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March of the Ents: Using America's National Forests to Mitigate the Threat of Climate Change

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March of the Ents: Using America's National Forests to Mitigate the Threat of Climate Change

Keywords

Climate Power Play: Financial, Legislative, and Regulatory Moves toward a New Energy Economy

NOTES

THE MARCH OF THE ENTS: USING AMERICA’S NATIONAL FORESTS TO MITIGATE THE THREAT OF CLIMATE CHANGE

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“We Ents do not like being roused; and we never are roused unless it is clear to us that our trees and our lives are in great danger.”¹

INTRODUCTION

In 2013, the Intergovernmental Panel on Climate Change (IPCC) began publishing Working Group contributions to the IPCC’s Fifth Assessment Report on the state of scientific knowledge regarding climate change.² According to Working Group I, the need to significantly limit greenhouse gas (“GHG”) emissions has become imminent if international efforts to hold warming in check are to have any chance at success.³ Several months later, the IPCC’s Working Group II issued a more dire warning, finding consensus that while the impacts of climate change may remain “moderate” under a one-to-two degree Celsius warming scenario, “[a]ggregate economic damages accelerate with increasing temperature.”⁴ At the same time, the risk of severe impacts to human health, food security, rural livelihoods, and biodiversity—especially in developing countries—increases as global average temperatures rise.⁵ As encapsulated by the *New York Times*, if GHG reductions are not achieved within a short timeframe, future generations may be faced with the expensive—and only theoretically possible—solution of mechanically removing GHGs from the atmosphere “to preserve the livability of the planet.”⁶

1. J.R.R. TOLKIEN, *THE LORD OF THE RINGS: THE TWO TOWERS* 89 (10th ed. 1963).

2. See generally INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS* (Thomas F. Stocker et al. eds., 2013) [hereinafter IPCC CLIMATE CHANGE 2013], available at http://www.climatechange2013.org/images/report/WG1AR5_ALL_FINAL.pdf (comprising the IPCC Working Group I’s findings for the Fifth Assessment Report).

3. See *id.* at 27–28; see also Roz Pidcock, *Carbon Briefing: Making Sense of the IPCC’s New Carbon Budget*, CARBON BRIEF (Oct. 23, 2013, 10:00 AM), <http://www.carbonbrief.org/blog/2013/10/carbon-briefing-making-sense-of-the-ipcc%E2%80%99s-new-carbon-budget> (explaining that based on current annual worldwide emission rates, the so-called “carbon budget” suggested by Working Group I will be exhausted within twenty-five years if GHG emissions are not significantly reduced).

4. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *CLIMATE CHANGE 2014: IMPACTS, ADAPTATION, AND VULNERABILITY—SUMMARY FOR POLICYMAKERS 13* (2014) [hereinafter IPCC CLIMATE CHANGE 2014—SMP], available at http://ipcc-wg2.gov/AR5/images/uploads/IPCC_WG2AR5_SPM_Approved.pdf.

5. *Id.* at 12–14.

6. Justin Gillis, *U.N. Says Lag in Confronting Climate Woes Will Be Costly*, N.Y. TIMES (Jan. 16, 2014), <http://www.nytimes.com/2014/01/17/science/earth/un-says-lag-in-confronting-climate-woes-will-be-costly.html>.

GHGs, such as carbon dioxide or methane, are chemical compounds in the Earth's atmosphere that absorb infrared radiation from the Sun after it has reflected off of the Earth's surface.⁷ Under ideal conditions, these GHGs help regulate the Earth's surface temperature by holding the temperature relatively constant.⁸ However, as concentrations of GHGs in the atmosphere increase, so do their heat-trapping effects, leading to gradual warming of the Earth's surface temperature.⁹ Since industrialization began in the mid-eighteenth century, this type of gradual warming has been observed alongside rapidly increasing concentrations of GHGs in the atmosphere.¹⁰ For example, in 2013 the concentration of carbon dioxide in the Earth's atmosphere surpassed 400 parts per million,¹¹ a concentration not experienced on the Earth for at least 800,000 years.¹²

This increasing concentration of atmospheric GHGs has been accompanied by more frequent and severe climatic events—including droughts, powerful storms, and extreme temperatures.¹³ It also has contributed to long-term challenges, such as rising sea levels and ocean acidification.¹⁴ In the United States alone, severe climatic events have already cost lives,¹⁵ put livelihoods at risk,¹⁶ and cost taxpayers billions of dollars.¹⁷

7. See *Greenhouse Gases: Introduction*, NAT'L OCEANIC & ATMOSPHERIC ADMIN., <http://www.ncdc.noaa.gov/monitoring-references/faq/greenhouse-gases.php> (last visited May 19, 2014) (stating that GHGs, which are both natural and man-made, have been rising "due to the industrial revolution").

8. *Causes of Climate Change*, U.S. ENVTL. PROTECTION AGENCY, <http://www.epa.gov/climatechange/science/causes.html#greenhouseeffect> (Mar. 18, 2014) (providing interactive videos and background information that illustrate the concurrent rise of climate temperatures with increased GHGs).

9. See *id.* (explaining that the Earth's concentration of carbon dioxide has increased from its average range of 180 to 300 parts per million—a constant over 800,000 years—to more than 380 parts per million within the last sixty years, a process that amplifies temperature changes).

10. See *id.* (highlighting that atmospheric carbon dioxide concentrations have increased by almost 40% since pre-industrial times).

11. See *For First Time, Earth's Single-Day CO2 Tops 400 ppm*, NAT'L AERONAUTICS & SPACE ADMIN. (May 9, 2013), <http://climate.nasa.gov/news/916> (providing data collected by the Hawaii-based Mauna Loa Observatory that illustrates a 24% increase in carbon dioxide levels from 1958 to 2013).

12. *Causes of Climate Change*, *supra* note 8 (assessing historical changes in climate based upon ice core samples).

13. See IPCC CLIMATE CHANGE 2013, *supra* note 2, at 7 (correlating extreme weather events and GHG emissions and predicting future trends).

14. See *id.* at 4, 11–12 (asserting that the "[w]arming of the climate system is unequivocal" given drastic changes and variable patterns in weather systems and environmental conditions around the globe).

15. See, e.g., *Deaths Associated with Hurricane Sandy—October–November 2012*, CENTERS FOR DISEASE CONTROL & PREVENTION (May 24, 2013), <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6220a1.htm> (issuing a total death count of 117 individuals in connection with Hurricane Sandy); see also IPCC

Despite these observed and ongoing threats, the United States has been slow to react. Efforts by Congress to pass overarching climate legislation have been abandoned¹⁸ and state efforts to implement innovative legislation aimed at mitigating the climate change threat have been met with considerable industry and political resistance.¹⁹ Within this political and legal vacuum, President Obama directed the U.S. Environmental Protection Agency (EPA) to promulgate a number of new regulations under the Clean Air Act (CAA) to attempt to aggressively curtail emissions of GHGs.²⁰ However, the

CLIMATE CHANGE 2014—SMP, *supra* note 4, at 13 (stating with high confidence that “[c]limate-change-related risks from extreme events, such as heat waves, extreme precipitation, and coastal flooding, are already moderate”); Charles H. Greene et al., *Superstorm Sandy: A Series of Unfortunate Events?*, OCEANOGRAPHY, Mar. 2013, at 8–9, available at http://www.tos.org/oceanography/archive/26-1_greene.pdf (arguing that atmospheric interactions shaped Hurricane Sandy’s development into an unusually powerful hybrid cyclone/hurricane).

16. See Mark Guarino, *Year After Drought, Wettest Midwest Spring in 40 Years Delays Crop Planting*, CHRISTIAN SCI. MONITOR (July 5, 2013), <http://www.csmonitor.com/USA/2013/0705/Year-after-drought-wettest-Midwest-spring-in-40-years-delays-crop-planting> (discussing recent increases in rainfall and the difficulties posed to American farmers when trying to till oversaturated farmland).

17. See, e.g., MATTHIAS RUTH ET AL., CTR. FOR INTEGRATIVE ENVTL. RESEARCH, THE U.S. ECONOMIC IMPACTS OF CLIMATE CHANGE AND THE COSTS OF INACTION 3–4 (2007), available at <http://www.cier.umd.edu/documents/US%20Economic%20Impacts%20of%20Climate%20Change%20and%20the%20Costs%20of%20Inaction.pdf> (detailing, by region, the economic impacts of climate change in the United States).

18. See, e.g., Clean Energy Jobs and American Power Act, S. 1733, 111th Cong. (2009) (comprising a bill “[t]o create clean energy jobs, promote energy independence, reduce global warming pollution, and transition to a clean energy economy”); see also Cinnamon Carlarne, Commentary, *Notes from a Climate Change Pressure-Cooker: Sub-Federal Attempts at Transformation Meet National Resistance in the USA*, 40 CONN. L. REV. 1351, 1361–63 (2008) (delineating policy stagnation in the area of climate change during the George W. Bush presidency, which included no concrete short- or long-term solutions due to prioritization of protecting the economy); Matthew Daly, *Climate Bill: Senate Democrats Abandon Comprehensive Energy Bill*, HUFFINGTON POST (July 22, 2010, 9:19 PM), http://www.huffingtonpost.com/2010/07/22/climate-bill-senate-democ_n_656175.html (recounting the political battles that halted passage of the clean energy bill in the U.S. Senate).

19. See Dana Hull, *Ninth Circuit Upholds California’s Low Carbon Fuel Standard*, SAN JOSE MERCURY NEWS (Sept. 18, 2013, 12:38 PM), http://www.mercurynews.com/business/ci_24123259/ninth-circuit-upholds-californias-low-carbon-fuel-standard (recounting the legal battle waged by gas, truck, and farming industries to attack a California law aimed at reducing the “carbon intensity” of vehicle fuel).

20. Memorandum on Power Sector Carbon Pollution Standards, 78 Fed. Reg. 39,535 (July 1, 2013), available at <http://www.whitehouse.gov/the-press-office/2013/06/25/presidential-memorandum-power-sector-carbon-pollution-standards>; see Justin Gillis, *Obama Puts Legacy at Stake with Clean-Air Act*, N.Y. TIMES (June 25, 2013), <http://www.nytimes.com/2013/06/26/science/earth/clean-air-act-reinterpreted-would-focus-on-flexibility-and-state-level-efforts.html>; see also *Regulatory Initiatives*, U.S. ENVTL. PROTECTION AGENCY (Jan. 22, 2014), <http://www.epa.gov/climatechange/EPAactivities/regulatory-initiatives.html> (delineating the EPA’s steps to make endangerment findings in the area of GHG emissions and the Agency’s subsequent efforts to regulate and document GHG emissions across industry and individual consumption). See generally EXEC. OFFICE OF THE PRESIDENT, THE PRESIDENT’S CLIMATE ACTION PLAN 5 (2013) (providing a blueprint for President Obama’s climate-change

tools available under the CAA are insufficient on their own to address the United States' contribution to climate change.²¹ In the absence of new legislation targeting climate change, the Administration should explore additional legally permissible and innovative options under other environmental statutes with the aim of mitigating the climate-change threat.

This Note argues that an innovative application of existing law is available under the National Forest Management Act of 1976²² (NFMA). While a regulatory regime that directly limits GHGs could lead to rapid short-term decreases in emissions, applying the NFMA to help slow the effects of climate change could result in two key, though longer term, benefits. First, forest management aimed at reducing land-use changes (i.e., reducing deforestation and other types of disturbances) has significant potential to cut current GHG emission rates.²³ Second, as forests mature, their carbon sequestration potential increases,²⁴ meaning that management toward old-growth²⁵ will not only help reduce emissions but will also help preserve already existing carbon sinks.²⁶

In the National Forest System (NFS) regulatory context, the U.S. Forest Service (USFS or "the Service") has the authority to manage the NFS as a tool for reversing GHG emission trends and mitigating

priorities and initiatives); JANE A. LEGGETT, CONG. RESEARCH SERV., R43120, PRESIDENT OBAMA'S CLIMATE ACTION PLAN (2014) (detailing the administrative action involved in carrying out President Obama's climate-change plans).

21. See Douglas Fischer, *Even Deep Cuts in Greenhouse Gas Emissions Will Not Stop Global Warming*, SCI. AM. (Apr. 14, 2009), <http://www.scientificamerican.com/article/even-deep-cuts-in-greenho> (reporting on findings that while drastic cuts to GHGs would curtail the effects of climate change, they would still fail to stave off its full effect). A study conducted by Princeton University examined this very question by simulating the trapping of 1,800 billion tons of GHGs in the atmosphere followed by a sudden halt in GHG production and concluded that cuts in GHG productions will not prevent climate change. Morgan Kelly, *Even if Emissions Stop, Carbon Dioxide Could Warm Earth for Centuries*, PRINCETON U. (Nov. 24, 2013), <https://www.princeton.edu/main/news/archive/S38/51/51I69/index.xml?section=topstories> (concluding that the planet will still increase its average temperature 100 years after a halt of GHG production).

22. 16 U.S.C. §§ 472a, 521b, 1600–1614 (2012).

23. See IPCC CLIMATE CHANGE 2013, *supra* note 2, at 12 (finding that "deforestation and other land use change" may be responsible for 32% of all anthropogenic GHG emissions).

24. See *infra* notes 182–90 and accompanying text (surveying the literature on carbon sequestration potential of forests).

25. A traditional definition of "old-growth forests" is "forests [that are] at least 150 years old that [have] developed a complex structure characterized by large, live and dead trees; distinctive habitats; and a diverse group of plants, fungi, and animals." VALERIE RAPP, PAC. NW. RESEARCH STATION, NEW FINDINGS ABOUT OLD-GROWTH FORESTS 2 (2003), available at <http://www.fs.fed.us/pnw/pubs/science-update-4.pdf> (discussing various definitions of "old-growth" and why each is insufficient).

26. See *infra* note 183 (discussing the carbon sequestration potential of trees in the United States).

the effects of climate change.²⁷ To demonstrate the regulatory flexibility necessary to implement this climate-focused forest-management priority, this Note examines the legislative evolution of the NFMA. Thus, Part I considers the content and legislative history of the Organic Administration Act of 1897²⁸ (OAA), the Multiple-Use Sustained-Yield Act of 1960²⁹ (MUSYA), and finally the NFMA. Building on this history, Part II argues that these statutes bestow the USFS with sufficient flexibility and discretion to allow for management approaches centered on using the NFS for climate-change mitigation by minimizing land-use disturbances and maximizing carbon sequestration potential. This Note concludes by reiterating that the challenges created by climate change necessitate a shift in forest management priorities that emphasize measures likely to help mitigate climate-change threats, as opposed to priorities focused on maximal natural resource exploitation.

I. THE NATIONAL FOREST SYSTEM: THE EVOLUTION OF THE UNITED STATES' STATUTORY FRAMEWORK GOVERNING THE MANAGEMENT OF ITS FOREST RESOURCES

Prior to the arrival of significant numbers of Europeans in North America, forestland covered nearly 50% of what would become the United States.³⁰ Over the next 250 years, that number dropped to just over 30% but has remained relatively stable since the turn of the twentieth century.³¹ Despite the loss of 300 million acres, forestland

27. This argument has been suggested, briefly, in at least one instance. See, e.g., Rebecca K. Smith, *Our National Forests as Carbon Sinks: A Timely and Appropriate Change in Management Emphasis*, 29 PUB. LAND & RESOURCES L. REV. 183, 184, 186–87 (2008) (arguing that a judicial trend under National Environmental Policy Act of 1969 (NEPA) cases requiring agencies to consider the climate impacts of their proposed actions suggests that the NFS should be managed primarily as a carbon sink). As used throughout this Note, the phrase “mitigate the effects of climate change” does not equate to the more typical discussion of directly decreasing GHG emissions. Instead, this phrase references the landscape’s ability to sequester or store carbon and how that storage capacity can be increased. As this capacity increases, more of the carbon currently present in the atmosphere is stored in the ground, resulting in the deceleration of GHG concentrations in the atmosphere. See *Carbon Sequestration*, U.S. FOREST SERV., <http://www.fs.fed.us/ecosystemservices/carbon.shtml> (last visited May 19, 2014).

28. 16 U.S.C. §§ 473, 478–482, 551 (2012).

29. *Id.* §§ 528–31; see *id.* § 529 (“The Secretary of Agriculture is authorized and directed to develop and administer the renewable surface resources of the national forests for multiple use and sustained yield of the several products and services obtained therefrom.”).

30. U.S. DEP’T OF AGRIC., U.S. FOREST FACTS AND HISTORICAL TRENDS 3 (2001), available at http://www.fia.fs.fed.us/library/briefings-summaries-overviews/docs/Forest_FactsMetric.pdf (estimating that forestland constituted 432 million hectares in 1630).

31. *Id.* (noting that forestland remained stable at about 300 million hectares throughout the twentieth century).

continues to represent an invaluable natural asset that is managed predominantly by the federal government, the timber industry, and private owners.³² Today, 193 million acres, or more than a quarter of the national total, of this remaining forested land makes up the NFS.³³

For most of its existence, the NFS has been managed by the USFS,³⁴ an agency located within the U.S. Department of Agriculture³⁵ (USDA). In the early years of the USFS, after passage of the OAA in 1897, and before the NFS was established under the Agency, the idea of a national forest was in its most nascent stages.³⁶ Under the OAA, Congress set aside lands for federal management with the purpose of improving forest conditions, securing water supplies, and providing a continual source of lumber for the country.³⁷ The Transfer Act of 1905 moved the forest-management authority that was granted by the OAA to the USDA and clarified that the Secretary of Agriculture “shall execute . . . all laws affecting public lands” reserved for the NFS³⁸ and “regulate their occupancy and use . . . to preserve the forests . . . from destruction.”³⁹

This broad management mandate has been refined only twice in the last century. First, in 1960, the MUSYA reaffirmed the OAA’s management priorities and also imposed a management scheme, acknowledging that the uses of NFS lands had greatly expanded and recognizing the necessity of meeting present *and* future needs.⁴⁰ To meet these present and future needs, the statute envisions “forests . . . [being] utilized in the combination that will best meet the needs of the American people”—an objective that requires the USFS to

32. See *id.* at 6 (detailing division of ownership of forested lands in the United States in 1997).

33. See U.S. DEP’T OF AGRIC., THE U.S. FOREST SERVICE—AN OVERVIEW 11–12 (2012) [hereinafter USFS OVERVIEW], available at http://www.fs.fed.us/documents/USFS_An_Overview_0106MJS.pdf (“Forest cover about one-third of the United States—about 751 million acres.”).

34. 16 U.S.C. § 472.

35. *USDA Organization Chart*, U.S. DEP’T OF AGRIC., <http://www.usda.gov/documents/AgencyWorkflow.pdf> (May 2, 2014).

36. See 16 U.S.C. § 475 (creating guidelines for the protection of public lands); see also *Forest Management: A Historical Perspective*, U.S. FOREST SERV., <http://www.fs.fed.us/forestmanagement/aboutus/histperspective.shtml> (last visited May 19, 2014) (indicating that the first national forests were established as “working forests” rather than to preserve natural beauty, as was true of the national parks).

37. 16 U.S.C. § 475.

38. *Id.* § 472.

39. 16 U.S.C. § 551 (1970) (repealed 1976).

40. See Multiple-Use Sustained-Yield Act of 1960, Pub. L. No. 86-517, §§ 1, 4(b), 74 Stat. 215, 215 (codified as amended at 16 U.S.C. §§ 528, 531(b) (2012)) (stating that NFS lands “shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes” to achieve “high-level annual or regular” output in perpetuity “of the various renewable resources of the [NFS]”).

consider and oversee the output of its managed resources while also preserving the integrity of the land.⁴¹ However, in practice, the MUSYA's broad management ideals provided little guidance for courts to assess the performance of USFS forest managers.⁴² Congress addressed this shortcoming with passage of the NFMA in 1976.⁴³ The NFMA affirmed the continued validity of the NFS's historic uses, and it also provided more precise management guidance regarding the interplay between scientific, environmental, social, and economic concerns.⁴⁴ Because the three statutes remain largely intact, the USFS continues to view the OAA as providing guidance on the underlying purpose of the NFS.⁴⁵ However the Service does not view its management authority as limited to the OAA's formative purposes due to the overlaying principles of the MUSYA and the specific dictates of the NFMA.⁴⁶ This change in management discretion has resulted in a dramatic shift in the use of the NFS, as the environmental protection provisions of the NFMA have been tied to a more than 60% drop in timber sales and an 80% drop in clearcut harvests.⁴⁷ Describing its modern management objective, the USFS states that today's "significant challenge" is "to

41. 16 U.S.C. § 531 (defining "multiple use" and "sustained yield"); *see also id.* § 1600(3) (stating a congressional finding that the objectives of the MUSYA are an essential part of protecting the national interest in a renewable resource program).

42. *See* Scott W. Hardt, *Federal Land Management in the Twenty-First Century: From Wise Use to Wise Stewardship*, 18 HARV. ENVTL. L. REV. 345, 367 (1994) (noting that courts have interpreted the MUSYA's multiple-use directive to be so broad that management for a single use could be valid so long as the Service at least *considered* multiple uses).

43. *See* Pub. L. No. 94-588, 90 Stat. 2949 (codified as amended at 16 U.S.C. §§ 1600-1614).

44. *See, e.g.*, 16 U.S.C. §§ 1600(3)-(4), 1601(a), 1604(b), 1604(g)(3)(A)-(B), 1606(d) (affirming multiple-use and sustained-yield goals and discussing the role of research, analysis, and interdisciplinary consideration of various branches of science; the goal of promoting the nation's social and economic well-being; the goal of balancing consideration of economic and environmental benefits; and the goal of ensuring ecological diversity).

45. *See* 16 U.S.C. § 475. *But see, e.g.*, 16 U.S.C. § 476 (1970) (repealed 1976) (demonstrating a now discarded section dating back to the OAA that allowed the Secretary of Agriculture to sell for timber trees that were dead or so large as to prevent younger growth).

46. *See* USFS OVERVIEW, *supra* note 33, at 30-31 (explaining the primary sources of the Service's authority and its interpretation of the effect of each statute on its management responsibilities).

47. *See* *Forest Management: Today*, U.S. FOREST SERV., <http://www.fs.fed.us/forestmanagement/aboutus/today.shtml> (last visited May 19, 2014) (indicating that due to increased concerns about over deforestation in the 1970s, the "Service now operates federal timber sales under some of the most substantial and effective environmental protection policies in the world").

provide forest resources and experiences within the overriding objective of sustaining ecological integrity.”⁴⁸

A. *The Organic Administration Act of 1897*

In 1893, President Harrison established the first forest reserves, following authorization in the General Reform Act of 1891, and sparked a heated debate over their value, purpose, and management.⁴⁹ Congress was divided on the subject of management, with representatives of western states framing the forest reserve system as an attack by Easterners on western sovereignty and land-use practices, and Easterners responding by asserting that they were merely seeking to prevent a repeat of the harmful practices that had decimated eastern forests.⁵⁰ Nonetheless, there appears to have been general consensus that there was a need to preserve timber⁵¹ and water supplies for farms and municipalities surrounding forest reserves.⁵²

The brief language of the OAA codified these two purposes. In relevant part, the statute states that “[n]o national forest shall be established, except to improve and protect the forest within the boundaries, or for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States.”⁵³ The OAA thus

48. *Forest Management: An Ecological Perspective*, U.S. FOREST SERV., <http://www.fs.fed.us/forestmanagement/aboutus/ecoperspective.shtml> (last visited May 19, 2014).

49. See ROBERT H. NELSON, PUBLIC LANDS AND PRIVATE RIGHTS: THE FAILURE OF SCIENTIFIC MANAGEMENT 45–46 (1995) (discussing the coalition of environmentalist-minded individuals and western water users that pushed for expansion, as well as the debated question at the time over whether such lands should be used for preservation or maximum use); see also 30 CONG. REC. 980–88 (1897) (reproducing the heated debate over the effect of the president’s forest reserve power and the purpose of the newly created forest reserves).

50. Compare 30 CONG. REC. at 981 (statement of Rep. Lacey) (arguing that Easterners were not criticizing Westerners but were instead trying to instill the lessons they had learned from over-use of natural resources in places like Connecticut and upstate New York into a framework for forest-reserve management), with *id.* at 986–87 (statement of Rep. Jones) (contending that the proposed legislation harmed residents of Washington State who lived within the boundaries of the newly created reserves because the residents would be severely restricted in their use of what they had previously understood to be their land).

51. See *id.* at 982 (statement of Rep. Shafroth) (explaining that the original purpose of setting aside forest reserves “was to conserve the waters for irrigation” by prolonging the duration of snowmelt and ensuring late-summer water supplies); *id.* at 987–88 (statement of Rep. Jones) (providing a compelling concession that despite concern for Washington State land, he remained in favor of the goal of preserving timber but did not see the need to preserve water supplies, at least in the Puget Sound area).

52. See *id.* at 986 (statement of Rep. Bell) (articulating support among western representatives for creation of forest reserves to protect water supplies in valleys, not “forest reservations for the sake of forests” or for the protection of timber).

53. 16 U.S.C. § 475 (2012).

arguably created a three-pronged management approach focused on forest improvement, timber production, and water security.⁵⁴ Under the OAA before 1976, the USDA managed timber sales of only “dead, matured, or large growth trees” that would be appraised at local rates and sold into local markets.⁵⁵ At the same time, actual water management guidelines were essentially non-existent except for the directive that “waters within the boundaries of national forests [were to be] used for domestic, mining, milling, or irrigation purposes.”⁵⁶ Thus, the OAA did little but provide three over-arching management goals.⁵⁷

The U.S. Supreme Court reaffirmed the continued applicability of the OAA as the statutory source laying out the fundamental purposes of the NFS in *United States v. New Mexico*.⁵⁸ There, the federal

54. The U.S. Supreme Court, in its only substantive analysis of the OAA, stated that Congress, in establishing the NFS, intended to ensure that the NFS served two, not three, purposes. *United States v. New Mexico*, 438 U.S. 696, 707 n.14 (1978). However, commentators, and Justice Powell in his dissent, have criticized this reading of the statute, which, on its face, clearly contains three separate purposes. *See id.* at 719 (Powell, J., dissenting in part) (arguing that a “natural reading” of the Act demonstrates that Congress created the NFS to “1) improv[e] and protect[] the forest, 2) secur[e] favorable conditions of water flows, and 3) furnish[] a continuous supply of timber”); *see, e.g.*, Christine A. Klein, *On Integrity: Some Considerations for Water Law*, 56 ALA. L. REV. 1009, 1045–46 (2005) (noting that “the Court declined to recognize the arguable third purpose of national forests suggested by the literal language of [the] statut[e]”); Note, *The Winters of Our Discontent: Federal Reserved Water Rights in the Western States*, 69 CORNELL L. REV. 1077, 1086 n.75 (1984) (calling “[t]he Court’s restrictive reading . . . plausible” but noting that there are “persuasive arguments” for reading the OAA as laying out three purposes). To get to two purposes, the Court added an additional phrase—“or, *in other words*,”—to the statute to reach its conclusion. *See New Mexico*, 438 U.S. at 707 n.14 (reading the statute to say “[f]orests would be created only ‘to improve and protect the forest within the boundaries,’ or, *in other words*, ‘for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber’”). This Note proceeds with the notion that there are three purposes and that regardless of the number, a conservation-minded approach to NFS management is not undermined by reading only two purposes of the OAA given the subsequent congressional action on the subject.

55. 16 U.S.C. § 476 (1970) (repealed 1976).

56. 16 U.S.C. § 481 (2012).

57. Due to the lack of substantive management directives regarding water, it seems appropriate to read the OAA’s statement of purpose at 16 U.S.C. § 475 as the substantive management directive regarding water within the NFS. *See id.* § 475. Thus, the Service’s management activities under OAA should “secure[] favorable conditions of water flows.” *Id.*

58. 438 U.S. 696, 707 (1978) (recounting the legislative history of the OAA and concluding that Congress enacted the OAA with the intended purpose of conserving water flows and the continuous supply of timber). It should be noted that this was the first and last time that the Supreme Court considered the purpose of the OAA. In one later decision, *California Coastal Commission v. Granite Rock Co.*, the Court considered the OAA’s effect on mineral development and addressed the obligations of the USFS to balance mineral resource development against renewable resources management and environmental protections. 480 U.S. 572, 599 (1987) (Powell, J., concurring). However, the Supreme Court has not considered the NFMA’s effect on the OAA or vice versa.

government argued that creation of the Gila National Forest meant that the government had reserved some quantity of water from the Rio Mimbres to ensure “minimum instream flow for ‘aesthetic, environmental, recreational and “fish” purposes.’”⁵⁹ Disagreeing with the government’s argument, Justice Rehnquist paid specific attention to the OAA’s legislative history and gave particular weight to Representative McRae’s statement that the NFS was created to protect forests from destruction by fire and logging and preserve conditions necessary for quality water flows.⁶⁰ McRae also noted that the NFS could be used for other purposes but that the NFS was “not [a] park[] set aside for nonuse.”⁶¹ Justice Rehnquist recognized this viewpoint, reiterated throughout the debate over the OAA, as clearly codified by the law’s management purposes.⁶² Thus, the Court held that, at least under the OAA, the NFS was initially conceived for “relatively narrow purposes.”⁶³ Nonetheless, by the time the Court decided *New Mexico*, Congress had expanded these “narrow” purposes through the MUSYA,⁶⁴ leading the Court to hold that although a national forest must generally be established to accomplish at least one of the OAA’s foundational purposes, the government could use one of the additional purposes allowed by the MUSYA to justify the national forest’s establishment.⁶⁵ Thus, the OAA will be satisfied so long as a national forest is established—to some undefined extent—for “the purposes of improving and protecting the forest, securing favorable conditions of water flows, or to furnish a continuous supply of timber.”⁶⁶ In the absence of Supreme Court precedent saying otherwise, this conclusion appears to still bind courts due to the fact that subsequent forest management laws have never completely repealed the OAA.

B. *The Multiple-Use Sustained-Yield Act of 1960*

Following World War II, the USFS faced mounting pressures from both sides of the conservation versus resource development divide on

59. *New Mexico*, 438 U.S. at 704 (citation omitted).

60. *Id.* at 708 (quoting 30 CONG. REC. 966 (1897) (statement of Rep. McRae)).

61. *Id.* (quoting 30 CONG. REC. 966 (statement of Rep. McRae)).

62. *Id.*

63. *Id.* at 709.

64. See 16 U.S.C. § 528 (2012) (establishing that the NFS should be managed for “outdoor recreation, range, timber, watershed, and wildlife and fish purposes”).

65. *New Mexico*, 438 U.S. at 714–15 (quoting H.R. REP. NO. 86-1551, at 4 (1960)) (acknowledging that Congress intended to broaden NFS authority to establish national forests beyond its powers to secure water flows and furnish supplies of timber when it enacted the MUSYA).

66. See *id.* at 715 (quoting H.R. REP. NO. 86-1551, at 4).

forest use issues.⁶⁷ Sawtimber consumption rose by nearly 50% from 1940 to 1970, while consumption of pulp and plywood saw triple-digit percentage increases.⁶⁸ With this growth in consumption came calls for transferring public rangeland to private ownership and increasing timber industry access to national forests.⁶⁹ Concurrently, recreational use of NFS land tripled from the 1950s to the 1960s while preservation-minded groups became more “active and politically effective.”⁷⁰ In response to these dual pressures, Congress enacted the MUSYA, as one author suggests, “as a defense against extreme commodity user demands and as a codification of the [S]ervice’s historic conservation mission to promote . . . the greatest good of the greatest number over the long run.”⁷¹

Land-use scholars and other commentators have roundly criticized the MUSYA for its lack of “specific guidance”⁷² and for being “vague.”⁷³ Nonetheless, the statute’s dictates regarding multiple use and sustained yield remain cornerstones of national forest-management policy.⁷⁴ Substantively, the law requires that the USFS consider the value of particular resources in particular areas when managing national forest resources for multiple use and sustained yield.⁷⁵ The multiple-use requirement means that the USFS must manage renewable forest resources in a way that contemplates “the needs of the American people” without significantly harming the land.⁷⁶ In addition, the sustained-yield

67. See PAUL J. CULHANE, PUBLIC LANDS POLITICS: INTEREST GROUP INFLUENCE ON THE FOREST SERVICE AND THE BUREAU OF LAND MANAGEMENT 50–55 (1981) (recounting the political battles between conservationists and the timber commodity interests that enveloped NFS policymaking and ultimately stirred Congress to enact the MUSYA).

68. *Id.* at 50 (stating that consumption for pulp and plywood rose by 235% and 475%, respectively).

69. *Id.* at 51.

70. *Id.*

71. *Id.* at 53 (internal quotation marks omitted); see also S. REP. NO. 86-1407, at 7–8 (1960) (emphasizing that the need for legislation was pressing because “the pressures for single use of specific national forest areas [were] growing tremendously”); H.R. REP. NO. 86-1551, at 6 (stating that that Forest Service should “administer the national forests for sustained yield of its several products . . . because . . . it would apply the concept of sustained yield not only to timber but also to the other renewable national forest resources; and . . . would protect national forest resources from possible overutilization in the future as a result of economic pressures or those of single-interest groups” (emphasis added)).

72. See, e.g., NELSON, *supra* note 49, at 68 (suggesting that the law’s lack of specificity has engendered multiple interpretations of the meaning of “multiple use”).

73. See, e.g., CULHANE, *supra* note 67, at 53 (noting that the statute’s vagueness has permitted “discretionary judgments” regarding how various uses should be prioritized).

74. See, e.g., 16 U.S.C. § 1600(3) (2012) (asserting a congressional finding that both principles are necessary components of a renewable resource program).

75. *Id.* § 529.

76. *Id.* § 531(a).

prong mandates a perpetual “high-level . . . output” of the renewable forest resources over regular intervals.⁷⁷

As the statutory language suggests, the MUSYA’s primary effect was to affirm the Service’s broad discretion in forest-management decision-making so long as the NFS is managed for “outdoor recreation, range, timber, watershed, and wildlife and fish purposes.”⁷⁸ Though the ideas of multiple use and sustained yield are attractive to industrial and environmental interests, their effect on actual management decisions is far from certain.⁷⁹ Traditionally, use of the multiple-use management framework sought to realize broader societal objectives by simultaneously fostering various “competing objectives.”⁸⁰ Impacted by modern conceptions of ecological sustainability,⁸¹ the traditional definition’s lack of prioritization of one objective over another has been supplanted by the notion that ecological sustainability is a foundational management goal, without which “other uses of the land and its resources could be impaired.”⁸²

77. *Id.* § 531(b).

78. *Id.* § 528; *see also* Hardt, *supra* note 42, at 365–66 (detailing the implementation guidance in the MUSYA and noting that courts have often upheld Forest Service decisions against challenges from environmental and industry litigants).

79. For example, from the timber industry’s perspective, multiple use requires use for timber and sustained yield requires a continuous stream of timber into the American marketplace. Conversely, from an environmentalist’s perspective, multiple use requires use for aesthetic appreciation, while sustained yield can mean the economic benefits derived from aesthetic appreciation such as tourism or improvement of health. This dichotomy is captured nicely in a USDA publication providing an overview of USFS management during the twentieth century. *See* JOHN FEDRIW, *MANAGING MULTIPLE USES ON NATIONAL FORESTS, 1905–1995: A 90-YEAR LEARNING EXPERIENCE AND IT ISN’T FINISHED YET* 30–34 (1998), *available at* <http://www.fs.fed.us/research/publications/managing%20multiple%20uses%20on%20national%20forests/chap3.pdf>. There is no guidance within the MUSYA to suggest that one reading is any more valid than the other, except that each reading is correct so long as uses do not lead to “overutilization” or “single use.” *See* 16 U.S.C. § 531(a) (defining “multiple use”).

80. George Hoberg, *Science, Politics, and U.S. Forest Service Law: The Battle Over the Forest Service Planning Rule*, 44 NAT. RESOURCES J. 1, 14 (2004).

81. A singular definition of “ecological sustainability” is difficult to come by. *See* 36 C.F.R. §§ 219.8(a), 219.19 (2013) (defining “ecological sustainability” as “the capability of ecosystems to maintain ecological integrity” and providing that the elements a land-management plan must include to maintain the principle). *But see* 36 C.F.R. § 219.36 (2004) (defining the term as “[t]he maintenance or restoration of the composition, structure, and processes of ecosystems including the diversity of plant and animal communities and the productive capacity of ecological systems” in a previous formulation of the planning rules).

82. COMM. OF SCIENTISTS, U.S. DEP’T OF AGRIC., *SUSTAINING THE PEOPLE’S LANDS: RECOMMENDATIONS FOR STEWARDSHIP OF THE NATIONAL FORESTS AND GRASSLANDS INTO THE NEXT CENTURY*, at xvi (1999); Hoberg, *supra* note 80, at 14–15 (quoting the committee recommendations as support for the assertion that it expanded upon the more classic multiple-use management to prioritize ecological principles over social and economic sustainability).

As Professor George Hoberg suggested in a case study on the role of scientists guiding the development of NFMA implementing regulations, the impact of ecological sciences on forest management direction has been profound and has significantly rebalanced the multiple-use scale, such that industry special interests can no longer expect a *carte blanche* for extracting forest resources as they please.⁸³

Most analysis regarding the MUSYA or the NFMA's incorporation of "multiple use" and "sustained yield" centers on discussion of "multiple use," with little attention paid to "sustained yield."⁸⁴ When Congress incorporated the term, which was previously defined by the MUSYA, into the NFMA, the new law retained "sustained yield" of timber products as a primary objective of the NFS.⁸⁵ Nonetheless, the statutory definition is no more exact than the definition of "multiple use."⁸⁶ Thus, it is unclear whether "sustained yield" means a general economic yield or a yield of specific resources each year.⁸⁷

Early cases challenging MUSYA management activities indicated that the law provided the USFS with wide latitude to allocate the various uses as it saw fit.⁸⁸ In 1970, the U.S. District Court for the Western District of North Carolina in *Dorothy Thomas Foundation, Inc. v. Hardin*⁸⁹ summarized the prevailing interpretation of the MUSYA

83. Hoberg, *supra*, note 80, at 3, 7–9 (tracing the recent history of legal action over forest management decisions and the impact of significant scientific studies on judicial outcomes as well as agency management direction).

84. Any search for writings and analysis regarding the MUSYA or the NFMA's incorporation of "multiple use" and "sustained yield" results in significant discussion of "multiple use," with little attention paid to "sustained yield." See, e.g., 3 GEORGE CAMERON COGGINS & ROBERT L. GLICKSMAN, PUBLIC NATURAL RESOURCES LAW § 30:5 (2d ed. 2014) (providing an overview of judicial review of issues relating to multiple use and sustained yield). Though both statutory definitions are particularly vague, the MUSYA makes clear that "yield" is used in reference to the economic role that "the various renewable resources of the national forests" play in the U.S. economy. 16 U.S.C. § 531(b).

85. See Federico Cheever, *Four Failed Forest Standards: What We Can Learn from the History of the National Forest Management Act's Substantive Timber Management Provisions*, 77 OR. L. REV. 601, 607–15 (1998) (discussing the legislative history of the NFMA and the historical origins of the "sustained yield" concept in European and American forestry); see also 16 U.S.C. § 1604(e)(1) (requiring that resource management plans provide for sustained yield of timber as one of several statutorily defined NFS uses/yields).

86. See 16 U.S.C. § 531 (defining "sustained yield" as "the achievement and maintenance . . . of the various renewable resources of the national forest without impairment of the productivity of land").

87. See Michael Goodman, Comment, *Forest Service Appeals Reform: Searching for Meaningful Review*, 3 N.Y.U. ENVTL. L.J. 117, 123 (1994) (describing the MUSYA's flexible guidelines as being so unclear as to not specify whether "sustained yield" should be applied to the system as a whole or individually within each forest).

88. See *The Timber Wars*, U.S. DEP'T OF JUST. (Nov. 2010), <http://www.justice.gov/enrd/3253.htm> (providing an assessment of the case history litigating the statute as affirming the discretion of the agency).

89. 317 F. Supp. 1072 (W.D.N.C. 1970).

and stated that simply “hav[ing] a different opinion about how a national forest should be run” is insufficient grounds upon which to determine that the USFS abused its discretion or acted in an arbitrary and capricious manner.⁹⁰ Indeed, as both commentators and the U.S. Department of Justice point out, because the law contains no specific substantive management standards, it created no way for courts to discern whether agency actions, such as a timber sale decisions, were “arbitrary and capricious” as contemplated by the Administrative Procedure Act⁹¹ (APA). Thus, the MUSYA’s effect on NFS management might best be described as affirming that the NFS is to be managed for timber production, water security, and forest preservation, alongside potential additional purposes of outdoor recreation, livestock grazing, and fish and wildlife.⁹²

C. *The National Forest Management Act of 1976*

In a bizarre twist involving a creative litigation strategy, a 1975 court decision rendered under the OAA, and circumventing the MUSYA, led to an urgent sense that forest management in the United States needed congressional clarification.⁹³ In *West Virginia Division of the Izaak Walton League of America, Inc. v. Butz*,⁹⁴ an environmental organization argued that the USFS violated the OAA’s timber-sales provision by allowing for clearcutting on the Monongahela National Forest in West Virginia.⁹⁵ Because the OAA specifically limited cutting to the “dead, matured, or large growth” trees specifically

90. *Id.* at 1076.

91. *See, e.g.*, Michael C. Blumm, *Public Choice Theory and the Public Lands: Why “Multiple Use” Failed*, 18 HARV. ENVTL. L. REV. 405, 406–07 (1994) (arguing that multiple use’s failure as a management standard is evidenced by continued overgrazing, below-cost timber sales, and endangerment of Snake River salmon); *The Timber Wars*, *supra* note 88 (recounting courts’ application of the APA standard to MUSYA challenges); *see also* 5 U.S.C. § 706(2)(A) (providing the arbitrary and capricious standard as a criterion for courts to overturn agency action).

92. *See* H.R. REP. NO. 86-1551, at 4 (1960) (clarifying that the MUSYA’s effect on NFS management was to ensure that the OAA’s purposes of “improving and protecting the forest or . . . securing favorable conditions of water flows and to furnish a continuous supply of timber” were not to be affected by the MUSYA’s addition of “outdoor recreation, range, or wildlife and fish purposes” such that an NFS unit had to first honor an OAA purpose before it could be managed for the “supplemental” purposes espoused by the MUSYA); *see also* *United States v. New Mexico*, 438 U.S. 696, 715 (1978) (holding the congressional finding as decisive in determining the parameters of the Agency’s discretion).

93. *See* Charles F. Wilkinson, *The National Forest Management Act: The Twenty Years Behind, the Twenty Years Ahead*, 68 U. COLO. L. REV. 659, 664 (1997) (describing the context and impact of the Monongahela National Forest case, *W. Va. Div. of the Izaak Walton League of Am., Inc. v. Butz*, 522 F.2d 945 (4th Cir. 1975)).

94. 522 F.2d 945 (4th Cir. 1975), *superseded by statute*, National Forest Management Act of 1976, Pub. L. No. 94-588, 90 Stat. 2949.

95. *Id.* at 946–47.

marked for cutting,⁹⁶ the U.S. Court of Appeals for the Fourth Circuit held that the OAA required timber sales to “serve[] the purpose of preserving and promoting the younger growth of timber on the national forests”; an outcome not possible if clearcutting was allowed.⁹⁷ For environmentalist plaintiffs, the *Izaak Walton League* decision became a powerful tool for restraining the USFS from permitting clearcuts on NFS lands and effectively undercutting the MUSYA’s broad grant of management discretion.⁹⁸

In response to the implications of the *Izaak Walton League* decision, Congress enacted the NFMA in part to restore the USFS’s ability to undertake “timber management” practices as part of its overall silvicultural, or forest growth and management, scheme.⁹⁹ At the same time, members of Congress advocating for the NFMA sought to “fundamental[ly] reform” management of all resources contained in the NFS, including timber, and recognized that

[t]he days have ended when the forest may be viewed only as trees and trees viewed only as timber. The soil and the water, the grasses and the shrubs, the fish and the wildlife, and the beauty that is the forest must become integral parts of resource managers’ thinking and actions.¹⁰⁰

Thus, the NFMA drafters envisioned future forest management “based on a comprehensive assessment of present and anticipated uses” in conjunction with environmental and economic impact analyses that account for the supply of, and demand for, renewable resources.¹⁰¹

At its core, the NFMA splits NFS management into a three-tiered system under which planning takes place at the national, regional, and individual forest levels.¹⁰² At the highest level, the USDA develops a strategic plan that compiles NFS needs, outputs and results, priorities, personnel needs, and recommendations for future management activity.¹⁰³ In addition, the USDA must promulgate land-management planning regulations adhering to the MUSYA’s

96. 16 U.S.C. § 476 (1958) (repealed 1976).

97. *Izaak Walton League*, 522 F.2d at 948.

98. See *The Timber Wars*, *supra* note 88 (describing the Fourth Circuit’s statutory analysis of the OAA).

99. 122 CONG. REC. 2215–16 (1976) (statement of Sen. Randolph).

100. *Id.* at 5618–19 (statement of Sen. Humphrey).

101. 16 U.S.C. § 1600(3) (2012).

102. See *id.* §§ 1601–1604 (delegating resource assessment creation and reporting, land management plan creation, and administrative regulation development to the USDA); 36 C.F.R. § 219.2 (2013) (exemplifying how the USDA has delegated the NFMA’s management directives in a way that best addresses the interests most affected by each requirement).

103. 16 U.S.C. § 1602.

principles.¹⁰⁴ National forest supervisors then develop a comprehensive management scheme for individual forests with respect and consideration for the scheme's implications on both the national and regional levels.¹⁰⁵ Finally, at the individual forest level, the legal framework obligates forest supervisors or district rangers to utilize the USDA's land and resource management plan regulations and applicable land-management plans as they make specific project and activity decisions.¹⁰⁶

The end result of this plan-development framework is an implementable land and resource management plan applicable to a single national forest unit. Under the NFMA, these plans must: (1) comply with the National Environmental Policy Act of 1969¹⁰⁷ (NEPA); (2) provide for a land use suitability inventory; (3) ensure that environmental, economic, ecological, research, and timber harvest interests are appropriately addressed; (4) specify where timber production should not take place; and (5) provide guidelines for determining when to harvest timber without precluding measures to improve forest health or promote multiple use objectives.¹⁰⁸ The USDA's promulgated rules provide more substantive requirements for forest supervisors to adhere to in developing forest-management plans.¹⁰⁹

On a broader level, the NFMA clarifies that NFS management must focus on the six principal uses allowed by the OAA and the MUSYA—"outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness"—without impairing the viability of plant and animal species.¹¹⁰ This last viability requirement is often pointed to as a justification for rebalancing forest policy to focus less on resource extraction and more on conservation.¹¹¹ This requirement also

104. *Id.* § 1604(g).

105. 36 C.F.R. § 219.2(b)(1).

106. *Id.* § 219.2(c); *see* 16 U.S.C. § 1604(a)–(f) (providing the basic outline for the development of land and resource management plans).

107. 42 U.S.C. §§ 4321–4370h.

108. 16 U.S.C. § 1604(g), (k), (m) (specifying various requirements of the NFS management plans under the NFMA, which are intended to provide a comprehensive regulatory picture of the units).

109. *See* National Forest System Land Management Planning, 77 Fed. Reg. 21,162 (Apr. 9, 2012) (codified at 36 C.F.R. §§ 219.1–.62) (setting out numerous guidelines for developing the plans, including, for example, the role of science, public participation requirements, and considerations of sustainability in the plans); *see also* 16 U.S.C. § 1604(g) (obligating the Secretary of Agriculture to promulgate regulations to carry out the MUSYA that set the parameters of management plans).

110. 16 U.S.C. § 1604(e)(1), (g)(3)(B).

111. *See* Oliver A. Houck, *On the Law of Biodiversity and Ecosystem Management*, 81 MINN. L. REV. 869, 885–91 (1997) (discussing the NFMA's biodiversity requirements and how Congress and the USDA managed to use it and its promulgated regulations to strengthen the statute's otherwise lifeless language).

represents what may be the most significant check on the USFS's discretion over forest-management policy.¹¹²

A definitive, forward-looking, conservation-minded dictate emerges from combining three principles from the OAA, the MUSYA, and the NFMA, respectively. First, the OAA commands that the NFS must be used to protect forests, stream flows, and a healthy timber supply.¹¹³ Second, MUSYA requires resource management that maximizes productive use of natural resources and that is responsive to the "needs of the American people . . . without impairment of the productivity of the land."¹¹⁴ Finally, the NFMA mandates that NFS management be for "present and *anticipated* uses" of NFS resources.¹¹⁵ Though the NFMA continues to keep numerous avenues open for resource extraction, a reasonable balancing of its provisions suggests (1) that the USFS cannot take actions that could threaten the survival of plant and animal species, and (2) that the area of greatest discretion in which the USFS may operate lies in its ability to steward the forest ecosystem to ensure its perpetual vitality.

II. THE U.S. FOREST SERVICE SHOULD EXERCISE ITS DISCRETION, IN CONJUNCTION WITH ITS DUTY TO CONSERVE, UNDER THE OAA, MUSYA, AND NFMA TO MAXIMIZE THE NATIONAL FORESTS' LONG-TERM USEFULNESS IN MITIGATING CLIMATE CHANGE

The balance between use, sustainability, and economic yield represents a complex and potentially conflicting management mandate for the USFS. Some commentators have used the interconnected nature of these priorities to argue that the threat of climate change requires a fundamental shift in USFS management priorities.¹¹⁶ Under this line of argument, climate change threatens the viability of the forests themselves, requiring a management direction focused on conservation and mitigation of negative

112. See Robert B. Keiter, *Ecological Concepts, Legal Standards, and Public Land Law: An Analysis and Assessment*, 44 NAT. RESOURCES J. 943, 946 (2004) (arguing that the NFMA's biodiversity requirement represented the end of "unbridled oversight of the national forests").

113. 16 U.S.C. § 475.

114. *Id.* § 531(a) (defining "multiple use").

115. *Id.* § 1600(3) (emphasis added).

116. See, e.g., Robert L. Glicksman, *Ecosystem Resilience to Disruptions Linked to Global Climate Change: An Adaptive Approach to Federal Land Management*, 87 NEB. L. REV. 833, 839, 866 (2009) (analyzing the effects of climate change on federal lands and suggesting a management focus that mitigates the impacts of climate change on these lands); Karin P. Sheldon, *Upstream of Peril: The Role of Federal Lands in Addressing the Extinction Crisis*, 24 PACE ENVTL. L. REV. 1, 2 (2007) (discussing the threat of species and ecosystem collapse posed by climate change and the need for a fundamental shift in public lands management).

impacts.¹¹⁷ Though in application this line of argument likely leads to a similar outcome as that advocated for by this Note, the arguments based on preservation of biodiversity inevitably collide with the long-held public belief that the NFS was created first and foremost as an economic driver for the forest-resources industry.¹¹⁸ As the statutory history above shows, the conservation-only and extraction-only viewpoints are myopic interpretations of the NFMA and its predecessor statutes.¹¹⁹

Remaining at the heart of the NFMA is the concept of NFS resource management for maximal positive economic effect in perpetuity.¹²⁰ From a traditional point of view, this would seem to translate into the cutting and processing of timber, the extraction of minerals, and the exploitation of other resources like plants and animals.¹²¹ However, faced with the threat and cost of climate change, neither the economic calculus nor the NFS's purpose as a nationally important natural resource is very clear.

Though this Note does not seek to quantify such things as nonuse values,¹²² natural resource damages,¹²³ or valuation of ecosystem services,¹²⁴ it does presuppose that quantifying the *ecological benefits* of a highly functional NFS ecosystem would demonstrate a long-term

117. See Glicksman, *supra* note 116, at 836–37 (discussing the shifting approach to land management that promotes “resilience of ecological systems” as the essential goal of management in the face of climate change).

118. See Eric Biber, *Too Many Things To Do: How To Deal with the Dysfunctions of Multiple-Goal Agencies*, 33 HARV. ENVTL. L. REV. 1, 19–20 (2009) (describing the regulatory practice by which other goals of the NFS were consistently subordinate to timber production); Sara A. Clark, Note, *Taking a Hard Look at Agency Science: Can the Courts Ever Succeed?*, 36 ECOLOGY L.Q. 317, 347 (2009) (noting that the USFS has a long-standing culture of favoring the timber harvest over conflicting management mandates in the NFMA).

119. See *supra* Part I (summarizing the origins and implementations of the OAA, MUSYA, and NFMA).

120. 16 U.S.C. § 1600(3).

121. See *supra* note 118 and accompanying text.

122. See Jason J. Czarnecki & Adrienne K. Zahner, *The Utility of Non-Use Values in Natural Resource Damage Assessment*, 32 B.C. ENVTL. AFF. L. REV. 509, 511–12 (2005) (describing various types of recognized “non-use values” and suggesting that they are “frequently underestimated or ignored in determinations of how much polluters should pay for damages inflicted upon natural resources”).

123. See Charles B. Anderson, *Damage to Natural Resources and the Costs of Restoration*, 72 TUL. L. REV. 417, 419–20 (1997) (providing an overview of how natural resource damages are calculated in the United States).

124. See, e.g., Robert Costanza et al., *The Value of the World's Ecosystem Services and Natural Capital*, 387 NATURE 253, 259 (1997) (placing the value of worldwide ecosystem services at \$33 trillion in 1997). Today, that number translates into over \$48 trillion once inflation is taken into account. See *CPI Inflation Calculator*, BUREAU LAB. STAT., http://www.bls.gov/data/inflation_calculator.htm (last visited May 19, 2014) (enter “33” and “1997,” select “2014” and the “Calculate” button, then add twelve zeros).

economic benefit for the United States.¹²⁵ This assumption is based on the costs already associated with climate change¹²⁶ and the general consensus that such costs are expected to increase for the foreseeable future.¹²⁷ Under this scenario, any available tool, be it natural or technological, will prove critical in attempting to mitigate the climate-change threat.

Thus, the remainder of this Note discusses how USFS policy can be shifted under current law to reorient the way the NFS should be perceived and primarily used. First, this Part explores how current law requires ecological considerations to be at the heart of forest-management activities and how regulatory schemes could achieve these mandates. Next, this Part specifically addresses the long-term role that old-growth forests can play in addressing climate change and argues that managing younger forests toward old-growth and expanding conservation of existing old-growth resources is a legally permissible management direction. Though the climate-change mitigation benefits of this management shift would not be immediate, the change is proposed as providing a long-term mitigation strategy geared toward slowing the effects of climate change. Finally, this Part briefly discusses management techniques that could make the policy goals discussed in this Note achievable. In doing so, this Part provides an overview of forest management techniques that scientists have found to increase the carbon sequestration potential of forests while continuing to allow for the production of forest products.

A. *The NFMA's Broad Grant of Discretion Is Limited by a Command To Consider Science and Preserve Biodiversity*

USFS discretion in managing the NFS is limited by affirmative duties to protect and conserve biodiversity. Because a management direction focused on minimizing GHG emissions from land-use changes and maximizing NFS carbon sequestration potential

125. *See id.* (finding that approximately 38% of the \$33 trillion worldwide ecosystem value comes from “terrestrial systems, mainly from forests... and wetlands”).

126. *See, e.g.*, FRANK ACKERMAN & ELIZABETH A. STANTON, STOCKHOLM ENV'T INST., *THE LAST DROP: CLIMATE CHANGE AND THE SOUTHWEST WATER CRISIS* 30 (2011), available at http://sei-us.org/Publications_PDF/SEI-WesternWater-0211.pdf (finding that the \$4 trillion cost of the existing water shortage in the southwestern United States could rise to as much as \$5 trillion over the next century under severe climate change scenarios).

127. *See, e.g.*, SAMUEL FANKHAUSER, *VALUING CLIMATE CHANGE: THE ECONOMICS OF THE GREENHOUSE* 27–28 (1995) (providing order of magnitude estimates of the costs of climate change to a variety of economic sectors and finding the “damage cost benchmark” to be one to 2% of GNP).

depends inherently on conservation, the NFMA's conservation provisions represent a critical element for justifying the management shift proposed. Thus, the broad discretion discussed above and the limitations on that discretion discussed below work in tandem to justify a policy shift that places certain NFS purposes above others.

As discussed above, the NFMA in many ways preserves the broad congressional grant of discretion embodied in the OAA and the MUSYA.¹²⁸ Key language in these statutes reaffirms the multiple use and sustained yield guiding principles¹²⁹ and states the affirmative duties of the USFS to: “be a leader in assuring that the Nation maintains a natural resource conservation posture that will meet the requirements of our people in perpetuity”;¹³⁰ attempting to balance logging and economic interests with the “protection of forest resources,” while also providing for “outdoor recreation (including wilderness), range, timber, watershed, wildlife, and fish”;¹³¹ and ensuring that the NFS is dedicated to “the long-term benefit for present and future generations.”¹³²

However, the broad language of the NFMA is tempered in several key respects. First, land-use planning regulations must contain provisions that “provide for diversity of plant and animal communities . . . [and] preserve the diversity of tree species” to the highest degree possible.¹³³ Though this provision's text is highly qualified¹³⁴ the next subsection of the law requires that research be done to “insure . . . that [management decisions] will not produce substantial and permanent impairment of the productivity of the land.”¹³⁵ Finally, the NFMA also requires that these regulations be written in consultation with scientists not employed by the USFS, to “assure that an effective interdisciplinary approach is proposed and adopted.”¹³⁶

Courts faced with legal challenges brought by conservation groups seeking NFMA enforcement have confirmed that the NFMA's biodiversity provisions require the USFS to avoid management activities that would cause irreparable or irreversible environmental

128. *See supra* Part I.C.

129. *See* 16 U.S.C. § 1600(3) (2012).

130. *Id.* § 1600(6).

131. *Id.* § 1604(g)(3)(A).

132. *Id.* § 1609(a).

133. *Id.* § 1604(g)(3)(B).

134. *Id.* (requiring preservation, but only “based on the suitability and capability of the specific land area . . . and within the multiple-use objectives,” “where appropriate,” and “to the degree practicable”).

135. *Id.* § 1604(g)(3)(C).

136. *Id.* § 1604(h)(1).

harm.¹³⁷ For example, in *Earth Island Institute v. U.S. Forest Service*,¹³⁸ the forest supervisor for the El Dorado National Forest argued that an emergency situation required immediate approval of a timber salvage sale following a forest fire.¹³⁹ The Service maintained that failure to grant approval might result in more than \$12 million in lost revenue to the federal government.¹⁴⁰ Earth Island, a California-based non-profit organization dedicated to conserving, preserving, and restoring ecosystems, filed suit, arguing that the USFS had failed to consider adverse environmental impacts that would follow from the project's approval.¹⁴¹ Despite the Service's claim of an emergency situation, the court admonished the Service for appearing to "have been more interested in harvesting timber than in complying with . . . environmental laws," finding instead that the "*loss of anticipated revenues . . . does not outweigh the potential for irreparable damage to the environment.*"¹⁴²

This sense of "irreparable damage" as a significant factor to weigh during management decisions was echoed in *Kootenai Tribe of Idaho v. Veneman*.¹⁴³ There, tribal, state, and industry plaintiffs challenged the USFS's proposed "Roadless Rule,"¹⁴⁴ alleging that they were harmed by loss of access to the NFS and that this access was necessary to promote the health of the forest.¹⁴⁵ Though not brought as a challenge under the NFMA, the case has been cited by later decisions for its assertion that "*the public's interest in preserving precious, unreplenishable resources must be taken into account in balancing the*

137. The NFMA provides no independent cause of action by which private citizens or conservation groups may challenge USFS management actions, but plaintiffs may bring suit against the Agency under the APA for noncompliance with NFMA requirements. 5 U.S.C. §§ 701–706; *see also* *Utah Env'tl Cong. v. Russell*, 518 F.3d 817, 823 (10th Cir. 2008) ("As neither the NFMA nor NEPA provide a private right of action, we review the Forest Service's approval of the Project as a final agency action under the Administrative Procedure Act (APA).").

138. 442 F.3d 1147 (9th Cir. 2006), *abrogated on other grounds by* *Winter v. Natural Res. Def. Council, Inc.*, 555 U.S. 7 (2008).

139. *Id.* at 1155.

140. *Id.*

141. *Id.* at 1156.

142. *Id.* at 1177–78 (alteration in original) (emphasis added) (quoting *Nat'l Parks & Conservation Ass'n v. Babbitt*, 241 F.3d 722, 738 (9th Cir. 2001)).

143. 313 F.3d 1094 (9th Cir. 2002), *abrogated on other grounds by* *Wilderness Soc'y v. U.S. Forest Serv.*, 630 F.3d 1173 (9th Cir. 2011) (en banc).

144. *Id.* at 1106. The Roadless Rule "generally banned road building" on 58.5 million acres, with narrow exceptions for pre-existing building rights or projects the USFS deem in the interest of public health or safety. *Id.* at 1105–06.

145. *Id.* at 1106.

hardships” that may result from the imposition of a certain rule or policy decision.¹⁴⁶

Finally, in *Oregon Natural Resources Council Fund v. Goodman*,¹⁴⁷ conservationist plaintiffs challenged the USFS’s decision to grant a permit to a ski resort to expand its operations in order to “ensure the ski area’s long-term economic viability.”¹⁴⁸ In granting the plaintiffs’ requested injunction, the court noted that although the ski area’s expansion could result in “temporary economic harm,” such an outcome was outweighed by the “risk of permanent ecological harm” posed by the area’s expansion.¹⁴⁹

These cases suggest that USFS management activities, like logging or road building, carry the potential for an impermissibly harmful environmental impact.¹⁵⁰ Given that there is some limiting threshold on the negative environmental impacts allowed for certain management activities, these cases support the notion that the NFMA’s conservation provisions are taken seriously by the courts and can significantly limit planned USFS activity.¹⁵¹

This resource development versus conservation tug-of-war begs the question: what if USFS management activities were designed to create positive environmental impacts? Admittedly, the suggestion that USFS management activities do not is open to the criticism that USFS management is statutorily required to create long-term positive environmental outcomes.¹⁵² Regardless of the policy statements contained in the NFMA¹⁵³ or its implementing regulations,¹⁵⁴ an

146. *Id.* at 1125 (emphasis added); *see also* *Earth Island Inst. v. U.S. Forest Serv.*, 351 F.3d 1291, 1308–09 (9th Cir. 2003) (applying the *Kootenai* court’s holding that the public interest in preserving forest resources is an appropriate factor to consider in claims brought concerning NFMA and NEPA actions).

147. 505 F.3d 884 (9th Cir. 2007).

148. *Id.* at 887.

149. *Id.* at 898.

150. *See, e.g.*, *Earth Island Inst. v. U.S. Forest Serv.*, 442 F.3d 1147, 1177–78 (9th Cir. 2006) (finding that the USFS’s timber enterprise posed a threat of irreparable harm to the environment), *abrogated on other grounds by* *Winter v. Natural Res. Def. Council, Inc.*, 555 U.S. 7 (2008); *Kootenai*, 313 F.3d at 1124–26 (scrutinizing USFS road building for its potential environmental impact).

151. *See, e.g.*, *Earth Island Inst.*, 442 F.3d at 1173–76 (scrutinizing the USFS’s failures to abide by the NFMA’s plant and animal preservation provisions).

152. *See, e.g.*, 16 U.S.C. §§ 1600(6), 1604(g)(3)(B) (2012); *see also* 36 C.F.R. § 219.1(b) (2012) (stating that the USFS “manages the NFS to sustain the multiple use of its renewable resources in perpetuity while maintaining the long-term health and productivity of the land”).

153. *See* 16 U.S.C. § 1600(6) (stating that the USFS “has both a responsibility and an opportunity to be a leader in assuring that the Nation maintains a natural resources conservation posture”).

154. *See* 36 C.F.R. § 219.1(c) (requiring that land management plans “guide management of NFS lands so that they are ecologically sustainable . . . ; consist of ecosystems and watersheds with ecological integrity . . . ; and have the capacity to

overarching NFS management policy direction declared by the president that prioritizes use of the NFS resource in relation to climate-change mitigation could result in additional long-term benefits not traditionally associated with the NFS.¹⁵⁵ Such a policy shift would not only maximize the ecological health of the NFS, but would re-center forest management to better confront the challenges posed by climate change.¹⁵⁶

The NFMA's biodiversity provisions, preservation of broad management discretion, and theme of conservation for perpetual usefulness appear to support a reading whereby USFS activities can be designed to minimize land-use changes and maximize the carbon storage capacity of every NFS unit. Because of the generally broad management discretion discussed in Part I, the statutory limitations on USFS's discretion suggest that the Service has the widest management latitude in relation to measures aimed at conservation, while its latitude for activities such as logging or road building can be narrowed due to the way these activities implicate the biodiversity and preservation provisions in the NFMA.¹⁵⁷ Additionally, this shift in management focus may begin to find additional support from new developments in the NEPA¹⁵⁸ case law, which is discussed briefly below.

B. Recent Jurisprudence and Scientific Findings Can Provide Support for NFS Management Strategies that Could Mitigate Climate Change

The Obama Administration's increased focus on climate-change mitigation strategies, in addition to a judicial willingness to consider whether federal agencies should address the climate-change impacts of federal actions, provides a compelling platform for the

provide people and communities with ecosystem services . . . for the present and into the future").

155. See *infra* notes 183–87 and accompanying text (discussing the carbon sequestration potential of forests, especially old-growth forests). Such additional benefits could include increased water security and a long-term decrease in government expenditures. See, e.g., Keith H. Hirokawa, *Sustaining Ecosystem Services Through Local Environmental Law*, 28 PACE ENVTL. L. REV. 760, 817 (2011) (discussing Seattle's purchase and protection of the watershed, providing the city with drinking water, and the long-term benefits of the decision to do so).

156. See National Forest System Land Management Planning, 77 Fed. Reg. 21,162 (Apr. 9, 2012) (codified at 36 C.F.R. §§ 219.1–62) (exemplifying a planning rule designed to develop land management plans that promote ecological sustainability and biodiversity). *But see* Complaint ¶¶ 23–81, Fed. Forest Res. Coal. v. Vilsack, No. 12-1333 (D.D.C. Aug. 13, 2012), 2012 WL 3281587 (representing a pending industry challenge to this 2012 planning rule).

157. See *supra* notes 128–51 and accompanying text (summarizing the breadth of USFS discretion and then exploring limitations on that discretion).

158. The NEPA is codified at 42 U.S.C. §§ 4321–4370f.

management focus advocated for by this Note. Further, recent scientific studies examining the carbon sequestration potential of forests provide a scientific foundation for a USFS management policy aimed at conserving existing old-growth and moving younger forests toward old-growth.¹⁵⁹ Though this management tactic would not result in immediate GHG reductions in the way that direct emissions cuts would, it ensures (1) that land-use change within the NFS does not lead to increased emissions, and (2) that the carbon sequestration capacity of the NFS increases over time, resulting in continued and long-term mitigation of GHG emission trends.¹⁶⁰

Under the NFMA, forest-management plans must comply with the NEPA,¹⁶¹ which requires that all major federal actions “significantly affecting the quality of the human environment” be accompanied by a detailed environmental impact statement.¹⁶² In recent years, some courts have required federal agencies considering environmental impacts under the NEPA to quantify the climate impacts that will result from proposed federal actions.¹⁶³ While these cases have not provided clear guidelines for how an agency is to accomplish this task,¹⁶⁴ they indicate the nascent stage of a new area of agency environmental impact analysis that focuses on climate change.¹⁶⁵

159. See *infra* notes 183–87 and accompanying text (discussing scientific evidence of the carbon sequestration potential of various forest types).

160. This forest management direction was suggested directly by the IPCC in its Fourth Assessment Report from 2007. See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: MITIGATION OF CLIMATE CHANGE 551 (Bert Metz et al. eds., 2007) [hereinafter IPCC CLIMATE CHANGE 2007: MITIGATION], available at http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4_wg3_full_report.pdf (suggesting management tactics for increasing “stand- and landscape-level carbon density”).

161. 16 U.S.C. § 1604(g)(1).

162. 42 U.S.C. § 4332(C).

163. See, e.g., *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1217 (9th Cir. 2008) (stating that “[t]he impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct”); see also *Border Power Plant Working Grp. v. Dep't. of Energy*, 260 F. Supp. 2d 997, 1028–29 (S.D. Cal. 2003) (holding that the Agency’s failure to disclose and analyze the effects of emitted GHGs was legally deficient under the NEPA).

164. See, e.g., *San Diego Navy Broadway Complex Coal. v. U.S. Dep't of Def.*, 904 F. Supp. 2d 1056, 1068 (S.D. Cal. 2012) (finding an agency’s summary treatment of climate impacts adequate because the project’s “incremental contribution . . . [to] global climate change [could not] be determined given the current state of the science and assessment methodology”); see also *Earth Island Inst. v. Gibson*, 834 F. Supp. 2d 979, 990 (E.D. Cal. 2011) (noting that the “NEPA only requires an agency to focus on issues that are truly significant to the action in question, and to discuss environmental impacts in proportion to their significance” (internal quotations omitted)), *aff'd*, 697 F.3d 1010 (9th Cir. 2012).

165. See generally James R. Holcomb, IV, *NEPA and Climate Change: After the CEQ's Draft Guidance*, 41 TEX. ENVTL. L.J. 259 (2011) (discussing the role of the NEPA and the Council on Environmental Quality’s (CEQ) climate change impacts guidance on judicial scrutiny of climate change impacts analysis); Matthew P. Reinhart, *The*

This emerging judicial scrutiny of the climate-change impacts of major federal actions comes at a time of increased administrative intervention. For example, in 2010, the Council on Environmental Quality¹⁶⁶ (CEQ) issued draft guidance concerning how federal agencies should consider the effects of GHG emissions caused by federal activities.¹⁶⁷ Under the draft guidance, the CEQ recommends “a quantitative and qualitative assessment” of the impacts following any federal action with annual emissions of more than 25,000 metric tons of carbon dioxide-equivalent GHGs.¹⁶⁸ In keeping with the federal government’s commitment to reduce GHG emissions, the CEQ guidance also suggests that agencies should weigh information on GHG emissions when deciding among alternatives.¹⁶⁹ Particularly relevant to this Note is the CEQ’s observation that federal agencies lack a comprehensive strategy for incorporating recognition of the resulting atmospheric carbon release or potential carbon sequestration at a landscape scale due to changes in land use or management strategy.¹⁷⁰ Taken together, the government’s emissions goals, the CEQ’s draft guidance, and the recognition of a need to develop a technique for assessing the GHG impact of land management decisions, create a path forward for the USFS to use carbon sequestration potential as a means for justifying management

National Environmental Policy Act: What Constitutes an Adequate Cumulative Environmental Impacts Analysis and Should It Require an Evaluation of Greenhouse Gas Emissions?, 17 U. BALT. J. ENVTL. L. 145 (2010) (arguing that, as scientific understanding of climate change becomes more sophisticated, it is likely that the CEQ and courts will require federal agencies to analyze their major actions’ cumulative impacts on climate change).

166. See 42 U.S.C. § 4342 (establishing the CEQ under the NEPA). The CEQ is a three-member body that operates within the Executive Office of the President and is filled by presidential appointment that is subject to Senate confirmation. *Id.* The CEQ is the body responsible for promulgating the regulations agencies must reference when preparing environmental impact documentation under the NEPA. See 16 C.F.R. § 1.81 (2013).

167. Memorandum from Nancy H. Sutley, Council on Env’tl. Quality, to the heads of federal departments and agencies on the CEQ’s Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions 1 (Feb. 18, 2010) [hereinafter NEPA Guidance Memo], available at http://energy.gov/sites/prod/files/CEQ_Draft_Guidance-ClimateChangeandGHG-emissions-2.18.10.pdf.

168. *Id.*

169. *Id.* at 2.

170. *Id.* at 4. Accounting for carbon sequestration at the landscape level is the equivalent of summing carbon stock changes observed at the individual forest unit level. See IPCC CLIMATE CHANGE 2007: MITIGATION, *supra* note 160, at 551 (providing a definition of “[l]andscape-level carbon stock changes”). In other words, this technique would allow managers to develop a sequestration baseline (how much carbon is in the ground) and project optimal or maximal levels of sequestration based on various management approaches.

activity.¹⁷¹ If such benefits can be shown, proposed projects may be justified because they play a crucial role in the overarching goal of “eliminating or reducing GHG emissions.”¹⁷²

Though a USFS project may find justification under an administration’s climate policies or the CEQ’s technical guidance, the more pressing question is whether these justifications can also coexist with the NFS purposes and management dictates of the NFMA. As discussed in Part I.C the NFMA builds upon the forest management ideals of previous statutes to clarify that NFS management must allow for at least one of six uses: recreation, livestock range, timber supply, water security, species preservation, and wilderness.¹⁷³ At the same time, these various uses must not impair the diversity or viability of those species found within the NFS and must be deployed in a way that allows for changes in use over time so as to serve the needs of the Nation in perpetuity.¹⁷⁴

Because climate change is happening and because the NFS is already playing a role in mitigating changes, it is arguable that the most beneficial uses of the NFS, at this time and into the future, are to help mitigate climate change and the problems created by climate change. In the NFS purposes framework created by the NFMA, use for climate-change mitigation does little to hinder a number of NFS purposes including recreation,¹⁷⁵ water security,¹⁷⁶ species preservation,¹⁷⁷ and wilderness.¹⁷⁸ At the same time, this

171. “Carbon Sequestration” refers to a process by which atmospheric carbon dioxide is captured and stored in soils and forests through photosynthesis. Roger Sedjo & Brent Sohngen, *Carbon Sequestration in Forests and Soils*, 4 ANN. REV. RESOURCE ECON. 127, 128 (2012). The process is used as a method to reduce the buildup of GHGs in the atmosphere. *Id.*

172. NEPA Guidance Memo, *supra* note 167, at 2.

173. 16 U.S.C. § 1604(e)(1) (2012).

174. *See id.* §§ 1600(1), (6), 1604(g)(3)(B).

175. Over time, the number of annual visitors to wilderness areas in the United States have increased. *See* U.S. DEP’T. OF AGRIC., NATIONAL SUMMARY REPORT: NATIONAL VISITOR USE MONITORING RESULTS tbl.1b (2013), *available at* http://www.fs.fed.us/recreation/programs/nvum/2012%20National_Summary_Report_061413.pdf. Similarly, a group of researchers comparing the economic benefits of forest conservation with traditional forestry found that certain management tactics can lead to greater economic benefit and ecological benefit following a reduction in traditional forestry practices (i.e., less logging). Anssi Ahtikoski et al., *Potential Trade-Offs Between Nature-Based Tourism and Forestry, a Case Study in Northern Finland*, 2 FORESTS 894, 906 (2011).

176. *See* U.S. DEPT. OF AGRIC., WATER & THE FOREST SERVICE, at i (James Sedell et al. eds., 2000), *available at* <http://www.fs.fed.us/publications/policy-analysis/water.pdf> (describing the importance of U.S. forests in providing clean water for U.S. consumption).

177. *See* LERA MILES ET AL., UN-REDD PROGRAMME, REDD+ AND THE 2020 AICHI BIODIVERSITY TARGETS: PROMOTING SYNERGIES IN INTERNATIONAL FOREST CONSERVATION EFFORTS 4, fig.1 (2012), *available at* <http://www.un-redd.org/Aichi>

range of uses fits easily within the multiple use and sustained yield principles laid down under the MUSYA,¹⁷⁹ as each of these uses has a significant economic benefit.¹⁸⁰ Further, forest management techniques are being developed that allow for increasing a forest's carbon sequestration potential without prohibiting timber harvest altogether.¹⁸¹

Recent scientific findings on the carbon sequestration potential of forests provide the necessary scientific foundation for the USFS to reorient its management approach toward land-use change minimization and carbon sequestration maximization.¹⁸² These studies suggest that the long-term sequestration potential of North American forests is substantial and that they can play a role in slowing the threat of climate change. In a 2007 study, for example, scientists estimated that "forests, urban trees, and wood products" represented 65% to 91% of the total carbon sequestration potential for the United States.¹⁸³ More importantly, the IPCC has found that more than 30% of increased GHG emissions are attributable to land-use impacts, such as deforestation, agriculture, and road building, as opposed to emissions from burning fossil fuels.¹⁸⁴ Additional research into the carbon sequestration potential of forests

BiodiversityPolicyBrief/tabid/130684/Default.aspx (providing examples of threats to forest biodiversity, activities to mitigate these risks, and positive environmental outcomes).

178. Since the passage of the Wilderness Act of 1964, more than 100 million acres have been set aside as "wilderness" in the United States. DAVID N. COLE & VITA WRIGHT, U.S. DEPT. OF AGRIC., WILDERNESS VISITORS AND RECREATION IMPACTS: BASELINE DATA AVAILABLE FOR TWENTIETH CENTURY CONDITIONS I (2003), available at http://www.fs.fed.us/rm/pubs/rmrs_gtr117.pdf. Because the point of the wilderness program is to "preserve each area's 'wilderness character,'" *id.*, a wilderness purpose is served by an overarching conservation management approach.

179. See *supra* notes 74–77 and accompany text (providing an overview of the MUSYA's management principles).

180. For example, in 2011, 165.7 million visitors used USFS-managed lands, supporting 200,000 full- and part-time employees and generating \$13 billion in revenue for the U.S. economy. *US Forest Service Visitor Report Shows Economic, Health Benefits of America's National Forests and Grasslands*, U.S. FOREST SERV. (July 26, 2012), <http://www.fs.fed.us/news/2012/releases/07/healthbenefits.shtml>. See generally SUSSANNE MALEKI, PAC. NW. RESEARCH STATION, COUNTING ALL THAT MATTERS: RECOGNIZING THE VALUE OF ECOSYSTEM SERVICES (2008), available at <http://www.fs.fed.us/pnw/pubs/science-update-16.pdf> (discussing the challenges and opportunities created by valuing ecosystem services).

181. See *infra* Part II.C.

182. See 16 U.S.C. § 1604(b), (h)(1) (2012) (requiring the NFMA's implementing regulations to be developed using an interdisciplinary approach that considers all the relevant sciences with development aided by a panel of independent scientists).

183. Peter B. Woodbury et al., *Carbon Sequestration in the U.S. Forest Sector from 1990–2010*, 241 FOREST ECOLOGY & MGMT. 14, 23 (2007).

184. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS 25 (Susan Solomon et al. eds., 2007), available at http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4_wg1_full_report.pdf.

demonstrates why land-use decisions can either greatly increase GHG emissions or significantly mitigate the impact of GHGs.¹⁸⁵ Especially pertinent to the argument in this Note is the finding that conversion of old-growth forest into a younger-growth-plantation model results in a forest capable of only about 31% of its sequestration potential.¹⁸⁶ However, conversion of an agricultural field to old-growth forest results in a forest capable of reaching about 83% of its sequestration potential.¹⁸⁷ On a global level, the effect of this type of policy shift is remarkable. Under conservative estimates of the land area available for reforestation,¹⁸⁸ researchers have found that the eventual carbon sequestration potential amounts to 120 gigatons of carbon.¹⁸⁹ Other studies suggest both that there is more land available for reforestation and that the carbon sequestration of that land may be even larger than the 120 gigatons of carbon referenced above.¹⁹⁰

These findings suggest significant room for a policy direction aimed at increasing the carbon sequestration capabilities of the NFS.

185. See generally Andres Arnalds, *Carbon Sequestration and the Restoration of Land Health: An Example from Iceland*, 65 CLIMATIC CHANGE 333 (2004) (arguing that increasing the capacity of carbon sinks is an essential tool for combatting climate change and discussing a number of considerations for how best to achieve this outcome, including revegetation, reforestation, and appropriate land-use changes); Patrick Asante & Glen W. Armstrong, *Optimal Forest Harvest Age Considering Carbon Sequestration in Multiple Carbon Pools: A Comparative Statics Analysis*, 18 J. FOREST ECON. 145 (2012) (confirming research showing that as forest age increases, so does the carbon it is sequestering and providing an analysis of when timber harvest might be optimized in an effort to balance economic and GHG emission goals); Pete Smith, *Carbon Sequestration in Croplands: The Potential in Europe and the Global Context*, 20 EUR. J. AGRONOMY 229 (2004) (considering the biospheric carbon loss from European croplands and the ways in which such losses could be mitigated through changed land-use practices related to, among other techniques, irrigation, crop selection, organics, and conversion back to grassland or woodland); Allison M. Thomson et al., *Integrated Estimates of Global Terrestrial Carbon Sequestration*, 18 GLOBAL ENVTL. CHANGE 192, 199 (2008) (summarizing the carbon sequestration potential from reforestation and changes to forestry practices).

186. Mark E. Harmon & Barbara Marks, *Effects of Silvicultural Practices on Carbon Stores in Douglas-Fir—Western Hemlock Forests in the Pacific Northwest, U.S.A.: Results from a Simulation Model*, 32 CANADIAN J. FOREST RES. 863, 871 (2002).

187. *Id.* This finding is in line with studies conducted in the Pacific Northwest that found that forests in that region are only meeting half of their sequestration potential. See, e.g., Peter S. Homann et al., *What the Soil Reveals: Potential Total Ecosystem C Stores of the Pacific Northwest Region, USA*, 220 FOREST ECOLOGY & MGMT. 270, 281 (2005) (arriving at the conclusion based on measurements of carbon content in the soil of old-growth forests).

188. “Reforestation” is “the establishment of trees on land that has been cleared of forest within the relatively recent past” or “the planting of forests on lands which have, historically, previously contained forests but which have been converted to some other use.” INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, LAND USE, LAND-USE CHANGE AND FORESTRY § 2.2.3.2 (Robert T. Watson ed. 2000), available at https://www.ipcc.ch/ipccreports/sres/land_use/index.php?idp=48.

189. Thomson et al., *supra* note 185, at 199.

190. See *id.*

While long-term management aimed at eventual 100% old-growth would maximize carbon sequestration, this is unrealistic given the ongoing vitality of the timber industry.¹⁹¹ Still, there is evidence that the sequestration capability of the NFS is vastly underutilized.¹⁹² Under a climate-mitigation directive, the USFS would develop methods for allowing statutorily prescribed NFS uses in ways that would contribute to increasing the long-term sequestration effectiveness of the NFS.¹⁹³ As discussed above, the economic benefits—considered at a national or even international level—of this management direction are likely to significantly outweigh the incremental and localized benefits of management for maximal resource extraction.¹⁹⁴ Strategies for actually accomplishing this management direction are discussed below.

*C. Imagining a Forest Management Plan with the Goal of
Climate-Change Mitigation*

What follows is a brief framework for how the management focus discussed in this Note might actually play out in the real world. Using examples from the relevant scientific literature related to forest management techniques for maximizing carbon sequestration, this sub-Part argues that the USFS should reframe the purpose of its management activities to align with a goal of minimizing land-use changes while maximizing carbon sequestration. In the long-term, these management activities should result in continued conservation of existing old-growth forests and incremental steps aimed at moving younger forests toward old-growth status. Because the NFS is not and cannot be a park “set aside for nonuse,”¹⁹⁵ additional measures must be taken to ensure that harvest activities are planned and

191. In Fiscal Year 2013, 264,564 timber sales took place on the NFS, totaling nearly \$163 million in sale value. U.S. FOREST SERV., FY2013: CUT AND SOLD REPORT I (2013), available at http://www.fs.fed.us/forestmanagement/documents/sold-harvest/reports/2013/2013_Q1-Q4_CandS_SW.pdf. Further, in 2013, the timber industry employed more than 36,000 people. *Industries at a Glance: Forestry and Logging*, BUREAU LAB. STAT. (May. 2, 2014), <http://www.bls.gov/iag/tgs/iag113.htm>.

192. James R. Strittholt et al., *Status of Mature and Old-Growth Forests in the Pacific Northwest*, 20 CONSERVATION BIOLOGY 363, 367 (2006) (finding that “approximately 72% of the original old-growth conifer forest ha[d] been lost to conversion or subjected to intensive forestry practices” in the Pacific Northwest alone).

193. Climate-mitigation directives are policies enacted in response to climate change in order to reduce net carbon emissions and limit long-term climate change. IPCC CLIMATE CHANGE 2007: MITIGATION, *supra* note 160, at 225.

194. See *supra* notes 123–30 and accompanying text (explaining the potential economic benefits of codifying climate mitigation directives).

195. See *supra* notes 60–63 and accompanying text (discussing the formation of the NFS and its initial purposes).

timed to minimize land-use changes and release of already-sequestered carbon.¹⁹⁶

Even if the NFMA allows sufficient USFS discretion to reorient the purpose of its management strategy toward long-term climate-change mitigation, there is no single example for how the USFS could actually accomplish this reorientation. Although some would argue that the overwhelming weight of scientific evidence suggests that “unlogged forest areas should be preserved indefinitely” with younger forests managed for conversion to eventual old-growth, such a singular solution is in contravention of the NFMA.¹⁹⁷ Despite the unclear statutory language concerning how much one use of the NFS can outweigh the others, the law’s statement that the NFS is for “outdoor recreation (including wilderness), range, timber, watershed, wildlife, and fish,”¹⁹⁸ shows that management solely for conservation is neither legally defensible, nor in the spirit of the NFMA and its statutory predecessors.¹⁹⁹

With these considerations in mind, a summary of the many forest management techniques recommended by the IPCC as potentially effective climate-change mitigation measures follows. These measures range from conservation of existing forestland, to sustainable timber production, to forest species climate adaptation²⁰⁰—all of which have substantial ecological and economical “co-benefits” beyond increasing carbon sequestration.²⁰¹

Perhaps the most obvious management option available for maximizing carbon sequestration on the NFS is the reduction of deforestation or other types of forest degradation. Thus, management strategies under this option would focus on conservation of existing forestland; avoidance of any harvest technique resulting in complete deforestation (i.e., clearcutting); and limiting human disturbances such as road building, firewood

196. See generally Asante & Armstrong, *supra* note 185 (analyzing the optimal harvest age of timber when accounting for economic value and the effect of harvest on carbon sequestration).

197. Compare Smith, *supra* note 27, at 188 (arguing that scientific evidence indicates that the USFS should focus on carbon storage instead of logging), with *supra* notes 99–101 and accompanying text (articulating the text and intent of the NFMA as focused on balancing conservation with land-use interests).

198. 16 U.S.C. § 1604(g)(3)(A) (2012).

199. See *supra* Part I (describing the statutory framework governing the NFS’s management and recounting several challenges of USFS management activities).

200. See IPCC CLIMATE CHANGE 2007: MITIGATION, *supra* note 160, at 549–51.

201. See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2014: MITIGATION OF CLIMATE CHANGE—AGRICULTURE, FORESTRY AND OTHER LAND USE 54–61 (2014) [hereinafter IPCC CLIMATE CHANGE 2014—AFOLU], available at http://report.mitigation2014.org/drafts/final-draft-postplenary/ipcc_wg3_ar5_final-draft_postplenary_chapter11.pdf.

collection, and non-sustainable harvesting practices.²⁰² Closely related in terms of management options are afforestation and reforestation, which the IPCC defines as “the direct human-induced conversion of non-forest to forest land through planting, seeding, and/or the human-induced promotion of natural seed sources.”²⁰³ Under one afforestation management strategy, deforested or unforested land areas are converted to timber for use as wood-product plantations.²⁰⁴ Though these plantations are harvested, the wood products generated from them continue to store a good deal of the sequestered carbon for years to decades after harvest.²⁰⁵

In line with the management toward old-growth policy direction discussed above, a number of discreet management options are available to maximize the amount of carbon sequestered within forests. These management options include ensuring that any harvest activity retains forest cover, minimizing removal of dead organic material, and avoiding erosion.²⁰⁶ In addition, post-harvest and post-fire planting can accelerate forest regeneration and help to mitigate the loss of already-sequestered carbon.²⁰⁷ Further, as briefly discussed above, the carbon sequestration potential of a forest increases with simple conservation—that is, protection “from all harvest” or management toward old-growth.²⁰⁸

In line with continuing to support an economically viable timber industry in the United States, a number of management options related to sustainably produced wood products may actually help to further the goal of maximizing carbon sequestration. These management options include “extending rotation cycles, reducing damage to remaining trees, reducing logging waste, implementing soil conservation practices, fertilization, and using wood in a more efficient way.”²⁰⁹ In addition to options related to on-the-ground practices, an overarching policy geared toward ensuring that annual

202. See IPCC CLIMATE CHANGE 2007: MITIGATION, *supra* note 160, at 550; see also Olivier Damette & Philippe Delacote, *Unsustainable Timber Harvesting, Deforestation, and the Role of Certification*, 70 *ECOLOGICAL ECON.* 1211, 1212 (2011) (defining “unsustainable timber harvesting” as either the cutting of trees to convert land to another use or the cutting of trees without replacement of the cut trees).

203. IPCC CLIMATE CHANGE 2007: MITIGATION, *supra* note 160, at 550.

204. See *id.*

205. See *id.* at 550–51 (noting that one constraint on this technique is the high initial cost of re-establishing or establishing new timber stands as well as the subsequent delay until the stand can produce economically viable timber; however, this high cost may be offset by other factors).

206. *Id.*

207. *Id.*

208. *Id.* at 550; see *supra* notes 186–87 and accompanying text (analyzing the carbon sequestration potential of various types of forests).

209. IPCC CLIMATE CHANGE 2014—AFOLU, *supra* note 201, at 24, tbl.11.2.

timber harvests take place at a rate that results in greater annual carbon sequestration than carbon loss would ensure that a major climate mitigation resource's climate mitigation potential is being maximized.²¹⁰ This final management priority would ensure an incremental increase in forest carbon sequestration over time.

Because an additional challenge to managing for long-term maximization of carbon sequestration is brought on by climate change itself, management options related to climate change resiliency are also important considerations. The IPCC suggests several tactics, including the planting of species likely to thrive under changing climate conditions (or those most resilient to expected changes), preservation or encouragement of both species and genetic diversity, and increased forest preservation to reduce fragmentation.²¹¹

In sum, the management possibilities briefly discussed essentially support two overarching goals: (1) minimizing human disturbances to forests in order to both keep sequestered carbon in place and increase sequestration capacity, and (2) ensuring that any human disturbance takes place with as little negative impact as possible to already sequestered carbon by carefully accounting for annual sequestration gains and losses. Though the management preference of these options might tend toward preservation, the outlined management options also allow for continued management flexibility that includes most of the traditional uses of a given forest. In the NFS context, this flexibility, on top of a conservation bias, continues to fit nicely in the statutory framework already provided by the OAA, MUSYA, and NFMA.

CONCLUSION

When Congress passed the OAA in 1897, legislators were faced with similar challenges to those faced today. Forests in the East had been degraded beyond recognition due to excessive extraction of natural resources.²¹² The degradation was so bad that even legislators from western states, still enjoying significant resource abundance at the time, acknowledged the need for some preservation.²¹³ Thus, from its inception, the OAA was a utilitarian statute focused on protecting forests from absolute destruction by fire and logging,

210. IPCC CLIMATE CHANGE 2007: MITIGATION, *supra* note 160, at 551.

211. IPCC CLIMATE CHANGE 2014—AFOLU, *supra* note 201, at 46.

212. See 30 CONG. REC. 981 (1897) (discussing the rate at which timber was removed from U.S. forests).

213. See *id.* at 986–88 (statement of Rep. Jones) (describing the pressing need to preserve resources like timber in Washington State's forests).

while ensuring that the NFS it created was not a system of parks “set aside for nonuse.”²¹⁴ This protection/production dichotomy has been retained in modern statutes that have sought to ensure that the Service manages for the long-term productivity of the NFS under ideals of “multiple use” and “sustained yield.” At the same time, modern environmental degradation has posed new challenges for NFS managers. Recognizing these challenges, Congress enacted the NFMA in order to clarify both the production and conservation purposes of NFS lands.

Today, however, the value of forest resources are changing again—and in many ways increasing—due to the pressures of growing consumption and the onset of climate change. Because the threats of climate change are real, and because the NFS is already playing a significant role in mitigating these effects, there is a pressing need to reevaluate traditional management practices so that mitigation of climate-change threats is prioritized over consumption of forest resources. Indeed, forest managers today must recognize that the ideal uses of forest resources are changing and that the greatest social, environmental, and economic benefits may be realized by minimizing land-use impacts and increasing conservation efforts in order to manage for climate-change mitigation. For the USFS to effectuate its statutory mandate of ensuring that the NFS remains perpetually available for “outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness,” the Service must recognize that a management shift toward climate-change mitigation will support each of these uses in a way that provides the greatest benefit to the American public.

214. *Id.* at 966 (statement of Rep. McRae) (describing the purposes for which forest reservations were to be established under the OAA).