policy and develop innovative approaches to mitigation. The following are summaries of Legacy Program projects that the natural resources community may find interesting and useful. Explore these and additional projects on the [Natural Resources Legacy Project Deliverables](#) page on DENIX.

The Legacy Program’s current wildland fire project (Legacy Project #Wildfire-23: National Wildland Fire Risk and Mitigation Optimization Assessment) (see callout box below) was initiated in 2022. This project focuses on the influence of climate change on wildland fire and addresses data and information gaps to advance our understanding of wildland fire risk.




Other recent Legacy Program projects addressing wildland fire include:

- Legacy Project #18-850 (Development and Implementation of Targeted Training Resources for Wildland Fire Operators on Military Installations) leveraged the expertise of the Forest Stewards Guild to develop a suite of targeted planning and training materials for use by installation fire management programs.
Point of Contact (POC): [Daniel Godwin](#), Ph.D., Forest Stewards Guild
- Legacy Project #18-846 (Dormant Season Burning Impacts to Migratory Bats) studied day-roost selection and foraging habitat use by non-hibernating tree bats (*Lasiurus* spp.) during winter. Results suggested that tree bats choose dormant season day-roosts that both maximize solar exposure and minimize risks associated with fire. The results underscored that fire use that varies in space, time and frequency provides a diverse landscape pattern of mesic, deciduous habitat within the larger pine forest matrix, thereby supporting a diverse bat community during the dormant season and in a manner compatible with stewardship and range management activities.
POC: [W. Mark Ford](#), Virginia Polytechnic Institute and State University
- Legacy Project #17-834 (An Early Warning Mapping Tool for Forecasting Fire Risk on DoD Lands in the Arid West) used readily available remote sensed and other spatially continuous data to create and deploy a simple “early-warning” mapping tool that can be used by DoD and surrounding jurisdictions to monitor fire risk at a high spatial (250m) and temporal (1 week) resolution. The mapping tool directs attention and resources to localized areas with high fire risk within and across installation borders.
POC: [Miranda Gray](#), Conservation Science Partners
- Legacy Project #16-831 (Post-Wildfire Plant Regeneration in Arid Ecosystems: Overcoming Biotic and Abiotic Soil Limitations) studied the natural regeneration limitations of an important host tree for an endemic and federal endangered bird following a fire disturbance. A germination, growth, and survival experiment was conducted that showed survival was not affected by the site or treatment. While this study worked on a species endemic to Hawai’i, the process of systematically testing potential limiting resources with soil amendments is one that can be replicated for species at other military sites facing recruitment limitations.
POC: [Rebecca Ostertag](#), Ph.D., University of Hawai’i at Hilo
- Legacy Project #16-788 (DoD Wildfire Hazard Assessment) triaged installations relative to others within and across military branches using the relative number, size, and location of remotely detected wildfires. The triaging process identified 13 installations with high wildfire hazard. An additional 31 installations were assigned to the moderate wildfire hazard category. Identifying installations with high and moderate wildfire hazards will increase the ability of national wildland fire managers to focus resources and make data-driven wildfire management decisions.
POC: [Andrew Beavers](#), Colorado State University

BANG FOR THE BUCK—WHERE DOD CAN FOCUS WILDFIRE MITIGATION EFFORTS

By: [Andy Beavers](#), Center for Environmental Management of Military Lands, Colorado State University

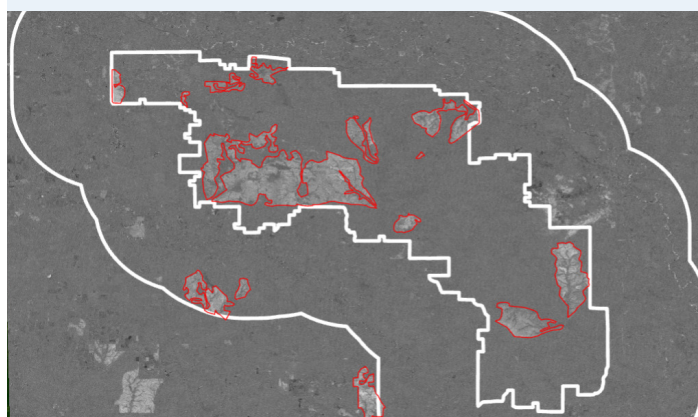
 Applied Science and Technology

The Center for Environmental Management of Military Lands (CEMML) is partnering with the DoD Legacy Resource Management Program to comprehensively address gaps in understanding the distribution of wildland fire hazards, risks, and mitigation opportunities. The U.S. military spends millions of dollars every year to mitigate wildfires, but the allocation of resources to accomplish those efforts is rarely guided by data because little data exists. This study is intended to allow DoD leadership to focus fire funds where they can produce the greatest wildfire mitigation impact.

The project entails four main phases:

1. Use Landsat to identify past fire occurrence, allowing for estimates of which installations have historically experienced concerning wildfire activity,
2. Triage installations with high historical fire activity into risk categories using wildfire risk assessment methodologies,
3. Assess climate impacts to those installations, and
4. Bundle the results into an optimization framework used by USFS and other land management agencies to identify high return-on-investment opportunities.

This project is still in Phase 1, which focuses on identifying historical areas where fires have occurred on or near military installations. Between this project and a previous effort, CEMML has already identified more than 23,000 fires at or within five miles of military installations. These fires will be analyzed for frequency, size, location relative to the installation boundary and each other, recurrence, and other factors that will separate installations with moderate to severe fire issues from those with less pronounced fire concerns. Phases 2 through 4 will take place in future fiscal years.



Landsat difference normalized burn ratio images like this one allow CEMML technicians to identify burn perimeters (red lines)



UPCOMING EVENTS, CONFERENCES, WORKSHOPS, AND TRAININGS

DoD Climate Resilience Workshop

July 10-13, 2023

St. Louis, Missouri

This workshop is hosted by the Office of the Assistant Secretary of Defense for Energy, Installations, and the Environment to provide a forum for DoD stakeholders and partners to explore the many facets of climate change, a national security threat that has tangible impacts to military readiness. Installations, environmental organizations, and climate change professionals will all be broadly represented to help inform the Military Departments on data, tools, and resources for addressing and combating climate change threats. Attendees will share lessons learned on built and natural infrastructure solutions and set the course for new and improved partnerships to connect missions, resources, and communities in support of military installation resilience.

Western Association of Fish & Wildlife Agencies Summer Meeting

July 10-14 2023

Santa Fe, New Mexico

The Summer Meeting will bring together more than 400 U.S. and Canadian fish and wildlife regulators to discuss shared biological, management, and land use issues. The event will attract professional fish and wildlife biologists (including commissioners and directors from over 20 states), managers, administrators, and others in fish and wildlife related fields.

Joint Meeting of Ichthyologists and Herpetologists

July 12-16, 2023

Norfolk, Virginia

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

Northeast-Midwest Prescribed Fire Science and Management Workshop

August 29-31, 2023

Madison, Wisconsin

The workshop is designed for all wildland fire management partners across the 20-state NE-MW region. The workshop's goal is to share regionwide, science-based, fire ecology information oriented toward expanding and maintaining the use of prescribed fire across all landscapes, jurisdictions, and fire-dependent ecosystems. The workshop also provides an opportunity for agency leaders and managers to interact with state prescribed fire councils and other key partners.

Association of Fish & Wildlife Agencies (AFWA) Annual Meeting

September 23-27, 2023

Calgary, Alberta, Canada

The 113th AFWA annual 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 24, 2023

Nationwide

National Public Lands Day (NPLD), hosted by the National Environmental Education Foundation (NEEF), is the nation's largest single-day volunteer effort for public lands. In 2019, volunteers celebrated at more than 2,500 public land sites, including parks, refuges, local waterways, recreation areas, trails, community gardens, historic sites, and DoD installations. DoD joined the NPLD partnership in 1999 and has awarded over \$3 million through the DoD Legacy Program to fund more than 575 NPLD projects that have directly benefited military lands across the United States. Check out these exciting opportunities, register an event, or volunteer at an existing event on the NPLD website at <https://www.neefusa.org/national-public-lands-day>. Volunteers' work will help ensure our public lands continue to be beautiful places for all to enjoy.

The Wildlife Society (TWS) Annual Conference

November 5-9, 2023

Louisville, KY

The Wildlife Society's Annual Conference is one of the largest gatherings of wildlife professionals and supporters in North America. For more than 25 years, TWS has hosted this unique and informative event that provides dozens of networking opportunities through working groups, meetings, and receptions, as well as nearly 1,000 educational opportunities that encourage discussion and collaboration. The conference will feature educational opportunities in wildlife management, research, and techniques through a wide variety of symposia, contributed research papers and posters, and workshops.

Sixth National Cohesive Wildland Fire Management Strategy Workshop

November 6-10, 2023

Santa Fe, New Mexico

These national workshops are designed to help stakeholders understand the Cohesive Strategy and see themselves as part of the solutions to wildland fire issues across the nation. These workshops help build and strengthen relationships, support Cohesive Strategy activities, and facilitate Cohesive Strategy implementation. The 2023 workshop is still under development, so check back frequently for updates on speakers and agenda topics!



LINKS OF INTEREST

DoD Natural Resources Program

DoD's Natural Resources Program provides policy, guidance, and oversight to manage natural resources on approximately 25 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 FY 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. Visitors can learn more about wildland fire operations on installations, interagency wildland fire operations, and 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 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.

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 natural resources managers.

DoD Chesapeake Bay Program (CBP)

DoD was one of the first federal departments to be formally involved in the Chesapeake Bay Watershed restoration effort. Military installations in Maryland, Pennsylvania, Virginia, New York, West Virginia, and the District of Columbia play an important role in defending and preserving the Bay. DoD-funded efforts advance the goals and outcomes of the Bay and further the ability for DoD to test, train, and operate in the watershed.





DOD NATURAL RESOURCES PROGRAM

Enabling the Mission, Defending the Resources

www.denix.osd.mil/nr

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