Climate Liability for Wildfire Emissions from Federal Forests

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The current wildfire crisis in the western United States shows no sign of abating. Repeated policy failures manifest in an enduring, multi-decade commitment to fire suppression combined with massive development in the wildland-urban interface and accelerating climate change have created the conditions for ever larger, more intense, and destructive wildfires. Many of these fires are happening on federal public lands, raising important questions about the federal government's approach to wildfires and its responsibility for the harms that they cause. While there is no easy fix to the crisis and while westerners will need to get used to living with more fire, more smoke, and more damage and destruction, there is widespread agreement that any long-term solution will require substantial and sustained investments in forest restoration and resilience, especially on federal public lands. To date, however, long-term funding for forest restoration and resilience has been lacking. This Symposium Article focuses on the issue of wildfire emissions from federal forests and the challenges that wildfire emissions, and forests generally, pose for climate policy. It starts from the observation that forests and land use may well turn out to be the hardest and most important part of the climate crisis, as illustrated by the increasing frequency of novel extreme wildfire events in the western United States and around the world. This Article argues that the mainstream climate policy approach to forests and land use, which views them as near-term mitigation opportunities that are relatively fast, easy, and cheap, needs to be reevaluated. Rather than looking for ways to leverage forests and land use as part of climate policy, this Article argues that we should be looking for ways to leverage climate policy to protect and restore forests and to enhance their resilience in the face of accelerating climate disruption. To that end, the Article proposes a new climate liability and funding mechanism that could facilitate

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longer-term investments in forest restoration and resilience. The proposal has three key elements: (1) a strict liability regime for all greenhouse gas emissions from unintentional fires on federal public lands; (2) a requirement that the federal government pay the social cost of carbon for these emissions; and (3) a special fund that would receive these payments and be dedicated to forest restoration, with a requirement that the funds be spent on actual on-the-ground restoration work.

INTRODUCTION

Anyone who lives in the western United States knows that our forests are burning. The 2020 fire season was the worst on record across multiple western states.[1] In California, previous records were shattered when more than four million acres burned—roughly 4 percent of the state's total land area.[2] In Colorado, 2020 saw the three largest fires in the state's history.[3] In Oregon, more than one million acres burned, roughly double the previous ten-year average.[4] During the worst of the fires, air quality in some western cities was literally off

1. For the United States as a whole, the 2020 fire season was the second worst since 1960 in terms of acreage burned, slightly below the 2015 fire season. All five of the worst fire seasons since 1960 have occurred since 2006 and the top three have all occurred since 2017. *See* CONG. RSCH. SERV., IF10244, WILDFIRE STATISTICS 1 fig.2 (2021), https://fas.org/sgp/crs/misc/IF10244.pdf. Since 2000, an annual average of seven million acres has burned in the United States, more than double the average annual acreage burned in the 1990s. *Id.* at 1.

2. *See 2020 Incident Archive*, CAL FIRE, https://www.fire.ca.gov/incidents/2020/ (last visited Jan. 28, 2022). The previous records were 1.98 million acres burned in 2018 and 1.59 million acres in 2008. CAL FIRE, CALIFORNIA WILDFIRES AND ACRES FOR ALL JURISDICTIONS (2020), https://www.fire.ca.gov/media/11397/fires-acres-all-agencies-thru-2018.pdf.

3. *See* Chase Woodruff, *Colorado Wildfires Latest Updates on the 2021 Fire Season*, COLO. NEWSLINE (June 17, 2021, 5:27 PM), https://coloradonewsline.com/2021/06/17/colorado-wildfires-latest-updates-on-the-2021-fire-season/ ("The three largest wildfires in Colorado history all occurred in 2020, and the state's 20 biggest fires on record have all occurred in the past 20 years."); *see also* Philip E. Huigera et al., *Rocky Mountain Subalpine Forests Now Burning More Than Any Time in Recent Millennia*, PROC. NAT'L ACAD. SCIS., June 22, 2021, at 1, 3 (finding that climate change is making subalpine forests in the Rocky Mountains more flammable now than at any time in the past 2,000 years).

4. *See* Zach Urness, *Oregon's 2020 Wildfire Season Brought a New Level of Destruction*, STATESMAN J. (May 6, 2021, 5:32 PM), https://www.statesmanjournal.com/story/news/2020/10/30/climate-change-oregon-wildfires-2020/6056170002/.

the charts, worse than Beijing, Delhi, and other notoriously polluted cities, leading to emergency orders that closed schools and workplaces and advised people to stay indoors.[5] Images from Portland, San Francisco, Seattle, and Los Angeles showed air so choked with smoke that the sun was barely visible.[6] Thousands of homes were destroyed across the region and dozens of people lost their lives.[7]

As climate change accelerates, fire seasons across the western United States are lasting longer, larger areas are burning, fires are getting bigger and burning hotter, more homes are being destroyed, and the air quality effects of wildfire smoke are more pervasive and persistent.[8] And this is happening not only across the western United States but around the world.[9] In Australia, fires in late 2019 and early 2020 burned an astonishing 21 percent of the country's temperate broadleaf and mixed forests, roughly ten times the typical area burned in these forests.[10] In Russia, unprecedented wildfires in Siberia burned some 65 million acres, which is about the size of the state of Colorado.[11] And in Brazil, despite a

5. *See, e.g.*, Aimee Green, *Portland's Air Quality Was the Worst of Major Cities in the World Friday, Due to Oregon and Washington Wildfires,* THE OREGONIAN (Sept. 11, 2020, 8:57 PM), https://www.oregonlive.com/news/2020/09/portland-now-has-the-worst-air-quality-in-the-world-due-to-oregon-and-washington-wildfires.html; *see also* Marshall Burke et al., *The Changing Risk and Burden of Wildfire in the United States*, PROC. NAT'L ACAD. SCIS., Jan. 12, 2021, at 1, 3 ("Our results show that the contribution of wildfire smoke to $PM_{2.5}$ [fine particulate matter] concentrations in the US has grown substantially since the mid 2000s, and in recent years has accounted for up to half of the overall $PM_{2.5}$ exposure in western regions as compared to <20% a decade ago.").

6. *See* Vivian Ho, *West Coast Cities Face the World's Worst Air Quality as Wildfires Rage*, THE GUARDIAN (Sept. 14, 2020, 4:37 PM), https://www.theguardian.com/world/2020/sep/14/west-coast-air-quality-wildfires-oregon-california-washington.

7. *See 2020 North American Wildfire Season*, CTR. FOR DISASTER PHILANTHROPY (Dec. 7, 2020), https://disasterphilanthropy.org/disaster/2020-california-wildfires/ (compiling statistics on fatalities and structures destroyed by 2020 wildfires in California, Colorado, and Oregon).

8. Tania Schoennagel et al., *Adapt to More Wildfire in Western North American Forests as Climate Changes*, 114 PROC. NAT'L ACAD. SCIS. 4582, 4582 (2017); A. Park Williams et al., *Observed Impacts of Anthropogenic Climate Change on Wildfire in California*, 7 EARTH'S FUTURE 892, 892 (2019) ("In the western United States, annual area burned increased substantially in recent decades due to increased frequency and size of large wildfires. It is well established that this observed increase in wildfire activity was promoted in many areas by reduced fuel moisture due to warming-induced increases in evaporative demand, reduced snowpack, and reduced warm-season precipitation frequency. These recent climate trends are broadly consistent with those expected from anthropogenic climate change." (internal citations omitted)).

9. *See, e.g.,* UNITED NATIONS ENVIRONMENT PROGRAMME, SPREADING LIKE WILDFIRE: THE RISING THREAT OF EXTRAORDINARY LANDSCAPE FIRES 26-27 (2022) (documenting increased frequency and distribution of wildfires around the world).

10. Matthias M. Boer et al., Correspondence, *Unprecedented Burn Area of Australian Mega Forest Fires*, 10 NATURE CLIMATE CHANGE 171, 171 (2020) (estimating that the 2019/20 forest fires burned a globally unprecedented 21 percent of the Australian temperate broadleaf and mixed forest biome roughly ten times the typical amount (less than 2 percent) even in extreme fire seasons).

11. Susan G. Conard & Evgenii Ponomarev, *Fire in the North The 2020 Siberian Fire Season*, INT'L ASS'N OF WILDLAND FIRE (Nov. 2020), https://www.iawfonline.org/article/fire-in-the-north-the-2020-siberian-fire-season/ (estimating total burned area, including forest and all types of non-forest fires in Siberia, from the beginning of the fire season in March through the end of September 2020, at twenty-six million hectares (sixty-five million acres)). The state of Colorado is 66.6 million acres. *Land & Water*, COLO. PARKS & WILDLIFE, https://cpw.state.co.us/aboutus/Pages/LandWater.aspx#:~:text

global outcry about forest fires during 2019, the 2020 fire season was worse, with some fires burning inside moist tropical forests, rather than on the edges of disturbed forests.[12] Indeed, an astonishing one-third of the huge tropical forest wetland ecosystem that drains the southern Amazon, the Pantanal, burned in 2020.[13] We are, it seems, living in a world where megafires have become the new normal.[14]

While the specific causes of these megafires vary across regions, a growing body of evidence points to climate change as a major contributing factor.[15] In the western United States, ongoing drought, together with warmer temperatures, has conspired with a history of poor forest management and repeated policy failures to substantially increase the frequency and destructiveness of large

=Colorado's%2066%20million%20acres%20of,than%2036%2C000%20ranches%20and%20farms (last visited Jan. 28, 2022).

12. *See* Manuela Andreoni et al., *With Amazon Rain Forest Ablaze, Brazil Faces Global Backlash*, N.Y. TIMES (Aug 24, 2019), https://www.nytimes.com/2019/08/22/world/americas/brazil-amazon-fires-bolsonaro html; *Fires Raged in the Amazon Again in 2020*, NASA EARTH OBSERVATORY, https://earthobservatory.nasa.gov/images/147946/fires-raged-in-the-amazon-again-in-2020 (last visited Jan. 28, 2022) (finding that the 2020 fire season was actually more severe than the previous year); *see also* Aline Pontes-Lopes et al., *Drought-Driven Wildfire Impacts on Structure and Dynamics in a Wet Central Amazonian Forest*, PROC. ROYAL SOC'Y B, May 26, 2021, at 1, 1–2 (finding that extreme drought is driving more wildfire activity in wet regions of the Amazon).

13. *See Fires Raged in the Amazon Again in 2020*, *supra* note 12 (finding that 28 percent of the Pantanal burned in 2020); Emiliano Rodríguez Mega, *Apocalyptic' Fires Are Ravaging a Rare Tropical Wetland*, 586 NATURE 20, 20–21 (2020).

14. The U.S. Forest Service has defined megafires as fires that burn more than 100,000 acres. *See Megafire Infographics*, U.S. FOREST SERV.: PAC. NW. RSCH. STATION, https://www.fs.usda.gov/pnw/page/megafire-infographics (last visited Jan. 28, 2022). Others have argued that the focus should be on impacts in addition to areal extent. *See, e.g.*, JERRY WILLIAMS ET AL., FOOD & AGRIC. ORG., FINDINGS AND IMPLICATIONS FROM A COARSE-SCALE GLOBAL ASSESSMENT OF RECENT SELECTED MEGA-FIRES 2 (2011), https://www.fao.org/forestry/32063-0613ebe395f6ff02fdecd13b7749f39ea.pdf ("Mega-fires are often extraordinary for their size, but they are more accurately defined by their impacts. Their complexity and their deep, long-lasting social, economic, and environmental consequences make them a serious situation, rather than, simply, a larger incident. Mega-fires are not always a single wildfire, but sometimes a grouping or 'complex' of inter-acting multiple fires across a large geographic area. The costs, losses, and damages that come with them seem limited only by the depth of drought, the amount and extent of available fuel, and the extremes of weather."); Scott L. Stephens et al., *Temperate and Boreal Forest Mega-Fires Characteristics and Challenges*, 12 FRONTIERS ECOLOGY & ENV'T 115, 115 (2014) ("Although often defined according to their size, mega-fires are more accurately characterized according to their impacts on human society."). *See also Are "Megafires" the New Normal?*, U.N. ENV'T PROGRAM (Jan. 10, 2020), https://www.unep.org/news-and-stories/story/are-megafires-new-normal; MICHAEL KODAS, MEGAFIRE: THE RACE TO EXTINGUISH A DEADLY EPIDEMIC OF FLAME (2017); STEPHEN J. PYNE, THE PYROCENE: HOW WE CREATED AN AGE OF FIRE, AND WHAT HAPPENS NEXT (2021).

15. *See generally* Andrea Duane et al., *Towards a Comprehensive Look at Global Drivers of Novel Extreme Wildfire Events*, 165 CLIMATIC CHANGE 43 (2021)*; see also* Williams et al., *supra* note 8.

fires.[16] In 2021, to take the most recent example, drought across much of the West, combined with record-setting heat, fueled yet another epic fire season.[17]

With fires raging across the region, their impacts, whether measured in lives lost, property destroyed, or dangerous air pollution, have continued to fall disproportionately on low-income communities and communities of color, raising important questions of environmental justice.[18] Residents of these communities have less capacity to escape fire and fewer resources to repair their lives in the wake of fire.[19] Local, regional, and national air quality impacts associated with wildfires, including most importantly increased fine particulate pollution, compound the harms that these communities already endure because of structural inequality and environmental racism.[20] Any comprehensive

16. *See, e.g.*, George Busenberg, *Wildfire Management in the United States The Evolution of a Policy Failure*, 21 REV. POL'Y RSCH. 145, 145 (2004) ("The wildfire crisis in America was created by a longstanding policy failure."); *id.* at 148 ("In sum, the wildfire suppression policy has created a major policy problem in the form of a massive fuel-load that now feeds severe wildfires."); Schoennagel et al., *supra* note 8, at 4583 (discussing three important changes underlying the wildfire problem: a warming and drying climate, the increase in fuels, and growth and development in the wildland-urban interface); Philip E. Higuera & John T. Abatzoglou, Letter to the Editor, *Record-Setting Climate Enabled the Extraordinary 2020 Fire Season in the Western United States*, 27 GLOB. CHANGE BIOLOGY 1, 1–2 (2021); John T. Abatzoglou & A. Park Williams, *Impact of Anthropogenic Climate Change on Wildfire Across Western US Forests*, 113 PROC. NAT'L ACAD. SCIS. 11,770, 11,770 (2016).

17. Across the West, state governments scrambled throughout the first half of 2021 to respond to another extreme fire season, adding money and manpower to the fight. In California, Governor Newsom's proposed 2021–2022 budget (as revised) allocates more than $750 million toward wildfire and forest resilience, with the vast majority going to the California Department of Forestry and Fire Protection. *See* BUDGET SUMMARY MAY REVISION 2021-22, at 123 (2021), http://www.ebudget.ca.gov/2021-22/pdf/Revised/BudgetSummary/FullBudgetSummary.pdf. In a special wildfire funding session in June 2021, the Arizona Legislature created a new $100 million fund for fighting wildfires. *See* Bob Christie, *Arizona Legislature Passes $100M Fire Funding Plan*, U.S. NEWS & WORLD REP. (June 17, 2021), https://www.usnews.com/news/best-states/arizona/articles/2021-06-16/arizona-lawmakers-advance-100m-fire-fund-in-special-session. At a June 2021 meeting of the Western Governors Association, President Biden also promised to temporarily increase the pay for federal wildland fire fighters in anticipation of the coming fire reason. *See* Felicia Sonmez et al., *Biden Pledges Better Pay for Firefighters as He Hosts Virtual Meeting of Western Governors*, WASH. POST (June 30, 2021, 6:04 PM), https://www.washingtonpost.com/politics/2021/06/30/joe-biden-live-updates/.

18. *See, e.g.*, Shahir Masri et al., *Disproportionate Impacts of Wildfires Among Elderly and Low-Income Communities in California from 2000–2020*, INT'L J. ENV'T RSCH. & PUB. HEALTH, Apr. 8, 2021, at 1, 1–2; Michael Méndez et al., *The (In)visible Victims of Disaster Understanding the Vulnerability of Undocumented Latino/a and Indigenous Immigrants*, 116 GEOFORUM 50 (2020).

19. *See* Timothy W. Collins, *Households, Forests, and Fire Hazard Vulnerability in the American West A Case Study of a California Community*, 6 GLOB. ENV'T CHANGE PART B: ENV'T HAZARDS 23, 26, 33–35 (2005); Timothy W. Collins, *The Political Ecology of Hazard Vulnerability Marginalization, Facilitation and the Production of Differential Risk to Urban Wildfires in Arizona's White Mountains*, 15 J. POL. ECOLOGY 21, 26–27 (2008); Kathy Lynn & Wendy Gerlitz, *Mapping the Relationship Between Wildfire and Poverty*, 41 ROCKY MOUNTAIN RSCH. STATION PROC. 401, 406 (2006), https://www.fs.fed.us/rm/pubs/rmrs_p041/rmrs_p041_401_415.pdf.

20. Jia Coco Liu et al., *Who Among the Elderly Is Most Vulnerable to Exposure to and Health Risks of Fine Particulate Matter from Wildfire Smoke?*, 186 AM. J. EPIDEMIOLOGY 730, 732 (2017).

approach to wildfires will need to find ways to center these environmental justice concerns.[21]

These burning forests are also creating huge challenges for climate policy. According to the California Air Resources Board, the 2020 fires in California emitted more than 112 million metric tons of CO_2 which is slightly more than 25 percent of the 2020 greenhouse gas (GHG) emission target for the entire state.[22] This figure is also almost double the emissions from the state's electric power sector in 2018 and about two-thirds of the 2018 emissions from the state's transportation sector.[23] California's progress on climate action, not to mention its air quality and overall livability, is directly threatened by these forest fires.

Forest fires and deforestation generally are also major sources of global GHG emissions, contributing some 16 billion metric tons of CO_2 emissions on a gross basis and around 6 billion metric tons on a net basis (after accounting for CO_2 removals from forest growth).[24] On a net basis, deforestation and land use change accounted for around 15 percent of global CO_2 emissions in 2020.[25] This is roughly equivalent to total GHG emissions from the United States.[26] Much of this is happening in the tropics, pushing some forests such as the Amazon toward dangerous tipping points.[27] But, as the numbers above indicate, fires are increasingly threatening the vast temperate and boreal forests of the Northern

21. Mark D.O. Adams & Susan Charnley, *The Environmental Justice Implications of Managing Hazardous Fuels on Federal Forest Lands*, 110 ANNALS AM. ASS'N GEOGRAPHERS 1907, 1931 (2020) (finding that environmental justice concerns did not figure prominently in U.S. Forest Service activities aimed at hazardous fuels reduction).

22. *See* CAL. AIR RES. BD., PUBLIC COMMENT DRAFT: GREENHOUSE GAS EMISSIONS OF CONTEMPORARY WILDFIRE, PRESCRIBED FIRE, AND FOREST MANAGEMENT ACTIVITIES 9 (Dec. 2020) (providing ARB staff's preliminary draft estimate of 2020 wildfire emissions of 112 million metric tons of CO_2); *GHG 1990 Emissions Level & 2020 Limit*, CAL. AIR RES. BD., https://ww2.arb.ca.gov/ghg-2020-limit (last visited Jan. 28, 2022) (indicating 2020 target of 431 million metric tons, which does not include land-based emissions). There are ongoing questions about the reliability of the underlying models used to estimate wildfire emissions. *See, e.g.*, Jeffrey E. Stenzel et al., *Fixing a Snag in Carbon Emissions Estimates from Wildfires*, 25 GLOB. CHANGE BIOLOGY 3985 (2019) (finding that regional emissions estimates substantially overestimate emissions from wildfires).

23. *See California Greenhouse Gas Emissions for 2000 to 2019*, CAL. AIR RES. BD., https://ww2.arb.ca.gov/sites/default/files/classic/cc/ca_ghg_inventory_trends_2000-2019.pdf (last visited Jan. 28, 2022). 2019 is the latest year for which the California Air Resources Board is reporting data under its GHG inventory.

24. *See* Global Carbon Project, Global Carbon Budget 2020: Summary Highlights, https://web.archive.org/web/20201211073409/https://www.globalcarbonproject.org/carbonbudget/20/highlights.htm.

25. *Id*.

26. *See Inventory of U.S. Greenhouse Gas Emissions and Sinks*, EPA, https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks (last updated Oct. 26, 2021).

27. *See* Thomas E. Lovejoy & Carlos Nobre, *Amazon Tipping Point*, SCI. ADVANCES, Feb. 21, 2018, at 1, 1 ("We believe that negative synergies between deforestation, climate change, and widespread use of fire indicate a tipping point for the Amazon system to flip to non-forest ecosystems in eastern, southern and central Amazonia at 20-25% deforestation."); Ignacio Amigo, *The Amazon's Fragile Future*, 578 NATURE 505, 505 (2020).

Hemisphere, in some cases turning what were once significant carbon sinks into new sources of emissions.[28]

And yet, within the climate policy community, there remains a strange disconnect regarding the role of forests and land use in reducing GHG emissions. For much of the last three decades, forests and land use have typically been framed as near-term mitigation opportunities that are relatively fast, easy, and cheap[29] and that are largely subordinate to the more important challenge of reducing emissions from fossil fuel burning.[30] The current version of this framing uses the broad terms "nature-based solutions" or "natural climate solutions" and has suggested that forests could provide up to 30 percent of the global GHG mitigation effort needed to achieve the targets of the Paris Agreement.[31]

This Article takes issue with that framing and argues that the climate implications of forests and land use need to be approached on their own terms and are far more serious than the mainstream climate policy community seems to recognize. By viewing climate change as primarily an energy problem, we have failed to recognize the vital importance of protecting and maintaining intact forests and other ecosystems as perhaps the most difficult long-term component of the climate change challenge.

The Article investigates these issues through the case of federal forests in the western United States and proposes a new liability and funding regime tied to GHG emissions from wildfires on federal public lands. While the issue of wildfire on federal public lands hardly exhausts the fire problem in the western United States and while any effective approach to managing the problem must embrace a regional approach that builds on and enhances coordination among the various government entities and other actors involved in forestland management, there are good reasons to focus on federal forests. Many of the wildland fires burning across the western United States are burning on federal lands and much of the forestland in the region that is vulnerable to fires is owned by the federal government. During the 2020 fire season, for example, 70 percent of the acres burned in the western United States were on federal public lands.[32]

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28. *See* Nancy L. Harris et al., *Global Maps of Twenty-First Century Forest Carbon Fluxes*, 11 NATURE CLIMATE CHANGE 234, 237 (2021) (showing that for certain forested areas in the Northern Hemisphere, particularly the west coast of North America, gross forest GHG emissions exceed gross forest GHG removals); V. Alaric Sample, *Introduction Forest Conservation and Management in the Anthropocene*, *in* FOREST CONSERVATION IN THE ANTHROPOCENE: SCIENCE, POLICY, AND PRACTICE 3, 10 (V. Alaric Sample et al. eds., 2016) (noting that U.S. forests are declining in their ability to serve as a carbon sink and could become net sources of emissions before 2050).

29. See Part I, *infra*.

30. *Id.*

31. *See, e.g.*, Bronson W. Griscom et al., *Natural Climate Solutions*, 114 PROC. NAT'L ACAD. SCIS. 11,645, 11,645–46 (2017).

32. *See* CONG. RSCH. SERV., *supra* note 1. In California, around 60 percent of forestland is federally owned. *Forest Research and Outreach California Forests*, UNIVERSITY OF CALIFORNIA AGRICULTURE AND NATURAL RESOURCES, https://ucanr.edu/sites/forestry/California_forests/ (last visited Feb. 28,

Managing the forest fire problem in the western United States thus requires substantial engagement with federal public lands and, specifically, federal forest and wildfire policy. To be sure, this has been a topic of discussion for years, but, to date, long-term solutions have eluded policymakers, and the problem seems to be getting worse as climate change accelerates.

Two structural features of federal forest and wildfire policy stand out when considering any reform effort. First, substantial coordination challenges both within the federal government and among federal, state, tribal, and private entities have made fire management and control difficult.[33] Needless to say, forest fires do not respect legal boundaries; without a regional approach that coordinates among all relevant actors, the fire problem cannot be effectively managed.[34] Second, the United States Forest Service budget for combatting wildfires has been strained for decades.[35] This has resulted in an extensive practice of "fire borrowing," whereby the Forest Service has been forced to take money away from other valuable activities to support emergency forest fire responses.[36] In effect, the Forest Service has operated for decades in triage mode when it comes to wildland fire, inhibiting its ability to make the longer-term investments in restoration and resilience needed to manage the fire problem more effectively.

Efforts to improve wildfire policy coordination have made some progress over the last twenty years.[37] The Forest Service and the Department of the

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2022). In other western states, the percentage is even higher. CONG. RSCH. SERV., IF12001, U.S. FOREST OWNERSHIP AND MANAGEMENT 1 fig.2 (2021), https://sgp.fas.org/crs/misc/IF12001.pdf.

33. Robert B. Keiter, *The Law of Fire Reshaping Public Land Policy in an Era of Ecology and Litigation*, 36 ENV'T L. 301, 358 (2006) ("Because wildfires do not respect jurisdictional boundaries, both federal and state law are germane to fire management policy. Basic federalism principles apply, creating a pastiche of laws and policies governing wildfire on the public lands.").

34. *Id.*; *see also* Karen Bradshaw Schulz & Dean Lueck, *Contracting for Control of Landscape-Level Resources*, 100 IOWA L. REV. 2507, 2529 (2015) ("Wildfire can extend across public and private parcels, with complementary or competing land uses. Firescapes are ephemeral and uncertain in nature; their outbreak and spread cannot be determined *ex ante.*"). For a more general discussion on collaboration and organizational conflict in the context of wildfire management, see generally Casey J. Fleming et al., *Conflict and Collaboration in Wildfire Management The Role of Mission Alignment*, 75 PUB. ADMIN. REV. 445 (2015).

35. *See* Courtney Schultz et al., *Forest Service Fire Management and the Elusiveness of Change*, 15 FIRE ECOLOGY 1, 3 (2019) ("[T]he amount of money spent on fighting wildfire on national forests, both in absolute terms and as a proportion of the US Forest Service's budget, has increased dramatically since 2000. As of 2017, wildfire management accounted for about 60% of annual appropriations for the agency, leaving less money for everything else—perhaps most notably the restoration work that is designed to support more resilient and fire-adapted landscapes that would reduce the need for fire suppression in the future" (internal citations omitted)); Keiter, *supra* note 33, at 376 ("Federal fire management has become an extraordinarily expensive matter laden with controversial fiscal and political overtones").

36. *See* Part II *infra*; *see also* Karen M. Bradshaw, *Backfired! Distorted Incentives in Wildfire Suppression Techniques*, 31 UTAH ENV'T L. REV. 155, 158–59 (2011) (arguing that the availability of fire borrowing has created misaligned incentives for the Forest Service with respect to fire management).

37. *See* Part II *infra*; *see also* Keiter, *supra* note 33, at 303–04 (noting that "the law of fire on the public domain is an uncoordinated and fragmented welter of organic statutory provisions, environmental protection mandates, annual budget riders, site-specific legislation, judicial decisions, policy documents,

Interior have both worked to move away from the single-minded focus on fire suppression that dominated wildfire policy for much of the post-World War II period by incorporating wildfire planning into their forest and land management plans.[38] Regional planning efforts have taken hold in important fire-prone regions such as the Sierra Nevada and the interior Columbia River basin.[39] Congress has also adopted site-specific legislation to advance wildfire management and post-fire rehabilitation efforts.[40] And, in 2003, Congress enacted the Healthy Forests Restoration Act, which one scholar described as "the first serious congressional effort to articulate a federal fire policy for the public lands."[41] This was followed by the Federal Land Assistance, Management, and Enhancement Act of 2009 (the FLAME Act), which passed as part of an appropriations bill and, among other things, mandated the development of a National Cohesive Wildland Fire Management Strategy to comprehensively address wildland fire management across all lands in the United States.[42] In 2014, after several years of intergovernmental planning and extensive stakeholder processes, the Forest Service and the Department of the Interior released the final strategy, which focuses on restoring and maintaining landscapes to promote resilience, creating fire-adapted communities, and promoting effective wildfire responses.[43]

In 2018, Congress also stepped up with a new approach to wildfire funding designed to end the practice of fire borrowing. Specifically, the 2018 omnibus appropriations bill established a special disaster fund, known as the Wildfire Suppression Operations Reserve Fund, that makes more than $2 billion available annually for fire control starting in 2020 and lasting through 2028, outside of the normal Forest Service budget.[44]

While these are welcome developments, none of them deals directly with the more fundamental challenge of restoring western forests and making them more resilient in the face of climate change. Indeed, experts have long pointed to the critical importance of significant and sustained investments in forest

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management plans, and diverse state statutory prohibitions") and 310–12 (observing that, nevertheless, "state and local governments [are] more directly [engaged] in federal fire policy" than before); Karen Bradshaw, *Agency Engagement with Stakeholder Collaborations, in Wildfire Policy and Beyond*, 51 ARIZ. STATE L.J. 437 (2019).

38. *See generally* Keiter, *supra* note 33 (detailing shift in wildfire policy and planning by Forest Service and Department of the Interior).

39. *See id.* at 329–30 (discussing regional planning efforts).

40. *Id.* at 331–32 (discussing site-specific legislation).

41. *Id.* at 344.

42. *See* FLAME Act of 2009, Pub. L. No. 111-88, 123 Stat. 2968.

43. *See* U.S. DEP'T OF THE INTERIOR & U.S. DEP'T OF AGRIC., THE NATIONAL STRATEGY: THE FINAL PHASE OF THE DEVELOPMENT OF THE NATIONAL WILDLAND FIRE MANAGEMENT STRATEGY 1 (2014), https://www.forestsandrangelands.gov/documents/strategy/strategy/CSPhaseIIINationalStrategyApr2014.pdf.

44. *See* Consolidated Appropriations Act, 2018, Pub. L. No. 115-141, Div. O, §§ 102–104, 132 Stat. 348, 1059–61.

restoration as the foundation for healthier forests.[45] Because this kind of work is expensive and labor intensive, requiring substantial on-the-ground activities across millions of acres, and because it can often involve more extensive use of prescribed burning, the political will to create and sustain such an effort has been lacking.[46]

The recent bipartisan infrastructure legislation does include new resources for wildfire management and forest restoration.[47] But even with these additional resources, and any other funding that might become available in future legislation, there is still a need for long-term, sustained funding. As the Chief of the Forest Service recently testified before Congress, the Forest Service needs to treat two to four times as many acres annually as it is currently treating, at a cost of roughly $1,000 per acre.[48]

This Article proposes a new liability and funding mechanism that could facilitate such longer-term investments in forest restoration and resilience. The proposal has three key elements: (1) a strict liability regime for all GHG emissions from unintentional fires on federal public lands; (2) a requirement that the federal government pay the social cost of carbon for these emissions (currently set at $51 per metric ton of CO_2);[49] and (3) a special fund that would

45. *See* Scott L. Stephens et al., *U.S. Federal Fire and Forest Policy Emphasizing Resilience in Dry Forests*, 7 ECOSPHERE 1, 7 (2016) (arguing that forest restoration should be the "umbrella goal" for federal forest management); Tong Wu et al., *Investing in Natural Capital Using Economic Incentives to Overcome Barriers to Forest Restoration*, 19 RESTORATION ECOLOGY 441, 441 (2011) (discussing "widely acknowledged need to restore regional forest resilience" in response to increase in severe forest fires "that compromise ecological health"); William Wallace Covington, *Helping Western Forests Heal*, 408 NATURE 135, 135 (2000) ("Ecological restoration offers a practical approach for developing scientifically and ethically sound fuel-reduction treatments which not only treat wildfire symptoms, but also attack the underlying causes of ecosystem health decline.").

46. *See* Keiter, *supra* note 33, at 376 ("Congress is now faced with funding a massive forest restoration and fuel reduction campaign that extends across approximately 190 million acres of unhealthy federal lands. The question is how to pay for these extensive forest restoration initiatives, given the immediacy and duration of the required effort.").

47. *See* Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, §§ 40803–40808, 135 Stat. 429, 1097–116 (2021) (providing for wildfire risk reduction and various forest restoration activities), President Biden's proposed Build Back Better Act also included substantial additional funding for forest restoration. As of early 2022, however, that legislation had been abandoned for lack of votes. *See, e.g.*, Build Back Better Act, H.R. 5376, 117th Cong. §§ 11001—11003 (2021).

48. *See Hearing on the President's Budget Request for the U.S. Forest Service for Fiscal Year 2022 Before the S. Comm. on Energy & Nat. Res.*, 117th Cong., at 27:49 (2021) (statement of Victoria Christiansen, Chief, U.S. Forest Service) [hereinafter Christiansen Testimony] ("We treat about three million acres each year on our national forest system land, and we need to do two to four times more than that. We have a scale mismatch. There's a billion burnable acres in this nation across all land ownerships, and fire is a natural part, a necessary part in many ecosystems, but we have too much fuel on the landscape – continuous fuel on the landscape that is causing these catastrophic severe wildfires. So two to four times more treatment over the next 10 years, we can significantly change the trajectory back into a resilient balance of the most critical fire sheds particularly in the west."); *see also id.* at 38:20 (affirming the figure of $1000 per acre for restoration efforts).

49. This value is for 2020 and reflects a 3 percent discount rate. *See* INTERAGENCY WORKING GRP. ON SOC. COST OF GREENHOUSE GASES, U.S. GOV'T, TECHNICAL SUPPORT DOCUMENT: SOCIAL COST OF CARBON, METHANE, AND NITROUS OXIDE: INTERIM ESTIMATES UNDER EXECUTIVE ORDER 13990, at 5

receive these payments and be dedicated to forest restoration, with a requirement that all funds be spent on actual on-the-ground restoration work.

The political attractions of the proposal are several. First, it would be simple to administer. Strict liability avoids any question of fault.[50] The monitoring and verification requirements for quantifying wildfire emissions can be agreed upon *ex ante* with no need to engage in the precise quantification required for offsetting emissions against carbon removals from forest regrowth and regeneration.[51] Second, the proposal ties funding for restoration directly to the climate harms caused by wildfire emissions in a manner that is easy to understand, using the government's own estimate of the social cost of carbon. Third, the creation of a dedicated fund to support restoration work would insulate this effort from the broader politics surrounding agency budgets and annual appropriations. Fourth, the requirement that funding be used to support long-term restoration work would create significant numbers of jobs. Moreover, because much of this work would need to take place outside of the normal fire season, it would complement the seasonality of wildfire response work, thus providing the potential for more stable, longer-term (and better-paid) work for wildland forest work.[52] These jobs might also be folded into recent proposals for a Civilian Climate Corps.[53]

There are also precedents for various aspects of this proposal. Imposing liability on federal forests for environmental harms is consistent with the standard practice of subjecting federal facilities to liability under federal environmental laws.[54] The use of special, dedicated funds to support specific activities has a long history in the public lands context and has continued up until the present.[55] And, of course, federal support for significant public works

tbl.ES-1 (2021), https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf.

50. *See, e.g.*, W. PAGE KEETON ET AL., PROSSER AND KEETON ON TORTS 534 (5th ed. 1984) ("'Strict liability,' . . . as that term is commonly used by modern courts, means liability that is imposed on an actor apart from either (1) an intent to interfere with a legally protected interest without a legal justification for doing so, or (2) a breach of a duty to exercise reasonable care, i.e., actionable negligence. This is often referred to as liability without fault.").

51. The U.S. forest carbon accounting framework used to establish an inventory of forest carbon sources and sinks focuses on multiple above- and below-ground carbon pools to quantify changes in forest carbon stocks over time. This approach could be used to quantify wildfire CO_2 emissions, but other simpler approaches could be used as well. The key point is that because the wildfire emissions under this proposed scheme would not be offset against removals, the same level of precision and complexity would not be required. For a discussion of the U.S. approach to forest carbon accounting, see generally CHRISTOPHER W. WOODALL ET AL., U.S. FOREST SERV., GEN. TECH. REP. NRS-154, THE U.S. FOREST CARBON ACCOUNTING FRAMEWORK: STOCKS AND STOCK CHANGE, 1990-2016 (2015), https://www.fs.fed.us/nrs/pubs/gtr/gtr_nrs154.pdf.

52. The issue of pay and working conditions for the seasonal wildland fire fighters has been a topic of concern for many years. On June 30, 2021, President Biden announced that the federal government would temporarily increase pay to $15 per hour for the current fire season. *See* Sonmez et al., *supra* note 17.

53. *See, e.g.*, Civilian Climate Corps for Jobs and Justice Act, S. 1244, 117th Cong. (2021).

54. *See infra* Subpart III A.

55. *See infra* Subpart III.C.

programs to restore forests and degraded lands goes back to the New Deal and the Civilian Conservation Corps.[56]

The Article proceeds as follows. Part I provides some context on forests and climate policy, both in the United States and globally. It argues that the mainstream approach to forests and land use within climate policy has failed to appreciate the overall importance of forests and land use as a component of the climate crisis and the distinctive challenges they entail. Part II discusses the policy and funding challenges that have stifled the development of a long-term, restoration-focused approach to the problem of wildland fire on federal lands. Part III then elaborates on the proposal to establish a strict liability regime for GHG emissions from unintentional fires as the basis for a funding mechanism to support forest restoration.

I. FORESTS AND CLIMATE POLICY

For much of the last thirty years, forests and land use have been seen as modest parts of the climate change challenge. Because of the large relative contribution that the combustion of fossil hydrocarbons makes to global CO_2 emissions, climate change mitigation is typically framed as an energy problem.[57] Given the momentum in the global energy system, and the committed emissions embodied in the trillions of dollars of fixed capital that make up that system, initiating and accelerating the clean energy transition has thus been viewed as the priority when it comes to fighting climate change.[58]

But by privileging the energy sector, the climate policy community has diminished the relative importance of forests and land use, discounting the many valuable climate and non-climate benefits that come from protecting forests and ignoring the fact that when intact forests are destroyed, they are lost for a generation or more.[59] Such a view also fails to recognize that reducing emissions from deforestation and land use is in many ways harder than reducing emissions from the energy sector.[60] And it misses the fact that the politics around forests

56. *See generally* NEIL M. MAHER, NATURE'S NEW DEAL: THE CIVILIAN CONSERVATION CORPS AND THE ROOTS OF THE AMERICAN ENVIRONMENTAL MOVEMENT (2008).

57. *See generally* Pierre Friedlingstein et al., *Global Carbon Budget 2020*, 12 EARTH SYS. SCI. DATA 3269 (2020).

58. *See* William Boyd, *Public Utility and the Low-Carbon Future*, 61 UCLA L. REV. 1614, 1623–26 (2014) (discussing concepts of energy system momentum and committed emissions).

59. *See* James E. M. Watson et al., *The Exceptional Value of Intact Forest Ecosystems*, 2 NATURE ECOLOGY & EVOLUTION 599, 599 (2018) (observing that "intact forests are indispensable not only for addressing rapid anthropogenic climate change, but also for confronting the planet's biodiversity crisis, providing critical ecosystem services and supporting the maintenance of human health."); Holly P. Jones & Oswald J. Schmitz, *Rapid Recovery of Damaged Ecosystems*, PLOS ONE, May 2009, at 1, 3 (observing based on meta-analysis of 240 independent studies that average recovery time for forest ecosystems after anthropogenic perturbations was 42 years).

60. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE AND LAND: AN IPCC SPECIAL REPORT ON CLIMATE CHANGE, DESERTIFICATION, LAND DEGRADATION, SUSTAINABLE LAND MANAGEMENT, FOOD SECURITY, AND GREENHOUSE GAS FLUXES IN TERRESTRIAL ECOSYSTEMS 30 (2019) ("The land and food sectors face particular challenges of institutional

and land use are often more intense and more difficult than those around energy.[61] Finally, and perhaps most importantly, it has resulted in a critical shortage of funding to protect forests. For 2017 and 2018, which are the most recent years with good data, an average of about three percent of global climate finance went to agriculture, forestry, land use, and natural resources management.[62]

This general lack of appreciation for the importance and difficulty of forests and land use as a component of the climate change challenge has, paradoxically, been compounded by some of the messaging from the forest advocacy community. By emphasizing that forests can be a near-term mitigation opportunity because reducing emissions from deforestation is fast, easy, and cheap, as one early report put it, advocates have reinforced the impression that this is the easier part of the climate change challenge.[63] Forest protection and restoration, in this view, provide a "land bridge" to the main event: reducing emissions from the energy sector.[64]

In fact, just the opposite is true. Although progress in decarbonizing the power sector is not moving fast enough, enormous strides have been made over the last several decades. Innovations and cost reductions in renewable power generation, storage, electric vehicles, and energy efficiency are all scaling (faster than expected in some cases).[65] And the very fact that they can scale—and reinforce each other—is what makes them different from forests and land use. As we decarbonize the power sector and start to electrify transportation and other sectors of the economy, we can actually see an end game of dramatically reduced carbon emissions associated with the global energy system.[66]

With forests and land use, it is much harder to see the pathway to substantial reductions. Similar economies of scale do not appear to hold in the forest and

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fragmentation and often suffer from a lack of engagement between stakeholders at different scales and narrowly focused policy objectives . . . .").

61. *See* Rebecca Froese & Janpeter Schilling, *The Nexus of Climate Change, Land Use, and Conflicts*, 5 CURRENT CLIMATE CHANGE REPS. 24, 24 (2019) ("Climate change and resource scarcity are increasingly perceived as multipliers of risks and threats that exacerbate existing societal problems such as poverty, injustice, social insecurity, violence, terrorism, or civil war. As one of the most abundant, but also most contested resources, land and land use are subject to a variety of conflicts worldwide." (internal citation omitted)).

62. *See* Rob Macquarie et al., CLIMATE POL'Y INITIATIVE, UPDATED VIEW ON THE GLOBAL LANDSCAPE OF CLIMATE FINANCE 2019, at 25 tbl.A.2 (2020), https://www.climatepolicyinitiative.org/wp-content/uploads/2020/12/Updated-View-on-the-2019-Global-Landscape-of-Climate-Finance-1.pdf.

63. *See, e.g.*, THE ELIASCH REV., CLIMATE CHANGE: FINANCING GLOBAL FORESTS (2008), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/228833/9780108507632.pdf.

64. *See* RICHARD A. HOUGHTON ET AL., WOODS HOLE RSCH. CTR., FORESTS AND LAND USE: UNDERVALUED ASSETS FOR GLOBAL CLIMATE STABILIZATION (2017).

65. *See, e.g.*, Jonathan Coignard et al., *Clean Vehicles as an Enabler for a Clean Electricity Grid*, 13 ENV'T RSCH. LETTERS 1, 1 (2018) (discussing synergistic opportunities emerging from the interaction of renewable electricity, storage, and electric vehicles in California).

66. *See, e.g.*, RYAN WISER ET AL., HALFWAY TO ZERO: PROGRESS TOWARDS A CARBON-FREE POWER SECTOR (2021), https://eta-publications.lbl.gov/sites/default/files/halfway_to_zero_report.pdf.

land use sectors. Too often, forests and land use are subject to a zero-sum logic, driven by competing demands for food, fiber, and raw materials; bioenergy; carbon sequestration; and all of the environmental services that come with healthy intact forests and terrestrial ecosystems.[67] The impacts of climate disruption on land and forests make this even harder. While the recent Intergovernmental Panel on Climate Change Reports on 1.5 Degrees and on Climate Change and Land both recognize these challenges, such recognition has not translated into widespread action on the part of the climate policy community.[68]

To be fair, recent years have witnessed growing enthusiasm for the idea that forests can play a vital role in a broader portfolio of "natural climate solutions," with some analysts suggesting that forests and land use could help achieve a third or more of the emissions reductions needed by 2030 to keep global warming below two degrees Celsius.[69] But here too, there is a tendency to slip back into an assumption that forests are the easier part of the climate challenge. One recent report, for example, has referred to forests as the "forgotten solution" to climate change, emphasizing that these "natural climate solutions are affordable, scalable and available right now."[70] And for more than a decade, various consultants and other high-level policy reports have suggested that avoided deforestation and reforestation are relatively cheap GHG abatement options when compared to replacement of fossil-based energy systems with new technologies.[71]

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67. *See* Daniel C. Nepstad et al., *Responding to Climate Change and the Global Land Crisis REDD+, Market Transformation and Low-Emissions Rural Development*, PHIL. TRANSACTIONS ROYAL SOC'Y B, June 5, 2013, at 1, 1–2 (2013) (discussing competing demands for land-based production (food, feed, fuel, and fiber) and conservation in the context of accelerating climate disruptions).

68. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, GLOBAL WARMING OF 1.5 C: AN IPCC SPECIAL REPORT ON THE IMPACTS OF GLOBAL WARMING OF 1.5 C ABOVE PRE-INDUSTRIAL LEVELS AND RELATED GLOBAL GREENHOUSE GAS EMISSION PATHWAYS, IN THE CONTEXT OF STRENGTHENING THE GLOBAL RESPONSE TO THE THREAT OF CLIMATE CHANGE, SUSTAINABLE DEVELOPMENT, AND EFFORTS TO ERADICATE POVERTY 462 (Valérie Masson-Delmotte et al. eds., 2018) ("Emerging evidence indicates that future mitigation efforts that would be required to reach stringent climate targets, particularly those associated with carbon dioxide removal (CDR) (e.g., afforestation and reforestation and bioenergy with carbon capture and storage; BECCS), may also impose significant constraints upon poor and vulnerable communities [ ] via increased food prices and competition for arable land, land appropriation and dispossession with disproportionate negative impacts upon rural poor and indigenous populations." (internal citation omitted)); INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 60, at 79 (discussing connections between land use and climate change and noting that reliance on large-scale land-based mitigation is expected to increase in the absence of substantial, rapid emissions reductions, which could further exacerbate competition for land, increase food insecurity, and undermine sustainable development goals).

69. *See* Griscom et al., *supra* note 31, at 11,645 (noting that forests and land use could provide up to a third or more of emissions reduction needed by 2030 to keep warming below two degrees Celsius); Nathalie Seddon et al., *Global Recognition of the Importance of Nature-Based Solutions to the Impacts of Climate Change*, GLOB. SUSTAINABILITY, May 12, 2020, at 1, 5 (reporting that 66 percent of Paris Agreement signatories include nature-based solutions in their NDCs).

70. *See* THE FORGOTTEN SOLUTION, https://www.theforgottensolution.org/ (last visited Jan. 30, 2022).

71. *See* MCKINSEY & CO., IMPACT OF THE FINANCIAL CRISIS ON CARBON ECONOMICS: VERSION 2.1 OF THE GLOBAL GREENHOUSE GAS ABATEMENT COST CURVE (2010); *see also* Fabian Kesicki & Paul

This idea of natural climate solutions, with forests playing a key role, has long been central to the U.S. approach to climate policy.[72] Like other forested countries (Canada, Japan, Russia), the United States has consistently relied on the prospect of a substantial net forest carbon sink to offset emissions from other sectors and to support its international climate commitments.[73] President Biden's recent commitment to reduce total U.S. emissions 50 percent below 2005 levels by 2030, for example, targets significant carbon removals from interventions to enhance sequestration in forests and agriculture.[74]

Various studies and expert reports have supported substantial reliance on forests as a means of achieving GHG mitigation targets. One recent study found a maximum mitigation potential from natural climate solutions in the United States in 2025 of roughly 1.2 billion metric tons of CO_2 per year or about 21 percent of U.S. emissions in 2016.[75] The vast majority of this potential came from carbon sequestration in forests.[76] The National Academy of Sciences has similarly estimated that the United States can store an additional 500 million metric tons of carbon dioxide per year—or about 9 percent of the nation's annual GHG emissions—through a mix of carbon-enhancing practices on croplands, grasslands, and forests.[77]

Ekins, *Marginal Abatement Cost Curves A Call for Caution*, 12 CLIMATE POL'Y 219 (2012) (discussing serious problems and risks with using marginal abatement cost curves to choose policies for reducing emissions from deforestation).

72. *See* THE WHITE HOUSE, UNITED STATES MIDCENTURY STRATEGY FOR DEEP DECARBONIZATION 68–86 (2016), https://unfccc.int/files/focus/long-term_strategies/application/pdf/mid_century_strategy_report-final_red.pdf (discussing role of forests and land use in meeting U.S. climate targets and relying upon substantial growth in the land sink as a basis for achieving mid-century targets).

73. *Id.*; *see also* Nicklas Forsell et al., *Assessing the INDCs' Land Use, Land Use Change, and Forest Emission Projection*s, 11 CARBON BALANCE & MGMT. 26, 3, 7, 11 (2016) (reviewing how countries consider anticipated emission removals from land use, land use change, and forest policies per their Paris Agreement commitments); Giacomo Grassi et al., *The Key Role of Forests in Meeting Climate Targets Requires Science for Credible Mitigation*, 7 NATURE CLIMATE CHANGE 220, 224 (2017) ("Russia . . . gives prominence to the contribution of the current forest sink to climate mitigation.").

74. U.S. GOV'T, NATIONALLY DETERMINED CONTRIBUTION: REDUCING GREENHOUSE GASES IN THE UNITED STATES: A 2030 EMISSIONS TARGET 5 (2021), https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/United%20States%20of%20America%20First/United%20States%20NDC%20April%2021%202021%20Final.pdf (identifying forests and land use as critical component of NDC). President Biden's Executive Order 14008 also sets ambitious reforestation and land conservation for GHG reduction. *See* Tackling the Climate Crisis at Home and Abroad, Exec. Order No. 14,008, §§ 214–216, 86 Fed. Reg. 7619, 7626–27 (Jan. 27, 2021). This includes an aggressive plan to conserve 30 percent of land and water by 2030. *Id.* § 216.

75. *See, e.g.*, Joseph E. Fargione et al., *Natural Climate Solutions for the United States*, SCI. ADVANCES, Nov. 14, 2018, at 1, 2.

76. *Id.*

77. NAT'L ACADS. OF SCIS., ENG'G, & MED., NEGATIVE EMISSIONS TECHNOLOGIES AND RELIABLE SEQUESTRATION: A RESEARCH AGENDA 354 (2019); *see also* James Mulligan et al., CarbonShot: Federal Policy Options for Carbon Removal in the United States (Jan. 2020) 8 (Working Paper) (estimating that tree restoration and agricultural soil carbon management can remove between 280–560 $MtCO_2$ per year), www.wri.org/publication/carbonshotfederal-policyoptions-for-carbon-removal-in-the-united-states; Hannah Ritchie and Max Roser, *United States CO_2 Country Profile*, OUR WORLD IN DATA, https://ourworldindata.org/co2/country/united-states (showing the United States annual CO_2 emissions).

These assessments build upon longstanding efforts to integrate forests and land use into carbon accounting frameworks that seek to quantify land-based emissions and removals as part of a comprehensive approach to GHG inventories.[78] For more than twenty years, the Intergovernmental Panel on Climate Change, together with various scientific organizations and national governments, has sought to develop standard accounting rules for Agriculture, Forestry, and Other Land Use or what is sometimes known as AFOLU.[79] Much of this has been driven by the desire to create new forest carbon assets that can be traded in emerging carbon markets or used as the basis for pay-for-performance schemes that provide financial compensation for avoided carbon emissions and enhanced removals of carbon.[80]

But the effort to integrate forests and land use into carbon accounting schemes that make them fungible with emissions reductions in the energy sector has proven to be immensely complicated and politically fraught. Within these schemes, the biological vulnerability of forests (and the forest carbon that they contain) has been the basis for ongoing questions about the environmental integrity of forest carbon offset credits.[81] This has led to detailed rules and requirements that seek to ensure permanence, additionality, and protection from leakage.[82] The complexity of these rules, together with the broader bias in climate policy toward reductions in energy and industrial sectors, has in turn led to seemingly endless battles over whether the emissions reductions and removals from forest projects should be eligible to offset emissions in the energy sector.[83]

There is a paradox here: the singular focus on the mitigation potential of forests and the effort to use forest carbon to offset emissions in energy and industry has diverted attention from the difficulty of protecting and restoring forests and undermined the political salience of the forest issue on its own terms. Indeed, the longstanding view of forests as a relatively cheap and easy mitigation

78. *See* William Boyd, *Ways of Seeing in Environmental Law How Deforestation Became an Object of Climate Governance*, 37 ECOLOGY L.Q. 843, 891–98 (2010) (discussing efforts to integrate forest carbon into broader carbon accounting schemes); *see also* WOODALL ET AL., *supra* note 51, at 2 (summarizing the history of forest carbon monitoring in the United States since the 1990s).

79. *See generally* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, GOOD PRACTICE GUIDANCE FOR LAND USE, LAND-USE CHANGE AND FORESTRY (Jim Penman et al. eds., 2003), https://www.ipcc.ch/site/assets/uploads/2018/03/GPG_LULUCF_FULLEN.pdf; 4 TASK FORCE ON NAT'L GREENHOUSE GAS INVENTORIES, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, AGRICULTURE, FORESTRY AND OTHER LAND USE (E. Calvo Buendia et al. eds., 2019), https://www.ipcc-nggip.iges.or.jp/public/2019rf/vol4.html.

80. *See* Boyd, *supra* note 78.

81. *Id.*; *see also* Evan Halper, *Burned Trees And Billions In Cash How A California Climate Program Lets Companies Keep Polluting*, L.A. TIMES (Sept. 8, 2021, 4:00 AM) (criticizing use of forest carbon offsets in California cap-and-trade program).

82. *See, e.g.*, *U.S. Forest Projects – June 25, 2015*, CAL. AIR RES. BD., https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program/compliance-offset-protocols/us-forest-projects/2015 (last visited Jan. 30, 2022).

83. *See, e.g.*, Lisa Song & James Temple, *The Climate Solution Actually Adding Millions of Tons of CO2 into the Atmosphere*, PROPUBLICA (Apr. 29, 2021, 5:00 AM), https://www.propublica.org/article/the-climate-solution-actually-adding-millions-of-tons-of-co2-into-the-atmosphere.

opportunity and the growing enthusiasm for natural climate solutions are belied by the fact that forests around the world are in crisis and increasingly vulnerable in the face of climate change. Recent analyses, for example, indicate that the forest carbon sink in the United States could decline in coming decades and that many western forests may be transitioning from emissions sink to emissions source as drought, disease, and fire take their toll.[84] This is especially true in California.[85]

Fire is, of course, the most obvious and immediate example of the increased threat to forests, but there are many other factors driving global forest destruction. In fact, the global forest crisis is part of a larger global land crisis threatening intact ecosystems as well as agricultural and food systems around the world.[86] Viewing forests and land use in this context suggests a need to recalibrate their potential for "solving" the climate change challenge. Rather than looking for ways to leverage forests and land use as part of climate policy, we should be looking for ways to leverage climate policy to protect, restore, and enhance the resilience of forests in the face of accelerating climate disruption. Put another way, instead of viewing forests through the zero-sum logic of offsets for energy sector emissions or as a complementary set of natural climate solutions, climate policy should prioritize efforts to protect and enhance intact forests and other critical ecosystems.[87] Such an effort would not only preserve

84. *See* Sample, *supra* note 28, at 10 (noting that the ability of U.S. forests to serve as the nation's largest terrestrial carbon sink is declining and that these forests could become a net source of emissions by midcentury); Bailu Zhao et al., *North American Boreal Forests Are a Large Carbon Source Due to Wildfires from 1986 to 2016*, 11 SCI. REPS. 7723 (2021); Zoeann Murphy & Chris Mooney, *Gone in a Generation Across America, Climate Change Is Already Disrupting Lives*, WASH. POST (Sept. 26, 2019), https://www.washingtonpost.com/graphics/2019/national/gone-in-a-generation/forest-climate-change.html#forest (reporting that forests in four western states have flipped to become carbon emitters in recent years).

85. California is working to include land and forests in a more robust way in its current revision to the Scoping Plan. *Natural and Working Lands Alternative Scenarios 2022 Scoping Plan* Update, Cal. Air. Res. Bd. 3 (Feb. 28, 2022), https://ww2.arb.ca.gov/sites/default/files/2022-02/Revised-NWL-2022SP-Scenario-Assumptions-28Feb.pdf. The Scoping Plan, which is mandated under AB 32, details the various activities that California will undertake to achieve its GHG mitigation targets. *Id.* at 1. The Scoping Plan must be updated at least every five years. *Id.* The current update will be completed in 2022. *See AB 32 Climate Change Scoping Plan*, CAL. AIR. RES. BD., https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan (last visited Jan. 30, 2022).

86. *See, e.g.*, Nepstad et al., *supra* note 67; INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 60, at 481.

87. *See, e.g.*, Watson et al., *supra* note 59, at 599 ("[I]ntact forests are indispensable not only for addressing rapid anthropogenic climate change, but also for confronting the planet's biodiversity crisis, providing critical ecosystem services and supporting the maintenance of human health."); Nathalie Seddon et al., *Grounding Nature-Based Climate Solutions in Sound Biodiversity Science*, 9 NATURE CLIMATE CHANGE 82, 87 (2019) ("[R]estoring and protecting nature really isn't just about storing carbon and slowing warming, it's also about cost-effective protection of ecosystems to help shield us from floods, droughts, landslides, storms, heatwaves, fire and other disasters increasingly common under climate change."). The mainstream climate policy framing of forests as a source of offsetting removals for energy sector emissions is in part an artifact of the influence of the modeling community on climate policy and the embrace of net zero emissions as a goal. *See* James Dyke et al., *Climate Scientists Concept of Net Zero Is a Dangerous Trap*, CONVERSATION (Apr. 22, 2021, 12:25 AM), https://theconversation.com/

the many ecological and biodiversity benefits that come with intact forests, but would also align with and reinforce efforts to secure and protect land rights for indigenous and local communities that live within and depend upon forests.

II. FEDERAL WILDFIRE POLICY AND THE RESTORATION CHALLENGE

"The budget," wrote German fiscal sociologist Rudolf Goldscheid, "is the skeleton of the state stripped of all misleading ideologies."[88] Viewed as a collection of "hard, naked facts," a government's actual budget reveals its true preferences.[89] In the case of wildland fire policy, budgets have historically been dominated by short-term attention to fire suppression rather than long-term investments needed to make forests more resilient. Notwithstanding perennial calls for reform of forest and wildland fire policy, the facts demonstrate very clearly that fire suppression continues to be a priority.[90]

A few figures to illustrate: in 1995, the Forest Service spent 16 percent of its budget on wildfires; by 2018 that percentage had grown to 57 percent and there was a substantial shift in staffing from non-fire to fire programs.[91] At the same time, the total area burned by wildfires has continued its upward trend.[92]

The roots of this problem date back to the early twentieth century. In 1908 Congress established a new funding provision that enabled the Forest Service to

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climate-scientists-concept-of-net-zero-is-a-dangerous-trap-157368 (tracing the history of net zero concept under the influence of the modeling community and its implications for both energy and forests).

88. Quoted in Joseph A. Schumpeter, *The Crisis of the Tax State in* JOSEPH A. SCHUMPETER: THE ECONOMICS AND SOCIOLOGY OF CAPITALISM 100 (R. Swedberg ed., 1991).

89. *Id*. These words are Schumpeter's gloss on Goldscheid.

90. *See* Susan J. Prichard et al., *Adapting Western North American Forests to Climate Change and Wildfires 10 Common Questions*, ECOLOGICAL APPLICATIONS, Dec. 2021, at 1, 21 ("Despite calls to restore fire as a cultural and ecological process (e.g., The U.S. National Wildland Fire Cohesive Strategy), the dominant approach to wildfire management continues to be aggressive suppression."); Schoennagel et al., *supra* note 9, at 4583 ("Our key message is that wildfire policy and management require a new paradigm that hinges on the critical need to adapt to inevitably more fire in the West in the coming decades."); *see also* Christiansen Testimony, *supra* note 48, at 18:11 (discussing need for a paradigm shift in the Forest Service approach to restoration); Keiter, *supra* note 33, at 304 ("The simple truth is that the law does not comprehensively address fire policy on the public lands, even though fire management may now claim more agency attention and resources than any other single matter.").

91. *See* National Environmental Policy Act (NEPA) Compliance, 84 Fed. Reg. 27,544, 27,544 (June 13, 2019) (to be codified at 36 C.F.R. pt. 220) ("In 1995, wildland fire management funding made up 16 percent of the Forest Service's annual spending, compared to 57 percent in 2018. Along with a shift in funding, there has also been a corresponding shift in staff from non-fire to fire programs, with a 39 percent reduction in all non-fire personnel since 1995.").

92. *See* CONG. RSCH. SERV., *supra* note 1, at 1 (noting that the average annual acreage burned since 2000 has been more than double the average for the 1990s and that the top five years with largest wildfire acreage burned since 1960 have all been since 2006, with the top 3 since 2017); *see also* Scott L. Stephens, *Forest Fire Causes and Extent on United States Forest Service Lands*, 14 INT'L J. WILDLAND FIRE 213, 220–21 (2005) ("Even with a large infrastructure dedicated to fire suppression, the majority of western forests managed by the USFS have experienced a significant increase in relative area burned from 1940 to 2000. A long-term commitment from the US Administration, Congress, Governors, land management agencies, and the public, is required to begin to reduce hazards and decrease the annual area burned by uncharacteristically severe wildfire.").

transfer funds to support emergency responses to forest fires.[93] This created a "fiscal tool" that allowed the agency to allocate funds to wildfire suppression at levels that "far exceeded its annual appropriations for that purpose."[94] In effect, the new tool gave the Forest Service the flexibility to spend aggressively on wildfire suppression, by "borrowing" from other programs, with the expectation that it would then be reimbursed via supplemental appropriations.[95] This practice, known as "fire borrowing," allowed the Forest Service to pursue fire suppression on a national scale.[96]

As the imperatives of wildfire suppression have grown, particularly in recent decades as more development has spread into the wildland-urban interface, the Forest Service has engaged in more extensive fire borrowing.[97] The logic is obvious. Due to the unpredictable and exigent nature of fire control activities, the Forest Service and the Department of the Interior need flexibility to transfer money out of other accounts if the appropriated funds available for wildfire suppression are insufficient.[98]

In theory, Forest Service and Department of Interior budgets should be unaffected by the process of fire borrowing as long as Congress provides supplemental funds to cover the amount transferred. And in years when borrowing has been necessary, Congress has typically provided supplemental appropriations to cover the transferred funds.[99] Sometimes these funds have been provided in subsequent fiscal years and sometimes they have been provided outside of discretionary budget limits.[100]

But in reality, the practice has created problems. Both the Forest Service and the Government Accountability Office have claimed that fire borrowing disrupts the Forest Service's non-fire operations, delays important activities, and

93. *See* Act of May 23, 1908, ch. 192, 35 Stat. 251, 259 (codified as amended at 16 U.S.C. § 556d) (stipulating that any money appropriated to the Forest Service could be used for fire suppression during emergencies); *see also* Busenberg, *supra* note 16, at 149.

94. Busenberg, *supra* note 16, at 149.

95. *Id.* ("This provision gave the Forest Service the budgetary flexibility it needed to pursue aggressive wildfire suppression throughout the nation, even when wildland firefighting costs exceeded the limits of its conventional budget."); *see also* STEPHEN J. PYNE, FIRE IN AMERICA: A CULTURAL HISTORY OF WILDLAND AND RURAL FIRE 263 (1997) (noting that the 1908 legislation allowed for "deficit spending in the event of forest fire emergencies" and reimbursement through supplemental appropriations).

96. *See* KATIE HOOVER, CONG. RSCH. SERV., R46583, FEDERAL WILDFIRE MANAGEMENT: TEN-YEAR FUNDING TRENDS AND ISSUES (FY2011–FY2020), at 6, 19 (2020).

97. *See* Volker C. Radeloff et al., *Rapid Growth of the US Wildland-Urban Interface Raises Wildfire Risk*, 115 PROC. NAT'L ACAD. SCIS. 3314, 3314–15 (2018) (documenting growth of wildland urban interface and attendant wildfire risks in the United States); Schultz et al., *supra* note 35, at 2–3 (discussing ongoing fire management challenges facing Forest Service, continued emphasis on fire suppression, and budget implications of fire borrowing).

98. The Forest Service and Department of Interior are authorized to transfer those funds once their suppression appropriations are exhausted. *See* HOOVER, *supra* note 96, at 3–12 (2020) (providing overview of wildfire suppression funding arrangements for Forest Service and Department of the Interior).

99. *See id.* at 6, 19.

100. *Id.* at 19.

undermines its ability to discharge its statutory obligations.[101] According to the Forest Service, borrowing from other program accounts—even when the borrowed amount is repaid in subsequent appropriations—creates uncertainty about the availability of funds and affects program implementation.[102]

In addition to the problems created by fire borrowing, the Forest Service has also had to reallocate a growing portion of its budget to wildfire suppression and management as the fire problem worsens. By 2018, close to 60 percent of the agency's budget was dedicated to wildfire suppression and management—more than three times the percentage twenty-five years earlier.[103] Given these "hard naked facts," it is not an exaggeration to say that the Forest Service has long operated primarily as a fire control agency.[104] The great irony, of course, is that the strong preference for fire exclusion and suppression reflected in these budget priorities has made the fire problem even worse.[105]

The problem has become particularly acute in recent years, as wildfire suppression costs have consistently outpaced appropriations from Congress.[106]

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101. *Id.*

102. *See The Federal Government's Role in Wildfire Management, the Impact of Fires on Communities, and Potential Improvements to Be Made in Fire Operations Hearing Before the S. Comm. On Energy & Nat. Res.*, 114th Cong. 16, 20 (2015) (statement of Thomas Tidwell, Chief, U.S. Forest Service). Sustained congressional concern with fire borrowing emerged in the early 2000s. *See, e.g.*, 149 CONG. REC. 15,709 (2003) (statement of Sen. Jesse Francis Bingaman, Jr.) ("Every year, the Forest Service borrows funds from other accounts to pay for firefighting. It is clear that this practice substantially contributes to project delays and cancellations."); *see also* V. Alaric Sample & Christopher Topik, *Forest Conservation in the Anthropocene Policy Recommendations*, *in* FOREST CONSERVATION IN THE ANTHROPOCENE: SCIENCE, POLICY, AND PRACTICE, *supra* note 28, at 235, 243 ("Fire borrowing severely impacts even the most basic level of resource management planning, reducing non-fire-related agency personnel, and undermining efforts to retain skilled contractors in local communities to carry out land management and stewardship activities.").

103. *See* National Environmental Policy Act (NEPA) Compliance*,* 84 Fed. Reg. 27,544, 27,544 (June 13, 2019) (to be codified at 36 C.F.R. pt. 220).

104. *See* PYNE, *supra* note 95, at 260 ("The problem of fire oppressed and preoccupied the Forest Service from its beginnings. . . . Fire loomed so large in the normal experience of forest rangers, became so much a part of organizational folklore, and so readily identified the Forest Service mission to the public mind that it was never far out of administrative sight. What a forester at a 1941 conference stated may well be projected over the course of Forest Service history. 'We have been so industrious in our crusade against fire,' he lamented, 'that the public generally recognizes us as a fire organization rather than a forest organization.'").

105. *See* Busenberg, *supra* note 16, at 152 ("It is now generally accepted that the wildfire problem cannot be solved through more aggressive firefighting."); Schoennagel et al., *supra* note 8, at 4586 ("Continued aggressive fire suppression is counterproductive to building adaptive resilience to increasing wildfire in the long term."); Stephens, *supra* note 92, at 213 ("The very policy of fire exclusion that had been adopted decades earlier was actually producing forests with high fire hazards."); M. P. North et al., *Reform Forest Fire Management Agency Incentives Undermine Policy Effectiveness*, 349 SCIENCE 1280, 1280 (2015) ("Suppression generally begets larger, more intense wildfires, which in turn intensifies agencies' suppression response.").

106. *See, e.g.,* KATIE HOOVER & BRUCE R. LINDSAY, CONG. RSCH. SERV. R44966, WILDFIRE SUPPRESSION SPENDING: BACKGROUND, ISSUES, AND LEGISLATION in the 115th Congress 2 (2017) ("Overall appropriations to FS [Forest Service] and DOI [Department of Interior] for wildland fire management have increased considerably since the 1990s. A significant portion of that increase is related to rising suppression costs, even during years of relatively mild wildfire activity, although the costs vary annually and are difficult to predict in advance. FS and DOI have frequently required more suppression

Since the early 2000s, the Forest Service and the Department of the Interior have relied increasingly on diverted funds and supplemental appropriations to pay for wildfire suppression.[107]

As noted in the introduction to this Article, the 2018 spending bill included a long-sought budget fix for the problem of fire borrowing, giving the Forest Service and the Department of the Interior the ability to access over $2 billion a year starting in 2020 that would be outside of their regular wildfire suppression budgets.[108] In effect, this new provision created a special disaster fund that the Forest Service and Department of the Interior can tap to pay excess costs during intense fire seasons.[109] The approach is similar to how the federal government budgets for other natural disasters such as hurricanes or earthquakes.[110] By design, the new funding approach will help to ensure that land management agencies can fight wildfires—even during extraordinary seasons—without depleting much-needed funding from other parts of their budgets.

By ending the practice of fire borrowing, the 2018 funding fix could free up substantial sums for other programs—an estimated $1.3 billion annually according to one estimate.[111] While some of this funding will be available for much-needed activities such as fuel removal and other restoration projects, the Forest Service will not be able to meet the pressing challenge of making western forests more resilient in the face of accelerating climate disruption without a

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funds than have been appropriated to them. This discrepancy often leads the agencies to transfer funds from other accounts, prompting concerns that increasing suppression spending may be detrimental to other agency programs.").

107. *See id*. *See also* Ryan Richards, *Defining Success for the Wildfire Funding Fix*, CTR. FOR AM. PROGRESS 1–2 (June 13, 2018), https://www.americanprogress.org/issues/green/reports/2018/06/13/451901/defining-success-wildfire-funding-fix/ ("Wildfire suppression costs have consistently outpaced appropriations from Congress. In 9 of the 10 years between fiscal years 2007 and 2016, the USFS or the Department of the Interior (DOI) have been forced to rely on emergency appropriations or diverted funds from other activities—including prescribed burning and other tools that reduce the risk of catastrophic wildfire in the first place—in order to pay for the growing costs of firefighting. Known as fire borrowing, this process has essentially hamstrung the agencies' ability to fulfill their various other missions.").

108. *See* Consolidated Appropriations Act, 2018, Pub. L. No. 115-141, Div. O, §§ 102–104, 132 Stat. 348, 1059–61. Beginning in FY 2020, the Forest Service and Department of Interior gained access to a disaster funding account to pay for wildfire fighting costs beyond the approximately $1.1 billion budgeted amount for wildfire suppression costs. *Id.* This contingency fund is currently authorized through FY 2027, with an initial funding level of $2.25 billion in 2020 that grows annually to $2.95 billion by 2027. *Id.* The program lasts until 2028. *Id.*

109. *Id.*

110. *See* WILLIAM L. PAINTER, CONG. RSCH. SERV., R45484, THE DISASTER RELIEF FUND: OVERVIEW AND ISSUES (2022).

111. *See* Richards, *supra* note 107 at 6. The 2018 Appropriations Act also included some modest provisions intended to promote forest restoration, including modified stewardship contracts—a contracting tool that the Forest Service and the Bureau of Land Management use to make it easier to partner with businesses on restoration projects. *See* Consolidated Appropriations Act § 207. These agreements allow the agencies to exchange timber instead of cash payments to contract private companies for long-term restoration and forestry projects. *Id.* The spending bill extended the maximum length of these agreements from ten years to twenty years. *Id.*

sustained commitment of significant resources for long-term restoration efforts.[112]

To be sure, the Forest Service has long recognized the vital ecological role that fires play in forest landscapes, and Congress has identified forest restoration and resilience as priorities in past legislation, most notably in the Healthy Forests Restoration Act of 2003 and the recent infrastructure legislation.[113] Although previous efforts emphasizing healthy forests have been criticized as little more than cover for more commercial logging,[114] recent debates in Congress and proposed legislation seem to recognize the need for urgent action to reduce hazardous fuel loads and engage in substantial forest restoration activities in many western forests.[115] Even if these proposed increases in funding materialize, however, overall support for restoration activities will still be far less than what is needed.[116]

The bottom line is that the Forest Service has been unable to dedicate anything close to the level of resources needed for sustained restoration work and still does not have a clear statutory mandate from Congress.[117] Again, the facts speak volumes: while the Forest Service manages 193 million acres of land, it has a reported backlog of some 80 million acres in need of restoration and 63

112. *See* Christiansen Testimony, *supra* note 48, at 1:03:24 ("This budget does call for some post-fire recovery funds, but it's just a first year. There's many years ahead, and we could do more.").

113. *See*, *e.g.*, Outdoor Restoration Partnership Act of 2021, S. 1248, 117th Cong. § 7 (proposing $60 billion restoration fund); The Healthy Forests Restoration Act of 2003, 16 U.S.C. §§ 6501–6591e. Among other things, the Healthy Forests Restoration Act of 2003 expedited environmental review under NEPA for authorized fuel reduction projects, including thinning projects, strategic fuel breaks, and prescribed fires. 16 U.S.C. § 6514. The 2014 Farm Bill expanded upon these provisions to allow the Secretary of Agriculture to work with state officials to designate forest restoration treatment areas within the national forests to address deteriorating forest health conditions caused by insects and disease. Agricultural Act of 2014, Pub. L. No. 113-79, 128 Stat. 649 (2014); *see also* 149 CONG. REC. 15,709 (2003) (statement of Sen. Jesse Francis "Jeff" Bingaman, Jr.) ("I am also a vocal proponent for spending Federal dollars conducting proactive forest restoration. Although some may contend that restoration costs too much money, over the long-term, it is much less expensive than fighting fires."); Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, §§ 40803–40808, 135 Stat. 429, 1097–116 (2021).

114. *See, e.g.*, April Reese, *Five Years After Passage, Healthy Forests Restoration Act Falls Short of Goals, Critics Say*, GREENWIRE (Nov. 6, 2008, 1:47 PM), https://www.eenews.net/stories/71006 ("When President Bush signed the [the Healthy Forests Restoration Act] into law Dec. 4, 2003, supporters saw it as a crucial tool to expedite hazardous fuels reduction projects and protect communities in the 'wildland-urban interface,' while critics viewed it as a ruse for covertly reviving the commercial logging industry."); *see also* Keiter, *supra* note 33, at 319 (discussing environmental groups' skepticism of forest thinning proposals as "another version of timber harvesting thinly disguised in fashionable ecological restoration and fire control garb").

115. *See* Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, §§ 40803–40808, 135 Stat. 429, 1097–116 (2021); *see also* Build Back Better Act, H.R. 5376, 117th Cong. §§ 11001–11003 (2021); Christiansen Testimony, *supra* note 48.

116. *See* Christiansen Testimony, *supra* note 48, at 38:41 (observing that hazardous fuel reduction at sufficient scale would cost roughly $20 billion over the next ten years).

117. *See id.* at 1:31:04 ("We need a paradigm shift. We have to treat two to four times more acres than we treat now at the Forest Service. . . . [t]o see a marked change in the high-risk fire sheds. . . . [W]e need more funding . . . ."); Keiter, *supra* note 33, at 358.

million acres facing high or very high risk of wildfire.[118] From 2009 to 2018, the Forest Service implemented forest restoration projects to reduce fire risks and improve forest health on less than 4 million acres per year, including fuel reduction projects on only 1.4 million acres per year.[119] In recent testimony before the Senate Environment and Natural Resources Committee, Forest Service Chief Vickie Christiansen stated that the agency needs to ramp up its restoration work by two to four times its current efforts.[120] At the higher end of that range, the Forest Service would be restoring more than 12 million acres per year.[121] At a cost of roughly $1,000 per acre, that comes to $12 billion per year, which is roughly double the entire Forest Service budget.[122]

Experts have long called for more spending on forest restoration and resilience and have observed repeatedly that "[c]urrent forest and fire policy in the western United States emphasizes short-term outcomes versus long-term goals."[123] Without a long-term commitment to forest restoration, western forests will continue to suffer from the combined effects of heavy fuel loading as a result of past management and fire control practices and hotter, drier conditions.

To be clear, forest restoration will not stop fires, but it could make forests more resilient and thereby reduce the intensity and destructiveness of fires. There is ongoing debate, moreover, regarding the proper approach to restoration, with some voicing concerns about an overreliance on thinning, fuel reduction, and salvage logging.[124] Finally, and most importantly, ongoing restoration work cannot come at the expense of protecting communities from wildfire and ensuring that poor and minority communities do not suffer disproportionate harm from wildfires.

But in any future scenario involving significant investments in restoration and resilience, substantial additional resources will be needed.[125] As one recent review noted, "[b]udgets are a fundamental constraint on restoring forest resilience."[126] Because restoration requires significant work on the ground, proceeding acre-by-acre across millions of acres throughout the western United

118. *See* National Environmental Policy Act (NEPA) Compliance, 84 Fed. Reg. 27,544, 27,544 (June 13, 2019) (to be codified at 36 C.F.R. pt. 220) ("Over 80 million acres of National Forest System (NFS) land are in need of restoration to reduce the risk of wildfire, insect epidemics, and forest diseases."); U.S. GOV'T ACCOUNTABILITY OFF., GAO-20-52, WILDLAND FIRE: FEDERAL AGENCIES' EFFORTS TO REDUCE WILDLAND FUELS AND LOWER RISK TO COMMUNITIES AND ECOSYSTEMS 9 n.19 (2019) ("In 2018, the Forest Service estimated that there were approximately 63 million acres of national forest lands at high to very high risk from uncharacteristic wildfire. In July 2019, [Department of the] Interior officials estimated that 54 million acres of the lands its agencies manage or administer were at high or very high risk from wildfire.").

119. *See* U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 117, at 11.

120. *See* Christiansen Testimony, *supra* note 48, at 27:50.

121. *Id.*

122. *Id.*

123. *See, e.g.*, Stephens et al., *supra* note 45, at 2.

124. *See, e.g.*, Scott L. Stephens et al., *Forest Restoration and Fuels Reduction Convergent or Divergent?*, 71 BIOSCIENCE 85 (2021).

125. Stephens et al., *supra* note 45, at 3.

126. *Id.* at 12.

States, costs are high.[127] Wildfire fuel reduction has long been a central focus of such activities, but there are limits to this strategy, not least the budget and personnel requirements, and fuel reduction is not sufficient by itself.[128] Other components of a broad landscape-scale approach to restoration include restoring streams, watersheds, and meadows; expanding the use of prescribed burning; and managing individual forests to establish a more heterogenous and resilient forest ecosystem that can recover quickly from large-scale natural disturbances.[129] Doing all of this with the specificity that it requires across the entire federal forest estate in the West would require tens of thousands of additional, largely seasonal laborers working in collaboration with state, tribal, and private entities.

Simply put, without dedicated funding for these on-the-ground activities, the sustained effort needed to help restore and prepare western forests for climate change will never happen. Clearly, funding is not enough by itself, but it is a necessary condition. Even with substantial additional funding, moreover, there are important questions about the capacity of federal agencies and state and tribal governments to deploy the new money effectively. Thus, while the proposal put forward in this Article responds to the need for funding, it recognizes that other important reforms are also necessary.

Perhaps most importantly, improved policy coordination is necessary among federal, state, and tribal agencies and governments involved in wildfire management as well as key stakeholders and local communities. Some elements of this are already in place. In 2002, the Secretaries of Agriculture and Interior established a new Wildland Fire Leadership Council to provide an intergovernmental committee to support the implementation and coordination of the Federal Fire Management Policy.[130] They later released the National

127. *See* Christiansen Testimony, *supra* note 48, at 28:26.

128. Busenberg, *supra* note 16, at 153 (observing that "any effective fuel-reduction strategy will require major investments to support personnel and equipment over a period of many years").

129. *See, e.g.*, Prichard et al., *supra* note 90, at 18 ("Given the complexity of forest ecosystems, the economic and personnel investment required, and the policy and management constraints, there is no single management tool that is adequate to increase the resilience of [western North American] landscapes to future wildfires. Coupled thinning and burning treatments will be especially helpful in dry pine, oak woodlands, and dry mixed conifer forests, while restoration of more characteristic forest successional and nonforest patchworks using managed moderate and high severity wildfires will be key in cold forests."); *see also* Sample & Topik, *supra* note 102, at 239 ("Correcting the downward trajectory in forest conditions and reinforcing their resiliency to the effects of climate change is a daunting challenge, requiring ecosystem restoration on an estimated 152 million acres (61.5 million ha) of federal, state, tribal, and private forest land in the United States. Ecosystem restoration in this context is focused on functions and processes, and strengthening the capacity to recover from significant, large-scale natural disturbances, not on attempting to restore forests to some earlier evolutionary state." (citation omitted)).

130. *See Wildland Fire Leadership Council*, FORESTS & RANGELANDS, https://www.forestsandrangelands.gov/leadership/index.shtml (last visited Jan. 21, 2022). The basic terms were updated in 2016 through a new memorandum of understanding, which expanded the council to include the Departments of Defense and Homeland Security. *See* SEC'Y OF DEF. ET AL., MEMORANDUM OF UNDERSTANDING: WILDLAND FIRE LEADERSHIP COUNCIL (2016), https://www.forestsandrangelands.gov/documents/leadership/wflc/WFLC-MOU-2016.pdf ("The Wildland Fire Leadership Council (Council) is an intergovernmental committee of Federal, state, tribal, county, and municipal government officials convened by the Secretaries of Agriculture, Interior, Defense,

Cohesive Wildland Fire Management Strategy in 2014 as mandated by the Federal Land Assistance, Management, and Enhancement Act of 2009.[131] Among other things, the strategy calls for more collaboration with key stakeholders to create and enhance resilient landscapes, promote fire-adapted communities, and ensure safe and effective wildfire responses.[132]

Whether this new strategy will translate into durable commitments to policy coordination and collaborative management across multiple landscapes remains to be seen. Persistent questions about institutional design, adaptive management, and the ability of multi-purpose agencies such as the Forest Service to carry out their various responsibilities for public lands management will need to be confronted in any such effort.[133] While these issues are beyond the scope of this Article, it is clear that any significant increase in funding for forest restoration and resilience will need to proceed in tandem with sustained attention to these challenges of policy coordination, planning, and agency design.

III. CLIMATE LIABILITY FOR WILDFIRE EMISSIONS FROM FEDERAL FORESTS

National forests have always been political institutions. The original forest reserves were established at the behest of western irrigators to protect watersheds and ensure adequate streamflow.[134] By the early 1900s, under the influence of

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and Homeland Security, dedicated to promoting consistent wildland fire policies, goals, and management activities. The Council provides strategic recommendations to help ensure policy coordination, accountability, and effective implementation of Federal wildland fire management policy and related long-term strategies through a collaborative environment to help ensure effective and efficient wildfire management, promote fire-adapted communities, and create resilient landscapes to achieve long-range benefits for society and nature.").

131. *See* U.S. DEP'T OF THE INTERIOR & U.S. DEP'T OF AGRIC., *supra* note 43.

132. *See The National Strategy The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy*, FORESTS & RANGELANDS, https://www.forestsandrangelands.gov/strategy/thestrategy.shtml (last visited Jan. 31, 2022). In one of his last acts in office, President Trump signed an executive order on January 14, 2021, creating the Wildland Fire Management Policy Committee—an attempt to impose some order and coordination on the various federal entities involved in combatting wildfires by putting them under Forest Service control. *See* Establishing the Wildland Fire Management Policy Committee, Exec. Order No. 13,976, 86 Fed. Reg. 6549 (Jan. 21, 2021). As of May 2022, President Biden had not signaled his intentions with respect to this executive order.

133. *See, e.g.*, Eric Biber, *Too Many Things to Do How to Deal with the Dysfunctions of Multiple-Goal Agencies*, 33 HARV. ENV'T L. REV. 1, 4 (2009) (using example of public lands management agencies such as the Forest Service to demonstrate challenges facing "multiple-goal agencies" as a broader "problem for institutional and legal design in the administrative state"). There is a large literature on adaptive management and agency design that often uses cases from the natural resources and public lands management fields. *See, e.g.*, J.B. Ruhl, *Regulation by Adaptive Management—Is it Possible?*, 7 MINN. J.L., SCI., & TECH. 21, 39–53 (2005) (discussing challenges of adaptive management in context of habitat conservation plans); Robin Kundis Craig & J.B. Ruhl, *Designing Administrative Law for Adaptive Management*, 67 VAND. L. REV. 1, 7 (2014) ("The idea of adaptive management is that agencies should be free to make more decisions, but that the timing of those decisions is spread out into a continuous process that makes differentiating between the 'front end' and the 'back end' of decisionmaking much less relevant."); Brian C. Chaffin et al., *A Decade of Adaptive Governance Scholarship Synthesis and Future Directions*, 19 ECOLOGY & SOC'Y 56 (2014) (reviewing literature).

134. *See* SAMUEL P. HAYS, CONSERVATION AND THE GOSPEL OF EFFICIENCY: THE PROGRESSIVE CONSERVATION MOVEMENT, 1890–1920, at 23 (1999) ("Western irrigators played a major role in

Gifford Pinchot and his allies, the newly created Forest Service pursued a policy of scientific management of forest resources built around the concept of sustained yield.[135] National forests, in Pinchot's view, should be managed as public resources in order to achieve "the greatest good for the greatest number over the long term."[136] Although Pinchot's vision has been modified and revised over the years—often to reflect the new realities of multiple use and, increasingly, the importance of environmental values—there is still a deep-seated commitment to managing the national forests according to a pragmatic, utilitarian logic.[137] At the core of this commitment lay the idea that our national forests are assets to be used for the benefit of the public.[138]

For much of the last century, timber harvesting dominated the basic approach.[139] By the early 1990s, the timber industry was taking more than 12

establishing the national forests and in defending them from attack. The primary intent of Congress in setting aside forest reserves in fact was watershed protection.").

135. *See id.* at 26–48 (providing detailed account of Pinchot's efforts to transfer authority over the forest reserves from the General Land Office in the Department of Interior to the USDA); *see also* CHARLES F. WILKINSON, CROSSING THE NEXT MERIDIAN: LAND, WATER, AND THE FUTURE OF THE WEST 124–31 (2013) (discussing Pinchot's role in creating and shaping the national forests and the Forest Service). In particular, Wilkinson points to the so-called Pinchot Letter—a letter from Secretary of Agriculture James Wilson to Pinchot, which Pinchot drafted, laying out the new responsibilities of the Forest Service. The letter was written on the day that the forest reserves were transferred from the Department of the Interior to the Department of Agriculture and, according to Wilkinson, "is in a certain sense the most important legal or policy statement ever made about the national forests." WILKINSON, *supra*, at 127.

136. *See* WILKINSON, *supra* note 135, at 128 (quoting the Pinchot letter which closes with a statement that the forest reserves should always be managed "from the standpoint of the greatest good of the greatest number in the long run"); *see also* PAUL W. HIRT, A CONSPIRACY OF OPTIMISM: MANAGEMENT OF THE NATIONAL FORESTS SINCE WORLD WAR II, at 35 (1994) ("With an unflagging optimism buoyed by his faith in scientific management, [Pinchot] insisted that the forests could provide a continuous, carefully regulated, efficient, and profitable output of water, timber, and livestock forage indefinitely, without environmental deterioration, economic dislocation, or impairment of the productivity of the land. This established the ideological pattern for the agency's future."); PYNE, *supra* note 95, at 189 (discussing "Pinchot's insistence that the public forests would be managed as a public utility").

137. HIRT, *supra* note 136, at xix ("Whether economically productive or marginal, the fundamental purpose of the national forests have remained largely unchanged since the turn of the century: to establish a permanent system of publicly owned forests managed by scientific experts trained to protect the forests from destruction while providing a sustained yield of renewable products and services, including wood, clean water, livestock forage, wildlife habitat, and recreation opportunities."); *id.* at 31 ("The basic institutional structure and guiding principles of federal forest management laid down by Pinchot have carried on to the present."); WILKINSON, *supra* note 135, at 168 (discussing continuing influence of Pinchot's vision for national forest policy).

138. WILKINSON, *supra* note 135, at 128 ("In the administration of the forest reserves it must be clearly borne in mind that all land is to be devoted to its most productive use for the permanent good of the whole people, and not for the temporary benefit of individuals or companies." (quoting Pinchot Letter)).

139. *Id.* at 129 ("'The greatest good of the greatest number' sounds like, and has been used to justify, multiple-use management, but the Pinchot Letter is better understood as standing for dominant-use management, with timber production as the dominant use in the national forests."). Timber harvesting on national forest lands declined dramatically starting in the 1990s, from over 12 billion board feet per year in the late 1980s to around 2 billion board feet per year in the early 2000s. For data and trends, see *Forest Products Cut and Sold from the National Forests and Grasslands*, U.S. FOREST SERV., https://www.fs.fed.us/forestmanagement/products/cut-sold/index.shtml (last visited Jan. 31, 2022).

billion board feet per year from the national forests.[140] A decade later, in the wake of the timber wars that raged across western forests, that number had been reduced by more than 75 percent.[141] This rapid and sustained reduction in cutting led to massive job losses among loggers and decimated many timber-dependent communities throughout the West.[142] Some of these communities have never recovered and many of them are now on the frontlines of the wildfire crisis.[143]

In addition to the lives lost and the destruction of property, wildfire emissions from federal lands have significant impacts on local and regional air quality and on the climate.[144] A simple liability regime that imposes damages for some of those harms could be used to generate much-needed revenues for a dedicated restoration fund that could be used to support the long-term, on-the-ground restoration work that is necessary to enhance forest resilience in the face of accelerating climate change. In effect, such an approach represents the inverse of the ecosystem services approach that has been promoted for decades. Rather than trying to quantify and monetize all of the valuable ecosystem services provided by forests and use this as a baseline for encouraging investments in restoration and resilience, the approach proposed here uses an objective trigger tied to a straightforward estimate of the climate *harms* associated with wildfire emissions as the basis for generating funds at scale that could be deployed more quickly for restoration activities.

A rough estimate of the magnitude of the funding that could be generated suggests multiple billions of dollars per year. For purposes of illustration, using the five-year average of annual acres burned on federal lands from 2016 to 2020 gives a figure of 4.8 million acres as a baseline.[145] Assuming average CO_2 emissions from these lands is about 25 tons per acre provides an estimate of around 120 million metric tons of CO_2 for the entire 4.8 million acres.[146] Using the United States government's 2020 social cost of carbon estimate of $51 per

140. *See* ANNE A. RIDDLE, CONG. RSCH. SERV., R45688, TIMBER HARVESTING ON FEDERAL LANDS 8–9 (2019), https://crsreports.congress.gov/product/pdf/R/R45688/1.

141. *Id.*

142. *See, e.g.*, Susan Charnley et al., *Forest Management Policy and Community Well-Being in the Pacific Northwest*, 106 J. FORESTRY 440, 446 (2008) (finding that forest dependent communities suffered greater economic decline than non-forest communities as a result of changes of national forest management and the decline in timber harvesting); Ted L. Helvoigt et al., *Employment Transitions in Oregon's Wood Products Sector During the 1990s*, 101 J. FORESTRY 42, 42 (2003) (documenting sustained job losses in Oregon timber industry during 1990s); *see also* W. SCOTT PRUDHAM, KNOCK ON WOOD: NATURE AS COMMODITY IN DOUGLAS-FIR COUNTRY 139–70 (2005) (documenting impacts of industry restructuring and changing national forest management policy on timber dependent communities in southern Oregon).

143. *See, e.g.*, Joshua Partlow, *As the Bootleg Fire Burns, Locals Are Faced with the Realities of Climate Change—and Remain Skeptical*, WASH. POST (July 17, 2021, 9:00 AM), https://www.washingtonpost.com/climate-environment/2021/07/17/bootleg-fire-oregon-heat-wave/ (discussing impacts on wildfires of former logging communities in Klamath County, Oregon).

144. *See* references in notes 5 and 6 *supra*.

145. *See* CONG. RSCH. SERV., *supra* note 1, at 1 tbl.1.

146. This number is consistent with the California emissions estimates cited in note 22 *supra*.

metric ton of CO_2 gives a total of $6.1 billion.[147] Even in years that see half as many acres burned as this average figure and even if the amount of emissions per acre is significantly lower, this proposed mechanism would generate several billion dollars per year.

It is important to emphasize here that this funding would *not* come from agency budgets but would instead come directly from the Treasury as part of the government's mandatory budget obligations. In effect, a simple objective trigger would be used on an annual basis to establish the amount, similar to the budget obligations under existing entitlement programs.

This Part elaborates on the three key elements of the proposal. If adopted, the proposal would constitute a significant advance on one of the major challenges facing long-term restoration work: funding. And it would do so in a way that ties that funding to the actual climate harms created by wildfire emissions without getting bogged down in arcane and politically fraught debates about how to quantify forest carbon and other ecosystem services provided by forests. Obviously, if Congress decided to take up this proposal, it would be subject to a political process that would inevitably shape the specific design features. In this respect, the details of the different components of the proposal are less important than the overall concept. The goal here is to offer a new framework for thinking about ways to use climate policy to fund long-term investments in forest restoration and resilience that meets the requirements of scale, speed, and simplicity needed to respond effectively to the problem.

A. Treating Federal Forests as Federal Facilities

The first component of the proposal is to treat federal forests as federal facilities for purposes of climate liability for wildfire emissions. This could be done at the level of individual national forests, national parks and monuments, and other federal lands; at a regional level, such as the Sierra Nevada or the Northern Rocky Mountains; or across the entire federal forest estate. Doing this at the individual national forest or park level could take advantage of the fact that these individual entities enjoy significant management autonomy and are engaged in various planning exercises and stakeholder processes that could get lost at the regional or national level.[148] A regional approach, on the other hand, might allow for better coordination across areas subject to a common fire regime. The key point, however, is not the precise scale of the entity to which the liability attaches. Rather, it is the fact that the federal forests would be treated as federal facilities for purposes of liability.

There is ample precedent under our federal environmental laws for imposing liability on federal facilities for the environmental harms that they cause. With a few modest exceptions (such as national security), federal facilities

147. *See* INTERAGENCY WORKING GRP. ON SOC. COST OF GREENHOUSE GASES, *supra* note 49.

148. *See* 36 C.F.R. § 219.2(b) (2021) (establishing procedures for land management planning at level of individual national forest units).

are generally liable for pollution under the Clean Air and Clean Water Acts,[149] for the treatment, storage, and disposal of hazardous wastes under the Resource Conservation and Recovery Act,[150] and for releases of hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act.[151] Making federal forests liable as federal facilities for wildfire emissions can be viewed as roughly analogous to this treatment of other federal facilities under our environmental laws.

B. Creating Strict Liability for Wildfire Emissions

The second key component of the proposal would impose strict liability for CO_2 emissions from all *unplanned* wildfires on federal lands. Emissions from prescribed burning, even in cases where such prescribed burns got out of control, would not be subject to liability under this scheme. The reason for this is that prescribed burning is a critical part of forest restoration. Creating liability for the GHG emissions from such planned activities could thus discourage the use of prescribed burning going forward.

A standard approach would be used to monitor forest loss and quantify the resulting emissions based on widely available tools and methodologies.[152] While there is considerable ongoing debate about the accuracy of some of the models used to estimate GHG emissions from wildfires, the success of this scheme does not depend upon estimating those emissions with precision.[153] In fact, one of the benefits of a simple, conservative approach to estimating emissions is that it avoids the complexities of carbon accounting that have plagued forest carbon offsets for years.

All existing liabilities associated with fires on public lands would be unaffected by this scheme, and none of the funds generated from this proposal

149. *See* 33 U.S.C. § 1323 (subjecting federal facilities to general regulatory requirements under the Clean Water Act); 42 U.S.C. § 7418 (subjecting federal facilities to general regulatory requirements under the Clean Air Act).

150. *See* 42 U.S.C. § 9620 (establishing federal liability for cleanup costs at both current and former federal facilities as well as at privately owned contaminated properties where federal agencies have sent their hazardous wastes).

151. *See* 42 U.S.C. § 6961 (requiring that federal facilities comply with federal, state, interstate, and local law with respect to solid or hazardous waste disposal and management, barring exemption by the President).

152. *See Forest Carbon Science and Reporting*, U.S. FOREST SERV.: FOREST INVENTORY & ANALYSIS NAT'L PROGRAM, https://www.fia.fs.fed.us/forestcarbon/ (last updated Nov. 30, 2021) (detailing forest carbon accounting methodologies and different levels of reporting).

153. *See, e.g.*, Stenzel et al., *supra* note 22, at 3987–89 (discussing different approaches to estimating CO_2 emissions from wildfires); Shawn Urbanski, *Wildland Fire Emissions, Carbon, and Climate Emission Factors*, 317 FOREST ECOLOGY & MGMT. 51, 51–52 (2017) (discussing use of emission factors to estimate emissions of CO_2 and other pollutants from wildfires). Because these emissions are not being offset by carbon removals and, for purposes of this scheme, are not tied to specific legal mandates or binding targets for carbon emissions, there is less need to quantify the emissions with accuracy and precision. A simple conservative approach that can be agreed upon up front is all that is needed.

would be used to compensate property owners for any damages.[154] This includes liability for property damage from fires on federal lands,[155] as well as the federal government's capacity to sue private landowners and individuals for fire damage.[156] And, of course, the notorious inverse condemnation regime in California that creates strict liability for utilities whose equipment is found to cause fires that then cause property damage would be unaffected.[157]

All that is being proposed here is a simple strict liability regime for the climate harms caused by the GHG emissions from unplanned ignitions on federal public lands. The great value of strict liability in this context is ease of administration. Although a substantial amount of the literature on tort liability focuses on the various incentives to avoid accidents that are created under different liability regimes,[158] this proposal adopts strict liability not because of its deterrent effects but because it does not require any finding of fault and because it allows the use of objective triggers (unplanned ignitions) that would also forgo the need for any detailed investigation of causation.

One might contend that the approach proposed here would essentially operate as a tax on wildfire emissions, with the tax set at the social cost of carbon value. But there are compelling normative and practical reasons to frame this as a strict liability regime rather than as a tax. Putting this within the law of obligations recognizes that there are actual harms associated with wildfire emissions that should be compensated. From a practical standpoint, moreover, using a liability-based mechanism to generate funds rather than a tax would avoid the larger politics around tax policy (not to mention the problematic politics of environmental taxes).[159] To be clear, though, one could get to the same result by fashioning this as a tax.

It is also important to note here that there would be no need for a private cause of action or any sort of litigation to trigger these budget obligations. One could of course fold this into existing statutory schemes such as the Clean Air Act and make use of citizens suits provisions in cases where a particular agency

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154. *See* Richard A. Epstein, *Common Law Liability for Fire A Conceptual, Historical, and Economic Analysis*, *in* WILDFIRE POLICY: LAW AND ECONOMICS PERSPECTIVES 3, 3 (Dean Lueck & Karen M. Bradshaw eds., 2011) ("[U]niversal recognition of the danger of fire has led to the development of a body of common law rules that, although rough around the edges, is reasonably adapted to the challenges of both earlier and modern times.").

155. The Federal Tort Claims Act allows for limited tort actions by private landowners and others for fire damage caused by negligence on federal public lands. *See* Keiter, *supra* note 33, at 335–58 (discussing limited opportunities to use FTCA).

156. *See id.*

157. *See* Walter W. Heiser, *Floods, Fires, and Inverse Condemnation*, 29 N.Y.U. ENV'T L.J. 1, 46–50 (2021) (describing law of inverse condemnation as applied to public utilities for damages caused by wildfires triggered by their equipment).

158. *See, e.g.*, GUIDO CALABRESI, THE COSTS OF ACCIDENTS: A LEGAL AND ECONOMIC ANALYSIS (1970); STEVEN SHAVELL, ECONOMIC ANALYSIS OF ACCIDENT LAW (1987).

159. *See, e.g.*, Leah C. Stokes & Matto Mildenberger, *The Trouble with Carbon Pricing*, BOS. REV. (Sept. 23, 2020), https://bostonreview.net/science-nature-politics/matto-mildenberger-leah-c-stokes-trouble-carbon-pricing (discussing political challenges of carbon taxes).

failed to discharge its obligations. But a simpler approach would be to make this a mandatory budget obligation like the entitlement programs, with the required annual accounting tied to a specific formula.

C. Using the Social Cost of Carbon as a Basis for Restoration Funding

The final component of the proposal would use the government's own estimate of the social cost of carbon to determine the damages from wildfire emissions on federal lands, which the government would then pay into a dedicated restoration fund.[160] As noted above, using the government's 2020 social cost of carbon ($51 per metric ton of CO_2) and given the magnitude of wildfire emissions from federal lands, this mechanism would generate on the order of $6 billion per year.[161] This money would come from the general fund, not from agency budgets, constituting a form of mandatory spending like the entitlement programs. Every year, a simple formula would be used to calculate the total cost of wildfire emissions (CO_2 emissions from wildfires on federal forests multiplied by the social cost of carbon) that would then trigger a general budget obligation.

While the social cost of carbon is hardly a perfect metric,[162] and has been subject to political and legal controversy in recent years,[163] it is intended to provide a relatively simple measure of the climate change harms associated with GHG emissions. The objective in using it here is not to come up with a precise measure of those harms, but rather to find a value that could be agreed upon *ex ante* and used to calculate monetary damages for wildfire emissions on federal lands. Congress could, of course, be more specific and prescribe an exact dollar value with appropriate adjustments over time in any legislation establishing such a fund. The calculation could also use a rolling average over several years to provide some smoothing.

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160. *See* INTERAGENCY WORKING GRP. ON SOC. COST OF GREENHOUSE GASES, *supra* note 49, at 5 tbl.ES-1.

161. *See id.*

162. *See* NAT'L ACADS. OF SCIS., ENG'G, & MED., VALUING CLIMATE DAMAGES: UPDATING ESTIMATION OF THE SOCIAL COST OF CARBON DIOXIDE 155 (2017) ("An expansion of research on climate damage estimation is needed and would improve the reliability of estimates of the [social cost of carbon dioxide]"); *id.* at 174 (recommending "a discounting module that explicitly recognizes the uncertainty surrounding discount rates over long time horizons, its connection to uncertainty in economic growth, and, in turn, to climate damages"). *See also id.* at 185–90 (noting long-term research needs for estimating the social cost of carbon dioxide).

163. *See, e.g.*, Joseph E. Aldy et al., *Keep Climate Policy Focused on the Social Cost of Carbon*, 373 SCIENCE 850 (2021); Maxine Joselow, *Seriously Flawed' Experts Clash over Social Cost of Carbon*, CLIMATEWIRE (Aug., 24, 2021, 5:38 AM), https://www.eenews.net/articles/seriously-flawed-experts-clash-over-social-cost-of-carbon/. In February 2022, a federal district court judge in Louisiana enjoined the U.S. government from using its interim estimates of the social cost of carbon in regulatory analysis. *See* Louisiana v. Biden, No. 2:21-CV-01074 (W.D. La., Feb 11, 2022). On March 16, 2022, a panel of the Fifth Circuit stayed the lower court's injunction pending appeal. *See* State of Louisiana v. Biden, No. 22-30087 (5th Cir., Mar. 16, 2022).

By creating a dedicated fund that would receive the money generated by this damages calculation, the proposal seeks to secure a sufficiently large and stable amount of funding for specific on-the-ground restoration activities. This would supplement and extend the additional funding for restoration that Congress has authorized in the recent infrastructure legislation as well as any funding that might be included in future legislation. The proposal could also be made retroactive to the 2020 fire season in order to generate a substantial initial allocation for the fund.

The creation and use of special funds for specific activities has a long history in public lands management. As part of the Transfer Act of 1905, for example, Gifford Pinchot secured a separate, five-year forestry fund that received all proceeds from the sale of national forest products and was available to the Secretary of Agriculture.[164] The fund was patterned after an earlier Reclamation Fund in the Department of the Interior.[165]

More recently, the Forest Service has used special funds and trust fund accounts to support specific activities such as reforestation, land acquisition, and other activities in specific national forests.[166] These special funds have been deliberately separated from the general appropriations process and agency budgets.[167] The goal is to provide a protected source of funds dedicated to specific priorities.

Given the challenges of funding long-term forest restoration work, a similarly designed fund provides a possible vehicle for accumulating money for ongoing restoration activities. One could imagine a variety of different rules regarding how the money should be allocated, when and under what conditions it could be spent, and how it would be replenished. Obviously, there are also

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164. HAYS, *supra* note 134, at 46. See the Transfer Act, ch. 288, § 5, 33 Stat. 628 (1905), which states "[t]hat all money received from the sale of any products or the use of any land or resources of said forest reserves shall be covered into the Treasury of the United States and for a period of five years from the passage of this Act shall constitute a special fund available, until expended, as the Secretary of Agriculture may direct, for the protection, administration, improvement, and extension of Federal forest reserves."

165. HAYS, *supra* note 134, at 46. In 1907, Pinchot sought to make the fund permanent, but Congress rejected his effort and abolished the fund. *Id.*

166. For a discussion of current funds used by the forest service, see U.S. FOREST SERV., U.S. DEP'T OF AGRIC., FY 2022 BUDGET JUSTIFICATION 95, 116, 118, 125 (2021), https://www.fs.usda.gov/sites/default/files/usfs-fy-2022-budget-justification.pdf; *see also* U.S. GOV'T ACCOUNTABILITY OFF., GAO/AIMD-96-102R, INFORMATION ON REPROGRAMMING AUTHORITY AND TRUST FUNDS 6, 10 (1996).

167. Special funds, like those included in the 1905 Transfer Act, are budget accounts that are financed solely to fund certain projects, programs, or activities designated in their authorizing legislation. *See* U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 163, at 4; *see also* U.S. GOV'T ACCOUNTABILITY OFF., GAO-05-734SP, A GLOSSARY OF TERMS USED IN THE FEDERAL BUDGET PROCESS 4 (2005) (special fund accounts are "federal fund accounts earmarked by law for a specific purpose"). Trust fund accounts are similar to special funds, but are categorized differently and sometimes are funded on a revolving basis. U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 163, at 4; *see also* U.S. GOV. ACCOUNTABILITY OFF., A GLOSSARY OF TERMS, *supra*, at 5 (categorizing trust fund accounts as "trust fund expenditure," "trust fund receipt," and "trust revolving fund account," where only revolving trusts may finance themselves through "business-type operations").

important questions about how decisions would be made, who would make them and at what level, and how this would all fit within ongoing multi-stakeholder planning processes for national forests.[168] One could also imagine that a portion (perhaps a significant portion) of the funding would be dedicated to protecting communities, especially frontline communities in fire-prone areas.

By restricting the fund to actual on-the-ground restoration and resilience activities, the proposal would also generate thousands of new jobs in a manner that might provide off-season employment for wildland firefighters.[169] Indeed, if the proposed Civilian Climate Corps ever becomes a reality, the proposal contemplated here could provide substantial funding for a large workforce focused on forest restoration as part of that effort. Putting people to work restoring public lands could be a modest but important and very visible component of a federal jobs program focused on the climate crisis.

CONCLUSION

More than a century ago, the national forests were established as an experiment in public ownership of natural resources. These lands, of course, had been taken from native peoples by the United States as part of a larger settler colonial project. The idea of the "public" that underwrote the creation of these national forests, moreover, was all too often the exclusive province of white men.

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168. Stakeholder processes have been important but are notoriously slow and too much of the money that has been allocated to forest resilience is spent on process, planning, and environmental review rather than on on-the-ground restoration activities. *See* Tomas M. Koontz & Craig W. Thomas, *What Do We Know and Need to Know About the Environmental Outcomes of Collaborative Management?*, 66 PUB. ADMIN. REV. 111, 111 (2006) ("Many tout the benefits of collaboration as an alternative to hierarchy and regulation, but the excitement over collaborative processes has not been matched by evidence that collaboration has actually improved the environment."); Emily Jane Davis et al., *Making and Breaking Trust in Forest Collaborative Groups*, 40 HUMBOLDT J. SOC. RELS. 211, 225–26 (2018) (discussing challenges of stakeholder collaborations in national forest management).

169. The federal government's ability to recruit and retain firefighters has been under examination periodically since the 1990s. The federal wildland firefighting workforce consists predominantly of seasonal hires. Michael Doyle, *Federal Wildland Firefighters Get Pay Boost*, E&E NEWS (Aug. 17, 2021, 3:08 PM), https://www.eenews.net/articles/federal-wildland-firefighters-get-pay-boost/; Anastasia Selby, *The Forest Service Should Embrace a Full-Time Workforc*e, HIGH COUNTRY NEWS (June 15, 2020), https://www.hcn.org/issues/52.7/south-wildfire-the-forest-service-should-embrace-a-full-time-workforce. Though some seasonal positions are permanent, many are temporary positions that have to be filled annually. Doyle, *supra*. "This situation has led to concerns about efficiency and about the recruitment and retention of firefighters, particularly when compared with employment opportunities at the state level or in the private sector." *Id.* In addition, there have been concerns about succession planning, as many leadership-level employees approach retirement age. Sophie Quinton, *Lack of Federal Firefighters Hurts California Wildfire Response*, PEW TRUSTS (Jul. 14, 2021), https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2021/07/14/lack-of-federal-firefighters-hurts-california-wildfire-response. The 2020 wildfire season exacerbated many of these concerns, as the location, severity, and extent of the wildfires exceeded interagency (federal, state, and local) firefighter capacities in many regards. Cyrus Farivar and Alicia Victoria Lozano, *Federal Wildland Firefighters Say They're Burned Out After Years of Low Pay, Little Job Stability*, NBC NEWS (Oct. 31, 2020, 3:00 AM), https://www.nbcnews.com/news/us-news/federal-wildland-firefighters-say-they-re-burned-out-after-years-n1245576.

Notwithstanding these legacies of dispossession and exclusion, the Progressive era leaders who established the national forests believed that principles of scientific management could be applied to ensure that the long-term public interest would be served.

Up until World War II, management of the national forests was relatively uncontroversial as far as the broader public was concerned. After the war, as the American economy took off, timber harvesting on national forests increased dramatically. By the last quarter of the twentieth century, the various management imperatives and political pressures embodied in the original conception of the national forests started to give way in the face of an increasingly diverse and fractured public and the growing importance of environmental concerns. Starting in the early 1990s, timber harvesting on national forest lands dropped dramatically, decimating many timber-dependent communities and turning some national forests into battlegrounds.

But throughout this entire history, the basic approach to wildland fire was remarkably stable. Despite competing priorities regarding the use of national forests and the longstanding recognition that fire plays a vital role in forest ecosystems, federal wildfire policy has been dominated by a focus on short-term fire suppression at the expense of the necessary long-term investments in restoration and forest resilience. Today, as climate change accelerates and western forests experience unprecedented fires, there is a growing awareness of the pathologies that have resulted from this approach and the need to generate significant long-term funding for forest restoration and resilience.

This Article has proposed a new climate liability and funding mechanism that would provide long-term support for forest restoration based on a simple, objective approach. If adopted, it would complement and extend the modest funding currently available for forest restoration as well as any funds that might become available in future legislation. By tying restoration funding to the climate harms associated with wildfire emissions from federal forests, the proposal recognizes the federal government's responsibility for these harms and the substantial mobilization needed for forest restoration at scale. Most importantly, it offers a new way of thinking about the relationship between forests and climate policy—one that looks not at how forests can be used to support climate mitigation but rather at how climate policy can be used to protect and enhance the ability of forests to withstand the effects of climate change.