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More Than A Rake: Toward a Statutory Solution for Wildfire Threats to Department of Defense Installations

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MORE THAN A RAKE: TOWARD A STATUTORY SOLUTION FOR WILDFIRE THREATS TO DEPARTMENT OF DEFENSE INSTALLATIONS

ABSTRACT

Over the past four decades, the average area annually burned in wildfires in the United States has roughly quadrupled. Larger, more powerful wildfires increasingly threaten inhabited areas as well as vital infrastructure, including many installations of the United States Armed Forces. This article first introduces readers to what wildfire is and the unique challenges it creates to the environment, health and, specifically, to the Department of Defense (DOD). Next, it discusses the dominant approaches to addressing the wildfire threat, prescribed fire, and mechanical treatment. It then summarizes the primary laws, policies and partners involved in wildfire policy in the United States as applied to the DOD. Finally, it proposes a statutory solution, the Building Up Resilience Now for Defense (BURND) Act, that would improve the wildfire resilience of the DOD and communities hosting DOD installations in important ways, thus enhancing our national defense.

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Dedications: For my wife, Rachel, and my daughter, Sutton, without whose love and support this article would not have been possible and who are the answers to all the questions that matter. This work is further dedicated to the sacrifices made by all of the brave people around the world who put themselves in harm's way each year as wildland firefighters.

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I. INTRODUCTION

As World War II raged in the Pacific, Japanese planners searched for ways to strike at the United States' homeland. They settled on a novel plan, known as Operation FuGo, which saw the launch of more than 9,000 incendiary balloons toward the western United States.[1] The attacks resulted in some small wildland fires, as well as the tragic deaths of six Oregonians in a 1945 explosion.[2] Disturbingly, the balloons also caused minor damage to a Washington engineering facility that was a component of the Manhattan Project, the United States' then-secret atomic weapons program.[3] While the attacks were ultimately ineffective, the enemy's realization that wildfire could threaten military interests was a harbinger of things to come.

Commenting in 2018 on the devasting wildfires sweeping parts of California, President Donald J. Trump memorably referred to a conversation with Finnish President Sauli Niinistö, wherein President Niinistö allegedly described Finnish forest management practices as " . . . a lot of time on raking and cleaning and doing things."[4] President Trump's comments were widely criticized as illogical and largely ignoring the impacts of climate change on fomenting wildfire. Social media users posted pictures and videos of themselves derisively raking or otherwise "cleaning" forests, and President Niinistö later disputed President Trump's description of their conversation.[5] While on some level humorous, this episode must also be viewed through the lens of the Trump Administration's (at best) lax approach to environmental policy over the last four years, particularly with respect to climate change.[6] This approach was perfectly encapsulated by a September 2020 episode: President Trump, again visiting California during a period of devasting wildfire, was confronted by California's Natural Resources Secretary about the science underpinning climate change's impact on wildfire—President Trump responded, "Well, I don't think science knows, actually."[7]

Science does know. A review of 116 studies conducted between 2013 and 2020 was unequivocal; the authors, scientists from the United States, United Kingdom and Australia, concluded that climate change *was* increasing weather conditions conducive to wildfire and that other factors, like land management practices, *could not alone* account for the increase in fire occurrence and intensity in

1. Jameson Karns, *A Fire Management Assessment of FuGo*, 75 FIRE MGMT. TODAY 53–57 (2017).
2. *Id*. at 53-54.
3. *Id*. at 54.
4. Patrick Kingsley, *Trump Says California Can Learn from Finland on Fires. Is He Right?* N. Y. TIMES (Nov. 19, 2018), https://www.nytimes.com/2018/11/18/world/europe/finland-california-wildfires-trump-raking.html.
5. Quint Forgey, *Finnish President Denies Ever Discussing 'Raking' with Trump*, POLITICO (May 18, 2018, 5:10 PM), https://www.politico.com/story/2018/11/18/trump-raking-wildfires-california-finland-1002526.
6. *See generally* Scott Frickel & Christopher Rea, *Drought, Hurricane or Wildfire? Assessing the Trump Administration's Anti-Science Disaster*, 6 ENGAGING SCI., TECH. & SOC'Y 66 (2020) [hereinafter *Frickel et al*] (The authors are harshly critical of the prior Administration's approach toward science-based regulation generally, particularly in the environmental sphere).
7. Peter Baker, Lisa Friedman & Thomas Kaplan, *As Trump Again Rejects Science, Biden Calls Him a 'Climate Arsonist'*, N. Y. TIMES (Sep. 15, 2020), https://www.nytimes.com/2020/09/14/us/politics/trump-biden-climate-change-fires.html.

the United States.[8] Effectively combating the growing wildfire threat in the United States, and specifically the threat it poses to military operations, will require more than rakes. As this article will argue, the growing threat posed by wildfire requires Congressional action.

Take, for example, Travis Air Force Base (AFB) located near Fairfield at the southwestern end of the California's Sacramento Valley.[9] Construction of what was then known as Fairfield-Suisun Army Air Base began in 1942 shortly after the surprise attack on Pearl Harbor thrust the United States into World War II.[10] When the base became operational in 1943, its primary mission involved readying military aircraft for combat duty in the War's Pacific Theater and managing the ferry flights to get them there.[11] Almost 80 years later, Travis AFB has greatly expanded in size, but its core mission still retains a great many similarities to its heritage. Travis's host unit, the 60th Air Mobility Wing (60 AMW), now operates C-5M Galaxy and C-17 Globemaster III aircrafts, both heavy cargo planes designed for strategic airlift, as well as KC-10 Extender aerial refuelers.[12] These are all aircrafts designed to quickly move (or help move for the KC-10) troops and equipment forward to the fight. In addition to doing actual flying, the 60 AMW also manages the movement of more cargo and personnel than any other military air terminal in the United States Armed Forces.[13] In total, the Wing is responsible for assets and resources valued in excess of $11 billion.[14]

Travis AFB is sometimes informally called the "Gateway to the Pacific."[15] The nickname comes from Travis's operations supporting U.S. forces based at U.S. Indo-Pacific Command locations in a variety of countries ringing the Pacific Ocean, most notably Japan and the Republic of Korea.[16] Given the United States' strategic interests in the Pacific, this role is increasingly important at the dawn of a new phase of Great Power competition with an increasingly aggressive China. The acrimony

8. Adam J. P. Smith et al., *Climate Change Increases the Risk of Wildfires*, SCIENCEBRIEF, September 2020 update, at 2. [hereinafter *Smith et al*.] (This report is part of a series reporting on the latest climate science in order to inform members at the United Nations Conference of the Parties (COP26) meeting in Glasgow, Scotland, scheduled for November 2021. The series focuses on studies published since 2013, when the 5th Assessment report of the Intergovernmental Panel on Climate Change was completed).
9. Mark Wilderman, *A Brief History of the 60th Air Mobility Wing and Travis Air Force Base*, TRAVIS AFB OFF. OF HISTORY (2018), https://www.travis.af.mil/Portals/30/documents/2018%2060AMW%20TAFB%20Heritage%20Pamphlet.pdf?ver=2018-03-09-145024-143 (last visited Apr. 5, 2021).
10. *Id*.
11. *Id.*
12. Travis Air Force Base, *60th Air Mobility Wing Unit Fact Sheet*, https://www.travis.af.mil/Information/Fact-Sheets/Display/Article/855903/60th-air-mobility-wing/ (last visited Jan. 10, 2021).
13. *Id*.
14. *Id*.
15. Patrick Harrower, *Command Presence: CMSAF Visits Gateway to the Pacific U.S. Air Force,* 60TH AIR MOBILITY WING PUB. AFF. (Jul. 14, 2014), https://www.af.mil/News/Article-Display/Article/486367/command-presence-cmsaf-visits-gateway-to-the-pacific/.
16. *Id*.

accompanying the first bilateral meeting between Biden Administration officials and their Chinese counterparts only serves to underscore this likelihood.[17]

The 60 AMW's capabilities are critical to its parent command, the Air Force's Air Mobility Command (AMC), and the AMC's mission of ensuring the "capacity required to project the Joint Force and ensure strategic deterrence."[18] Travis AFB would be the major strategic hub for rapid movement of U.S. forces into the Pacific Theater in the event U.S. forces were directed to protect the Republic of China (commonly referred to as "Taiwan") in the face of increased tensions or even open conflict with the Chinese.[19] In short, Travis AFB and the missions it supports are strategically vital to U.S. national security interests. Therefore, threats to the operations, personnel, and infrastructure of installations like Travis must be mitigated where possible. Wildfire is among the most significant threats, and it is growing.

The annual fire season, which now runs from approximately June through September in that part of California, has repeatedly threatened Travis AFB in recent years, with annual fire impacts and major fire impacts in 2008 and 2020.[20] In August 2008, a fast-moving fire damaged or destroyed 270 military family housing units on Travis AFB in the largest fire event in the Base's history.[21] Twelve years later, the Lake-Napa Unit (LNU) Lightning Complex fire forced the installation commander to direct a mandatory evacuation of non-essential base personnel for two days.[22] This included the evacuation of patients from Travis AFB's hospital, the Air Force's largest medical facility, a hub for military patients being transported from Pacific theater locations back to the United States for treatment.[23] Moreover, the fire necessitated the evacuation of C-5s, C-17s, and KC-10s to various other installations

17. EXEC. OFF. OF THE PRESIDENT, *National Security Strategy of the United States of America*, 45-47 (2017), https://trumpwhitehouse.archives.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf; Robert D. Williams, *What's Next for U.S.-China Military Relations?*, LAWFARE (Mar. 22, 2021, 11:38 AM), https://www.lawfareblog.com/whats-next-us-china-military-relations.

18. Air Mobility Command Public Affairs, *AMC Commander Announces Her Command Priorities*, U.S.A.F. (Oct. 28, 2020), https://www.af.mil/News/Article-Display/Article/2395783/amc-commander-announces-her-command-priorities/.

19. *See, e.g.,* CNN Staff, *China Flies Warplanes Close to Taiwan in Early Test for Biden*, CNN (Jan. 25, 2021, 10:24 AM), https://www.cnn.com/2021/01/25/asia/china-us-taiwan-military-moves-intl-hnk-mil/index.html (In recent months, threatening PRC military activities directed at the ROC have continued to increase).

20. *See* A. LeRoy Westerling et al., *Climate and Wildfire in the Western United States*, 84 BULL. AM. METEOROLOGICAL SOC'Y 595, 596-598 (2003) (For other parts of the western U.S., this primary fire season runs as long as May to October).

21. Demian Bulwa, *Travis AFB Fire Destroyed, Damaged 270 Homes*, S.F. CHRON. (Aug. 18, 2008, 11:25 AM), https://www.sfgate.com/bayarea/article/Travis-AFB-fire-destroyed-damaged-270-homes-3199011.php.

22. 60th Air Mobility Wing Pub. Aff., *Travis Orders Mandatory Evacuations in Response to Local Fires*, TRAVIS A.F. BASE (Aug. 19, 2020), https://www.travis.af.mil/News/Article/2318810/media-release-travis-orders-mandatory-evacuations-in-response-to-local-fires/.

23. Cameron Otte, *Wildfire Forces DGMC to Evacuate Patients* (Aug. 28, 2020), https://www.travis.af.mil/News/Article/2329716/wildfire-forces-dgmc-to-evacuate-patients/.

as far away as Texas, complicating routine flight operations and the "rapid global mobility" Travis AFB exists to provide for any crisis that might emerge.[24]

Grass and shrub types common on and around Travis AFB provide ready fuel for fires and, when combined with the area's frequent strong winds and high temperatures, provide the ingredients required to produce powerful, fast moving fire that can threaten the safety of the installation.[25] Publicly-available data identifies one of the Base's radar installations, critical to its constant flight operations, as located in an area of the installation that is highly prone to fire, as is much of the on-base housing for military personnel and their families.[26]

Consider a fire occurring at Travis AFB during a period of extreme tension between the governments of Japan and China over the Senkaku Islands in the East China Sea. Successive Presidential Administrations have continually reaffirmed that the United States considers the islands included under the mutual defense provisions of Article V of the U.S.—Japan Security Treaty, meaning that a hostile incursion on the Senkaku Islands would demand a U.S. military response.[27] In such an event, the President could conceivably determine that additional troops should be rapidly deployed eastward to support current U.S. forces and our Japanese allies. An intense wildfire would present a major strategic problem in such a crisis, resulting in logistical challenges and potential delays in the arrival of critically needed forces.

Unfortunately, Travis AFB is not unique as a military installation facing wildfire threats. A recent Department of Defense (DOD) report assessing the impacts of climate change found 36 DOD installations facing current wildfire threats, with an additional seven likely to face them in the near future.[28] Of the 36 installations currently threatened, 32 are operated by the Air Force and house some of its most critical capabilities; including B-2 Spirit strategic bombers at Whiteman AFB in Missouri, F-35 fighters at Eglin AFB in Florida, and Minuteman III intercontinental ballistic missiles at Malmstrom AFB in Montana.[29]

In only his third official statement as Secretary of Defense, Secretary Lloyd Austin referred explicitly to this analysis in recognizing the threat climate change,

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24. Jennifer-Leigh Oprihory, *California Fire Triggers Personnel, Aircraft Evacuations at Travis* (Aug. 20, 2020), https://www.airforcemag.com/california-fire-triggers-personnel-aircraft-evacuations-at-travis/.

25. *Collaborative Efforts at Travis AFB Make Prescribed Fire Possible*, A.F. WILDLAND FIRE BRANCH NEWSL. (A.F. Wildland Fire Branch, San Antonio, Tex.), Oct. 2019.

26. *Id*.

27. MARK E. MANYIN, CONG. RSCH. SERV., R42761, THE SENKAKUS (DIAOYU/DIAOYUTAI) DISPUTE: U.S. TREATY OBLIGATIONS 7-8 (2021) [hereinafter MANYIN]; Treaty of Mutual Cooperation and Security, Japan-U.S., art. V, Jan. 19, 1960, 11 U.S.T. 1632 [hereinafter Treaty of Mutual Cooperation and Security].

28. OFF. OF THE UNDER SEC'Y OF DEF. FOR ACQUISITION & SUSTAINMENT, REPORT ON EFFECTS OF A CHANGING CLIMATE TO THE DEPARTMENT OF DEFENSE 5 (2019).

29. *Id*.; Eglin Air Force Base, *33rd Fighter Wing Fact Sheet*, https://www.eglin.af.mil/About-Us/Fact-Sheets/Display/Article/390944/33rd-fighter-wing/ (last visited Jan. 9, 2022); Malmstrom Air Force Base, *Malmstrom Air Force Base Units*, https://www.malmstrom.af.mil/Units/ (last visited Jan. 9, 2022); Whiteman Air Force Base, *509th Bomb Wing*, https://www.whiteman.af.mil/Units/509th-Bomb-Wing/ (last visited Jan. 9, 2022).

and specifically wildfire, poses to DOD installations.[30] However, we are not powerless in the face of this threat. Wildfires can be proactively mitigated in a way that other disasters, like hurricanes, cannot.

This article argues that the best method to address wildfire threats to military installations is through federal legislation. Part I describes the current wildfire problem, including key terminology, wildfire's physical and economic effects, its impact on the climate crisis, and its impact on military operations. Part II reviews current wildfire mitigation approaches. Part III reviews the legal and policy context in which the Department of Defense and partner agencies seek to address wildfire threats. Finally, Parts IV and V discuss the need for federal legislation and propose draft statutory text.

Wildfire legislation is a national security imperative because of the ever-increasing threats to military installations, operations, and readiness. The new statutory schema should ensure prioritization and funding for aggressive wildfire mitigation efforts, especially increased use of the well-tested prescribed burn techniques, by all federal agencies with significant land management responsibility. This article's proposed solution, the Building Up Resilience Now for Defense (BURND) Act, would enhance the DOD's ability to prepare for, and respond to, the growing wildfire threat. Further, it would close a problematic capability gap by removing existing statutory prohibitions on obtaining the wildfire expertise from the federal contractor community. By passing the BURND Act, Congress can position the DOD to meet a significant and growing threat while also improving environmental resiliency and mitigating climate change impacts.

II. THE CURRENT ENVIRONMENT

A. Fires in the Wild: Key Definitions

For those whose knowledge about wildfire begins and ends with "remember . . . only YOU can prevent forest fires", earnestly intoned by an anthropomorphic bear, it is important to address some basic terminology.[31] The terms and definitions this article will use are those adopted by the United States' National Wildfire Coordinating Group (NWCG).[32] "Wildland fire", as used by the NWCG and in the community, is a broad term for any non-structure fire occurring

30. Press Release, Lloyd J. Austin III, Sec'y of Def., U.S. Dep't of Def., Statement by Secretary of Defense Lloyd J. Austin on Tackling the Climate Crisis at Home and Abroad (Jan. 27, 2021), https://www.defense.gov/Newsroom/Releases/Release/Article/2484504/statement-by-secretary-of-defense-lloyd-j-austin-iii-on-tackling-the-climate-cr/.

31. *About the Campaign*, THE AD COUNCIL, https://smokeybear.com/en/smokeys-history/about-the-campaign (last visited Feb. 6, 2021) (emphasis in original). Notably, Smokey Bear's famous admonition was updated in 2001 to its current form: "only you can prevent wildfires", in order to properly capture that the scope of the fire challenges the United States faces extends beyond the Nation's forests. *Id*. Finally, in addition to covering the history of the Smokey Bear advertising campaign, which began in 1944, smokeybear.com contains a great deal of easily consumable information on wildfire prevention and safety.

32. *NWCG Glossary of Wildland Fire, PMS 205*, NAT'L WILDFIRE COORDINATING GRP., https://www.nwcg.gov/glossary/a-z (last visited Jan 12, 2021) [hereinafter *NWCG Glossary*]. The NWCG, whose institutional role will be discussed below, maintains an online glossary, PMS 205, defining hundreds of wildfire-related terms. *Id.*

in vegetation or with natural fuels.[33] It includes wildfires and prescribed fires, which are fires intentionally set for authorized purposes, usually to strategically eliminate potential fire fuel sources.[34] "Wildland fire" should best be thought of as a fire ignited in "the wild", i.e. outside of urban, suburban, or exurban areas though fires can and frequently do impact such areas.

By contrast, "wildfire" is defined as a "wildland fire originating from an unplanned ignition, such as lightning, volcanos, unauthorized and accidental human caused fires, and prescribed fires that are declared wildfires."[35] Wildfire is thus a narrower term, encompassing naturally occurring fires as well as those caused by human negligence.[36] In other words, wildfires are wildland fires, but not all wildland fires are wildfires. The term this article will predominately use is "wildfire" because, definitionally, wildfires form the primary threat addressed. However, the broader term "wildland fire" will also be used when appropriate.

It is important to understand how fires are classified. From a scientific standpoint, the most important metrics are intensity and severity. Intensity is a numerical expression of the amount of heat energy given off by a fire and is closely tied to the amount of available fuel.[37] It is measured at the fireline, the leading edge of the fire. As a fire's intensity increases, its destructive capacity typically also increases. Fire severity refers to the "degree to which a site has been altered or disrupted by fire."[38] Put another way, fire severity refers to the degree of physical change of the ecosystem caused by the fire in terms of consumption of fuels and other changes.[39] Thus, both terms can be thought of as providing a measure of a fire's relative "strength."

When looking at the responses to wildfire, it is important to understand the concepts of suppression and mitigation. The NWCG defines suppression as "[a]ll the work to extinguish or limit wildland fire spread."[40] Suppression thus refers to active firefighting in relation to a specific active fire, ranging from high-tech approaches like the aerial release of flame-retardant chemicals on vegetation in the path of a fire

33. *Id.* at *Wildland Fire*.
34. *Id*.
35. *Id*. at *Wildfire*. Prescribed fires may be declared wildfires in the rare but problematic case of the personnel managing the prescribed fire losing control of the fire, thus rendering it functionally a wildfire.
36. The efforts of Smokey Bear notwithstanding, human negligence remains a major cause of wildfire. Incidents range from carelessly discarded cigarettes to the combined 54,000 acres burned in wildfires infamously ignited in Arizona in 2017 and California in 2020 by amateur pyrotechnic displays associated with "gender reveal" celebrations. *See* Leah Asmelash, *Woman Who Popularized the Gender Reveal Party Says Enough Already After Latest Wildfire*, CNN (Sep. 7, 2020, 11:33 PM), https://www.cnn.com/2020/09/07/us/gender-reveal-parties-overview-trnd/index.html.
37. Jon E. Keeley, *Fire Intensity, Fire Severity and Burn Severity: A Brief Review and Suggested Usage*, 18 INT'L J. OF WILDLAND FIRE 116 (2009); NWCG Glossary, *supra* note 32, at *Fireline Intensity*.
38. NWCG Glossary, *supra* note 32, at *Fire Severity*.
39. Keeley, *supra* note 37, at 118.
40. NWCG Glossary, *supra* note 32, at *Suppression*.

to lower-tech, more labor intensive approaches like clearing a line of vegetation in the path of an advancing fire to act as a "firebreak."[41]

Mitigation refers to the proactive modification of "the environment or human behavior to reduce potential adverse impacts" of a fire.[42] Mitigation activities are conducted before a specific fire to either reduce the risk of fire or, where fire is unavoidable or even desirable, to reduce the potential for fires to become larger than the natural environment and human population can tolerate.[43] Mitigation activities range from simple methods like open flame bans issued during dry weather, various types of removal of potential fuel for fires, or the intentional setting of "prescribed" fires during cooler, wetter periods to reduce the fire area's fuel load prior to fire season.[44] Wildfire is a rare natural threat that can be mitigated in ongoing ways, through systematically planned and implemented activities to reduce adverse fire impacts. Mitigation is the focus of this article.

B. Environmental Impacts

In areas where it is prevalent, wildfire is a dominant environmental force. Understanding its harmful, but also beneficial, impacts is crucial to developing sound policy. But a threshold question for this discussion is what constitutes an environmental impact. For purposes of this article, "environmental impact" will be defined as "adverse and beneficial physical, biological and health effects on the natural and human environments resulting from a wildfire event."[45] Unfortunately, there is no publicly available central data collection effort relevant to the environmental effects of wildfire on the DOD and so much of what follows must be more generalized to impacts in the United States.

The physical and biological effects of fire vary widely and depend largely on the intensity and severity of the fire. Fires burning in areas without significant fuel availability, like grasslands, are typically less intense and severe.[46] Damage to surface plants may be largely superficial, with plant life resprouting quickly after the fire, soils remaining healthy, and the land having the capacity to return to its pre-fire state in short order.[47] Notwithstanding their relative strength, such fires still retain destructive capacity and may require mitigation activities if human areas are

41. Karen M. Bradshaw, *Backfired - Distorted Incentives in Wildfire Suppression Techniques*, 31 UTAH ENVTL. L. REV. 155, 158 (2011).
42. NWCG Glossary, *supra* note 32, at *Mitigation*.
43. NWCG Glossary, *supra* note 32, at *Mitigation Actions*.
44. KATIE HOOVER, CONG. RSCH. SERV., R40811, WILDFIRE FUELS AND FUEL REDUCTION 6-9 (2013).
45. *See* Drew Martin et al., *Environmental Impact of Fire*, 5 FIRE SCI. REV. 2 (2016) (the definition provided above is a modified version of the definition of "environmental impact of fire" adopted by the authors, which addresses the impact of fire, including but not limited to wildfires. The authors adapted their definition from the previous definition of environmental "effects or impacts" used in the Council of Environmental Quality's National Environmental Policy Act (NEPA) implementing regulations); *See also* 40 C.F.R. § 1508.8 (2005).
46. *Wildfire Burn Severity Classification*, UNIV. OF CAL. AGRIC. & NAT. RES., https://ucanr.edu/sites/fire/files/288135.pdf (last visited Dec. 22, 2021) [hereinafter *Burn Severity Classification*].
47. *Id*.

threatened, however, they may also serve important and beneficial purposes for their ecosystems.[48]

Studies have demonstrated that wildfire improves the vigor and hardiness of many types of fire-habituated plants.[49] They open grazing lands, benefiting grazing animals and predators dependent on grazing populations, and reduce tree cover, benefiting plant life less tolerant of shade, such as the Giant Sequoia.[50] Wildfires also serve an important biological function by opening physical habitat gaps between members of the same species, thus dividing populations, promoting intraspecies genetic diversity, and overall species health.[51]

By contrast, high intensity and severity wildfires have the potential to devastate ecosystems. Such fires may reduce the outer portion of even large trees to charcoal, while completely eradicating less hardy forms of plant life,[52] and soil health may be seriously degraded, limiting the potential for regrowth of plant life.[53] The potential for destructive erosion is also often increased, with the hydrologic cycle transporting eroded material into the water supply, creating deleterious impacts on water quality.[54] Recovery time from such events is generally measured in years, if not decades.[55]

Particularly concerning are high intensity, high severity "megafires" which have been occurring with increasing regularity in the western United States and will likely increase in frequency as a result of the ongoing impacts of climate change.[56] Scientists studying an Oregon fire determined that flame temperatures reached at least 1,300 degrees Fahrenheit (700 degrees Celsius), after finding melted aluminum research tags previously posted in the fire's path.[57] Analysis showed the fire resulted

48. Juli G. Pausas & Jon E. Keeley, *Wildfires as an Ecosystem Service*, 17 FRONTIERS IN ECOLOGY & ENV'T. 289, 289–295 (2019) [hereinafter *Pausas & Keeley*]. Obviously, assessing wildfire risk prior to future development is an important step in reducing the need for mitigation activities in areas where they would otherwise be unnecessary. *See generally* Hannah Brenkert-Smith et al., *Trying Not to Get Burned: Understanding Homeowners' Wildfire Risk-Mitigation Behaviors*, 50 ENV'T. MGMT. 1139 (2012).

49. Victoria M. Donovan et al., *Resilience to Large, "Catastrophic" Wildfires in North America's Grassland Biome*, 8 EARTH'S FUTURE, July 2020, at 1,11.

50. Pausas & Keeley, *supra* note 48, at 289-295; L. JACK LYON ET AL., U.S. DEP'T OF AGRIC., GEN. TECH. REP. RMRS-GTR-42-VOL. 1, WILDLAND FIRE IN ECOSYSTEMS: EFFECTS OF FIRE ON FAUNA 29 (2000).

51. Pausas & Keeley, *supra* note 48, at 290-291.

52. Burn Severity Classification*, supra* note 46.

53. *Id.*

54. *Id.*; U.S. Environmental Protection Agency, *Wildfires: How Do They Affect Our Water Supplies?*, https://www.epa.gov/sciencematters/wildfires-how-do-they-affect-our-water-supplies (last visited Jan. 9, 2022).

55. Burn Severity Classification*, supra* note 46.

56. Fantina Tedim et al., *Defining Extreme Wildfire Events: Difficulties, Challenges, and Impacts*, 1 FIRE 1, 4-5 (2018); A. Park Williams et al. *Observed impacts of anthropogenic climate change on wildfire in California*, 7 EARTH'S FUTURE 8, 905 (2019). Despite its increasing usage in the popular vernacular, as Tedim et al note, "megafire" is not a definitionally precise term, with various entities defining the term based on size alone (and with different sizes) or a mixture of factors including size and intensity. What does seem clear, however, is that use of the term always implies a powerful fire that is net destructive, rather than net beneficial, to the environment.

57. *Intense Wildfire Alters Forest Soil*, U.S. FOREST SERV., (Mar. 8, 2018), https://www.fs.usda.gov/pnw/pnw-research-highlights/intense-wildfire-alters-forest-soil.

in significant loss of topsoil and soil carbon that may adversely impact processes including nutrient retention and water infiltration.[58]

Fire also poses serious challenges to human health. Obviously, an encroaching wildfire poses an immediate threat to human life and, tragically, fatalities among the public and the brave people who put themselves in harm's way as wildland firefighters occur each year. Between 2006-2017, an average of 17 firefighters per year lost their lives fighting wildland fires from a variety of causes including smoke inhalation, vehicle accidents, and exertion-induced heart attacks.[59] While no single agency appears to maintain wildland fire-specific statistics of civilian fatalities country-wide, the California Department of Forestry and Fire Protection (CAL FIRE) maintains data for California wildfires. Three of the five deadliest fires in modern California history killed 85, 22, and 15 people, respectively, and occurred between 2017 and 2020. [60]

In addition to flames and heat, wildfires produce prodigious quantities of smoke. To conceptualize the magnitude of the potential issues, one need only recall the many apocalyptic images captured across Northern California in September 2020. Residents were greeted with orange-hued, smokey skylines that appeared dark at mid-day—the result of many tons of smoke produced by numerous fires.[61] Unfortunately, this smoke is not merely an eyesore; it has the capacity to pose serious threats to human health for people located far from the immediate vicinity of the source fire.

Smoke from wildfire is made up of "a complex mixture of particulate matter, carbon dioxide, water vapor, carbon monoxide, hydrocarbons and other organic chemicals, nitrogen oxides, and trace minerals."[62] Of these components, particulate matter (PM), specifically particles 2.5 micrometers (μm) or smaller (abbreviated $PM_{2.5}$), poses the greatest threat to human health.[63] These tiny particles, many times smaller than the width of a human hair, are inhaled and can imbed deep into the lungs and enter directly into the bloodstream, posing a number of serious health risks.[64] Exposure to $PM_{2.5}$ has been linked to a range of conditions including

58. *Id*.

59. NAT'L WILDFIRE COORDINATING GRP., NWCG REPORT ON WILDLAND FIREFIGHTER FATALITIES IN THE UNITED STATES: 2007-2016 3 (PMS 841, 2017).

60. *Top 20 Deadliest California Wildfires,* CAL. DEP'T OF FORESTRY & FIRE PROT., https://www.fire.ca.gov/media/lbfd0m2f/top20_deadliest.pdf (last visited Feb 19, 2021). These fires are, respectively, the Camp Fire of November 2018, the Tubbs Fire of October 2017, and the North Complex Fire of August 2020.

61. *Photos: Surreal orange skies as wildfire smoke blocks sun in Bay Area,* L.A. TIMES (Sep. 9, 2020, 12:43 PM), https://www.latimes.com/california/story/2020-09-09/amazing-photos-of-deep-orange-skies-snowing-ash-as-fire-smoke-swamps-bay-area; Heide Couch, *Wildfires across California propel ash and smoke above Travis AFB,* 60TH AIR MOBILITY WING PUB. AFF. (Sep. 15, 2020) https://www.travis.af.mil/News/Article/2347854/wildfires-across-california-propel-ash-and-smoke-above-travis-afb/.

62. SUSAN L. STONE ET AL., U.S. ENVTL. PROTECTION AGENCY, WILDFIRE SMOKE: A GUIDE FOR PUBLIC HEALTH OFFICIALS 12 (2019) [hereinafter STONE ET AL.].

63. *Id*. at 4-5.

64. *Particulate Matter Pollution*, U.S. ENVTL. PROTECTION AGENCY, (last visited Feb 19, 2021), https://www.epa.gov/pm-pollution/particulate-matter-pm-basics.

impaired lung function, chronic bronchitis, heart failure and early death.[65] The type of short-term $PM_{2.5}$ exposure (days to weeks) typically caused by wildfire events is associated with exacerbation of existing cardiovascular and respiratory conditions, and elevated risk of premature death for persons suffering from them.[66] However, $PM_{2.5}$ can also adversely impact young, healthy populations, [67] like military members, by inducing temporarily impaired function and inflammation of the lungs as well as other respiratory symptoms. This is less than optimal for troops the DOD is charged with keeping in fighting shape.

An analysis of studies examining immediate impacts of PM-laden wildfire smoke showed statistically significant increases in short-term mortality during wildfire events, i.e., measurable increases in deaths on smoke-heavy days, and estimates of annual additional United States deaths related to wildfire smoke may surpass 21,000 people.[68] Wildfire smoke, and particularly $PM_{2.5}$, is now believed to adversely impact fetal development. A study examining data from Colorado patients linked wildfire smoke exposure to premature birth and low birth weight, as well as increased incidences of maternal high blood pressure and gestational diabetes. Again, this is very concerning for the many troops and their family-members who become pregnant each year.[69] Finally, emerging evidence from a study examining three recent fire events in California has even suggested a link between wildfire-related $PM_{2.5}$ exposure and increased susceptibility to SARS-CoV-2, the virus that causes COVID-19.[70] The authors suggest exposure to wildfire smoke may increase COVID-19 infection incidence, particularly among individuals with existing cardiac or pulmonary conditions.[71] In addition to the main PM threat, wildfire smoke may increase exposure to ground level ozone, carbon monoxide, and various substances designated as Hazardous Air Pollutants under the Clean Air Act.[72]

In the aggregate, wildfire smoke poses a serious threat to human health especially for those more susceptible to its impacts: young children, the elderly, and people with preexisting cardiovascular or respiratory conditions.[73] As the number and severity of wildfires continues to grow, the cumulative impact of repeated exposure to smoke events is a concern. While evidence is lacking to make a definitive pronouncement on the impact of chronic environmental exposure to wildfire smoke, there is sufficient reason for concern that the cumulative effect may increase risk of cardiovascular or pulmonary diseases, as well as some types of cancer.[74]

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65. STONE ET AL., *supra* note 62, at 4.
66. *Id.*
67. *Id*.
68. Colleen E. Reid et al., *Critical Review of Health Impacts of Wildfire Smoke Exposure*, 124 ENVTL. HEALTH PERSP. 1334, 1336 (2016); DOUGLAS S. THOMAS ET AL., NAT'L INST. OF STANDARDS & TECH., DEP'T OF COM., NIST SP 1215, THE COSTS AND LOSSES OF WILDFIRE: A LITERATURE SURVEY 24 (2017) [hereinafter THOMAS ET AL.].
69. Mona Abdo et al., *Impact of Wildfire Smoke on Adverse Pregnancy Outcomes in Colorado, 2007–2015,* 16 INT'L. J. OF ENV'T. RES. & PUB. HEALTH, 12-14 (2019).
70. Ira Leifer et al., *Wildfire Smoke Exposure: Covid19 Comorbidity?* 1 J. OF RESPIRATION 74, 76-77 (2021).
71. *Id.* at 74-75.
72. STONE ET AL., *supra* note 62, at 5; *see generally* 42 U.S.C. § 7412.
73. STONE ET AL., *supra* note 62, at 6-8.
74. *Id*. at 5.

C. Economic Impacts

As with environmental impacts, understanding the economic impacts of wildfire is important to developing sound policy. Wildfires are tremendously costly. Governmental costs associated with wildfire include preparedness activities, mitigation programs, suppression activities, and disaster response costs.[75] According to a Congressional Research Service report reviewing wildfire-related appropriations made to the U.S. Forest Service (USFS) and the four Department of Interior (DOI) agencies currently vested with chief responsibility for wildfire response on federal lands, recent appropriations related to wildfire have more than doubled from approximately $2 billion in Fiscal Year (FY) 2011 to $4.48 billion in FY2020.[76] Coupled with the likelihood that wildfires will continue to increase in frequency and destructive force as a result of climate change, rising costs raise significant concerns—however, these concerns are not new.[77] For example, a 2009 report by the Government Accountability Office (GAO) referred to the "sharply rising costs of managing wildland fires" and noted that between 1999—2003 the USFS and the DOI had been forced to transfer appropriations totaling $2.7 billion to fire suppression activities, resulting in other important projects, including those related to wildfire risk mitigation, being delayed or simply unaddressed.[78]

Wildfire-related economic losses are also substantial. California's Camp Fire of 2018 resulted in the burning of 153,000 acres and over 18,000 structures, with estimated losses of over $10 billion based on insurance claim data alone.[79] An extensive 2017 analysis by the Department of Commerce's National Institute of Standards and Technology estimated total *annual* wildfire-related losses in the United States range from $63.5 billion to as much as $285 billion depending on calculation methodology.[80] The report included both direct losses, such as economic impact of wildfire-related deaths and the destruction of homes, and indirect losses, such as impairment of the various supply chains and fire-related interruptions of government services.[81] Notable for the DOD, which already spends approximately $50 billion annually on health care costs for servicemembers and their families, are

75. THOMAS ET AL., *supra* note 68, at 11-16.

76. KATIE HOOVER, FEDERAL WILDFIRE MANAGEMENT: TEN-YEAR FUNDING TRENDS AND ISSUES (FY2011-FY2020), 12 (CONG. RES. SERV., R46583 2020) (Noting that all figures are expressed in inflation adjusted FY2020 dollars).

77. *See* Marshall Burke et al., *The Changing Risk and Burden of Wildfire in the United States*, 118 PROC. NAT'L ACAD. SCI.,2-5 (2020) (stating that there is growing evidence since 2000 that indicates a wide range of negative health consequences associated with wildfire smoke exposure).

78. ROBIN M. NAZZARO, GOV'T ACCT. OFF., GAO-09-444T, WILDLAND FIRE MANAGEMENT – ACTIONS BY FEDERAL AGENCIES AND CONGRESS COULD MITIGATE RISING FIRE COSTS AND THEIR EFFECTS ON OTHER AGENCY PROGRAMS (2009).

79. *Camp Fire,* CAL. DEP'T OF FORESTRY & FIRE PROT., https://www.fire.ca.gov/incidents/2018/11/8/camp-fire/ (last visited Feb. 20, 2021); *Facts + Statistics: Wildfires,* INS. INFO. INST., https://www.iii.org/fact-statistic/facts-statistics-wildfires (last visited Feb. 20, 2021).

80. THOMAS ET AL., *supra* note 68, at 45.

81. *Id*. at 23-45 (Notably, the report also referenced as an indirect loss, the impact of wildfire on military operations, noting wildfires "can disrupt military training and operations, [but that] there is not a public database that tracks the total cost of these incidents").

the increased lifetime health care costs associated with wildfire smoke exposure.[82] Other recent natural disasters have also proven extraordinarily costly for the DOD. For example, of the estimated $25 billion in damage caused by 2017's Hurricane Michael, restoring the destruction caused to Tyndall AFB alone is estimated to cost nearly $5 billion.[83] While the chances of a wildfire as singularly destructive as Hurricane Michael are likely small, it is important to remember that a bad hurricane season may include fifteen hurricanes, while a "good" wildfire season will still encompass tens of thousands of fires.

D. The Climate Crisis

The opening line of Executive Order 14008, issued a week into President Biden's presidency, notes, "the United States and the world face a profound climate crisis."[84] Wildfires are both a contributor and product of this worsening crisis. Understanding wildfire's intersection with climate is important to the military, where planning for one's operational environment is a bedrock principle.[85]

Vegetation fires of all types contribute significantly to the global emission of greenhouse gases, primarily carbon-dioxide, which is the near certain cause of warming global temperatures.[86] Fires accounted for an estimated 2.2 billion metric tons of greenhouse gases emitted into the air annually between 1997 and 2016, or about 22% of global annual emissions estimated to be generated by fossil fuel consumption over that period. [87] Of this quantity of greenhouse gas emissions, about 75%, or 1.65 billion metric tons, is estimated to come from wildfires around the globe.[88] Moreover, in addition to the carbon directly emitted by burning fires, the destruction of vegetation further erodes the Earth's natural capacity to use and store carbon dioxide through degradation of the photosynthetic process.[89] Of particular concern are fires, and warming, occurring in permafrost regions of the global Arctic,

82. *Id*. at 25-27; BRYCE H. P. MENDEZ, CONG. RES. SERV., IF11206, FY2020 BUDGET REQUEST FOR THE MILITARY HEALTH SYSTEM, 1 (2019); Ikuho Kochi et al., *The Economic Cost of Adverse Health Effects from Wildfire-Smoke Exposure: a Review*, 19 INT'L. J. OF WILDLAND FIRE 803, 804 (2010).

83. Ari Shapiro, *Tyndall Air Force Base Still Faces Challenges in Recovering from Hurricane Michael*, NAT'L PUB. RADIO (May 31, 2019 5:09 PM), https://www.npr.org/2019/05/31/728754872/tyndall-air-force-base-still-faces-challenges-in-recovering-from-hurricane-micha.

84. Exec. Order No. 14008, 86 Fed. Reg. 7619 (Jan. 27, 2021).

85. *See generally* DEP'T OF DEF., JOINT PUBLICATION 5-0: JOINT PLANNING (2020). JP 5-0 describes "planning" as determining "how (the **ways**) to use military capabilities (the **means**) in time and space to achieve objectives (the **ends**) within an acceptable level of **risk**". (Emphasis in original). Understanding wildfire are critical to defining the operational ways, means, ends and acceptable risk required to meet mission requirements in the face of this threat.

86. David M.J.S. Bowman et al*., Vegetation Fires in the Anthropocene*, 1 NAT. REV. EARTH & ENVN'T, 2 (2020) [hereinafter Bowman et al.]; Rajendra K. Pachauri et al., *Climate Change 2014 Synthesis Report*, 4, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE [IPCC], (2015), https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf.

87. Bowman et al., *supra* note 86, at 2.

88. *Id*.

89. Rongbin Xu et al., *Wildfires, Global Climate Change, and Human Health*, 383 NEW ENG. J. MED. 2173, 2173-2174 (2020) [hereinafter Xu et al.].

including northern Alaska, where enormous quantities of carbon are stored in frozen soil.[90] Some estimates suggest thawing permafrost could lead to the release of 220 billion metric tons of stored carbon by the year 2100 and up to 500 billion metric tons by 2300.[91] To put this latter number in context, it is equivalent to between 10% and 30% of the amount of carbon emissions believed necessary to push global temperature rise above two degrees centigrade, with significant adverse effects on the planet. [92] Further, it would represent an amount equivalent to approximately one-fourth of the 2040 billion metric tons of anthropogenically-released carbon dioxide estimated to have been emitted since the mid-18th Century.[93]

The Intergovernmental Panel on Climate Change (IPCC) has noted the warming temperatures brought on by climate change contribute to increased, and more destructive, wildfires.[94] In addition to increased heat, climate impacts on the timing and amount of seasonal rainfall have led to some regions experiencing wetter winters and longer, dryer summers, increasing fire risk and ferocity during fire seasons.[95] Scientists also theorize that climate change is contributing to mass changes in cloud ice particles, a phenomenon linked to more frequent lightning strikes and the potential for igniting still more wildfires.[96] Still, further evidence links the warming climate to increases in surface wind speed, which increases the potential for the wildfire spread and intensity.[97]

Taken together, wildfire is a part of a larger destructive, climate-driven feedback loop. Warming temperatures lead to more wildfires, emitting more greenhouse gases, leading to yet more warming and to more wildfires.

E. Impacts on Military Operations

Due to the nature of its operations, which sometimes inadvertently ignites fires, the DOD experiences more wildfires than any of the other federal land management agencies, adjusted for the size of the DOD's land holdings.[98] In 2019,

90. Benjamin W. Abbott et al., *Biomass Offsets Little or None of Permafrost Carbon Release from Soils, Streams, and Wildfire: an Expert Assessment*, 11 ENV'T. RES. LETTERS 1 (2016), 3-4 [hereinafter Abbott et al.].

91. *Id*. at 3.

92. *Id*.; *see also* Alan Buis, *A Degree of Concern: Why Global Temperatures Matter,* NAT'L AERONAUTICS AND SPACE ADMIN. (Jun. 19, 2019) (noting that global temperature warming of 2 degrees Celsius is projected to cause destabilizing effects, including severe annual heatwaves in large parts of the United States, water scarcity in countries around the world, and extreme weather events such as severe flooding in places as diverse Alaska and Southeast Asia) https://climate.nasa.gov/news/2865/a-degree-of-concern-why-global-temperatures-matter/.

93. Pachauri et al., *supra* note 86, at 4.

94. Valérie Masson-Delmotte et al., *Climate Change and the Land: An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 16 [IPPC] (2020).

95. Xu et al., *supra* note 89, at 2173.

96. *Id*.

97. *Id*.

98. DANIEL S. GODWIN ET AL., DEPARTMENT OF DEFENSE LEGACY RESOURCE MANAGEMENT PROGRAM, DEVELOPMENT AND IMPLEMENTATION OF TARGETED TRAINING RESOURCES FOR WILDLAND FIRE OPERATIONS ON MILITARY LANDS 8 (2020).

a DOD report stated unequivocally that "the effects of a changing climate are a national security issue" that could negatively impact military planning, operations and installations.[99] Specific to wildfire, the authors note wildfire requires the DOD to expend substantial resources on "claims, asset loss, and suppression activities due to the impacts of wildfire."[100]

Illustrating the direct impacts of wildfire on military operations, the report then describes a recent incident at Vandenberg AFB in California, home of the United States Space Force's 30th Space Wing (30 SW).[101] The 30 SW conducts space and missile testing operations, as well as launching satellites into orbit with rocket boosters, like the Atlas V.[102] On September 18, 2016, personnel of the United Launch Alliance, a private company that conducts launches from Vandenberg AFB, were preparing to launch an Atlas V rocket carrying a Worldview-4 earth observation satellite.[103] The launch countdown had already begun when an urgent abort command was issued—fast approaching flames forced personnel to flee the launch complex.[104] Storage tanks containing highly flammable liquid oxygen at the site were also threatened, though ultimately spared, by the flames.[105] While there were no injuries or lasting infrastructure damage, the fire burned more than 10,000 acres on Vandenberg AFB and a satellite launch was delayed nearly two months, disrupting a meticulously planned operation.[106]

In addition to the direct physical threat wildfires pose to military personnel, property, and operations, there are also indirect impacts, most notably on training and through the fiscal impact of wildfire-related damages. For example, live fire training, necessary to ensure troop mission readiness, poses a significant threat of

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99. OFF. OF THE UNDER SEC'Y OF DEF. FOR ACQUISITION AND SUSTAINMENT, REPORT ON EFFECTS OF A CHANGING CLIMATE TO THE DEPARTMENT OF DEFENSE 2 (2019) [hereinafter *DOD Climate Effects Report*]; Note that preparation of this report was mandated by Section 335 of the 2018 National Defense Authorization (Public Law 115-91), with the law noting it was the sense of Congress that "military installations must be able to effectively prepare to mitigate climate damage in their master planning and infrastructure planning and design, so that they might best consider the weather and natural resources most pertinent to them." National Defense Authorization Act, Pub. L. No. 115-91, 131 Stat. 1283 (2017).

100. DOD Climate Effects Report, *supra* note 99, at 7.

101. *Space Launch Delta 30*, VANDENBERG SPACE FORCE BASE, https://www.vandenberg.spaceforce.mil/Units/ (last visited Mar. 1, 2021).

102. *Id*.

103. Phillip Swarts, *WorldView-4 launches successfully after two-month fire delay*, SPACENEWS, https://spacenews.com/worldview-4-launches-successfully-after-two-month-fire-delay/ (last visited Mar. 1, 2021) [hereinafter *Swarts*].

104. *Id.*; DOD CLIMATE EFFECTS REPORT, *supra* note 99, at 7.

105. Swarts, *supra* note 103, at 7; DOD CLIMATE EFFECTS REPORT, *supra* note 99, at 7.

106. Swarts, *supra* note 103; DOD CLIMATE EFFECTS REPORT, *supra* note 99, at 7; The Canyon Fire was not, however, the worst Vandenberg wildfire incident; that would be the 1977 Honda Canyon fire, ignited unexpectedly in December by high winds downing a powerline. Fast moving flames overran a vehicle carrying three people, including Base Commander Colonel Joseph Turner, Fire Chief Billy Bell, and Assistant Fire Chief Eugene Cooper; tragically all three were killed. A fourth person, a bulldozer operator named Clarence McCauley, was also badly injured and later succumbed to his injuries. *See* Joseph N. Valencia, *1977 Honda Canyon Fire Recalled*, LOMPOC REC. (Dec. 20, 2007), https://lompocrecord.com/news/local/1977-honda-canyon-fire-recalled/article_239c13c6-2c79-58b6-9d67-4e711baa01ac.html.

wildfire ignition in wildfire prone areas.[107] "Red flag" days, days when high temperature, wind, and dry conditions make fire ignition likely, often lead to cancellation or restriction of training activities.[108] If not, live fire of military weapons could easily ignite wildfires on these days, as happened near Fort Carson, Colorado in 2018. In that case, Army aviators, engaging in weapons fire training for an upcoming deployment, accidently ignited a wildfire that burned 400 acres on Fort Carson and 2,900 acres of nearby private property.[109] The blaze required the temporary evacuation of 250 civilians and destroyed three private homes, subjecting the Army to liability (and less than favorable attention from the public).[110] Such threats frequently require training to be limited, curtailed, or moved to safer areas, thus creating delays and the potential for degraded readiness.

Specific to the Air Force, aircraft operations pose multiple wildfire concerns. The release of flares used to protect military aircraft by confusing certain types of infrared (colloquially, "heat-seeking") anti-aircraft munitions in combat sometimes trigger wildfires.[111] Though infrequent, aircraft mishaps are also a source of wildfire ignition. For example, the author's first exposure to wildfire was as part of a team from Holloman AFB that responded to a crash site and resulting wildfire in southern New Mexico in November 2011.[112] These, and other wildfire-related expenditures, cost the Air Force over $15 million annually in damage claims from persons impacted by wildfires.[113]

In the Air Force, existing mitigation and suppression strategies, including wildland fire expertise, is centralized in the Air Force Civil Engineer Center's Wildland Fire Branch (AFWB), headquartered at Joint Base San Antonio in Texas, with regional operating locations at bases in California, Colorado, and Florida.[114] Day to day activities and tactical response are directed by installation fire departments that are part of the installation Civil Engineer Squadrons, which have

107. U.S. AIR FORCE JOINT BASE ELMENDORF-RICHARDSON, ALASKA, SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT FOR WILDLAND FIRE PREVENTION ACTIVITIES AT JBER, ALASKA 1 (2019).

108. Maureen Sullivan, *U.S. Deputy Assistant Sec'y of Def. for Env't., Safety & Occupational Health*, *Presentation on Wildland Fire Challenges at the Sustaining Military Readiness Conference* (Sep. 10, 2018) (on file with author).

109. Charlsy Panzino, *Live-fire Training Ignited Blaze at Fort Carson, Officials Say*, ARMY TIMES (Mar. 26, 2018), https://www.armytimes.com/news/your-army/2018/03/26/live-fire-training-ignited-blaze-at-fort-carson-officials-say/.

110. *Id*.

111. HEADQUARTERS AIR COMBAT COMMAND, ENVIRONMENTAL EFFECTS OF SELF-PROTECTION CHAFF AND FLARES, 4-27 (1997).

112. Associated Press, *Military Fighter Drone Crashes in New Mexico, Starts Grass Fire*, FOX NEWS (Jul. 6, 2011), https://www.foxnews.com/us/military-fighter-drone-crashes-in-new-mexico-starts-grass-fire (last visited Nov 4, 2021).

113. Jennifer Schneider, *AF Takes Partnership Approach to Wildland Fire Management*, A.F. (Apr. 9, 2015), https://www.af.mil/News/Article-Display/Article/584603/af-takes-partnership-approach-to-wildland-fire-management/.

114. *Air Force Wildland Fire Branch*, A.F. CIV. ENG'R CTR. (Dec. 2018), https://www.afcec.af.mil/What-We-Do/Environment/AF-Wildland-Fire-Branch/ [hereinafter *AF Wildland Fire Branch*].

responsibility for response to fire events ranging from house fires, to aircraft mishaps, to wildfires.[115]

In addition to its efforts to protect its own resources from wildfire, the DOD plays an active role in wildfire response throughout the country. This role is coordinated between United States Northern Command (USNORTHCOM) and the National Interagency Coordination Center (NICC).[116] Upon request and appropriate approval, the DOD's support typically comes in the form of provision of equipment, personnel, or both. For example, the Modular Airborne Fire Fighting System (MAFFS) Program, operated by the U.S. Air Force Reserve and Air National Guard Units in concert with the Forest Service, outfits C-130 Hercules transport aircraft to aerially drop water or flame-retardant materials.[117] C-130s can be prepared for MAFFS missions in as little as four hours and drop 3,000 gallons of water in under five seconds or a sufficient amount of flame-retardant material to blanket an area a quarter mile long by 100 feet wide.[118] In addition to MAFFS aircraft, the DOD may also provide other aerial systems, including remotely-piloted aircraft for fire reconnaissance.[119] The DOD may also provide personnel to directly assist with firefighting operations or other disaster responses. In 2018, the NICC requested active duty troops to assist with firefighting efforts for the Mendocino Complex Fire in California.[120] The DOD approved this request and deployed more than 200 troops from the Army's 14th Brigade Engineer Battalion, stationed at Joint Base Lewis-McChord, to assist with fire barrier construction, removal of road-side brush, and cutting fire lines to prevent the fire from spreading.[121]

Finally, DOD personnel may become involved in local wildfire fighting operations more directly under what is known as Immediate Response Authority (IRA), a form of Defense Support to Civil Authorities (DSCA).[122] This authority is limited to circumstances where support is needed to, "save lives, prevent human suffering, or mitigate great property damage in response to a request for assistance

115. *See generally* DEP'T OF THE AIR FORCE, AIR FORCE INSTRUCTION 32-2001, FIRE AND EMERGENCY SERVICES PROGRAM (2018) [hereinafter *AFI 32-2001*].

116. UNITED STATES NORTHERN COMMAND, USNORTHCOM'S WILDLAND FIREFIGHTING (WFF) CONCEPT OF OPERATIONS (CONOPS) (2010) [hereinafter *USNORTHCOM*].

117. *Modular Airborne Fire Fighting System (MAFFS)*, 302ND AIRLIFT WING (Apr. 17, 2015), https://www.302aw.afrc.af.mil/About-Us/Fact-Sheets/Display/Article/627167/modular-airborne-fire-fighting-system-maffs/ [hereinafter *MAFFS*]; *See, e.g.*, Kimberly Holman, *MAFFS tackle largest wildfires in California history*, A.F. (Nov. 2, 2020), https://www.af.mil/News/Article-Display/Article/2401529/maffs-tackle-largest-wildfires-in-california-history/.

118. *MAFFS*, *supra* note 117.

119. USNORTHCOM, *supra* note 116, at 4; *See e.g.* Gregory Solman, *Air Force Drones California Firefighters Combat Wildfire,* 163RD ATTACK WING, (Oct. 19, 2017), https://www.defense.gov/News/News-Stories/Article/Article/1348274/air-force-drones-help-california-firefighters-combat-wildfires/.

120. *Military Support in Wildland Fire Suppression,* NAT'L INTERAGENCY FIRE CENTER, https://www.nifc.gov/fireInfo/fireInfo_military.html (last visited Feb 2, 2021) [hereinafter *Military Support*]; *See also* Uriah Walker, *Task Force Rugged Soldiers Join the Fight Against Western Wildfires,* U.S. ARMY (Aug. 21, 2018), https://www.army.mil/article/209944/task_force_rugged_soldiers_join_the_fight_against_western_wildfires.

121. Walker, *supra* note 120.

122. U.S. DEP'T OF DEF., DEPARTMENT OF DEFENSE INSTRUCTION 3025.18, DEFENSE SUPPORT OF CIVIL AUTHORITIES (2010).

from a civil authority, under imminently serious conditions when time does not permit approval from a higher authority within the United States."[123]

III. STOPPING THE BURN: MITIGATION APPROACHES

As climate change continues to increase the frequency and severity of wildfires, the need for mitigation activities to limit the potential for the most destructive fires will continue to grow.[124] There are two primary approaches recommended by the literature: mechanical treatment and prescribed fire.

As defined by the U.S. Forest Service, mechanical treatment, also called "thinning", means, "reducing the amount of vegetation which has built up to dangerous levels, or changing the arrangement of these fuels in the environment."[125] Work crews use various means to remove vegetation from the area being treated, from handheld tools to bulldozers.[126] There are different types of treatment methods depending on the nature of the land being treated. One approach focuses on the forest canopy by selectively removing a small number of full-size trees to open gaps, limiting fire spread.[127] Another tactic focuses on the forest floor, removing smaller types of vegetation that are less resistant to ignition as opposed to larger, more resilient trees.[128]

By contrast, prescribed fires are fires intentionally set to strategically eliminate potential fire fuel sources.[129] In other words, prescribed fire is, quite literally, the process of fighting potentially worse fire with fire. [130] Prescribed fire may also mimic the salutary impacts of naturally occurring fire on fire-conditioned environments.[131] Prescribed fires are carefully planned and monitored in order to control potential impacts. They are typically initiated outside of the fire season, when weather conditions are less apt to lead to an intense fire,[132] and have been demonstrated to be highly effective at reducing the potential for the most intense fires through their reduction of potential fuels.[133]

Each approach has advantages. Prescribed fire is cheaper and less labor intensive since the fire does the actual work of reducing the fuel.[134] Studies have

123. *Id*.

124. *See, e.g.*, John T. Abatzoglou & A. Park Williams, *Impact of Anthropogenic Climate Change on Wildfire Across Western US Forests*. 113 PROC. NAT'L ACAD. SCI. 11770 (2016); Mike Flannigan et al., *Global Wildland Fire Season Severity in the 21st Century*. 294 FOREST ECOLOGY & MGMT. 54, 54-60 (2013).

125. *Mechanical Treatment*, U.S. FOREST SERV., https://www.fs.usda.gov/managing-land/fire/mechanical-treatment (last visited Mar 1, 2021).

126. *Id*.

127. Scott L. Stephens et al., *The Effects of Forest Fuel-Reduction Treatments in the United States*, 62 BIOSCIENCE 549, 550-553 (2012).

128. *Id.*

129. NWCG Glossary, *supra* note 32, at *Prescribed Fires*.

130. M.A. Cochrane et al., *Estimation of Wildfire Size and Risk Changes Due to Fuels Treatments*, 21 INT'L J. OF WILDLAND FIRE 357, 358 (2012).

131. *Id.*

132. Stephens et al., *supra* note 127.

133. *Id*.

134. FS, U.S. DEP'T OF AGRIC., PRESCRIBED FIRE COSTS, FUELS PLANNING: SCIENCE SYNTHESIS AND INTEGRATION 2 (2004).

assessed the costs of application of prescribed fire through a variety of methodologies and contexts with per acre cost estimates ranging from less than $20 in ideal circumstances to several thousand dollars in locations with dense nearby populations, with an economical mean predicted value of $60 per acre.[135]

Prescribed fires also generally produce less harmful emissions when compared with wildfires, both in terms of climate change-inducing greenhouse gases and harmful $PM_{2.5}$-laden smoke.[136] This is likely due to the reduced intensity and duration of properly managed prescribed fires compared with naturally occurring fires. Studies comparing the prescribed fire and wildfire emissions have shown greenhouse house gas reductions of up to 74%.[137] Given the billions of tons of greenhouse gases emitted annually by wildfire, even modest percentage reductions in emissions would be a positive step. In terms of PM emissions, the raw amounts released by any wildland fire are heavily dependent on the fuel type and intensity of the fire.[138] Research comparing air quality showed a $PM_{2.5}$ range of 125 to 500 micrograms per cubic meter of air ($\mu g/m^3$) in wildfire areas compared with much lower range of 29 $\mu g/m^3$ to 49 $\mu g/m^3$ in the studied prescribed fires.[139] Note that the Clean Air Act's National Ambient Air Quality Standard (NAAQS) for $PM_{2.5}$ currently sets a daily concentration limit of 35 $\mu g/m^3$.[140] The upshot is that, even with their emissions, prescribed fires remain a significant improvement when compared with the impacts of wildfires. Most importantly, prescribed fire is effective at dramatically reducing the potential for later occurring wildfires of the size and intensity to cause the types of lasting damage seen in some of the recent fires that have attracted significant recent attention and concern.[141]

However, prescribed fires are still fires. Their use is rendered increasingly difficult the closer the target area is to inhabited areas, particularly due to smoke production. Contrasted with prescribed fire, mechanical treatment produces no flames or smoke, but it is more labor intensive and expensive to implement as a strategy. Mean costs start at about $213 per acre, but costs increase significantly in

135. *See, e.g.*, *Id.*; BENJAMIN BAGDON & CHING-HSUN HUANG, SW. FIRE SCI. CONSORTIUM, REVIEW OF ECONOMIC BENEFITS FROM FUEL REDUCTION TREATMENTS IN THE FIRE PRONE FORESTS OF THE SOUTHWESTERN UNITED STATES 3 (2016); David Calkin & Krista Gebert, *Modeling Fuel Treatment Costs on Forest Service Lands in the Western United States*, 21 W.J. OF APPLIED FORESTRY 217, 219 (2006).

136. Carrie Berger et al., *Air Quality Impacts from Prescribed Fire and Wildfire: How do They Compare?*, 9203 EM 1, 1-2 (2018).

137. Christine Wiedinmyer & Matthew Hurteau, *Prescribed Fire as a Means of Reducing Forest Carbon Emissions in the Western United States*, 44 ENV'T. SCI. & TECH. 1926, 1928-1930 (2010). In addition to their own analysis, showing reduced greenhouse gas emissions of up to 26% for the sites included in their study, the authors review several other studies showing even larger potential emissions reductions.

138. *See generally* Daniel Jaffe et al., *Wildfire and Prescribed Burning Impacts on Air Quality in the United States*, 70 J. OF THE AIR & WASTE MGMT. ASS'N. 583, 583 (2020).

139. *Id*. at 593-594. The authors compare $PM_{2.5}$ emissions from the states with the largest burned areas from wildfires (California, Montana, Nevada, Oregon and Idaho) with those with the most acres treated with prescribed fire (Texas, Georgia, Oklahoma, Florida and Alabama), and determined that maximum daily $PM_{2.5}$ emissions loads.

140. 40 C.F.R. § 50.13(a) (2012).

141. Smith et al., *supra* note 8, at 2.

developed areas.[142] It is also more difficult to accurately design and implement an effective, but ecologically sound, mechanical treatment approach because of the vagaries of fire and subsequent plant growth.[143]

Both approaches may be used in concert, typically with mechanical treatment followed by prescribed fire, and there is evidence suggesting this approach may be most effective over the long term.[144] Using both methods has the advantage of reducing the amount of vegetation killed by prescribed fire, but not consumed, which would ultimately fall to the ground and become fuel for future potential wildfires.[145] On the other hand, taking a more labor-intensive approach to mechanical thinning, by selectively cutting and removing appropriate biomass, can generate economically viable products, including saw-logs and woodchips.[146] This may assist in defraying thinning costs, though managers must ensure proposed operations are designed for legitimate fire-mitigation impact rather than around potential profitability.

IV. THE WILDFIRE LEGAL AND POLICY CONTEXT

A. Federal Wildfire Law

The law of wildfire is a paradox. A myriad of statutes and policies impact it, but, at least in the federal statutory context, finding laws that address it squarely and intentionally is more of a challenge. An analysis of the major statutes impacting federal wildfire policy, particularly around mitigation measures, demonstrates this paradox.

1. The National Environmental Policy Act of 1969 (42 U.S.C. § 4321 et seq.)

The National Environment Policy Act (NEPA) is often called the Magna Carta of United States environmental law.[147] It established as national policy a requirement that the federal government use, "all practicable means and measures . . . to create and maintain conditions under which man and nature can exist in productive harmony and fulfill the social, economic, and other requirements of present and future generations of Americans."[148] From a practical standpoint, NEPA requires federal agencies, including the DOD, to assess the environmental impacts of "major federal actions" they plan to take and to consult with other relevant

142. Calkin & Gebert, *supra* note 135, at 220.

143. Robert J. Huggett Jr. et al., *Efficacy of Mechanical Fuel Treatments for Reducing Wildfire Hazard*, 10 FOREST POL'Y. & ECON. 408, 408 (2008).

144. Eric Knappa et al., *Efficacy of Variable Density Thinning and Prescribed Fire for Restoring Forest Heterogeneity to Mixed-Conifer Forest in the Central Sierra Nevada*, CA, 406 FOREST & ECOLOGY MGMT. 228, 239 (2017).

145. *Id*.

146. *Id.*

147. 42 U.S.C. §§ 4321-4370; DANIEL MANDELKER ET AL., 1:1 NEPA LAW AND LITIGATION, (2d ed. 2020). [hereinafter *Mandelker et al.*].

148. 42 U.S.C. § 4331(a).

agencies as part of the assessment process.[149] Depending on the environmental significance of the potential action, NEPA may require agencies to produce written assessments of the action as well as analyzing potential alternatives.[150] Agencies must typically publicize the potential major federal action and a draft of the assessments in order to permit public comments, which the agency must then consider.[151] While compliance with NEPA is mandatory for federal agencies, courts have construed NEPA as a process-oriented statute rather than an outcome-determinative one requiring particular substantive outcomes.[152] In other words, NEPA itself does not limit federal action provided its processes are followed.[153]

In the context of wildfire, NEPA compliance issues will most commonly arise in mitigation activities, such as the application of prescribed fire.[154] Depending on the projected impact of a mitigation action, it may be considered a major federal action and thus subject to NEPA's requirements, resulting in the need to conduct an environmental assessment (EA) to evaluate the effects. EAs are public documents that provide sufficient evidence and analysis for agencies to determine whether an Environmental Impact Statement (EIS) is required.[155] Further, they aid agency compliance with NEPA when no EIS is necessary.[156] Depending on the findings from this assessment, the agency will then need to prepare either a Finding of No Significant Impact (FONSI) or an EIS.[157] Ellsworth AFB's 2018 EA, resulting in a FONSI and cited below, is a good recent example of a prescribed fire EA.[158]

2. Cultural, Archaeological and Historic Protection Laws

Three laws are important to consider in the context of wildfire mitigation activities: The National Historic Preservation Act of 1966 (NHPA, 54 U.S.C. §§ 300101-320303), the Archaeological Resources Protection Act of 1979 (ARPA, 16 U.S.C. §§ 470aa-470mm,) and the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA, 25 U.S.C. §§ 3001-3013). Each law, as the

149. 42 U.S.C. § 4332; 40 C.F.R. § 1508.18 (2020) (describing "*Major Federal action"* under NEPA to "[include] actions with effects that may be major and which are potentially subject to Federal control and responsibility.").

150. 42 U.S.C. § 4332(C).

151. *See e.g.*, Environmental Impact Analysis Process, 32 C.F.R. § 989.24 (1999) (implementing 40 C.F.R. § 1506.6's public participation requirements).

152. Strycker's Bay Neighborhood Council, Inc. v. Karlen, 444 U.S. 223, 227-28 (1980).

153. *Id*.; MANDELKER ET AL., *supra* note 147, at 10:13.

154. *See e.g.*, Forest Service Employees for Environmental Ethics v. U.S. Forest Service, No. 17-35569, 726 Fed. Appx. 605 (9th Cir. Jun. 8, 2018) (addressing NEPA's emergency provisions and upholding a decision by the Forest Service to construct a fire line during a 2015 wildfire in in eastern Washington).

155. 40 C.F.R § 1508.9; ADMIN. & CIV. LAW DEP'T, U.S. ARMY JUDGE ADVOC. GEN.'S SCH., ENVIRONMENTAL LAW DESKBOOK B-7 (2015).

156. *Id*.

157. 40 C.F.R. §§ 1501-1502.

158. GARY C. BRUNDIGE, DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR PRESCRIBED FIRE FOR VEGETATION MANAGEMENT ON ELLSWORTH AIR FORCE BASE (2018), https://www.ellsworth.af.mil/Portals/146/documents/EAFBDraftEAFONSIRxBurnGrasslands.pdf (last visited Mar 3, 2021).

names imply, deal with the protection of certain important cultural, archaeological, or historical resources.

With the establishment of the NHPA, Congress made historic preservation a part of federal policy and created the National Historic Preservation Program to implement that policy.[159] The NHPA established a national system for the identification and registration of "historic properties" and, under the Act's section 106, mandated review by federal agencies when planning actions that could impact items of historic significance.[160] When a historic property may be impacted, the section 106 process generally requires consultation with impacted agencies or entities, such as Native American Tribes, resource identification, and assessments of potential harm.[161] In these requirements to consider and consult regarding the potential impacts of federal action, the NHPA operates somewhat similarly to the much more broadly applicable NEPA discussed above.

ARPA is primarily concerned with the protection of archaeological remains of "past human life of activities" on public lands.[162] To the extent such items are known to exist or discovered on a potential mitigation site, installations have a general duty to preserve them.[163] ARPA prohibits alteration or damage to archaeological resources without a permit issued by the responsible land manager pursuant to the statute.[164] Consultation with preservation management authorities should be undertaken prior to any planned mitigation activities that will impact identified archaeological resources.

Finally, NAGPRA is intended to ensure protection and proper disposition of Native American (American Indian, Native Alaskan, or Native Hawaiian) cultural items on federal lands.[165] The most salient wildfire-related issue with respect to NAGPRA concerns the inadvertent discovery of previously unknown "human remains, funerary objects, sacred objects, or objects of cultural patrimony."[166] In such cases, activities at the site must immediately cease for a period of up to 30 days while a series of notifications are made to the responsible federal official and the relevant Native American tribe.[167]

These statutes, like NEPA, are typically implicated in the context of wildfire mitigation activities. If an installation identifies historical, archaeological, or cultural resources within its bounds, the agency must ensure such items are appropriately treated, which can often be accomplished through coordination with partner state and federal agencies and then subsumed into completion and documentation during the NEPA EA process.

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159. 54 U.S.C. §§ 300101, 302101-303903.

160. *Id*. at §§ 302101-302108, 306108 (the term "Section 106" is a reference to the section of the law's original numbering prior to its codification, but it is still widely used when referring to agency regulatory responsibilities under the NHPA).

161. *Id*. at § 306108.

162. 16 U.S.C. §§ 470aa, 470bb(1).

163. *See generally* DEPT. OF DEF., DODI 4715.16, CULTURAL RESOURCES MANAGEMENT (Sep. 18, 2008).

164. 16 U.S.C. § 470ee.

165. 25 U.S.C. § 3001 *et seq*.

166. 43 C.F.R. § 10.4 (2013).

167. *Id*.

3. The Endangered Species Act of 1973 (16 USC §§ 1531-1544)

In enacting the Endangered Species Act (ESA), Congress declared as national policy that, "all Federal departments and agencies shall seek to conserve endangered species and threatened species."[168] The ESA generally prohibits the "taking" of any federally protected species absent a permit issued by the U.S. Fish and Wildlife Service or other exception. Thus, military installations are responsible for conserving species of plants and animals on the installation that are listed as threatened or endangered (T&E) under the ESA.[169] When a federal agency considers an action that may impact a T&E species or its designated critical habitat, such as a wildfire mitigation project, Section 7 of the ESA obligates federal agencies to consult with the applicable agency, either the Fish and Wildlife Service or the National Marine Fisheries Service for oceanic species.[170]

Wildfire, particularly high intensity fires, can jeopardize the survival of T&E species and, due to this threat, properly implemented wildfire mitigation measures are generally consistent with federal agency ESA obligations.[171] Fuels mitigation techniques, like prescribed burning, can raise concerns about potential impact on endangered species present on an installation and will frequently require at least informal consultation Section 7 of the ESA.[172] The results of any such consultation should then be documented in the NEPA EA or otherwise.

4. The Sikes Act of 1960 (16 U.S.C. § 670a-670o)

Of the laws discussed, the Sikes Act is the first that has an explicit focus on military installations. It directs the Secretary of Defense to "carry out a program . . . on military installations" designed to provide for natural resource conservation and rehabilitation, sustainable multipurpose use and public access to installations.[173] The Act's most significant compliance mandate is the requirement that military installations develop and maintain an Integrated Natural Resources Management Plan (INRMP).[174] INRMPs must comply with conservation-related criteria set forth in the Act, define installation natural resources management goals, and ensure there is, "no net loss in the capability of installation lands to support military mission requirements."[175]

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168. 16 U.S.C. § 1531(c).

169. *Id.*; 16 U.S.C. § 1539.

170. 16 U.S.C. §§ 1533, 1536(a)(2) (as with the NHPA's Sections 106 and 110 referenced above, "Section 7" of the ESA refers to a section of the original pre-codified law, but remains the most commonly used term for the requisite consultation).

171. Sylvia Kantor, Rocky Mountain Res. Station, U.S. Dep't of Agric., *Through the Smoke: Spotted Owls, Wildfire and Forest Restoration*, 46 SCI. YOU CAN USE BULLETIN 5-8 (2020), https://www.fs.usda.gov/rmrs/sites/default/files/documents/SYCU_Through_the_Smoke.pdf (last visited Mar 3, 2021) (discussing the impact of increasing intensity wildfires on three species of owl, all listed under the ESA, in the southwestern United States. Conversely, they note the beneficial impacts of lower intensity prescribed fires in creating better habitat for the owls).

172. *See* 50 C.F.R. §§ 402.10-17 (detailing the Section 7 consultation process under the ESA).

173. 16 U.S.C. § 670a(a).

174. 16 U.S.C. § 670a(b).

175. *Id.* INRMPs are, as applicable, required to provide for: "fish and wildlife management, land management, forest management, and fish- and wildlife-oriented recreation; fish and wildlife habitat enhancement or modifications; wetland protection, enhancement, and restoration, where

INRMPs are mandated to address land and forest management, habitat modifications for fish and wildlife, and the integration and consistency of activities conducted under the plan.[176] The Sikes Act requires military installations to consider the impact of wildfire mitigation activities it conducts on its broader obligations under the Act to manage land in a way consistent with the goals of habitat conservation and rehabilitation. As such, wildfire management planning and activities are necessarily integrated into broader installation natural resources planning.[177] Accordingly, where wildfire presents an ongoing threat, wildfire management plans are typically required to be included in INRMPs.[178]

5. The Clean Air Act of 1970 (42 U.S.C. § 7401-7671q)

The chief purpose of the Clean Air Act (CAA) is, "to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population."[179] One of the basic ways this goal is accomplished is through the establishment of the National Ambient Air Quality Standards (NAAQS), which set emission limits for the amounts of certain airborne pollutants.[180] Under the CAA, states are required to adopt plans, called State Implementation Plans (SIPs), to meet the CAA's requirements, including the NAAQS.[181]

Included in the NAAQS are limits for PM and ozone, both of which are typically found in smoke from wildland fire.[182] Wildfire smoke may cause states to exceed the NAAQS, but these naturally occurring emissions are generally excluded from calculation of compliance under the EPA's Exceptional Events Rule, which essentially operates not to fault states for NAAQS non-compliance beyond the state's

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necessary for support of fish, wildlife, or plants; integration of, and consistency among, the various activities conducted under the plan; establishment of specific natural resource management goals and objectives and time frames for proposed action; sustainable use by the public of natural resources to the extent that the use is not inconsistent with the needs of fish and wildlife resources; public access to the installation that is necessary or appropriate . . . subject to requirements necessary to ensure safety and military security; enforcement of applicable natural resource laws (including regulations); no net loss in the capability of installation lands to support the military mission of the installation; and such other activities as the Secretary of the military department determines appropriate."

176. *Id*.

177. *See* U.S. DEP'T OF THE AIR FORCE, AIR FORCE MANUAL 32-7003, ENVIRONMENTAL CONSERVATION (2020) [hereinafter *AFMAN 32-7003*] (detailing AFMAN 32-7003 mandated establishment of wildland fire management plans (WFMP) by Air Force installations threatened by wildfire and requirements that such plans be consistent with the broader conservation policies set forth in the installation INRMP).

178. *Id*.

179. Clean Air Act (CAA), 42 U.S.C. § 7401(b)(1).

180. *See* 42 U.S.C. § 7409.

181. *See* 42 U.S.C. § 7410; *See also* 42 U.S.C. § 7418 (noting that while the focus of CAA regulation is on the interaction between the EPA and the States, federal facilities, such as military installations are expressly included in the CAA's reach and must generally comply with the requirements of the SIP of the state in which they are located).

182. 40 C.F.R. § 50 (2020); Memorandum to the Agency Directors, Scott Mathias & Richard Wayland, AIR QUALITY POLICY DIVISION, U.S. ENV'T. PROT. AGENCY, EXCEPTIONAL EVENTS GUIDANCE: PRESCRIBED FIRE ON WILDLAND THAT MAY INFLUENCE OZONE AND PARTICULATE MATTER CONCENTRATIONS 1-5 (2019). [hereinafter MATHIAS & WAYLAND].

control with a natural event like a wildfire.[183] Recognizing the benefits of prescribed fire and that it generally produces fewer emissions than wildfire, the EPA has clarified that the Exceptional Events Rule also applies to prescribed fires provided appropriate processes, such as adoption and documentation of a smoke management plan, are followed.[184] Thus, with proper planning and coordination, military installations may pursue aggressive prescribed burn plans without concern that such actions will create CAA compliance issues.

6. Healthy Forest Restoration Act (HFRA) of 2003 (16 U.S.C. § 6501 – 6591e)

Signed into law in 2003, in the wake of three consecutive devastating wildfire seasons, the Health Forest Restoration Act (HFRA) is arguably the first legislative enactment of a, somewhat, comprehensive federal wildfire policy.[185] The HFRA's principle purpose is, "to reduce wildfire risk to communities, municipal water supplies, and other at-risk Federal land through a collaborative process of planning, prioritizing, and implementing hazardous fuel reduction projects."[186] The Act directs implementation of "hazardous fuel reduction projects" on federal lands and reduced NEPA and other administrative compliance requirements for some fuels reduction projects and forest management practices, which could include prescribed fire or mechanical treatment.[187] Unfortunately, the HFRA was not drafted to include the DOD. Its definition of "federal lands" is limited to lands of the National Forest System, which fall under the jurisdiction of the Department of Agriculture, and "public lands" administered by the Department of the Interior. In other words, lands held by the DOD are not included in the coverage of the Act.[188]

7. Federal Land Assistance, Management, and Enhancement (FLAME) Act of 2009 (43 U.S.C. § 1748a-d)

Enacted in 2009, the well-named FLAME Act sought to shore up funding for wildfire suppression efforts and thus to reduce so-called "fire borrowing."[189] This is the practice of agencies reprograming funds appropriated for fire mitigation activities and for active firefighting, resulting in an ever-greater backlog of mitigation projects and worsening fires.[190] Eligible agencies could access the FLAME funds to address shortfalls in suppression-related appropriations while using funds appropriated for mitigation or other activities for their intended purposes. Unfortunately, like the HFRA, the FLAME Act is directed to federal lands

183. 40 C.F.R. § 50.14 (2016).

184. *Id.*; *See also* MATHIAS & WAYLAND, *supra* note 182, at 5, 10.

185. Jeremy Martin, *Active Forest Management and the "New Normal": Advocating for an Integrative Wildfire Management Policy*, 46 OHIO N.U. L. REV. 137, 142 (2018); Robert B. Keiter, *The Law of Fire: Reshaping Public Policy in an Era of Ecology and Litigation*, 36 ENV'T. LAW 301, 344 (2006).

186. 16 U.S.C. § 6501(1).

187. *See* 16 U.S.C. §§ 6512-16.

188. 16 U.S.C. § 6502(1).

189. Martin, *supra* note 185, at 142-143.

190. *Id.*

administered by the Departments of the Interior and Agriculture and includes no provision for funding DOD wildfire activities.

8. 10 U.S.C. § 2465, Prohibition on contracts for performance of firefighting functions

Finally, there is 10 U.S.C. § 2465. Unlike the statutes discussed above, 10 U.S.C. § 2465 is not focused on the environment or wildfire, but rather on military acquisitions. Specifically, it bars the DOD from contracting for firefighting, or security-guard, functions at military installations unless a series of narrow exceptions are met.[191] For wildfire suppression, the only potentially relevant exception is found in Section (b)(4) of the statute, which exempts from the general prohibition:

> [a] contract for the performance of firefighting functions if the contract is for a period of one year or less and covers only the performance of firefighting functions that, in the absence of the contract, would have to be performed by members of the armed forces who are not readily available to perform such functions by reason of a deployment.[192]

Note that the prohibition would not limit military authorities from accessing contracted support for wildfire mitigation activities, like the application of prescribed fire, as such activities are not considered firefighting.[193]

However, the statute does prohibit the DOD from accessing readily available contract support for immediate wildfire threats absent a determination that the response would have been addressed by military personnel who are now specifically unavailable due to military deployment.[194] Instead, military installations are obliged to rely solely on the establishment of voluntary intergovernmental partnerships and, in an emergency, the availability and willingness of such partner agencies to respond when requested.

This patchwork body of federal wildfire law creates requirements, like those imposed by NEPA or the Sikes Act, and imposes restrictions, as seen in the ESA or in 10 U.S.C. § 2465. Many of these requirements and restrictions have reasonable policy bases, but they nevertheless impact DOD's ability to effectively mitigate wildfire related threats. Moreover, what this body of law fails to do is proactively empower DOD to attack the wildfire threat in an organized and ongoing way.

B. Federal, DOD and Air Force Policy Guidance

1. The Review and Update of the 1995 Federal Wildland Fire Management Policy (2001)

The Review and Update of the 1995 Federal Wildland Fire Management Policy was jointly issued in 2001 by the Departments of Interior, Commerce, Agriculture, Energy, and Defense, along with the EPA, FEMA and the National

191. 10 U.S.C. **§** 2465.

192. 10 U.S.C. **§** 2465(b)(4).

193. *AFMAN 32-7003*, *supra* note 177, at 57.

194. 10 U.S.C. **§** 2465(b)(4).

Association of State Foresters.[195] As the name implies, the Review is a substantial update of the earlier Federal Wildland Fire Policy issued in 1995.[196] Unlike its predecessor, the Review prioritized the participation and input of agencies outside of the traditionally wildfire-focused agencies in the Departments of Interior and Agriculture, including the DOD and the Department of Energy.[197] Twenty years on, the Review remains the primary wildland fire guidance document used by federal agencies and establishes the guiding principles and implementation actions for wildland fire management on federal lands.[198]

The Review directs that, "every area with burnable vegetation must have an approved Fire Management Plan," that, "provides for firefighter and public safety; include[s] fire management strategies, tactics, and alternatives; address[es] values to be protected and public health issues; and [is] consistent with resource management objectives, activities of the area, and environmental laws and regulations."[199] It also endorses the benefits of proactive fire mitigation practices, including prescribed fire and mechanical treatment, while also stressing the importance of public education about the benefits of practice management practices.[200]

2. Department of Defense Instruction 6055.06, DOD Fire and Emergency Services (F&ES) Program (October 3, 2019)

Department of Defense Instruction (DODI) 6055.06 sets basic policy for F&ES programs across all DOD components. In particular, it tasks DOD F&ES organizations with response to emergencies at the wildland and urban interface and with response to natural disasters.[201] The Instruction further tasks the Assistant Secretary of Defense for Sustainment (ASD(S)) with development of policy for DOD F&ES programs, including wildland fire policy, but provides no further specific guidance.[202] Finally, it directs the Secretary of the Air Force (SECAF) to establish and administer DOD's certification process for wildland firefighting.[203]

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195. INTERAGENCY FED. WILDLAND FIRE POL'Y REV. WORKING GRP., REVIEW AND UPDATE OF THE 1995 FEDERAL WILDLAND FIRE MANAGEMENT POLICY (2001) [hereinafter *Fed. Pol'y Update*].

196. U.S. DEP'T OF INTERIOR & U.S. DEP'T OF AGRIC., FEDERAL WILDLAND FIRE MANAGEMENT POLICY AND PROGRAM REVIEW (1995).

197. *Fed. Pol'y Update, supra* note 195, at 4.

198. *Id*. at 21-32; *see, e.g.*, *AFMAN* 32-7003, *supra* note 177, at 95.

199. *Fed. Pol'y Update*, *supra* note 195, at 23-24.

200. *Fed. Pol'y Update*, *supra* note 195, at 7, 16.

201. DEP'T OF DEF., DOD INSTRUCTION 6055.06, DOD FIRE AND EMERGENCY SERVICES (F&ES) PROGRAM 12 (2019) [hereinafter *DODI 6055.06*]. The implementing service regulations for the Air Force, Army, Navy and Marine Corps are respectively: Air Force Instruction 32-2001, Fire and Emergency Services; Army Regulation 420-1, Army Facilities Management; OPNAV INSTRUCTION 11320.23G, Navy Fire and Emergency Services Program; and Marine Corps Regulation 11000.11A, Marine Corps Fire and Emergency Services Program. As of publication, the United States Space Force has not issued a separate, relevant regulation and continues to follow Air Force Instruction 32-2001.

202. *DODI 6055.06*, *supra* note 201, at 5.

203. *Id*. at 8.

3. DODI 4715.03, Natural Resources Conservation Program (August 31, 2018)

DODI 4715.03 tasks all DOD components with managing fuel loads, planning for wildland fire management, and, significantly, with implementing prescribed burn programs where appropriate.[204] The DODI further directs that wildfire mitigation actions be conducted consistent with preservation of health, safety, and air quality, the protection of facilities, and the facilitation of the health and maintenance of natural environment.[205]

4. Air Force Manual 32-7003, Environmental Conservation (April 20, 2020)

Air Force Manual (AFMAN) 32-7003, Chapter 3P, provides extensive policy guidance on wildfire management within the Air Force and describes the Air Force's Wildland Fire Program (WFP).[206] The missions of the WFP include reducing wildfire threats to Air Force assets and personnel by fuel reduction treatments, and the provision of guidance for execution of wildfire suppression, mitigation, prescribed fire, and hazardous fuel reduction on Air Force installations.[207] The AFMAN sets forth the mandate and requirements for Air Force Wildland Fire Management Plans (WFMP), which are required for all Air Force installations with land subject to wildfire and which are designed to, "reduce wildfire potential, protect and enhance valuable infrastructure and natural resources, and implement ecosystem resiliency goals and objectives on Air Force-managed properties."[208]

WFMP plans are required to be individualized to the installation and to include numerous elements, including a description of the installation's mission physical layout, the WFMP's specific goals and objectives, an analysis of the potential impact of wildfire on the installation's mission, and identification and discussion of relevant interagency partnerships, such as Mutual Aid Agreements with local fire departments.[209]

C. Partner Organizations and Agencies

Given that fire does not respect jurisdictional boundaries, wildfire mitigation and response is necessarily a team sport.[210] Military installations are

204. DEP'T OF DEF., DOD INSTRUCTION 4715.03 24 (2018).

205. *Id.*

206. *AFMAN 32-7003*, *supra* note 177, at 95-106.

207. *Id*. at 96.

208. *Id*.

209. *Id*. at 97-100. For an excellent example of a WFMP, see *Wildland Fire Management Plan 2017-2021*, ARNOLD AIR FORCE BASE (2017), https://media.defense.gov/2018/Aug/23/2001957757/-1/-1/1/WILDLAND%20FIRE%20MANAGEMENT%20PLAN%20(WFMP).PDF (last accessed Oct. 18, 2021).

210. Anne-Marie Fennell, GOV'T ACCOUNTABILITY OFF., WILDLAND FIRE RISK REDUCTION: MULTIPLE FACTORS AFFECT FEDERAL-NONFEDERAL COLLABORATION, BUT ACTION COULD BE TAKEN TO BETTER MEASURE PROGRESS 18-19 (2017) (The report discusses the benefits of improved collaboration in responding to wildfire.).

encouraged to develop partnerships with the individual Interior Department agencies, the Forest Service, and the state and local agencies to facilitate a team approach to wildfire response.[211] When it comes to their fire programs generally, all of these organizations currently have a more specialized focus on wildfire than DOD Fire and Emergency Services programs, which must be prepared to deal with a broader range of fire threats, for example, aircraft mishaps.

1. The National Interagency Coordination Center (NICC)

The NICC is focused on suppression of wildfire and is staffed by personnel from the five primary wildfire response agencies (the BIA, BLM, USFS, USFWS, NPS and the National Association of State Foresters).[212] It serves as the focal point for coordination of interagency suppression activities throughout the United States, using a three-tiered system: local, then regional, and then national.[213] If an agency suppressing a wildfire requires assistance, it will first seek assistance locally, for example, from a neighboring county's fire department.[214] If such support is unavailable or proves insufficient, support may be sought from one of ten regional Geographic Area Coordination Centers (GACC), which are managed by an interagency group made up of fire response professionals from federal and state land management agencies within the region.[215] If this support is also insufficient, NICC will coordinate support nationally including, as discussed above, seeking support from the DOD through USNORTHCOM.[216] While the DOD is not a formal NICC participant, a military liaison is invited to participate in the NICC's National Multi-Agency Coordinating Group (NMAC), whose members manage NICC's strategic coordination of national wildfire suppression response.[217]

2. The National Wildfire Coordinating Group (NWCG)

Whereas the NICC may be thought of as a strategic and tactical wildfire suppression response entity, the National NWCG is focused more broadly on policy and preparation. The NWCG's membership includes all of the NICC's participants as well other interested governmental and private organizations, such as FEMA's U.S. Fire Administration and the Intertribal Timber Council. [218] The NWCG develops national interagency wildland fire standards, designs and provides training for personnel involved in wildland fire mitigation or suppression, and generally works to develop better interagency cooperation.[219] To these ends, the NWCG

211. DODI 6055.06, *supra* note 201, at 12.

212. WELCOME TO THE NAT'L INTERAGENCY COORDINATION CTR, *About Us*, https://www.nifc.gov/nicc/about/about.htm (last visted Jan 2, 2021) [hereinafter NICC].

213. *Id*.

214. *Id*.

215. *Id*.; GEOGRAPHIC AREA COORDINATION CTR, WELCOME TO THE NAT'L GAAC WEBSITE PORTAL, *About Us*, https://gacc.nifc.gov/admin/about_us/about_us.htm (last visited Mar 4, 2021).

216. NICC, *supra* note 212; USNORTHCOM, *supra* note 116, at 2.

217. NAT'L INTERAGENCY COORDINATION CTR., NAT'L MULTI-AGENCY COORDINATING GRP. OPERATIONS PLAN 6 (2020).

218. THE NAT'L WILDFIRE COORDINATING GRP., https://www.nwcg.gov/ (last visited Jan 2, 2021).

219. *Id*.

maintains dozens of committees and subcommittees to study and develop policy in all wildland fire operational spheres, ranging from the study of aerial tanker safety, to the use of prescribed fire, to interagency communications protocols.[220] Unfortunately, despite the DOD's participation and expertise in many of these matters and its use of NCWG training and certification standards, there does not appear to be any formal participation by the DOD in the NCWG at this time.[221]

3. The Wildland Fire Leadership Council (WFLC)

The WFLC is an intergovernmental committee organized under the auspices of the Forests and Rangelands initiative, established in 2002 as a cooperative effort of the Departments of Agriculture and the Interior.[222] The WFLC's mission is the achievement of, "consistent implementation of wildland fire policies, goals, and management activities."[223] In addition to the traditional partnership between the Agriculture and Interior Departments, the DOD and the Department of Homeland Security (DHS) joined the WFLC in 2016.[224] In the Memorandum of Understanding documenting the addition of the DOD and DHS, the parties noted their shared goals of protecting communities and natural resources from wildfire, reducing hazardous fuel, restoring fire-adapted ecosystems, and assisting communities in their efforts to reduce loss from wildfires.[225] But, at present, there is little indication that DOD wildland fire policy has changed significantly since joining the WFLC.

4. Department of the Interior (DOI) Agencies

We turn now to individual agencies, chiefly the five agencies most traditionally associated with federal wildland fire response. Home to four of the federal agencies with primary wildland fire mitigation and suppression responsibility on enormous parts of the western United States and Alaska, the DOI plays a central role in developing and implementing federal wildland fire policy. These agencies often work with DOD, providing subject matter expertise for DOD wildfire efforts as well as requesting DOD logistical and manpower assistance in their own efforts. Understanding these relationships and their limitations is important to grasping the maturity of DOD's existing wildfire related activities and its capacity, given appropriate authorization and funding, to be much more proactive in its efforts.

220. *List of Committees*, NAT'L WILDFIRE COORDINATING GRP., https://www.nwcg.gov/full-committee-list (last visited Mar 5, 2021).

221. AFMAN 32-7003, *supra* note 177, at 102 (discussing requirements for NWCG standard wildland firefighting certification of DOD personnel).

222. FORESTS AND RANGELAND, *Wildland Fire Leadership Council,* https://www.forestsandrangelands.gov/leadership/index.shtml (last visited Mar 2, 2021).

223. *Id*.

224. Wildland Fire Leadership Council, MEMORANDUM OF UNDERSTANDING (2016).

225. *Id*. at 1.

The U.S. Fish and Wildlife Service (FWS)

Of the 89.2 million acres managed by the FWS, 80% are prone to wildfire, with an average of nearly 400,000 acres impacted by wildfire annually.[226] Fuels management plays a major role in the FWS's approach to mitigating excessive wildfire impacts on the land it manages, primarily through application of prescribed fire and mechanical treatment.[227]

In its role in managing and enforcing the ESA, the FWS often provides consultation for DOD agencies (and many others) concerning fuels mitigation actions and Fire Management Plans pursuant to Section 7 of the ESA.[228] Under the Sikes Act, DOD entities are also required to consult with the FWS in the preparation of their INRMPs, which may involve further wildland fire related consultation.[229]

Since 2012, the FWS has also partnered directly with the Air Force as part of the Air Force Wildland Fire Branch, providing expertise and assistance to the Air Force in wildfire mitigation.[230] In 2017, this partnership was expanded with the imbedding of FWS wildland fire experts with Air Force Wildland Support Modules, teams of personnel trained and equipped to implement prescribed fire, mechanical treatment, and fire suppression activities at installations within their regional areas of responsibility.[231] This has proven to be an active partnership, with the FWS providing support for prescribed fire or mechanical treatment initiatives at 14 Air Force installations in 2019 and maintaining operations around the country in 2020 despite the COVID-19 Pandemic.[232]

The Bureau of Land Management (BLM)

The BLM, also a part of the DOI, administers approximately 244.4 million acres, more federal lands in the United States than any other agency, heavily concentrated in the eleven western states and Alaska.[233] Through the agency's Fire and Aviation Program, the BLM is broadly involved in all facets of wildfire response: suppression, preparedness, prediction, fuels reduction, planning, prevention, education, and safety.[234]

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226. *Fire Management*, U.S. FISH & WILDLIFE SERV., https://www.fws.gov/fire/ (last visited Mar 4, 2021) [hereinafter *Fire Management*]; CAROL H. VINCENT ET AL., CONG. RSCH. SERV., R42346, FEDERAL LAND OWNERSHIP: OVERVIEW AND DATA (2020) [hereinafter *Vincent et al.*].

227. *Fire Management*, *supra* note 226.

228. *Section 7 Consultation Issued Biological Opinions*, U.S. FISH & WILDLIFE SERV., https://ecos.fws.gov/ecp/pullreports/catalog/species/report/bo/export?format=html (last visited Mar 4, 2021).

229. 16 U.S.C. § 670a(a)(2).

230. AF Wildland Fire Branch, *supra* note 114; Kari Cobb, *U.S. Air Force and U.S. Fish and Wildlife Service partner to complete fuels reduction projects*, DEP'T OF INTERIOR OFF. OF WILDFIRE (Sep. 9, 2020), https://www.doi.gov/wildlandfire/us-air-force-and-us-fish-and-wildlife-service-partner-complete-fuels-reduction-projects.

231. Cobb, *supra* note 230.

232. *Id.*; Courtney Strzelczyk, *Wildland Fire Pros Battle Fire Season Despite COVID-19*, AIR FORCE CIV. ENG'G CTR.. (Jul. 20, 2020), https://www.afcec.af.mil/News/Article-Display/Article/2279888/wildland-fire-pros-battle-fire-season-despite-covid-19/.

233. VINCENT ET AL, *supra* note 226, at 4.

234. *About Fire and Aviation*, BUREAU OF LAND MGMT., https://www.blm.gov/programs/fire-and-aviation (last accessed Jan 11, 2021).

Like the FWS, the BLM also partners with the Air Force in support of the Wildland Fire Branch.[235] It also partners with installations more directly, such as executing agreements authorizing loan of heavy fire equipment to military installations during fire season.[236] Finally, also like the FWS, the BLM may, but is typically not required to, participate in the preparation and approval of base INRMPs.[237]

The Bureau of Indian Affairs (BIA)

A third DOI agency, the BIA, works closely with 89 federally recognized Native American Tribes and agencies to manage fire-related activities across tribal lands. [238] Over the last decade, lands managed by the BIA have experienced on average over 4,700 wildfires annually, burning an average of more than half a million acres.[239] As stated by the BIA, "Indian Country relies upon an aggressive fuels management program to restore and maintain the ecological health of tribal lands."[240] Prescribed fire is a major part of BIA's approach, which jibes well with the historical use of fire as an important, ecologically sound land management tool by indigenous peoples in what is now the United States.[241]

The National Park Service (NPS)

The fourth and final DOI agency, the NPS, is responsible for management of the 85 million federal acres that comprise the 422 units of National Park System—307 of which are subject to wildfire. [242] About two-thirds of the lands, 52.5 million acres, or 65.6%, are located in Alaska.[243] The NPS manages fire prevention, mitigation, and response on its lands and has a fire response equipment prepositioned at locations around the country.[244] The NPS has an active fuels management program, applying prescribed fire and mechanical treatment to an average of approximately 180,000 and 11,000 acres, respectively, since 2017.[245]

235. AF Wildland Fire Branch, *supra* note 114.

236. Benjamin Sutton, *Agreement with BLM helps CE Airmen Combat Wildfires, Keep Base Safe*, MOUNTAIN HOME AIR FORCE BASE (Jul. 5, 2012, https://www.mountainhome.af.mil/News/Article-Display/Article/308817/agreement-with-blm-helps-ce-airmen-combat-wildfires-keep-base-safe/.

237. AFMAN 32-7003, *supra* note 177, at 51-53.

238. *Branch of Wildland Fire Management*, BUREAU OF INDIAN AFF., https://www.bia.gov/bia/ots/dfwfm/bwfm (last visited Jan. 11, 2021).

239. *Id*.

240. *Id.*

241. INDIANS, FIRE, AND THE LAND IN THE PACIFIC NORTHWEST 2-4 (Robert Boyd, ed., Or. State Univ. Press, 1999).

242. VINCENT ET AL., *supra* note 226, at 5; *Wildland Fire Fact Sheet*, NAT'L PARK SERV. (Sept. 2021), https://www.nps.gov/orgs/1965/upload/wildland-fire-fact-sheet.pdf.

243. VINCENT ET AL, *supra* note 226, at 5.

244. Wildland Fire Fact Sheet, *supra* note 242.

245. *Id.*

5. United States Forest Service (FS)

The FS, an agency of the U.S. Department of Agriculture, is the final of the "big five" federal agencies involved with wildland fire operations. It administers approximately 193 million acres of land, predominantly in the western United States, while also managing the majority of federal lands in the eastern United States.[246] In 2015, the FS spent approximately $1.79 billion, 52% of its budget, on wildfire-related activity.[247] The FS has long experience in wildland firefighting and a highly organized response process based on dispatch zones calibrated by fire severity.[248] The FS also has a long history of partnering with the military on wildfire response, frequently requesting support from military assets in the form of MAFFS aircraft, rotary wing transport (helicopters), and military personnel to assist with firefighting as well as conducting joint wildfire response training with DOD personnel.[249] Finally, the Forest Service also imbeds a liaison, funded by the Air Force, at the Air Force Wildland Fire Center at Eglin AFB in Florida, where the Air Force manages approximately 100,000 acres with the regular application of prescribed fire and conducts wildfire-related training.[250] The liaison position provides wildland fire management expertise as well as technical assistance on forestry and range conservation issues for installations across the Air Force.[251]

Existing partnerships with the FWS, the BLM, and the FS play an important role in enhancing DOD wildfire expertise. Understanding the responsibilities and capabilities of existing partners, and potential ones like the BIA and the NPS, is critical to effectively leveraging the full federal capacity to meet the wildfire threat. While this piece argues for legislation that would better empower DOD to attack wildfire mitigation unilaterally, expanded resources would also create the potential for further and greater partnerships with other agencies.

6. State and Local Partners

Often partnerships with state and local authorities form the backbone of outside support for DOD's installations when called upon. Most states with regular wildfire impacts have invested in fighting fire and managing prescribed fires on state and private lands.[252] These resources are typically found in the states' forestry or natural resource management agencies with California's CALFIRE being the

246. VINCENT ET AL., *supra* note 226, at 4.

247. *Wildland Fire in the Southeast*, NAT'L COHESIVE WILDLAND FIRE MGMT. STRATEGY, http://www.southernwildfire.net/about (last visited Mar. 4, 2021).

248. *Wildland Fire*, U.S. FOREST SERV., https://www.fs.usda.gov/managing-land/fire (last visited Jan. 11, 2021).

249. *Military Partners*, U.S. FOREST SERV., https://www.fs.usda.gov/managing-land/fire/partners/military (last visited Mar. 4, 2021); Emerson Marcus, *Air Guard, Reserve Wings Conduct Firefighting Training With Forest Service,* U.S. DEP'T OF DEF. (Apr. 26, 2018), https://www.defense.gov/Explore/News/Article/Article/1504124/air-guard-reserve-wings-conduct-firefighting-training-with-forest-service/.

250. FOREST SERVICE LIAISON TO THE AIR FORCE, U.S. DEP'T OF AGRIC. 1 (Jul. 2015); JAMES FURMAN, U.S. FOREST SERV., SREF-CFS-007, INTERAGENCY PARTNERSHIPS ENABLE THE U.S. AIR FORCE TO ADDRESS WILDLAND FIRE CHALLENGES 1 [hereinafter *Furman*].

251. FURMAN, supra note 250, at 1-2.

252. ARMY WILDLAND FIRE, UNDERSTANDING WILDLAND FIRE 4.

largest.[253] The FS provides support to state wildland fire programs in the form of grants and by providing access to equipment, such as vehicles and aircraft, through the Federal Excess Personal Property (FEPP) program.[254] Many of the resources for state wildland fire programs provided through the FEPP program are originally obtained from the DOD through the Defense Reutilization and Marketing Office (DRMO) program.[255] By taking advantage of this federal assistance, state governments are able to more quickly and effectively suppress problem fires and limit the need to seek federal or other outside assistance, reducing the burden on the larger system.

State and local agencies are DOD's primary partners for training and wildland fire activities. DOD installations frequently partner with experienced local agencies for training on both mitigation and suppression activities.[256] Military installations are also encouraged to form formal partnerships, called mutual aid agreements (MAAs), with local partners for reciprocal assistance in fire emergencies, including for wildland fire.[257] These agreements are entered pursuant to 42 U.S.C. § 1856a, which authorizes reciprocal agreements, "with any fire organization maintaining fire protection facilities in the vicinity of [the installation] for mutual aid in furnishing fire protection." MAAs provide both agencies with additional personnel and assets, in case a large fire threatens to overwhelm their individual agency resources.

V. THE NEED FOR A BURND ACT

The destruction of an old growth forest by a high intensity wildfire is an ecological tragedy. The $PM_{2.5}$ contained in the smoke it emits endangers the health of thousands of nearby residents, compounds the harm, and demands an aggressive response from government. But an individual event would not likely threaten America's National Security interests.

However, return to the example from the introduction and consider that same fire occurring at Travis AFB during a period of extreme tension between the governments of Japan and China over the Senkaku Islands in the East China Sea. Under the Obama, Trump, and Biden Administrations, the United States government has continually reaffirmed that it considers those islands to be included under the mutual defense provisions of Article V of the U.S.—Japan Security Treaty—meaning a hostile incursion on the Senkaku Islands would demand a U.S. response to the same degree as an attack on Tokyo.[258] In such an event, the President could conceivably determine that additional U.S. troops should be rapidly deployed

253. *Id*.

254. *Id.*

255. *Id.*

256. *See, e.g.* Jennifer Evans, *North Carolina Air Force Base Trains Structural Firefighter in Wildland Fire,* S. REGIONAL EXTENSION FORESTRY (2016) http://www.southernwildfire.net/success-stories/north-carolina-air-force-base-trains-structural-firefighters-in-wildland-fire/at_download/file (the report describes active duty Air Force firefighters at Seymour Johnson AFB conducted prescribed fire and wildfire suppression training with experts from the North Carolina Forest Service and North Carolina State University).

257. AFI 32-2001, *supra* note 115, at 23.

258. MANYIN, *supra* note 27; Treaty of Mutual Cooperation and Security, *supra* note 27.

eastward to support current U.S. forces and our Japanese allies. An intense wildfire would present a major strategic problem in such a crisis, resulting in logistical challenges and potential delays in the arrival of critically needed forces. The potential for such wildfire impacts could play into the planning of our adversaries. Fires could even be started intentionally, as the Japanese attempted in World War II.

Given these threats—and the near certainty climate change will continue to exacerbate them—Congress needs to do more to ensure the DOD can mitigate the wildfire threat. This is all the more relevant because of the DOD's omission from prior statutory attempts, like the HFRA and the FLAME Act, to address this threat. This omission is in spite of DOD being the fifth largest land management agency in the federal government, responsible for approximately 8.8 million acres within the United States.[259] Even this statistic does not tell the entire story, while other federal agencies, such as the FS or the BLM, are responsible for far more acreage, these holdings do not begin to approach either the monetary or national security value of DOD's land holdings.[260] Moreover, millions of the acres managed by the DOI agencies and the FS are located far from population centers, unlike the communities that normally host and grow around DOD installations. So, the fire problems impacting DOD installations are much more likely to occur at the interface of wilderness areas and urban, inhabited areas. And thus, attacking DOD's wildfire threat will also benefit surrounding communities.

The Building Up Resilience Now for Defense Act (BURND), is inspired and informed by the HFRA, the Defense Community Infrastructure Pilot Program, the proposed National Prescribed Fire Act of 2020, and the 2019 report, "A Climate Security Plan for America", produced by the Center for Climate and Security.[261] Its adoption would improve DOD's capacity for wildfire mitigation and suppression in four important ways: 1) expanding DOD's funding for wildfire mitigation techniques;[262] 2) removing barriers to skilled wildfire fighting expertise in the civilian contractor community;[263] 3) creating a wildfire mitigation and suppression policy apparatus at the level of the Office of the Secretary of Defense; and 4) authorizing and funding DOD-lead infrastructure investments to build the fire, and other disaster, resilience of DOD installations and the communities that support them.

A. Building Wildfire Mitigation Capacity

Unlike other major federal land management agencies, DOD F&ES programs have a much broader scope than the specialist wildfire organizations of the

259. VINCENT ET AL., *supra* note 226, at 6.

260. BRIAN J. LEPORE & WILLIAM J. CORDREY, GOV'T ACCOUNTABILITY OFF., GAO-19-73, DOD NEEDS TO TAKE ADDITIONAL ACTIONS TO IMPROVE MANAGEMENT OF ITS INVENTORY DATA 2 (2018).

261. 16 U.S.C. § 6501 *et seq.*; 10 U.S.C. § 2391(d); National Prescribed Fire Act of 2020, S. 4625, 116th Cong. § 2 (2020); A CLIMATE SECURITY PLAN FOR AMERICA (JOHN CONGER, FRANCESCO FEMIA & CAITLIN WERRELL, EDS., THE CTR. FOR CLIMATE & SEC., 2019). The Center for Climate and Security is an institute of the non-profit Council on Strategic Risks.

262. NAT'L WILDFIRE COORDINATING GRP., INTERAGENCY PRESCRIBED FIRE PLAN. AND IMPLEMENTATION PROC. GUIDE 1-3, 17-35 (2017).

263. 10 U.S.C. § 2465.

five major federal wildfire response agencies. For example, it is unlikely that a NPS firefighting team would need to prepare to respond to complex fires involving hazardous chemicals and the potential presence of unexploded ordnance. Given the DOD's mission, such a threat is precisely what DOD F&ES personnel must be prepared to respond to at a moment's notice, with response to wildfire being an additional concern at installations where the threat exists.

Despite this broader scope, the DOD receives no specific appropriations for related to wildfire mitigation and thus must address the growing wildfire threat out of its larger appropriations. The BURND Act would correct this problem by aggressively funding the DOD's expansion of evidence-based fire mitigation practices, including mechanical treatment and application of prescribed fire, and government or contract personnel to carry them out to reduce the likelihood of high intensity wildfire that would overwhelm installation capacity and impact mission readiness. By its increased funding for well-tested mitigation activities, particularly the application of prescribed fire, the BURND Act would significantly enhance the DOD's capacity to maintain readiness in the face of increasing wildfire impacts.

The $30 million fire mitigation appropriation to be provided to the DOD by the Act is only a fraction of the $300 million sought for the Departments of Agriculture and Interior in the proposed National Prescribed Fire Act of 2020, and is a modest amount in the context of the enormous monetary and security value of the infrastructure and assets it would protect.[264]

Further, the BURND Act would also simplify the environmental compliance process for wildfire mitigation activities. It would direct all military departments to promulgate appropriate NEPA categorical exclusions (CATEX) for wildfire mitigation activities. While the Department of the Navy has already promulgated a CATEX that broadly includes "prescribed burning" among other permitted activities, neither the Departments of the Air Force or Army have followed suit.[265] Even the Navy's CATEX is subject to numerous considerations that must be assessed prior to the agency determining that the CATEX is applicable.[266] These include whether the action adversely affects public health or safety, involves effects on the human environment that are highly uncertain, involve unique or unknown risks, or which are scientifically controversial, and establishes precedents or make decisions in principle for future actions that have the potential for significant impacts.[267]

A better model is, not surprisingly, offered by the DOI.[268] Its CATEX explicitly provides for both prescribed fire and mechanical treatment activities and specifies modest maximum acreage limits for each, but has few other restrictions.[269] This size limited model is a solid approach to balance NEPA's procedural requirements and substantive policy goals with agency efficiency. It ensures small

264. National Prescribed Fire Act of 2020, S. 4625, 116th Cong. § 2 (2020).

265. 32 C.F.R. § 775.6(f)(45) (2021); 32 C.F.R. pt. 989 app. B (2012); 32 C.F.R. pt. 651 app. B (2012).

266. 32 C.F.R. § 775.6(e) (2021).

267. *Id*.

268. 43 C.F.R. § 46.210(k) (2021).

269. *Id*. (limiting 4,500 acres for prescribed fire and 1,000 acres for mechanical treatment).

projects can generally move quickly while larger ones will appropriately receive greater scrutiny.

B. Accessing Expert Contractor Support

The prohibition on contracting by the DOD for firefighter services originated with the 1987 National Defense Authorization Act.[270] After the events of September 11, 2001, Daniel J. Dell 'Orto, Principle Deputy General Counsel of the DOD, wrote to Vice President Dick Cheney in his capacity as President of the United States Senate, and Speaker of the House of Representatives Dennis Hastert, asking for the statute to be substantially amended.[271] In his letters, Mr. Dell 'Orto noted that the statute originated with the concern that allowing contracting for firefighting, and security, services would have an adverse impact on civil service jobs.[272] However, he emphasized that in the years since its passage, there was no evidence that such an impact on the civil service in the locations where the prohibition did not apply, due to a grandfather provision for contracts existing at its passage.[273] In the twenty intervening years, no evidence has arisen to suggest such a deleterious impact.

The BURND Act would empower military installations threatened by high intensity wildfire to immediately access expert assistance in the civilian contracting community. While wildfire is a constant and severe threat during fire season, due to the vagaries of weather, it is not yet a constant problem. The availability of expert contractor assistance would serve as an important, and economical, force multiplier for DOD installations. It would free DOD fire personnel to focus more attention on core missions, including general fire and aircraft mishap response. Thus, the BURND Act would, through its training initiative, improve the DOD's inchoate capacity to address wildfire, but also position it to access the best available support and free it from having to rely on the availability and willingness of interagency partners to assist during dire circumstances.

C. Creating a Policy Apparatus

As described above, the DOD joined the WFLC in 2016 and has participated in quarterly meetings. This is a positive step, but it does not go far enough. The DOD does not have formal membership in the two most important tactical and policy governmental bodies focused on wildfire issues in the United States, the NICC and the NWCG. This must change. As a major member of the wildfire response community and particularly as an aggressive employer of fire mitigation techniques, the DOD should be at the table to share its collective experience and to learn from these exchanges as well as to continue to improve interagency coordination. Thus, the BURND Act findings include language

270. National Defense Authorization Act of 1987, Pub. L. 99-661, § 2693, 100 Stat. 3816, 3976 (1986).

271. Letter from Daniel J. Dell'Orto, Principal Deputy General Counsel of the Dep't of Def., to Vice President Richard B. Cheney and Speaker of the U.S. House of Representatives J. Dennis Hastert (Sep. 25, 2001) (on file with the author).

272. *Id*.

273. *Id*.

encouraging the DOD to formally seek membership in the NICC, the NWCG, and other relevant organizations.

However, this important step alone is not sufficient. The DOD's multitude of missions create unique challenges that the other major federal land management agencies do not face, requiring DOD to have the capacity and knowledge to competently react and adapt on a much more compressed time scale. Thus, the BURND Act would also create a wildfire-focused policy apparatus, the Wildfire Executive Council, made up of existing DOD personnel and headed by the Secretary of one of the military services, to ensure the issue of wildfire policy receives the sustained focus it requires to mitigate the growing threat.

D. Building Defense and Community Resilience

Finally, the BURND Act would make permanent and significantly expands funding for the Defense Community Infrastructure Pilot Program (DCIP) created by 2019 National Defense Authorization Act.[274] The current DCIP program is designed to improve military resilience by improving the communities hosting military installations through a DOD grant program that partially funds community infrastructure programs.[275] The BURND Act would increase annual funding by a factor of five, from $50 million to $250 million. More importantly, it would recenter the goals of the projects and ground them firmly in environmental sustainability, with an additional project category for natural resource conservation or rehabilitation projects. These investments would enhance military and community resilience to natural and environmental disasters, including but not limited to wildfire events, and thus enhance military readiness.

VI. MODEL BURND ACT TEXT

The following pages depict the author's model text for the proposed BURND Act.

A Bill to enhance the National Security of the United States by directing the Secretary of Defense to encourage and expand the use of wildfire mitigation techniques on Department of the Defense military installations and to invest in the future resilience of military communities, as well as other related measures.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE; TABLE OF CONTENTS

(a) Short Title. – This Act may be cited as the "Building Up Resilience Now for Defense Act of 2021".

(b) Table of Contents. – The table of contents of this Act is as follows:

274. John S. McCain National Defense Authorization Act for Fiscal Year 2019, Pub. L. 115-232, § 2861, 132 Stat. 1636, 2282 (2018).

275. *Id*.

SECTION 2. FINDINGS

Congress finds that –

(1) it is the overwhelming consensus of the American and international scientific communities that our planet's climate is changing due in large part to human activity and resulting emission of greenhouse gases;

(2) the changing climate poses grave threats to humanity and the natural world, including the increasing occurrence of extreme weather events, such as hurricanes, droughts and wildfires;

(3) the changing climate and its likely impacts pose a profound threat to international peace and security;

(4) the resilience of Department of Defense installations and personnel to the impacts of climate change is now and will continue to be vital to the national security of the United States;

(5) according to a 2019 study published by the Department of Defense, forty-three military installations within the United States are currently or shall soon be threatened by wildfire, including some of the United States' most strategically vital military units: rapid global mobility forces, our most elite special operations forces, and forces charged with maintaining the readiness of our strategic nuclear deterrent;

(6) recent wildfires have impacted military operations at numerous military installations, requiring the evacuation of military personnel and equipment, destroying or damaging military infrastructure, and impairing military operations and readiness;

(7) the Department of Defense manages approximately 8.8 million acres within the United States, the fifth largest land management responsibility within the Federal Government;

(8) according to a 2019 report by the Government Accountability Office, the real property making up the various military installations has an estimated replacement value of at least $1.2 trillion;

(9) since 2000, an annual average of 70,685 wildfires burned an annual average of 7.1 million acres in the United States, more than double the average 3.3 million acres burned in the 1990s;

(10) according to the National Interagency Fire Center, the five most destructive wildfire years in terms of United States acreage burned have all occurred since 2006;

(11) as wildfires continue to grow in size and intensity, the annual costs associated with suppression continue to increase and now approach $3 billion in federal spending alone;

(12) according to a 2017 study published in the Journal of Forestry, on a given acre, a prescribed fire burning in April or May produces less than twenty percent of the smoke emissions of a wildfire that would burn on that acre in August;

(13) according to a 2019 study conducted by Stanford University, smoke from prescribed fires exposes children to fewer negative health effects than the detrimental smoke generated by wildfires;

(14) proactive measures are needed to protect military personnel, property and readiness from wildfire threats;

(15) expertise in combating wildfires is readily available in the civilian contracting community;

(16) a significant contributor to the wildfire resilience of Department of Defense installations is the resilience of the surrounding communities that support them;

(17) The Defense Community Infrastructure Pilot Program created by Section 2861 of Public Law 115-232 has empowered the Secretary of Defense to make investments in the infrastructure of local communities to the benefit of the Department of Defense mission;

(18) the Department of Defense and the larger wildfire response community would benefit from formal membership and participation by the Department of Defense in bodies including the National Interagency Coordination Center and the National Wildfire Coordinating Group.

SECTION 3. DEFINITIONS.

(1) COMMUNITY INFRASTRUCTURE – The term "community infrastructure" means a project or facility described in subparagraph (B) that—

(A) is located off of a military installation; and

(B) is —

i. owned by a State or local government; or

ii. a not-for-profit, member-owned utility service.

(C) A project or facility described in this subparagraph is any of the following:

i. A natural resource conservation or rehabilitation project that improves military and community resilience to natural or environmental disaster.

ii. An environmentally sustainable transportation project.

iii. An environmentally sustainably constructed school, hospital, police, fire, emergency response, or other community support facility.

iv. An environmentally sustainable water, wastewater, telecommunications, electric or other utility infrastructure project.

(2) ENVIRONMENTALLY SUSTAINABLE – The term "environmentally sustainable" means meeting the resource and services needs of current and future generations without compromising the health of the ecosystems that provide them.

(3) MECHANICAL TREATMENT. – Mechanical treatment means reducing the amount of vegetation which has built up to dangerous levels or changing the arrangement of these potential fuels for fire in the environment.

(4) MILITARY INSTALLATION. – The term "military installation" means any location managed by the Department of Defense and falling within the definition of –

(A) "range" as defined in 10 U.S.C. § 101(e)(1); or

(B) "military installation" as defined by 10 U.S.C. § 2801(c)(4); or

(C) "military installation" as defined by 16 U.S.C. § 670(1).

(5) PRESCRIBED FIRE. – The term "prescribed fire" means a fire deliberately ignited to burn fuels in a natural or modified state—

(A) under specified environmental conditions that allow the fire to be confined to a predetermined area and produce the fire line intensity and rate of spread required to attain planned resource management objectives; and

(B) in accordance with applicable law, including applicable regulations.

(6) RURAL – The term "rural area" means a city, town, or unincorporated area that has a population of not more than 50,000 inhabitants.

(7) SECRETARY. – The term "the Secretary" means the Secretary of Defense. The Secretary may delegate any duties under this Act to the Under Secretary of Defense for Acquisition and Sustainment.

(8) MILITARY INSTALLATION RESILIENCE – The term "military installation resilience" shall have the meaning provided at 10 U.S.C. § 101(e)(8).

(9) WILDFIRE. – The term "wildfire" means any non-structure fire occurring in vegetation or with natural fuels.

(10) WILDFIRE MITIGATION. – The term "wildfire mitigation" means evidence-based activities, including but not limited mechanical treatment and prescribed fire, conducted to reduce the threat of destructive wildfire.

TITLE I – APPROPRIATION AND USE OF FUNDS

Sec. 101. Annual Appropriation Requests.

(a) The Secretary shall annually direct each military department to submit a report to the Office of the Secretary describing wildfire mitigation and community infrastructure priorities for the next fiscal year.

(b) For fiscal year 2023 and each fiscal year thereafter, the Secretary shall submit, through the budget request of the President, a request for amounts to carry out the wildfire mitigation and community infrastructure activities under this Act.

Sec. 102. Prescribed Fire Account. – There is established in the Treasury of the United States the Wildfire Mitigation Account for the Department of Defense.

(a) Amounts annually appropriated to this account will be divided among the military departments for use in accordance with the authorized activities of this Act.

(b) Amounts to be disbursed to each military department shall be in the discretion of the Secretary based on prioritization of wildfire mitigation need.

Sec. 103. Defense Community Infrastructure Program Account. - There is established in the Treasury of the United States the Defense Community Infrastructure Program Account for the Department of Defense.

(a) Amounts annually appropriated to this account will be divided among the military departments for use in accordance with the authorized activities of this Act.

(b) Amounts to be disbursed to each military department shall be at the discretion of the Secretary based on prioritization of military infrastructure need.

Sec. 104. Authorized Wildfire Mitigation Activities. The Secretary shall use amounts in the Wildfire Mitigation Account for the Department of Defense as follows:

(a) develop a prescribed fire burn plan, carry out necessary environmental review, conduct outreach to the public, Indian Tribes, and adjacent landowners, and implement prescribed fire and mechanical treatment on military installations;

(b) hire or contract for additional personnel and procure additional equipment to implement a greater number of prescribed fires;

(c) provide training for the implementation of prescribed fire;

(d) conduct post-prescribed burning activities, including, as appropriate, reseeding to prevent the spread of invasive species;

(e) conduct monitoring for safety and fire effects; and

(f) produce reports required under this Act.

Sec. 105. Authorized Defense Community Infrastructure Activities. The Secretary shall use amounts in the Defense Community Infrastructure Program Account for the Department of Defense as follows:

(a) The Secretary may make grants, conclude cooperative agreements, and supplement funds available under Federal programs administered by agencies other than the Department of Defense to assist State and local governments to address deficiencies in community infrastructure supportive of a military installation, if the Secretary determines that such assistance will enhance the military resilience at such military installation.

(b) The Secretary shall establish criteria for the selection of community infrastructure projects to receive assistance under paragraph (1). The criteria shall include a requirement that the State or local government agree to contribute not less than 30 percent of the funding for the community infrastructure project, unless the community infrastructure project is located in a rural area, or for reasons related to national security, in which case the Secretary may waive the requirement for a State or local government contribution.

(c) Amounts appropriated or otherwise made available for assistance under paragraph (1) may remain available until expended.

Sec. 106. Wildfire Executive Officer and Executive Council. The Secretary shall appoint –

(a) the Secretary of one of the military departments as the Department of Defense's Wildfire Executive Officer, who will be responsible for development, standardization and evaluation of wildfire policy and activities within the Department of Defense; and

(b) a representative from each military department and such scientific and technical representatives as the Secretary deems necessary to a Wildfire Executive Council.

(1) The Executive Council shall review reports and other relevant wildfire data in order to make policy and other recommendations to the Wildfire Executive Officer;

(2) The Executive Council will collaborate with the Office of Local Defense Community Cooperation to identify potential Defense Community Infrastructure Program projects that would enhance the resilience of Department of Defense installations to wildfire.

Sec. 107. Collaboration with Other Wildfire Activities.

(a) The Secretary shall ensure that regulations implementing this Act require personnel carrying out Department of Defense wildfire mitigation activities coordinate those activities with relevant federal, state or local authorities and consolidate activities to achieve maximum mitigation effects.

(b) Nothing in this subsection shall be interpreted to authorize expenditure of funds appropriated under this Act for wildfire mitigation activities conducted on lands outside of military installations.

Sec. 108. Contracting for Firefighting and Security-Guard Functions.

(a) Repeal of Prohibition. – Section 2465, Title 10, United States Code, is amended to read as follows:

"2465. Contracting for firefighting and security-guard functions

"The Secretaries of the Military Departments are authorized to contract to obtain fire protection and security-guard services on a military installations and facilities. The Secretary concerned may obtain such services from private contractors, or the Secretary may obtain such services and other municipal services, such as police, public works, and sanitation services, from nearby local government or governments in which the installation or facility lies, notwithstanding whether any such local government is obligated to provide such services to the general public without compensation."

(b) Clerical Amendment. – The table of sections for chapter 146 is amended by amending the item relating to section 2465 to read as follows:

"2465. Contracting for Firefighting and Security-Guard Functions."

Sec. 109. Authorization of Wildfire Mitigation Appropriations. There are authorized to be appropriated for fiscal year 2022 and each fiscal year thereafter for the account established by this Act such sums as are necessary to carry out this section, not to exceed $30,000,000.

Sec. 110. Authorization of Defense Community Infrastructure Program Appropriations. There are authorized to be appropriated for fiscal year

2022 and each fiscal year thereafter for the account established by this Act such sums as are necessary to carry out this section, not to exceed $250,000,000.

Title II – Hazardous Fuel Reductions

Sec. 201. Quadrennial Report on Wildfire Threatened Military Installations.

(a) Not more than six months from enactment of this Act, each military department shall conduct an initial wildfire risk assessment of all military installations within the United States and its territories.

(b) For those installations deemed at risk, a detailed wildfire risk assessment shall be conducted which shall include scientific and technical analysis of current and future wildfire threats for each identified installation.

(c) The assessment will be documented in writing and provided to the Wildfire Executive Officer and the Secretary.

(d) The assessment shall be reviewed for scientific and technical currency, as well as the potential addition or removal of installations designated at risk, and reissued at minimum every four years.

Sec. 202. Annual Report on Mitigation Activities. Beginning in 2023, each installation designated as at wildfire risk shall publish an annual report on completed and potential and wildfire mitigation projects and submit this assessment to the Wildfire Executive Officer through military command channels.

Sec. 203. Policies and Practices.

(a) The Secretary shall significantly increase the use of wildfire mitigation techniques on military installations, including mechanical treatment of hazardous fuels and prescribed fire, with the intent to significantly reduce the threat of damaging wildfire at the threatened installations.

(b) Subject to availability of appropriations, the Secretary shall annually carry out prescribed fire or mechanical treatment on at least twenty percent of military installation property identified as appropriate for wildfire mitigation activities.

(c) Wildfire mitigation activities will be managed by personnel certified by the Department of Defense or other competent authority to conduct such activities.

(d) Only personnel certified in the application of prescribed fire by the Department of Defense or other competent authority will participate in the application of prescribed fire.

Sec. 204. Prioritization. Prioritization of individual projects at military installations shall be conducted in accordance with Department of Defense and service regulations.

Sec. 205. Environmental Analysis and Protection.

(a) Except as otherwise provided in this subchapter, the Secretary shall conduct authorized wildfire mitigation activities in accordance with—

(1) The Sikes Act of 1960 [16 USC § 670c-1];

(2) the National Environmental Policy Act of 1969 [42 U.S.C. § 4321 et seq.];

(3) the Endangered Species Act of 1970 [16 USC § 1531 et seq.]; and

(4) other applicable laws.

(b) The Secretary shall direct the Wildfire Executive Officer to-

(1) gather and evaluate all of the decision memos, decision notices, and records of decision and associated findings of no significant impact or environmental impact statements under the National Environmental Policy Act of 1969 (42 U.S.C. § 4321 et seq.) prepared for recent wildfire mitigation activities;

(2) review any documented environmental impacts of those wildfire mitigation activities; and

(3) develop findings of—

(i) similarities and differences among prescribed fire projects; and

(ii) elements and mitigation measures that consistently appeared in those prescribed fire projects that did not individually or cumulatively have a significant impact on the environment.

(c) Following this review and not more than 2 years from the enactment of this statute, the Secretary shall cause the military departments to publish notice of relevant categorical exclusions from the requirements of the National Environmental Policy Act of 1969 (42 U.S.C. § 4321 et seq.) for implementing wildfire mitigation activities in accordance with this Act.

(d) Military installations conducting authorized prescribed fire activities shall reasonably coordinate with State, Tribal and Local authorities to facilitate smoke management and, if applicable, Exceptional Event Demonstration pursuant to the Clean Air Act [42 U.S.C. § 7401 et seq].

(e) Nothing in this Act shall be interpreted to limit the authority of the Department of Defense or Military Departments to conduct any activity permissible under any existing emergency or national defense-related authority.

VII. CONCLUSION

Climate change and its attendant threats, like increasingly frequent and intense wildfire, are now facts of life. Understanding and accepting this hard truth is a precondition if the DOD is to maintain its preeminent position among the world's military powers, safeguarding our homeland and way of life.

Study and preparation by the military as an institution is only half the equation, however. The bedrock principle of military subordination to civilian control is at the core of the U.S. military doctrine and ethics. We are obliged to look to the President and our Congressional leaders to set priorities and resource them. President Biden's early days in office have demonstrated he and his administration recognize the significance of this threat and that he intends to ensure the Executive Branch takes a whole of government approach to meeting the moment in our growing climate crisis. Even the Commander in Chief's authority has limits, however, and thus what we need now is bold legislative action. The BURND Act is one step toward that kind of bold action.