# CHAPTERS

## FIRE MANAGEMENT IN A CLIMATE CHANGED WORLD: OPPORTUNITIES FOR THE BIDEN ADMINISTRATION UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT

BY

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*With dramatic photographs of massive fires blazing through human communities across the western United States, perennially gracing the news each summer, wildfire in the face of climate change has become a hot topic in popular culture in recent years. The forest management community, in contrast, has long debated how best to safely and effectively manage fires in a way that protects human lives and property while also preserving ecological stability in western United States forests. In the absence of a fully settled solution, the Ninth Circuit's recent decision in Bark v. United States Forest Service (USFS) demonstrated the importance of the National Environmental Policy Act (NEPA) in ensuring that the USFS at least fully and transparently considers all relevant factors when assessing the relationships between a forest management decision, wildfire, and climate change. The Trump administration's rescission of the 1978 NEPA regulations and the Obama administration's 2016 Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in*

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*National Environmental Policy Act Reviews (2016 GHG Guidance), however, severely undercut federal agencies' obligations to consider climate change and incorporate meaningful opportunities for public participation in its environmental analyses of major federal actions. This Chapter proposes that, to provide support for USFS to better manage forests and fires in a way that builds adaptive resilience and thus better protects both human and ecological communities in the long term, the Biden administration should repromulgate the 1978 NEPA regulations and the 2016 GHG Guidance. The Chapter highlights components of these policies that are particularly useful for managing fire in a climate-changed world, and suggests possible improvements to better equip USFS to make intelligent and informed decisions around forests, fires, and climate change.*

## I. INTRODUCTION

In 2020 the West Coast of the United States saw more wildfires and more area burned than ever previously recorded.[1] For those who live or work in the West, or are generally concerned with climate change, this has become a common refrain, and a regular reminder that the impacts of climate change have arrived, and they are at least as bad as scientists have long predicted.[2] Hotter, drier air, changing precipitation patterns, shifts in plant growing seasons and geography, and other climate-related changes have led to increases in fire frequency and intensity and longer fire seasons.[3] These patterns are likely to continue and perhaps accelerate.[4]

Climate change did not alone bring western United States forests to this precipice. For decades, the prevailing narrative in popular culture and federal policy has been that fire is bad, that it is destructive and nothing more.[5] This framework led to decades of fire exclusion as the dominant paradigm, wherein fires were "extinguish[ed] . . . as soon as possible after ignition."[6] This in turn led to decades worth of fuel buildup in western forests which, when combined with the worsening effects of anthropogenic climate change and excessive logging often disguised as "hazardous fuels reduction," formed the root cause of the recent increase in destructive wildfires.[7]

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[1] Blacki Migliozzi et al., *Record Wildfires on the West Coast are Capping a Disastrous Decade,* N.Y. TIMES (Sept. 24, 2020), https://perma.cc/B9SK-XKD8.

[2] *The Effects of Climate Change*, NASA: GLOBAL CLIMATE CHANGE, https://perma.cc/QC47-Y23K (last visited May 11, 2021); *IPCC: Effects of Climate Change 'Worse Than We Had Predicted,'* AL JAZEERA AMERICA, https://perma.cc/CF7W-P3GD (last updated Mar. 31, 2014).

[3] Robert B. Keiter, *Wildfire Policy, Climate Change, and the Law*, TEX. A&M J. REAL PROP. L. 87, 94 (2012) [hereinafter Keiter II].

[4] *See* Eric Toman, *Wildland Fire Policy and Climate Change: Evolution of Fire Policy and Current Needs*, *in* THE ENVIRONMENTAL POLITICS AND POLICY OF WESTERN PUBLIC LANDS 75, 81 (Erika Allen Wolters & Brent S. Steel eds., 2020) ("Substantial research suggests fire occurrence will continue to increase in future years with specific changes depending on local conditions.").

[5] *Id.* at 87.

[6] *Id.*

[7] TIMOTHY INGALSBEE, INCENDIARY RHETORIC: CLIMATE CHANGE, WILDFIRE, AND ECOLOGICAL FIRE MANAGEMENT, FIREFIGHTERS UNITED FOR SAFETY, ETHICS, & ECOLOGY 9

In more recent years, increased destruction or threat to human communities as a result of wildfire has caused scientists and policymakers to re-examine the conventional wisdom around fire: if fire is categorically bad and suppression is therefore the answer, then why, year after year, does the United States experience worse and more expensive fire seasons?[8] Must this be our fate, or can fire management evolve to address not only today's fire, but to better prepare both human and ecological communities for tomorrow's fire as well?

Contemporary scientific developments have instigated a shift from all out suppression-based fire management to more hazardous fuel reduction-based strategies, but federal forest and fire policy in the western United States continues to "emphasize[] short-term outcomes versus long-term goals."[9] As climate change worsens, this is an increasingly dangerous path to tread due to the feedback loop between climate change and fire, intensified by impacts from human development: as forests are lost to both climate change and anthropogenic deforestation, they are lost as valuable carbon sinks, worsening climate change, and contributing to an increase in fire occurrence and intensity that further drives forest loss, and so on.[10]

To respond adequately to the challenges presented by this feedback loop and the consequences already witnessed, a wholesale reexamination of fire management in the face of a changing climate is warranted. Unfortunately, such an endeavor has long been stalled by and mired in political controversy around what exactly that might look like.[11] Environmental stakeholders often encourage pursuit of the restoration of more natural fire regimes through prescribed burns or allowing fires to burn themselves out naturally.[12] Timber interests and the United States Forest Service (USFS), meanwhile, have long favored methods such as salvage logging and mechanical thinning, pairing their version of fire

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(May 2020), https://perma.cc/JD3J-S88V. "Destructive," as used in this Chapter, refers to the destruction of human structures. Fires which burn in the backcountry and do not threaten human communities are vital components of many healthy ecosystems and should not be thought of as "destructive."

[8] Leigh Barton, *Let it Burn: An Argument for an Adaptive Resilience Approach to Federal Wildfire Management in the Western United States*, 30 GEO. ENV'T L. REV. 695, 696 (2018).

[9] Scott L. Stephens et al., *U.S. Federal Fire and Forest Policy: Emphasizing Resilience in Dry Forests*, ECOSPHERE, Nov. 2016, at 1, 2.

[10] Nancy Harris et al., *6 Graphics Explain the Climate Feedback Loop Fueling US Fires*, WORLD RES. INST. (Sept. 16, 2020), https://perma.cc/28DT-85N2.

[11] Matthew P. Thompson, *Social, Institutional, and Psychological Factors Affecting Wildfire Incident Decision Making*, 27 SOC'Y & NAT. RESOURCES 636, 638 (2014).

[12] *See, e.g.*, *Fire is Native to Oregon*, BARK (May 30, 2018), https://perma.cc/EZW3-VC6B ("Accepting fire as a necessary part of our forest ecosystems will take shifting both dominant culture and federal policy . . . . It will mean re-writing the Mt. Hood forest management plan to include new provisions for wildland fire use and prescribed fire."); INGALSBEE, *supra* note 7, at 13 (noting that "forest conservationists tend to be more supportive of using prescribed fire treatments" but that "only fire *inclusion* can fully compensate for the adverse effects of fire exclusion").

management with economic benefit.[13] This conflict is enhanced by the inherent uncertainty of climate change and fire management.[14] While there is consensus that climate change is a reality, and that it drives increased occurrence and intensity of fires,[15] there remains robust disagreement over how forest managers can best respond.[16] The Ninth Circuit recently considered such a controversy in *Bark v. United States Forest Service*,[17] where Bark and other environmental advocacy groups challenged USFS's environmental analysis of the Crystal Clear Restoration Project (Crystal Clear), a forest management project and timber sale planned for part of Mt. Hood National Forest.[18] The case is discussed in greater detail below.[19]

This Chapter argues that the urgency of climate change demands that a reexamination of fire management not be delayed while the scientific and forest policy communities resolve this debate. Fire management strategies must account now for what we do know: forests need climate-smart policy now, and what is appropriate in one stand of trees may not be appropriate in another stand within the same forest. In a changing world, that means that forest management must be climate-aware, fire-aware, and aware of the interactions between climate and fire. Fire management must allow forests to adapt to a new normal and be resilient through ecologically turbulent times. Rather than evade the uncertainty around the efficacy of various fire management strategies, land management agencies must confront that uncertainty, better disclose and respond to controversy, and better engage all interested parties. Agencies should be guided in this task by three key themes: adaptation, mitigation, and resilience. Federal guidance, regulations, and policy must be implemented to support the agencies in these endeavors.

With the recent change in political administration, the federal government has an opportunity to embark upon the overhaul necessary to put our forests and forest management on a path toward the resilience necessary to withstand and respond to our changing world. The National Environmental Policy Act (NEPA),[20] as the nation's broadest reaching

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[13] *See, e.g.*, Scoping comments from Scott Stawiarski, AFRC Consultant, American Forest Resource Council, to Russell Nickerson, District Ranger, American Forest Resource Council (Mar. 27, 2019), https://perma.cc/3HMH-LYAM (letter in support of proposed action "to utilize mechanical harvesting on 115 acres to remove fire-killed and fire-injured trees" in Lassen National Forest).

[14] Thompson, *supra* note 11, at 637; Matthew P. Thompson & Dave E. Calkin, *Uncertainty and Risk in Wildland Fire Management: A Review*, 92 J. ENV'T MGMT. 1895, 1895 (2011).

[15] *Scientific Consensus: Earth's Climate Is Warming*, NASA: GLOBAL CLIMATE CHANGE, https://perma.cc/6NUM-UP8U (last updated June 21, 2021); *Climate Change Increases the Risk of Wildfires Confirms New Review*, SCIENCEDAILY (Jan. 14, 2020), https://perma.cc/SK2W-43KC.

[16] Thompson, *supra* note 11, at 640.

[17] 958 F.3d 865 (9th Cir. 2020).

[18] *Id.* at 869.

[19] *See* discussion *infra* Part III.

[20] National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321–4370h (2018).

environmental statute and one which has long been used to address the potential impacts of federal actions on climate change,[21] has a special role to play here. This Chapter therefore proposes and assesses potential policies for the Biden administration to better incorporate climate change into forest management utilizing the NEPA framework, with an emphasis on the special role that fire and fire management can and must play. Part II provides a brief overview of the history of fire management in the western United States, its impacts on forests, and the impacts and implications of climate change for federally managed forests.[22] Part III discusses the Ninth Circuit's recent decision in *Bark* and its implications for the role of NEPA in fire management for the National Forest System (NFS).[23] Part IV suggests policy proposals the Biden administration might pursue to better address the interrelationships between climate change, wildfires, and forest management under NEPA.[24] Part V discusses in brief other potential policies outside the NEPA framework.[25] The Chapter concludes that fire on the landscape is not going anywhere, nor should it; fire is a vital ecological process and an important tool for retaining western United States forests as a major carbon sink.[26] Federal forest and fire policy must therefore emphasize climate-aware management and prioritize proactive protection of human communities and ecological restoration and resilience over profit or all out suppression.

## II. A BRIEF OVERVIEW OF THE HISTORY OF FIRE MANAGEMENT IN THE WESTERN U.S. AND ITS IMPACTS ON FORESTS AND FIRE REGIMES

The history of fire in the western United States is highly dynamic, storied, and rife with controversy. Indigenous peoples have used fire to manage landscapes for millennia.[27] Even through the early decades of European settlement, fire was a normal and accepted part of the landscape.[28] But as more non-Natives spread across the land and the human population on the landscape grew, humans, their structures, and fire came into conflict more often.[29] It became increasingly clear, at least to society at the time, that the federal government would have to take on the role of fighting these fires, and the era of fire exclusion at the hands of USFS was born in 1905.[30] A few years later, following the historic fire

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21 *See generally* Arnold W. Reitze, Jr., *Dealing With Climate Change Under the National Environmental Policy Act*, 43 WM. & MARY ENV'T L. & POL'Y REV. 173, 180–81 (2018) (describing CEQ's affirmation in 2010 to apply NEPA to climate change issues).

22 *See* discussion *infra* Part II.

23 *See* discussion *infra* Part III.

24 *See* discussion *infra* Part IV.

25 *See* discussion *infra* Part V.

26 *See* discussion *infra* Part IV.A.4, V.

27 William D. Nikolakis & Emma Roberts, *Indigenous Fire Management: A Conceptual Model from Literature*, ECOLOGY & SOC'Y, Dec. 2020.

28 Keiter II, *supra* note 3, at 88.

29 *Id.* at 89.

30 *Id.*

season of 1910, which took the lives of eighty-six people, burned three million acres of land, and leveled entire towns,[31] Congress bolstered USFS's authority to shape fire policy with the passage of the Weeks Act of 1911 (Weeks Act).[32] The Weeks Act gave states financial incentives to cooperate with USFS on fire suppression activity and access to an emergency budget to be used for suppression.[33] Thus began an aggressive USFS practice of suppressing fires as soon as possible, formalized in 1935 as the "10:00 a.m. policy": all fires were to be extinguished by 10:00 a.m. the morning following detection.[34]

The 10:00 a.m. policy was, by any measure of the day, a great success. USFS, working with other land management agencies and the Civilian Conservation Corps, halved the acreage burned annually—"from two million acres to less than one million acres by mid-century."[35]

A shift began in the late 1960s as land managers, at the behest of scientists beginning to recognize the vital regenerative role of fire on the landscape, began to shift toward a more mixed policy of "allowing some fires to burn unabated in backcountry locations, [and] even utilizing controlled burning to restore some fire-adapted ecosystems."[36] Public attitudes toward fire, and the concept of "wildness" more broadly, were also shifting with the growth of the environmental movement, the wilderness movement, and the passage of the Wilderness Act of 1964.[37] This shift may have come too late, however. Years of fire suppression had led to a massive buildup of fuels in forests, and the 1990s and 2000s saw some of the deadliest fire seasons the United States had yet seen.[38] In response, Congress and the Bush administration shifted toward an "aggressive federal approach to controlling wildfire" focused primarily on hazardous fuel removal and reduction,[39] minimizing opportunities for administrative appeal of certain forest management decisions, and easing NEPA and the Endangered Species Act (ESA)[40] procedural requirements for certain federal forest management actions.[41] This approach included the Healthy Forests Initiative (HFI), a slew of regulatory reforms unveiled at the site of the still-burning Biscuit Fire in southern Oregon

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31 Toman, *supra* note 4, at 86.

32 Weeks Act of 1911, ch. 186, 36 Stat. 961 (1911).

33 Toman, *supra* note 4, at 87.

34 *Id.*

35 Keiter II, *supra* note 3, at 89.

36 *Id.* at 89–90.

37 Wilderness Act of 1964, Pub. L. No. 88-577, 78 Stat. 890 (1964); Robert B. Keiter, *The Law of Fire: Reshaping Public Land Policy in an Era of Ecology and Litigation*, 36 ENV'T L. 301, 308 (2006) [hereinafter Keiter I].

38 Keiter II, *supra* note 3, at 90. *See also* Barton, *supra* note 8, at 698–99 (2018) ("Naturally burning fires clear forests of underbrush. Decades of suppressing these fires created a buildup of underbrush, reducing the overall number of wildfires, but making the wildfires that escaped suppression catastrophic and extremely difficult (and expensive) to control.").

39 Keiter II, *supra* note 3, at 90.

40 Endangered Species Act of 1973, 16 U.S.C. §§ 1531–1544 (2018).

41 Keiter I, *supra* note 37, at 338–39.

in 2002,[42] and the Healthy Forests Restoration Act of 2003 (HFRA).[43] Many of the HFI regulations were either successfully challenged in court[44] or amended by the Obama administration.[45] While HFRA remains good law, it did not have a significant effect on forest fire policy,[46] with the exception of the 2014 Farm Bill,[47] which allowed an increase in logging on federal lands.[48]

During the Trump administration, many of the components of HFI and HFRA were resurrected and built upon, with regulatory and statutory handouts to the timber industry thinly veiled as hazardous fuels reduction efforts.[49] In the 2018 Consolidated Appropriations Act, for example, Congress amended HFRA to add categorical exclusions (CEs)[50] for "hazardous fuel reduction" in certain forested areas, allowing USFS to approve such actions, including logging, without completing a full NEPA analysis.[51] Soon after, USFS adopted a final rule amending its NEPA regulations to add six new CEs and revise other CEs, including a new CE for certain "[f]orest and grassland management activities," including timber harvest.[52] The forest and grassland management activities CE purports to include only projects with "a primary purpose of meeting restoration objectives or increasing resilience,"[53] but environmental groups have raised concerns about USFS's statement "that restoration need not be the *only* purpose of the project," and USFS's

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[42] Jesse B. Davis, *The Healthy Forests Initiative: Unhealthy Policy Choices in Forest and Fire Management*, 34 ENV'T L. 1209, 1218 (2004).

[43] Healthy Forests Restoration Act of 2003, 16 U.S.C. §§ 6501–6591 (2018).

[44] *E.g.*, Sierra Club v. Bosworth, 510 F.3d 1016, 1018 (9th Cir. 2007) (invalidating USFS's categorical exclusion for hazardous fuels reduction activities).

[45] Kyle Sasser, *The West's Hot Topic: Snuffing Out Poor Wildfire Policy in National Forests*, 20 VT. J. ENV'T L. 202, 214 (2019).

[46] *Id.* at 216.

[47] Agricultural Act of 2014, Pub. L. No. 113-79, §§ 8204–8206, 128 Stat. 649, 915–16, 918, 921–22 (2014).

[48] *E.g.*, Frankie Barnhill, *How the Farm Bill Makes It Easier for Idaho to Log on Federal Land*, BOISE STATE PUB. RADIO (Sept. 25, 2017), https://perma.cc/Q4BZ-GBM4.

[49] *See NEPA – USDA / Forest Service*, ENV'T & ENERGY L. PROGRAM (Aug. 15, 2018), https://perma.cc/5CE3-T5US (providing a timeline of statutory and regulatory rollbacks of environmental statutes and regulations related to the United States Department of Agriculture (USDA) and USFS).

[50] A CE is "a class of actions that a Federal agency has determined, after review by [the Council on Environmental Quality] (CEQ), do not individually or cumulatively have a significant effect on the human environment" and are therefore not required to complete a full NEPA analysis. Council on Environmental Quality, *Categorical Exclusions*, NAT'L ENV'T POL'Y ACT, https://perma.cc/NA2V-XMJV (last visited Mar. 28, 2021).

[51] Consolidated Appropriations Act, 2018, Pub. L. No. 115-141, 132 Stat. 348 (codified as amended at 16 U.S.C. § 6591d (2018)).

[52] National Environmental Policy Act (NEPA) Compliance, 85 Fed. Reg. 73,620, 73,632 (Nov. 19, 2020) (to be codified at 36 C.F.R. pt. 220).

[53] *Id.*

failure to explain "how the primary purpose test would exclude actions with significant harm from coverage under the CE."[54]

Despite whatever good intentions previous political administrations may have had with respect to protecting human communities from wildfire, the situation has only worsened. One study found an average 84-day increase in fire seasons in 2003–2012 compared to 1973–1982.[55] And across California, Oregon, and Washington, "[i]n the last 20 years, . . . the number of square miles burned annually . . . has increased sixfold compared with the average between 1950 and 2000."[56] Furthermore, the long history of fire suppression in the western United States enabled the encroachment of human development into and adjacent to forests in the "Wildland Urban Interface" (WUI), long ago setting the course for conflict between these communities and wildfire.[57] While recent scientific research suggests that the amount and intensity of fire recently seen in the western United States is actually less than what the landscape has historically experienced,[58] current fire management must be reexamined to better protect the human lives, livelihoods, and property in the WUI.

USFS's continued focus on fuel reduction, primarily through thinning, does not seem to be helping as much as the agency suggests it should.[59] As Bark noted in its comments on Crystal Clear:

> Commercial thinning has become, by political default, the prevailing mechanism for fuels reduction that federal land management agencies use because it usually offers the least public controversy, while potentially offering the most commercial benefit to the agencies. The current approach assumes that by controlling the amount of fuel in the forest through thinning, fire behavior can be similarly be controlled. However, studies have failed to demonstrate that thinning significantly alters the behavior, spread, or severity of wildfire.[60]

Furthermore, "a large scale analysis of fire severity patterns in the western [United States] from 1984 to 2014 found that national parks, wilderness, and other areas with the most restrictions on logging tended

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[54] Clinch Coal. v. U.S. Forest Serv., No 2:21-cv-00003-JPJ-PMS, Complaint at 71 (W.D. Va. Jan. 8, 2021) (LEXIS, Federal Pleadings).

[55] Anthony LeRoy Westerling, *Increasing Western US Forest Wildfire Activity: Sensitivity to Changes in the Timing of Spring*, PHIL. TRANSACTION ROYAL SOC'Y BIOLOGICAL SCI., June 2016, at 1, 8.

[56] Migliozzi et al., *supra* note 1, at 5.

[57] Elias Kohn, *Wildfire Litigation: Effects on Forest Management and Wildfire Emergency Response*, 48 ENV'T L. 585, 592 (2018).

[58] *E.g.*, Dominick A. DellaSala et al., *Accommodating Mixed-Severity Fire to Restore and Maintain Ecosystem Integrity with a Focus on the Sierra Nevada of California, USA*, FIRE ECOLOGY, Aug. 2017, at 148, 151.

[59] Letter from Michael Krochta, Forest Watch Coordinator, & Brenna Bell, NEPA Coordinator/Staff Attorney, Bark, to Casey Gatz, Team Leader, Barlow Ranger Dist. (Mar. 30, 2017), https://perma.cc/8ZUV-LA53.

[60] *Id.*

to burn at lower severity than national forest lands with fewer restrictions on logging."[61]

Decades of suppression, followed by a gradual and ongoing shift toward a more holistic and ecologically competent, but still flawed, understanding of the role of fire in ecosystem resiliency, has left our national forests, their managers, and other stakeholders today in a difficult predicament: how can we deal with hazardous fuels in a way that best serves the forests, the air, the WUI, and a livable climate, and in a way that does all of this both now and in a climate changed future? To meet this challenge, federal forest policy must fully abandon the long-held assumption that a fire inclusive landscape is inherently at odds with human health, safety, and livelihoods.[62] The history of fire exclusion in western United States forest management has already demonstrated that it is neither possible nor wise to prevent all wildfires. Wildfire management should therefore prioritize building resilience to wildfires in human communities rather than trying to prevent these events altogether. At the same time, management must actively confront the value of fire to healthy forests, the value of healthy forests in the face of climate change, and the value of actively engaging the entire spectrum of stakeholders and confronting the inherent uncertainty of the path forward for forest management in a changing climate. The next section discusses the value of NEPA as a vital tool in this management shift, using *Bark* as a case study in what this process can look like.

## III. *BARK V. U.S. FOREST SERV.* AND THE ROLE OF NEPA IN MANAGING FIRE IN A CHANGING CLIMATE

NEPA is one of the nation's broadest reaching environmental statutes. Enacted in 1969, it is a purely procedural statute which requires federal agencies undertaking any "major [f]ederal action[]"[63] "to consider and publicly disclose" the potential environmental impacts of the action.[64] If the initial analysis, known as an Environmental Analysis (EA) finds that the project will "significantly affect[] the quality of the human environment," then the agency must prepare "a detailed statement . . . on the environmental impact of the proposed action,"[65] known as an Environmental Impact Statement (EIS).[66] If the EA finds, on the other

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61 Douglas Bevington, *Lessons from Groups that Litigate Logging*, *in* 193 MILLION ACRES: TOWARD A HEALTHIER AND MORE RESILIENT US FOREST SERVICE 471, 477 (Steve Wilent ed., 2018).

62 *U.S. Forest Service Fire Suppression,* FOREST HISTORY SOC'Y, https://perma.cc/DVT4-CP8W (last visited May 28, 2021) (explaining that fire policy in the 1900s was shaped by the idea that devastation from forest fires could only be prevented by fire suppression).

63 National Environmental Policy Act of 1969, 42 U.S.C. § 4332(C) (2018).

64 Barton, *supra* note 8, at 703.

65 42 U.S.C. § 4332(C).

66 *National Environmental Policy Act Review Process*, EPA, https://perma.cc/J3EY-ZWWM (last visited May 12, 2021).

hand, that the project will not have significant impacts on the quality of the human environment, then the agency issues a Finding of No Significant Impact (FONSI), and the NEPA process ends.[67] NEPA is relevant in the forest and fire management context because many, if not most, management projects in the national forests will trigger NEPA.[68]

Since the Council on Environmental Quality (CEQ) promulgated the original regulations in 1978 (1978 Regulations), NEPA and its implementing regulations have been used to address the implications of climate change for fire management.[69] The 1978 Regulations required the scope of an EIS to include direct, indirect, and cumulative impact analyses of the human environment.[70] Perhaps the most important provisions in the 1978 Regulations for addressing climate change were the cumulative and indirect impacts analyses because they provided the primary climate change hooks in NEPA analysis:[71] climate change impacts are almost always "later in time or farther removed in distance, but . . . still reasonably foreseeable,"[72] and "result[] from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions."[73]

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67 40 C.F.R. § 1508.13 (2018). As discussed in this Chapter, in 2020 the Trump administration made the first significant modifications to the NEPA implementing regulations since their enactment in 1978. The regulations referenced here are as they existed prior to the changes implemented under the Trump administration. *See* discussion *infra* notes 90–93 and accompanying text.

68 *National Environmental Policy Act,* BUREAU OF LAND MGMT., https://perma.cc/CHH8-6ZYG (last visited May 11, 2021) (describing that "[m]ost of the actions the BLM takes to implement its land-use plans are reviewed under the requirements of [NEPA]"); *see Planning 101*, BUREAU OF LAND MGMT., https://perma.cc/GH5B-LZHC (last visited June 24, 2021) (explaining that "[l]and-use plans and planning decisions are the basis for every on-the-ground action the BLM takes"); *see also Forest Resilience and Ecosystem Services*, BUREAU OF LAND MGMT., https://perma.cc/3DBF-T2WS (last visited June 24, 2021) (noting that the BLM manages the U.S. forests).

69 *See* U.S. FOREST SERV., CLIMATE CHANGE CONSIDERATIONS IN PROJECT LEVEL NEPA ANALYSIS 2–3 (2009) (considering both the direct, indirect, or cumulative effects climate change poses to proposed projects and vice versa); *CEQ NEPA Regulations*, NEPA.GOV, https://perma.cc/342Z-7RHD (last visited May 11, 2021) (describing the promulgation of NEPA guidelines and regulations).

70 40 C.F.R. § 1508.25(c) (2018).

71 *E.g.*, Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin., 538 F.3d 1172, 1216–17 (9th Cir. 2008) (holding that the cumulative impacts analysis in an EA for fuel economy standards was inadequate because it failed to consider the impact of emissions from light trucks on climate change and noting that "[t]he impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct"); *see, e.g.*, Wildearth Guardians v. U.S. Bureau of Land Mgmt., 457 F. Supp. 3d 880, 894 (D. Mont. 2020) (noting that "the large-scale nature of environmental issues like climate change show why cumulative impacts analysis proves vital to the overall NEPA analysis" and that without a cumulative impacts analysis, "the relevant 'decisionmaker' cannot determine 'whether, or how, to alter the program to lessen cumulative impacts' on climate change.") (quoting Churchill Cty. v. Norton, 276 F.3d 1060, 1080 (9th Cir. 2001).

72 40 C.F.R. § 1508.08(b) (1979) (definition of "indirect effects").

73 *Id.* § 1508.7 (definition of "cumulative impact").

The 1978 Regulations' "significance factors" were also an important tool in addressing the relationship between climate change and forest and fire management projects.[74] The significance factors dictated that whether a major federal action would "significantly" affect the human environment, and therefore trigger NEPA review, depended on the project's "context" and "intensity."[75] "Intensity" was then evaluated using ten sub-factors.[76] For example, a project's intensity might weigh toward the need for NEPA review if the project's "effects on the quality of the human environment are likely to be highly controversial."[77] A project is "highly controversial" if there is sufficient evidence to question the reasonableness of the agency's decision, creating a "substantial dispute."[78] A project for "which the possible effects on the human environment are highly uncertain or involve unique or unknown risks" may also have the requisite intensity to necessitate an EIS.[79]

The Ninth Circuit's decision in *Bark* highlights the role of the significance factors in ensuring USFS does its due diligence before approving a forest management project that may be unwise in the context of building a fire-inclusive and resilient forest ecosystem in a climate changed world.[80] The petitioners in *Bark*, a group of environmental conservation organizations, brought suit against USFS arguing, among other things, that the agency's FONSI for Crystal Clear violated NEPA and its implementing regulations.[81] The Ninth Circuit agreed, holding that Crystal Clear was "highly controversial and uncertain" and therefore required an EIS.[82] The project proposed to use a forest management technique called "variable density thinning" to cut trees for forest products.[83] According to USFS, this technique would reduce the risk and intensity of wildfires.[84] USFS issued a FONSI for Crystal Clear, following the completion of an EA, despite public comments provided by Bark containing scientific evidence that raised substantial questions about the potential impact of Crystal Clear on fire severity.[85] According to Bark's evidence, variable density thinning may not be effective in fire suppression and may actually worsen fire severity in mature forests, such

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74 *Id.* § 1508.27.

75 *Id.*

76 *Id.* § 1508.27(b).

77 *Id.* § 1508.27(b)(4).

78 Bark v. U.S. Forest Serv., 958 F.3d 865, 870 (9th Cir. 2020) (quoting *Native Ecosystems Council v. U.S. Forest Serv.*, 428 F.3d 1233, 1240 (9th Cir. 2005)).

79 40 C.F.R. § 1508.27(b)(5).

80 *See generally Bark*, 958 F.3d at 870–71 (noting "[t]he stated primary purpose of the [federal] [p]roject [wa]s to reduce the risk of wildfires and promote safe fire-suppression activities," and that an EIS is required even where only one intensity factor raises substantial questions).

81 *Id.* at 869.

82 *Id.* at 870.

83 *Id.* at 868.

84 *Id.*

85 *Id.* at 869–71.

as the forest for which Crystal Clear was planned, contrary to USFS' assertions.[86] USFS failed to meaningfully engage with this evidence in its response to Bark's comments.[87] Crystal Clear was therefore highly controversial and highly uncertain, and an EIS was required.[88]

Despite the significance of this controversy, and what it could mean for USFS to be wrong here, USFS failed to meaningfully engage with the petitioners' evidence, leading, in part, to the petitioners' victory before the Ninth Circuit.[89] The significance factors provided the *Bark* petitioners and the Ninth Circuit a tool with which to check USFS's work and ensure it was considering all relevant scientific evidence presented to it. The result in *Bark* highlights the importance of the significance factors and the 1978 Regulations generally in moving toward more resilient forests in the face of climate change.

The effectiveness of the CEQ NEPA regulations in addressing climate change were significantly eroded by the Trump administration, however.[90] In July 2020, the CEQ published an update to the regulations implementing NEPA for the first time since their original promulgation in 1978 (2020 Regulations).[91] The updated regulations removed many of the regulatory requirements that were typically used to address climate change in NEPA reviews, including the requirement to conduct a cumulative and indirect impacts analysis[92] and the significance factors.[93]

The Trump administration also took aim at the *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews* (2016 GHG Guidance), issued by CEQ in August 2016 in the final months of the Obama administration.[94] The purpose of the 2016 GHG Guidance was to "assist Federal agencies in their consideration of the effects of greenhouse gas (GHG) emissions and climate change when evaluating proposed Federal actions in accordance

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[86] *Id.* at 869–70.

[87] *Id.* at 871.

[88] *Id.* at 870.

[89] The Ninth Circuit held that the project was highly controversial and highly uncertain, and an EIS was therefore required. *Id.* at 869–71.

[90] Rebecca Beitsch, *Trump Finalizes Rollback of Bedrock Environmental Law NEPA*, HILL (July 15, 2020), https://perma.cc/X9CQ-KW8X.

[91] Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act, 85 Fed. Reg. 43,304 (July 16, 2020) (to be codified at 40 C.F.R. pts. 1500–1508, 1515–1518).

[92] *Id.* at 43,343; Beitsch, *supra* note 90.

[93] Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act, 85 Fed. Reg. 1,684, 1,695 (Jan. 10, 2020) (to be codified at 40 C.F.R. §§ 1500–1505, 1507–1508).

[94] COUNCIL ON ENV'T QUALITY, EXEC. OFFICE OF THE PRESIDENT, FINAL GUIDANCE FOR FEDERAL DEPARTMENTS AND AGENCIES ON CONSIDERATION OF GREENHOUSE GAS EMISSIONS AND THE EFFECTS OF CLIMATE CHANGE IN NATIONAL ENVIRONMENTAL POLICY ACT REVIEWS (2016) [hereinafter 2016 GHG Guidance] (The memorandum was issued four months before the Obama Administration ended.).

with [NEPA] and the CEQ Regulations Implementing the Procedural Provisions of NEPA."[95]

The 2016 GHG Guidance was significant in the context of NEPA analysis of fire management actions because it explicitly called on federal agencies to consider "[t]he potential effects of a proposed action on climate change . . . and [t]he effects of climate change on a proposed action and its environmental impacts."[96] The feedback loop between forests as carbon sinks and the harms wrought on forests as a result of climate change[97] makes this framing essential to an effective analysis of the environmental impacts of fire-related federal actions. Furthermore, the 2016 GHG Guidance instructed agencies in dealing head-on with uncertainty and discord around what might constitute the best management practices in an uncertain climate-changed future. It emphasized open public communication, willingness to consider multiple alternatives and potentially adapt as the situation on the ground changed, and pursuit of actions which promote the resilience of human communities in the WUI.[98] These are all highly relevant considerations when USFS faces a choice between an action that might seem appropriate today if the goal is to prevent a fire from burning at all, but which does nothing to move the landscape to a more resilient state, and an action that better prepares forests and development in the WUI for a future of fire inclusion and resilience on the landscape.

Unfortunately, the 2016 GHG Guidance was not in place for long. On March 28, 2017, then President Donald Trump issued the *Presidential Executive Order on Promoting Independence and Economic Growth* which, among other things, instructed the CEQ to rescind the 2016 GHG Guidance.[99] The CEQ did so on April 5, 2017.[100] CEQ then proposed, but never finalized, *Draft National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions* (2019 Draft Guidance).[101]

On January 20, 2021, the tables turned yet again with President Biden's Executive Order 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis.*[102] This Executive Order, among other things, directed CEQ to rescind the 2019 Draft Guidance and review, revise, and update the 2016 GHG

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95 *Id.* at 1.

96 *Id.* at 4, 9 (explaining that the effects of climate change include longer fire seasons and more severe wildfires).

97 *See* discussion *supra* Part I, notes 1–10 and accompany text.

98 2016 GHG Guidance, *supra* note 94, at 15, 21–22, 24 (discussed *infra* Part IV.A.6.B).

99 Promoting Energy Independence and Economic Growth, Exec. Order No. 13,783, 82 Fed. Reg. 16,093, 16,094 (Mar. 31, 2017).

100 Withdrawal of Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews, 82 Fed. Reg. 16,576 (Apr. 5, 2017).

101 Draft National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions, 84 Fed. Reg. 30,097 (June 26, 2019).

102 Exec. Order No. 13,990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, 86 Fed. Reg. 7,037 (Jan. 25, 2021).

Guidance.[103] On February 19, 2021, CEQ once again complied, rescinded the 2019 Draft Guidance, and declared its intent to revise and update the 2016 GHG Guidance.[104] CEQ instructed agencies to, "[i]n the interim, . . . consider all available tools and resources in assessing GHG emissions and climate change effects of their proposed actions, including, as appropriate and relevant, the 2016 GHG Guidance."[105]

Returning the NEPA regulations and the GHG Guidance to their full force, with some revisions and updates, should be a priority of the CEQ under the Biden administration. The next section discusses some of the applications of the NEPA regulations and Guidance in the context of fire management and suggests some potential opportunities to further strengthen their potential to better support USFS in better preparing human communities and forests for a more fire-inclusive climate changed world.

## IV. THE PROPOSALS

The Trump administration is considered by many to be the most anti-environmental administration in American history, having rolled back more than 100 environmental rules over the course of its four-year term.[106] The Biden administration is now in the difficult position—though rife with opportunity for progress—of re-assembling the Nation's most vital environmental protections. This section will discuss some of those opportunities in the context of managing fire in our national forests in a climate-conscious way and managing forests for climate change in a fire-conscious way, with a particular focus on NEPA and the management of the national forests under the jurisdiction of USFS.[107] Utilizing this statutory framework is particularly important in the context of fire. In the absence of consensus over the specifics of fire management, the framework can help "ensure[] the agencies carefully balance competing resource values, ecological implications, safety considerations, and risk

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103 *Id.* at 7,042.

104 National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions, 86 Fed. Reg. 10,252 (Feb. 19, 2021).

105 *Id.*

106 Nadja Popovich et al., *The Trump Administration Rolled Back More Than 100 Environmental Rules. Here's the Full List*, N.Y. TIMES, https://perma.cc/K6RH-XCRQ (last updated Jan. 20, 2021).

107 While the Bureau of Land Management (BLM) manages nearly 245 million acres of the U.S. land base—more than any other government agency in the U.S.—this Chapter focuses on lands managed by USFS. CONG. RESEARCH SERV., R42346, FEDERAL LAND OWNERSHIP: OVERVIEW AND DATA 4 (2020). USFS manages the majority of federal forests, while BLM manages more rangelands. *Id.* These two types of land are characterized by distinctly different relationships to fire and human usage. Furthermore, this Chapter is rooted in *Bark*, which involved only USFS. *Bark*, 958 F.3d 865, 868 (9th Cir. 2020) (focusing on USFS's determination that the Crystal Clear Restoration Project did not require an EIS). This Chapter is therefore cabined in USFS forest management and policy.

factors," and that the public has opportunities to participate and make their concerns known.[108]

The following proposals are put forth with two primary goals in mind: 1) to create a framework for fire management in national forests that accounts for what we do know about climate change, and allow specific management strategies to adapt to the various potential outcomes and uncertainties; and 2) to restore forests to a resilient state while protecting human life and property as best as possible.

### *A. Reissue an Updated CEQ Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews*

The Biden administration should reimplement the 2016 GHG Guidance with some revisions and updates consistent with advances in climate science in recent years. This section highlights some of the applications of the 2016 GHG Guidance to promoting fire-aware and climate smart forest management, demonstrating the importance of issuing similar guidance as soon as feasible. It also suggests changes or additions to the 2016 GHG Guidance which may help USFS better account for how fire figures into a climate-uncertain future. The updated GHG Guidance should especially consider where our forests currently stand, how they have already been affected by climate change and past management decisions, and what climate-conscious forest management aimed toward ecological restoration, including restoration of the role of fire in forest ecosystems, could mean for the future of forests and their role as carbon sinks. This section will identify opportunities for Biden's CEQ to implement these considerations in an updated GHG Guidance.

#### *1. Utilize an Emissions-Based Approach*

One essential component of the 2016 GHG Guidance was that it suggested an emissions-based approach to climate change in NEPA analysis, recommending that "agencies use the projected GHG emissions associated with proposed actions as a proxy for assessing proposed actions' potential effects on climate change in NEPA analysis."[109] This recommendation was designed to address a tendency of agencies to dismiss the climate impacts of an action by comparing anticipated impacts based on the percentage of emissions it would contribute to "sector, nationwide, or global emissions."[110] Such comparisons might be followed by a statement that the action would "represent only a small fraction of global emissions," which the 2016 GHG Guidance noted "is essentially a statement about the nature of the climate change challenge,

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108 Keiter I, *supra* note 37, at 380.
109 2016 GHG Guidance, *supra* note 94, at 10.
110 *Id.* at 11.

and is not an appropriate basis for deciding whether or to what extent to consider climate change impacts under NEPA."[111] The updated GHG Guidance should follow a similar emissions-based approach. When it comes to then using such an approach to manage a fire-inclusive landscape, agencies should be instructed to calculate an action's net contribution to global GHG emissions, or conversely, its potential to sequester carbon, and compare the results to all reasonable alternatives. These measures are addressed in further detail below.[112]

*2. Incorporate GHG Emissions and Carbon Sequestration Potential in the Alternatives Analysis.*

The alternatives analysis, which calls for the agency to consider "alternatives to the proposed action,"[113] was referred to as "the heart of the environmental impact statement" in the 1978 Regulations.[114] The 2016 GHG Guidance emphasized the importance of this analysis and instructed agencies to "compare the anticipated levels of GHG emissions from each alternative—including the no-action alternative—and mitigation actions to provide information to the public and enable the decision maker to make an informed choice."[115] Of particular note in the forest management context, the 2016 GHG Guidance encouraged agencies to "consider reasonable alternatives . . . to reduce action-related GHG emissions or increase carbon sequestration in the same fashion as they consider alternatives and mitigation measures for any other environmental effects."[116] The updated GHG Guidance should include similar provisions, but should also more explicitly suggest that agencies include in their analyses comparisons of possible GHG emission outcomes predicted by conflicting science.

The significance of such guidance is evident in the district court opinion in *Bark*.[117] There, the court held that "USFS did not violate NEPA's hard look requirement with respect to its evaluation of [Crystal Clear]'s effect on climate change," despite uncertainty surrounding the project's expected carbon emissions.[118] The court noted that "[w]hether the Project will have a net positive or negative contribution to carbon emissions depends on whether the USFS is correct in determining that thinning of overstocked stands will contribute to forest health and reduce the risk of fire, insect infestation, and disease."[119] On review, the Ninth Circuit did not go so far as to fully settle that debate, but the court did

111 *Id.*
112 *See* discussion *infra* Part IV(A)(2).
113 NEPA, 42 U.S.C. § 4332(C)(iii) (2018).
114 40 C.F.R. § 1502.14 (1979).
115 2016 GHG Guidance, *supra* note 94, at 15.
116 *Id.*
117 Bark v. U.S. Forest Serv., 393 F. Supp. 3d 1043 (D. Or. 2019).
118 *Id.* at 1059.
119 *Id.*

hold that Bark's evidence demonstrated that the variable density thinning proposed by USFS may actually worsen fire severity, which made the project highly controversial and highly uncertain.[120] An EIS was therefore required.[121] Guidance such as that proposed here, if followed by USFS, would help USFS better compare and communicate the disparities between different scientific studies on the impacts of various management decisions on GHG emissions.

*3. Consider Short-Term and Long-Term Goals for Forest Resilience.*

Fire management in a changing climate must consider both short-term and long-term goals and project impacts if it is to enhance forest resilience.[122] The 2016 GHG Guidance took a valuable step in this direction:

> Biogenic GHG emissions and carbon stocks from some land or resource management activities, such as a prescribed burn of a forest or grassland conducted to limit loss of ecosystem function through wildfires or insect infestations, may result in short-term GHG emissions and loss of stored carbon, while in the longer term a restored, healthy ecosystem may provide long-term carbon sequestration. Therefore, the short- and long-term effects should be described in comparison to the no action alternative in the NEPA review.[123]

This comparison of short- and long-term effects is essential to any NEPA analysis grappling with the uncertainty of what the long-term effects of a fire management decision may look like. Similar to the policy described above, updated GHG Guidance should also specify the importance of acknowledging that uncertainty so that the public and decision makers are at least presented with that information and are able to incorporate it into their understanding of the effects of the action.

*4. Mitigation Should be More than a Zero-Sum Game.*

Fighting climate change must include not only adaptation, but mitigation.[124] Furthermore, it is not enough to simply produce fewer GHG emissions; we must capture more, reaching a point of net-negative emissions.[125] The 2016 GHG Guidance addresses mitigation by instructing agencies to "carefully evaluate the quality of . . . mitigation to ensure it is additional, verifiable, durable, enforceable, and will be

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120 *Bark*, 958 F.3d 865, 870–71 (9th Cir. 2020).

121 *Id.* at 871.

122 Stephens et al., *supra* note 9, at 2.

123 2016 GHG Guidance, *supra* note 94, at 18.

124 Keiter II, *supra* note 3, at 98.

125 T. Gasser et al., *Negative Emissions Physically Needed to Keep Global Warming Below 2°C*, NATURE COMM., Aug. 3, 2015, at 1, 5.

implemented."[126] These measures are essential and should be incorporated in any updated GHG Guidance as well.

In addition, updated GHG Guidance should also suggest that mitigation do more than compensate for the emissions of the agency action, but should aim to sequester more carbon than what is emitted by the action. Similar policies can be seen in the context of Clean Water Act § 404.[127] Recognizing the value of wetlands, general practice under § 404 has long been to require that mitigation efforts protect *at least* as many acres of wetland as will be lost to the project.[128] Forest management should likewise recognize the value of forests as carbon sinks and consider not only how their protection might be an effective mitigation tool, but also the extent of warranted mitigation where they are lost.

What precisely this might look like should be left up to the agency, with the availability of judicial review, but updated GHG Guidance could play a role in encouraging agencies to consider these factors and contemplate how mitigation efforts can compensate for the loss of forest as a carbon sink, or can enhance ecosystem resilience where fire suppression, for example, is the chosen action in stand with a historic fire regime of high frequency and/or high intensity fire. Such efforts must also bear in mind that appropriate and effective mitigation efforts to increase carbon storage capacity of forests will vary by forest ecotype.[129] For example, in the dry forests of eastern Oregon, where frequent fire once helped maintain diverse wildlife habitat and prevented stands from becoming too dense and thus vulnerable to more catastrophic disturbances, decades of fire exclusion have actually led to too many trees.[130] Shade-tolerant species that historically would have been cleared out by fire as saplings have instead been allowed to grow and create dense forests "extremely vulnerable to larger and more intense wildfires, expansive bark beetle outbreaks, and drought, all fueled by a warming climate."[131] Planting more trees in these dry forests may therefore actually be inconsistent with increasing carbon storage capacity or meeting other conservation goals. Participants in forest management activities must ensure that they are not pushing certain ecotypes outside

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126 2016 GHG Guidance, *supra* note 94, at 19.

127 Federal Water Pollution Control Act, 33 U.S.C. § 1344 (2018); MEMORANDUM OF AGREEMENT BETWEEN THE ENVIRONMENTAL PROTECTION AGENCY AND THE DEPARTMENT OF THE ARMY CONCERNING THE DETERMINATION OF MITIGATION UNDER THE CLEAN WATER ACT SECTION 404(B)(1) GUIDELINES 1 (Feb. 6, 1990), https://perma.cc/FYZ9-46A3.

128 *Id.* at 5–6; *see also Wetland Compensatory Mitigation*, U.S. ENV'T PROT. AGENCY (2008), https://perma.cc/EV8V-PSGV (noting that compensatory mitigation includes restoration, which "may result in a gain in wetland function or wetland acres, or both," and establishment, which, if successful, "results in a net gain in wetland acres and function").

129 *See What Type of Forest to Choose for Better CO2 Storage?,* SCIENCEDAILY (Nov. 13, 2020), https://perma.cc/AK8R-GS3T (discussing how not all forests have the same capacity to capture and store carbon).

130 Kerry Kemp, *East Cascade Dry Forests*, DESCHUTES LAND TR. (Mar. 13, 2018), https://perma.cc/U7RG-ARXQ.

131 *Id.*

of their natural and most resilient state in a perhaps well-intentioned, but misguided attempt to sequester more carbon.

Essential to mitigation being more than a zero-sum game is the recognition that, in a climate changed world with more fires and more intense fires, mitigation may not look the way it has historically. One way to mitigate the loss of forested land is to set aside other land in reserve, but forest managers must consider what that means in a world of increased fire, and where fire is suppressed less often. What is a forest manager to do if an area reserved for mitigation is destroyed by fire? If forest reserves are set aside in a climate-smart way which accounts for the unique features of different forest ecotypes, the answer might be "nothing." As explained by Firefighters United for Safety, Ethics, & Ecology, "[t]he majority of carbon in a forest is stored in large trees and organic soil, and even the most severe wildfires do not completely consume large tree [trunks] or deeper layers of organic soil."[132] While "[f]ire-killed trees may stop sequestering . . . carbon," they can "take decades or even centuries to decompose . . . slowly emitting to the atmosphere their stored carbon over that time."[133] Forest reserves may therefore be a more effective mitigation tool where forest managers fully consider the varying role of fire in different forest types, perhaps focusing on wet old growth forests where fire is relatively infrequent, while still understanding that there are no guarantees in a climate-changed world. The requirement in the 2016 GHG Guidance that mitigation efforts be "durable," if reinstated by the Biden administration, can help guide USFS in implementing such climate-smart projects.

*5. Consider How Climate Change Will Affect Suitable Future Uses of the Land and Resources.*

To enhance the resilience of forests to climate change and fire, NEPA analysis should also consider how "[c]limate change will affect the ability of landscapes [and] ecosystems . . . to sustain certain uses"[134] and how the different components of the environment may be impacted by the compounding effects of the proposed action and climate change.[135] The 2016 GHG Guidance acknowledged that "[c]limate change can make a resource, ecosystem, human community, or structure more susceptible to many types of impacts and lessen its resilience to other environmental impacts apart from climate change,"[136] such as fire. The 2016 GHG Guidance suggested that agencies consider these compounding effects when deciding "whether to proceed with, and how to design, the proposed

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132 INGALSBEE, *supra* note 7, at 11.

133 *Id.*

134 Jessica Wentz, *Planning for the Effects of Climate Change on Natural Resources*, 47 ENV'T L. REP. 10220, 10222 (2017).

135 2016 GHG Guidance, *supra* note 94, at 21.

136 *Id.*

action to eliminate or mitigate impacts exacerbated by climate change"[137] and understand these compounding effects to "inform possible adaptation measures to address the impacts of climate change, ultimately enabling the selection of smarter, more resilient actions."[138]

Along these lines, updated GHG Guidance should encourage agencies to put some of their resources toward enhancing fire resilience of nearby communities, even if USFS believes the action it is taking will reduce fire risk. This is especially so because with climate change and a shift in how fire is managed, it is highly unlikely there will ever be a world without any fire at all, nor should that be the goal. As a procedural statute, NEPA likely does not provide statutory authority for CEQ to dictate precisely how an agency spends its funding. But updated GHG Guidance suggesting that an agency, such as USFS, consider how various alternative actions may better prepare a community to withstand the increased presence of fire on the landscape, might be helpful in guiding decisions around resource allocation.

Updated GHG Guidance should also direct agencies to consider how a changing climate might impact a community's ability to protect itself from natural disasters which might occur more intensely or more frequently in the future, such as fire. For example, sometimes fire weather and the impacts of climate change cause conditions that are too hazardous for aerial drops of fire retardants.[139] Climate change may also reduce "the efficacy of thinning in reducing high-severity fire . . . as fire becomes more controlled by climate and weather."[140] Thinking beyond human communities, as ecological communities become more vulnerable and fragile from the impacts of climate change, the potential environmental impacts of these chemical retardants on aquatic and other ecosystems becomes all the more worrisome, given their use is not generally subjected to environmental analysis.[141] NEPA analysis should consider whether all components of the proposed action, or mitigating actions, even have a place in today's world, let alone down the line with likely worsening impacts from climate change.

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137 *Id.*

138 *Id.* at 22.

139 *See* Kelsey Ray, *Is Aerial Firefighting Worth It?*, HIGH COUNTRY NEWS (Aug. 3, 2015), https://perma.cc/R94B-S8NE ("[U]npredictable atmospheric conditions make flying over wildfires difficult and dangerous."); *see also* Payton Hampton, *Commentary: Wildfire Retardant is Often Ineffective. Here's What Communities Should Do Instead*, SALT LAKE TRIB. (July 22, 2018), https://perma.cc/THP8-ZQBF ("Retardant only works under ideal circumstances—in areas with sparse fuels, little wind and firefighters on the ground to immediately secure the area.").

140 Letter from Michael Krochta, *supra* note 59, at 5.

141 Keiter II, *supra* note 3, at 106.

*6. Try to Anticipate Future Threats to the Project that May Result from Climate Change.*

Human development in the WUI is "vulnerable to the effects of climate change such as . . . increased fire risk."[142] The 2016 GHG Guidance highlights such projects as needing to incorporate "[c]limate change effects on the environment and on the proposed project."[143] In these cases "a NEPA review will provide relevant information that agencies can use to consider in the initial project design, as well as alternatives with preferable overall environmental outcomes and improved resilience to climate impacts."[144] In the case of human development projects in the WUI, such as construction or the siting of public works, NEPA analysis must give extra consideration to whether or not increased fire risk means the project should even proceed, especially if fire management is going to err even less on the side of suppression than it does at present. The solution can no longer be an assumption that any fire in the area will simply be suppressed. That is not necessarily the most ecological option, or, in some cases, an option at all under current climatic conditions.[145] Updated GHG Guidance should encourage agencies to consider, for example, the current structure of the surrounding forest. Is it resilient to fire? Or will fire move quickly through the forest, endangering human-built structures? The answers to these questions can help advise the agency as to whether better alternatives exist.

### *B. Restore and Update the 1978 NEPA Regulations*

The breadth of applicability of the CEQ NEPA regulations make them a tempting tool for addressing climate change in general: any agency undertaking a major federal action that may significantly affect the environment must comply.[146] And until the Trump administration's rollback, they were quite stable, having not been significantly modified since their original promulgation in 1978.[147] By centering NEPA in a political battle, in ways never before seen, the rollback seems to have spotlighted the regulations and their potential power in addressing

142 2016 GHG Guidance, *supra* note 94, at 24.

143 *Id.*

144 *Id.*

145 *See* INGALSBEE, *supra* note 7, at 8 ("Conventional firefighting tactics of dumping fire retardant chemicals, cutting fire containment lines, and lighting high-intensity backfires or large-scale burnouts in aggressive 'perimeter-control' strategies increasingly cannot stop today's fast-spreading blazes. . . . Firefighters are simply overwhelmed by the rapid speed of fire spread and amount of wildfire activity in this era of climate change.").

146 NEPA, 42 U.S.C. § 4332(C) (2018).

147 *CEQ NEPA Regulations*, *supra* note 69 ("In July 2020, CEQ comprehensively updated its NEPA regulations for the first time in over 40 years.").

climate change.[148] They are now politically vulnerable, and any attempts to do anything more than reinstate the 1978 Regulations must tread lightly, lest they end up in a lengthy court battle with Trump's toothless 2020 Regulations in place in the meantime. Along the same lines, time is of the essence in terms of releasing whatever new regulations the Biden administration may be contemplating. The 2020 Regulations were enacted just in time to avoid the Congressional Review Act,[149] and so they remain in place until new regulations complete the rulemaking process.[150] It is therefore in the planet's and society's best interest that the Biden administration act quickly. But this is not to say that there is no room for improvement, or that some improvement is not worth the risk, to better address the interactions between climate change and fire management on National Forest land.

*1. Reinstate the Cumulative and Indirect Impacts Analysis Requirements.*

First and foremost, CEQ must reinstate the cumulative and indirect impacts analysis requirements. The 2020 Regulations removed the requirement from the 1978 Regulations that agencies consider the cumulative and indirect impacts of proposed projects.[151] As discussed above, these requirements are the crux of the climate change impacts analysis under NEPA.[152] They are therefore absolutely essential for a full accounting of the interrelated impacts of forest management, fire management, and climate change. Consider, for example, the very nature of fire and how it spreads.[153] A single misplaced variable density thinning project, like that alleged to be inappropriate for the specific forest type in *Bark*,[154] with a similar project in another stand nearby, may seem to have minimal impact on its own, but particularly if the forest between them is

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148 *See* Lisa Friedman, *Trump Weakens Major Conservation Law to Speed Construction Permits*, N.Y. TIMES, https://perma.cc/MZ99-K6WQ (last updated Aug. 4, 2020) ("[I]n one of the most bitterly contested provisions, the rule would free federal agencies from having to consider the impacts of infrastructure projects on climate change. . . . 'This may be the single biggest giveaway to polluters in the past 40 years,' said Brett Hartl, government affairs director at the Center for Biological Diversity, an environmental group.").

149 Congressional Review Act, 5 U.S.C. §§ 801–08 (2018).

150 Sheila McCafferty Harvey et al., *The Return of the Congressional Review Act*, PILLSBURY WINTHROP SHAW PITTMAN LLP (Jan. 19, 2021), https://perma.cc/AAZ7-XHXU.

151 40 C.F.R. § 1508.1(g) (2020).

152 *See* discussion *supra* Part III, notes 70–79 and accompanying text.

153 *See* Ethan Siegel, *The Terrifying Physics of How Wildfires Spread So Fast,* FORBES (Sept. 6, 2017), https://perma.cc/2LKT-ALT2 ("Fires can travel quickly: up to 6 miles-per-hour in forests. . . . When high-standing plant matter (like trees) catch fire, burning twigs, leaves, and pieces of debris can be carried large distances by the wind, still aflame after traveling tens or hundreds of feet through the air. Any small, dry, easily flammable thing that it contacts can easily catch fire.").

154 *Bark*, 958 F.3d 865, 870 (9th Cir. 2020).

not resilient and fire adapted due to past mismanagement,[155] and even more so in a hotter, drier climate,[156] together they could be disastrous. The indirect and cumulative impacts analyses are also crucial for considering the loss of forest as a carbon sink. Without these analyses, the carbon sequestration potential of national forests could see death by a thousand cuts—literally.

*2. Restore Public Involvement Requirements in Full.*

CEQ must also restore the regulations regarding public participation in the NEPA process.[157] Public participation is a core component of NEPA itself, which establishes that it is federal policy to "cooperat[e] with State and local governments, and other concerned public and private organizations, to use all practical means and measures . . . to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony."[158] Consistent with this policy, the 1978 Regulations called for "NEPA procedures [to] insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken."[159] The 1978 Regulations also recognized that "public scrutiny [is] essential to implementing NEPA" and also instructed that "[f]ederal agencies shall to the fullest extent possible . . . [e]ncourage and facilitate public involvement in decisions which affect the quality of the human environment."[160] The 2020 Regulations completely removed these provisions.[161]

The 2020 Regulations also added time limits to agency decision making, requiring that agencies complete "[e]nvironmental assessments within 1 year" and "[e]nvironmental impact statements within 2 years."[162] Such time limits and restrictions on public involvement curtail the public's ability to fully engage in key agency decisions, particularly members of the public who may not have the time or resources to

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155 *See* Opening Brief of Appellants at 23, Bark v. U.S. Forest Serv., 958 F.3d 865 (9th Cir. 2020) (No. 19-35665) ("The growing scientific consensus is that logging large, fire-resistant trees in mature forests actually *increases* severe fire risk as reducing the forest canopy makes stands hotter, drier, windier and stimulates the growth of the understory.").

156 *See* Jeremy S. Fried et al., *The Impact of Climate Change on Wildfire Severity: A Regional Forecast for Northern California*, 64 CLIMATIC CHANGE 169, 188 (using modeling to conclude that even under "relatively conservative" climate modeling, frequencies with which fires exceeded initial containment limits increased by more than 100%).

157 *See, e.g.*, Bevington, *supra* note 61, at 472 ("The first step towards a better direction in national forest management is for the Forest Service to engage more rigorously with the issues being raised by the environmental groups that litigate over logging projects.").

158 NEPA, 42 U.S.C. § 4331(a) (2018).

159 40 C.F.R. § 1500.1(b) (1979).

160 *Id.* §§ 1500.1(b), 1500.2(d).

161 Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act, 85 Fed. Reg. 43,304, 43,357–58 (July 16, 2020) (to be codified at 40 C.F.R. pts. 1500–1508, 1515–1518).

162 40 C.F.R. § 1501.10(b) (2020).

participate or organize their communities on such a rushed timescale.[163] Furthermore, by narrowing the definition of "major federal action," the 2020 regulations "severely curtail review of environmental impacts and provide the public with little to no voice in the decisions affecting their communities."[164]

*Bark* provides a useful example of the importance of robust public participation in fire, forest, and climate management issues. The central controversies in *Bark* all stemmed from USFS' failure to meaningfully engage with Bark's comments. Bark provided the agency with evidence which raised substantial questions about whether USFS' decision to use variable density thinning for Crystal Clear may actually worsen fire severity.[165] USFS failed to respond adequately to this evidence, depriving Bark, the public, and the court of a meaningful debate on the issue.[166] The events that gave rise to *Bark* occurred with the 1978 Regulations in place.[167] If USFS was failing to comply with these regulations when they were in place, this should raise concern for how USFS might, or might not, engage with the public with significantly pared down regulations in place. Furthermore, without regulatory requirements for public participation, organizations such as Bark are left without one of their primary avenues for judicial review—questioning the adequacy of agencies' involvement of the public in its environmental decision-making.[168]

*3. Restore and Strengthen the Significance Factors.*

One component of the 1978 Regulations which should not only be reinstated, but perhaps strengthened to better address the interrelatedness of climate change and fire management, are the "significance factors." As discussed above, under the 1978 Regulations, whether a major federal action would "significantly" affect the human environment, and therefore necessitate a full NEPA review, depended on the project's "context" and "intensity."[169] In *Bark*, the Ninth Circuit examined these factors as they related to Crystal Clear, and agreed with the environmental petitioners that the controversy and uncertainty around whether USFS's proposed variable density thinning would be effective in fire control or if it might actually worsen fire severity meant

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163 Phila LaRue, *Trump Administration Launches Attack on Nation's First Environmental Law,* EARTHJUSTICE (Jan. 9, 2020), https://perma.cc/HH3C-LX4S.

164 *Id.*

165 *Bark*, 958 F.3d 865, 870 (9th Cir. 2020).

166 *Id.* at 871.

167 *Bark*, 393 F. Supp. 3d 1043, 1049 (D. Or. 2019) (noting that the Crystal Clear EA and FONSI were issued in 2018, prior to the 2020 Regulations).

168 *See generally* Audrey Bixler et al., *Administrative and Judicial Review of NEPA Decisions: Risk Factors and Risk Minimizing Strategies for the Forest Service* 1 (Ecosystem Workforce Program, Working Paper No. 66, 2016).

169 *See supra* Part III, notes 74–79 and accompanying text.

the project might significantly affect the environment, warranting an EIS.[170]

The trouble with the *Bark* holding is it sets out a procedural path by which USFS might simply issue an EIS that acknowledges Bark's conflicting evidence, explains why it was reasonable for the agency to rely on the evidence that it did to support its FONSI, and again clear the path for the project to move forward. Bark's ability to raise similar concerns in the future, and the courts' ability to review such concerns, is lessened by the NEPA regulations following the Trump administration's rollbacks: between the restrictions on public participation discussed above and the removal of the significance factors, it is hard to imagine how, under the 2020 Regulations, a court might be able to even reach concerns such as those raised in *Bark*.[171]

An environmental review that more thoroughly and substantively addresses the interactions, and acknowledges the uncertainty of those interactions, between climate change, fire behavior, and management is necessary to enhance long-term stability and resilience for both ecological and human communities. A reinstated version of the significance factors could help accomplish this by adding a minor modification to more directly implore agencies to consider the cyclical relationship between a federal action and climate change. For example, the fifth sub-factor under "intensity" could be modified as so: "The degree to which the possible effects on the human environment, *particularly in light of anticipated effects of climate change based on the best available science*, are highly uncertain or involve unique or unknown risks" (modification in italics).

*4. Retain Expanded Tribal Involvement and Consultation.*

There is perhaps one category of change to the NEPA regulations made in the 2020 rollback that should be incorporated into new regulations: enhanced cooperation and consultation with Tribes and Tribal governments. The 2020 Regulations, for example, require that the environmental consequences section of an EIS address "[p]ossible conflicts between the proposed action and the objectives of Federal, regional, State, *Tribal*, and local land use plans, policies and controls for the area concerned."[172] The 1978 Regulations, in contrast, only required that Tribal actions and objectives be considered "in the case of a reservation."[173] The 2020 Regulations also require agencies to send draft and final EISs to affected Tribal agencies and seek their comment,[174] whereas the 1978 Regulations only required these procedures be carried out in relation to "appropriate Federal, State, or local agenc[ies]."[175]

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170 *Bark*, 958 F.3d at 870.
171 *See* discussion *supra* Part III, notes 90–101 and accompanying text.
172 40 C.F.R. § 1502.16(a)(5) (2020) (emphasis added).
173 40 C.F.R. § 1502.16(c) (1979).
174 40 C.F.R. §§ 1502.20(a), 1503.1(a)(2)(i) (2020).
175 40 C.F.R. §§ 1502.19(a), 1503.1(a)(2)(i) (1979).

Unconditionally including Tribal actions and objectives in this regulation is particularly critical in fire management, where traditional knowledge of indigenous peoples and Tribes' goals and visions for their ancestral homelands and reservations should inform USFS decisions. More critically, however, as sovereign nations,[176] Tribes should be included in NEPA procedures to at least the same extent as states and local governments. Any update to the NEPA regulations must respect this sovereignty and address Tribal government involvement in the NEPA process consistent with Tribes' status as sovereign nations.

### *5. Conclusion*

NEPA can be a powerful tool for addressing the interrelated impacts of climate change, fire, and forest management. From 1978 until 2020, much of that power was enacted through the implementation of CEQ's NEPA regulations, particularly the cumulative and indirect impacts analyses, significance factors, and public participation. These components of the 1978 Regulations can likely be relatively easily reinstated through the rulemaking process, but the question remains whether it is wise to take this opportunity to more explicitly address climate change in renewed regulations. It can be argued that such efforts are unnecessary, as courts have held that NEPA's statutory mandates require agencies to consider climate change in their NEPA analyses.[177] But that same case law prompts the question, then why not go further? Why not more explicitly require agencies to consider climate change if such regulations are likely to be upheld by the courts, given NEPA's apparent statutory mandate to consider climate change? With more progressive leaders in CEQ and a presidential administration which has made clear its intentions to prioritize action on climate change,[178] it may be an ideal time to try for bold change. But if such changes were litigated, as they likely would be, and rose all the way to the Supreme Court, they may face significant hurdles from the majority conservative-leaning and

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176 *See generally* FELIX S. COHEN, HANDBOOK OF FEDERAL INDIAN LAW (1940) (providing a comprehensive history of Native rights and Indian Law).

177 *See, e.g.*, Border Power Plant Working Grp. v. U.S. Dep't of Energy, 260 F. Supp. 2d 997, 1016, 1033 (S.D. Cal. 2003) (holding that because carbon dioxide contributes to climate change, emissions from the construction of electric lines to connect new power plants in Mexico with California's electric grid have potential environmental impacts which the agency was obligated under NEPA to disclose and analyze); *see also, e.g.*, Wentz, *supra* note 134, at 10,223 (noting that even without guidance agencies have statutory "obligation[s] to consider whether climate change has implications for the environmental outcomes of proposed management actions when conducting environmental reviews for those actions").

178 Brook J. Detterman et al., *Biden Administration Rapidly Advances Climate Change Agenda*, NAT'L L. REV. (Feb. 17, 2021), https://perma.cc/Y49Q-DPYR; Sebastien Malo, *Biden's New CEQ Leadership Heavy on Climate Change, Enviro Justice Expertise*, THOMSON REUTERS (Feb. 9, 2021), https://perma.cc/VV5C-D4V2.

often anti-regulatory bench.[179] CEQ may therefore want to at least consider taking further action on climate through the NEPA regulations, but proceed cautiously given how NEPA and climate change have become such politicized issues and the current makeup of the Supreme Court.

### *C. Miscellaneous Additional Opportunities*

Forest and fire management in the face of climate change is a big, urgent issue that must be addressed from all viable angles. This section will discuss in brief several additional opportunities outside of the NEPA context.

#### *1. Forest Planning Under the National Forest Management Act*

The National Forest Management Act (NFMA)[180] is the only federal natural resource management statute that directly addresses climate change,[181] requiring USFS to analyze "the potential effects of global climate change on the condition of renewable resources on the forests and rangelands of the United States,"[182] "rural and urban forestry opportunities to mitigate the buildup of atmospheric carbon dioxide and reduce the risk of global climate change,"[183] and to "account for the effects of global climate change on forest and rangeland conditions, including potential effects on the geographic ranges of species, and on forest and rangeland products."[184] Undertaking a new rulemaking to update the National Forest System Land Management Planning Rule to better manage forests for climate resilience in a fire-conscious manner may therefore find success because of the explicit mandate to consider climate in the statute.[185] Commensurate with this mandate, the 2012 Planning Rule is fairly strong on climate, but there is likely room for improvement.[186]

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179 *See* Jennifer Hijazi & Nina H. Farah, *How a More Conservative Supreme Court Could Impact Environmental Laws*, SCI. AM. (Sept. 28, 2020), https://perma.cc/38MX-E9UQ ("There is a real risk that sweeping climate and environmental regulations under Biden . . . could be halted by a more conservative court, say experts—especially if a new administration broadly interprets regulatory powers.").

180 National Forest Management Act of 1976, 16 U.S.C. §§ 472a, 521b, 1600, 1611–1614 (2018) (amending Forest and Rangeland Renewable Resources Planning Act of 1974, Pub. L. No. 93-378, 88 Stat. 476 (1974)).

181 Wentz, *supra* note 134, at 10,221.

182 16 U.S.C. § 1601(a)(5).

183 *Id.* § 1601(a)(6).

184 *Id.* § 1602(5)(F).

185 36 C.F.R. §§ 219.1–219.19 (2020).

186 *Id.* §§ 219.6(b)(3), 219.8(a)(iv), 219.12(a)(5)(vi); *see also* National Forest System Land Management Planning, 77 Fed. Reg. 21,162, 21,176 (Apr. 9, 2012) (codified at 36 C.F.R. pt. 219) (describing USFS's response to the issue of climate change).

*2. A National Carbon Reserve System*

Forests, especially old growth forests, are critical carbon sinks, and the importance of their role as such will increase exponentially as the world experiences the ongoing impacts of climate change.[187] Action should be taken to protect in perpetuity a certain portion of national forests as carbon reserves. This could be accomplished in a few ways using legislation. For one, Congress could pursue legislation reminiscent of the Wilderness Act and set aside certain federal lands in a National Carbon Reserve System. Precisely what kinds of lands would qualify for the system should be determined by a team of policymakers, scientists, and other stakeholders, but they should likely prioritize old growth forests, as the carbon storage potential of large mature trees is significantly higher than smaller, younger trees.[188] Congress could also pass legislation or engage in rulemaking pursuant to the United States' international treaty commitments, specifically the Paris Climate Agreement, now that the United States has re-entered the Agreement.[189]

These may sound like very big asks, but now is as good a time as any. Not only has the United States re-entered the Paris Climate Agreement, signaling a renewed commitment to addressing global climate change, but in a recent Executive Order, President Biden committed to a goal of conserving thirty percent of United States lands and waters by 2030.[190] With climate-friendly Democrats controlling the White House and both houses of Congress,[191] it is possible that in this moment we are in a narrow window with more opportunity to pass progressive and effective climate legislation and/or rulemaking than we may ever find again before it is too late. But there would be significant challenges. Reserving enough forest to actually be effective in carbon sequestration quickly enough for its full benefits to be realized will likely be politically challenging in the

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187 *See* Rebecca K. Smith, *Our National Forests as Carbon Sinks: A Timely and Appropriate Change in Management Emphasis*, PUB. LAND & RESOURCES L. REV., 2008, at 183, 184 (noting that "recent scientific studies estimate that North America stores 60 percent of global terrestrial carbon, and that 65 to 91 percent of this carbon storage is in forests, urban trees, and wood products").

188 The largest 1% of trees in an old growth forest contain about half of the carbon stored by the forest. J. Maloof & V. Goold, *Recent Findings on Carbon Storage in Old-Growth Forests*, OLD-GROWTH FOREST NETWORK (2020), https://perma.cc/MUF2-KT3J.

189 A national carbon reserve system could, for example, serve as one of the United States' nationally determined contributions under the Paris Agreement. *See* Conference of the Parties, *U.N. Framework Convention on Climate Change*, U.N. Doc. FCCC/CP/2015/10 /Add.1, at 4 (Jan. 29, 2016) (instructing the parties to the Agreement "to communicate to the secretariat their intended nationally determined contributions towards achieving the objective of the [U.N. Framework Convention on Climate Change]"); Press Release, Antony J. Blinken, Sec'y of State, U.S. Dep't of State, the United States Officially Rejoins the Paris Agreement (Feb. 19, 2021).

190 Tackling the Climate Crisis at Home and Abroad, Exec. Order No. 14008, 86 Fed. Reg. 7,619, 7,627 (Feb. 1, 2021).

191 Katherine Gypson, *With Control of White House and Congress, Democrats Have 2 Years to Make Big Changes*, VOA NEWS (Jan. 22, 2021), https://perma.cc/9WXN-LHC8.

areas where reserves would likely need to be established: rural communities centered around the timber industry. It is also possible that timber production would just shift to be more intensive on other non-reserve lands. Some of these potential consequences could be preempted in the legislation or rulemaking itself, such as providing for a just transition or other economic benefits for affected timber workers or implementing anti-leakage measures to avoid the intensification of logging on nearby lands. Increased fire frequency and severity would also present a challenge to designing effective carbon reserves, as discussed above in the context of mitigation.[192] As previously discussed, however, even a burned forest only very slowly emits its stored carbon to the atmosphere.[193] Furthermore, the earliest established carbon reserves should likely be positioned in moist old growth forests with ample large trees for greater carbon storage. These forests, such as the Tongass National Forest in Alaska, do not tend to experience frequent fires, so they are somewhat less likely to be lost as reserves to wildfire.[194]

*3. Public Communications*

Fire has a public relations problem. When most people hear about a wildfire, their minds jump to all kinds of horrible outcomes. They "perceive[] fire as both bad and preventable and expect[] quick results in controlling fires," and understand suppression to be the only solution.[195] More widespread education on the ecological benefits of fire, and how embracing allowing certain fires to burn could better protect our communities and our planet at large could help to rehabilitate wildfire's public image, in turn helping to build support for more progressive, and less suppressive, fire policy and management.

*4. Additional Funding for Fire Planning and Management at State and Local Levels*

Fire planning to protect human communities should increasingly shift to efforts more specifically focused on serving the needs of the community itself to be prepared, adaptive, and resilient in the face of wildfire. These efforts can include individual actions such as home hardening, fire awareness and preparedness education, and purchasing fire insurance, but perhaps more important are state and local measures such as creating fire breaks, zoning to limit development in the WUI, or imposing additional taxes on development in the WUI.[196] At least in

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192 *See* discussion *supra* Part IV.A.4.

193 *See supra* Part IV.A.4, notes 132–133 and accompanying text.

194 Kristin Zouhar, *Fire Regimes in Alaskan Pacific Maritime Ecosystems*, FIRE EFFECTS INFO. SYS. (2017), https://perma.cc/UGX3-L9W5.

195 Stephens et al., *supra* note 9, at 6.

196 *See generally* Jeremy Martin, *Active Forest Mismanagement and the "New Normal": Advocating for an Integrative Wildfire Management Policy*, 46 OHIO N. U. L. REV. 137, 152–

theory, these and other measures to "protect[] homes, especially those within the WUI, [are] the responsibility of the state and local governments."[197] In practice, most of the fire-fighting responsibility has fallen on the federal government, "result[ing] in incentives that are completely misaligned," with "the people who bear the risks of living in fire-prone areas" being more insulated from the costs.[198] Shifting funding toward state and local agencies would not only help re-align the incentives to build smarter, or not at all, in the WUI,[199] but would also result in fire management more closely tailored to the community's needs.

## V. CONCLUSION

The future portrait of climate change, wildfires, forests, and their many complicated interrelationships is unclear and uncertain. At this point, it is difficult, if not impossible, to pinpoint discrete, clear solutions beyond that something needs to change if humans, wildlife, and the newly developing fire regime of climate chaos are to coexist with any semblance of peace. One thing that the human environment must come to terms with is "that wildland fires are going to occur on the landscape, likely more frequently than they have in the past."[200] The question to ask is therefore "not whether wildfire events will occur, but whether we are prepared for them."[201] We will not have a world without fire, nor should we, but we can have "a world where wildfires are largely controlled within historic levels, thus reducing the risk to our communities and vital natural resources."[202] Much of the policy and management that will facilitate our shift to that world will come from the actions of forest management agencies, particularly USFS. The policies described in this Chapter can help support and guide these agencies in getting us there.

55 (2020) (detailing various solutions for greater wildfire resilience and management on a community level, with an emphasis on restoration rather than suppression).

197 Barton, *supra* note 8, at 712.

198 *Id.*

199 *Id.*

200 Toman, *supra* note 4, at 96.

201 Keiter II, *supra* note 3, at 107.

202 *Id.* at 108.