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ECOSYSTEM SERVICES AND FEDERAL PUBLIC LANDS: A QUIET REVOLUTION IN NATURAL RESOURCES MANAGEMENT

J.B. RUHL* & JAMES SALZMAN**

The major federal public land management agencies (the Forest Service, Bureau of Land Management, Park Service, Fish & Wildlife Service, and Department of Defense) have increasingly adopted a language that did not exist twenty-five years ago—the language of ecosystem services. Ecosystem services are the range of benefits that ecological resources provide to humans, from water purification and pollination to carbon sequestration and wildlife habitat. The scientific discipline advancing the ecosystem services framework arose in the mid-1990s and quickly became a central strategy for fusing ecology and economics research. Despite its ascendance in research communities, the recognition and conservation of ecosystem services in law and policy has been a more gradual, incremental process. While largely unrecognized, the federal public land management agencies have been embedding consideration of ecosystem services in their policy decision making. Looking back, it is remarkable how far this quiet revolution has come. This Article traces that policy evolution and assesses why it happened, how it happened, and what it means for the future of public land management. The Article concludes by arguing that federal land management agencies' emphasis on the flow of ecosystem services from public lands to off-site human communities rebuts arguments that public lands would be better managed by privatization or by increased resource extraction.

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Electronic copy available at: https://ssrn.com/abstract=3471445

INTRODUCTION 678
I. THE RISE OF ECOSYSTEM SERVICES 685
A. *The 2012 Planning Rule: Cementing Ecosystem Services in Agency Practice*.....686
B. *The 2015 Planning Directives: Providing the Implementation Details* 689
C. *The 2015 Strategic Plan: Ecosystem Services Elevated to Major Agency Goal*.....690
D. *The 2016 EOC Report: The White House Boosts the Ecosystem Services Profile*.....691
II. CURRENT STATE OF PLAY.....693
A. *Advancing Science to Enable Ecosystem Service Assessments* 694
B. *Policy Quiets Down*.....694
C. *Superficial Progress in National Forest Plans*.....696
1. The LRMP Revision Timeline Bottleneck.....696
2. Agency Inertia Resists Change 697
3. Science for Identifying Beneficiaries Is Lagging 698
III. A NEW ROLE FOR FEDERAL PUBLIC LANDS 699
A. *Agency Incentives: The Decline of Timber*.....699
B. *Agency Authority: The Multiple Use Mandate*.....701
C. *Implications: Reimagining the National Forests*.....704
CONCLUSION 707

INTRODUCTION

Healthy ecosystems provide a range of critical services that we largely take for granted. Created by the physical processes of ecosystems as well as by the interactions of living organisms with their environments, these "ecosystem services" underpin society and always have.[1] The benefits ecological resources provide to humans may be usefully divided into four categories: regulating services (e.g., flood control and water purification by riparian habitat); provisioning services (e.g., timber and crops); cultural services (e.g., recreation and spiritual connection); and

1. Two landmark publications in 1997 compellingly made this case. *See* NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS (Gretchen C. Daily ed., 1997) [hereinafter NATURE'S SERVICES]; Robert Costanza et al., *The Value of the World's Ecosystem Services and Natural Capital*, 387 NATURE 253 (1997).

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supporting services (e.g., nutrient cycling).[2]

The scientific discipline advancing this way of thinking about the benefits humans derive from ecosystems—the ecosystem services framework—arose in the mid-1990s, quickly became a central strategy for fusing research by ecologists and economists, and has continued to develop since then.[3] By explicitly describing ecosystems as providing economically valuable benefits to humans and advancing a scientifically based argument for integrating those values into private and public decisions, the ecosystem services framework added human well-being to the case for conservation. Prior to this, support for ecosystem conservation had depended largely on appeals to environmental well-being and intrinsic values of nature.[4] This new perspective and its potential to alter the dynamics of public and private resource management decision making, while not free of controversy, rapidly invigorated scientific research and economic thought.[5]

By contrast, the influence of the ecosystem services framework on law and policy has been a more gradual, incremental process.[6] In many respects, this is surprising. Ecosystem services are, quite literally, essential to human well-being. Try growing crops without renewal of soil fertility or pollination. Given that, one might expect that ecosystem services would be prized by markets and explicitly addressed by the law. Indeed, this has been the case for provisioning ecosystem services such as timber and fish as well as for cultural services such as recreation. With few exceptions, however, it most certainly has not been the case for regulating and supporting services such as carbon sequestration and water purification.

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2. MILLENNIUM ECOSYSTEM ASSESSMENT, ECOSYSTEMS AND HUMAN WELL-BEING: SYNTHESIS vi (José Sarukhán et al. eds., 2005), http://www.millenniumassessment.org/documents/document.356.aspx.pdf [https://perma.cc/F8MS-V5Y9] [hereinafter MILLENNIUM ECOSYSTEM ASSESSMENT].

3. Robert Costanza et al., *Twenty Years of Ecosystem Services: How Far Have We Come and How Far Do We Still Need to Go?*, 28 ECOSYSTEM SERVS. 1 (2017); *see also* Harold A. Mooney & Paul R. Ehrlich, *Ecosystem Services: A Fragmentary History*, in NATURE'S SERVICES, *supra* note 1, at 11; Erik Gomez-Baggethun et al., *The History of Ecosystem Services in Economic Theory and Practice: From Early Notions to Markets and Payment Schemes*, 69 ECOLOGICAL ECON. 1209 (2010).

4. Costanza et al., *supra* note 3.

5. *Id*. at 1–2.

6. J.B. Ruhl & James Salzman, *The Law and Policy Beginnings of Ecosystem Services*, 22 J. LAND USE & ENVTL. L. 157 (2007).

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The first major symposium on the law and policy of ecosystem services was held two decades ago.[7] This is not a new idea. Yet among all the federal environmental and natural resource management programs, only the wetlands mitigation program under the Clean Water Act clearly considered ecosystem services, and, even there, the regulations focused on acreage rather than measures of service provision.[8] The simple fact is that pollution and natural resource statutes were not drafted with ecosystem services in mind, and agencies were slow to incorporate the framework into their implementing policies and regulations.

There are three reasons that regulating and supporting ecosystem services have been largely ignored in law and policy. The first is that they are free. Markets explicitly value and assign dollar figures to certain "ecosystem goods," such as timber and seafood. These fall into the provisioning services category. Yet, almost without exception, the regulating and supporting services underpinning the production of these goods have no market value—not because they are worthless but, rather, because there is no market to capture and express their value directly.[9] For example, the owner of coastal property with intact dunes—the "natural capital" producing the ecosystem service of flood control—cannot prevent inland properties from receiving the flood-control benefits the dunes provide. So why would the beneficiaries pay for those services? And even if one inland property owner did pay, the others would still benefit. Under such conditions, markets for the service will not arise.[10]

The second reason is that we do not fully understand the biophysical provision of services, particularly of regulating and supporting services. If we pave an entire wetland, there will likely be water quality problems, but most land use decisions are marginal—only a small section of wetlands will be paved. Scientists do not have a nuanced understanding of what will

7. Symposium, *Ecosystem Services*, 20 STAN. ENVTL. L.J. 309 (2001).

8. If one cares about conserving wetlands because of the ecosystem services they provide, then the proper focus should be on levels of service provision, not simply the acres of wetland impacted by development. *See* James Salzman & J.B. Ruhl, *Currencies and the Commodification of Environmental Law*, 53 STAN. L. REV. 607, 648–67 (2000); J.B. Ruhl & James Salzman, *The Effects of Wetlands Mitigation Banking on People*, NAT'L WETLANDS NEWSL. (Env't L. Inst., Wash., D.C.), Mar.–Apr. 2006, at 1, 8–13.

9. Christopher L. Lant et al., *The Tragedy of Ecosystem Services*, 58 BIOSCIENCE 969, 970–71 (2008).

10. *Id.*

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happen if 5 or 10 percent of the wetland is developed.

And finally, there are serious institutional obstacles to incorporating regulating and supporting services into law and policy. A map of counties and states shows a lot of straight lines, but such political jurisdictions rarely track the contours of ecosystems. In general, the area where ecosystem services originate does not align with the political reach of those who benefit. Because the scales of providers and beneficiaries do not match, there are significant collective action problems. Landowners in an upper watershed may provide ecosystem services of flood prevention and water quality, for example, but the beneficiaries far downstream may have no political means to influence land management in the upper watershed, which might even be in a different state.

Despite these challenges, over the past decade federal policy makers have received and responded to the ecosystem services message, particularly in the public land management agencies. Compared to past efforts, their progress has been rapid and impressive. The Secretary of the Department of Agriculture (USDA) in the George W. Bush Administration, Mike Johanns, broke from tradition in 2005 when he boldly declared that the USDA would seek to broaden the use of market incentives to create "a future where credits for clean water, greenhouse gases, or wetlands can be traded as easily as a commodity such as corn."[11] This was soon after reflected in the 2008 version of the Farm Bill. Section 2709 required the USDA to "establish technical guidelines that outline science-based methods to measure the environmental services benefits from conservation and land management activities in order to facilitate the participation of farmers, ranchers, and forest landowners in emerging environmental services markets." The law also required that the USDA develop a procedure to measure environmental services benefits; a protocol to report benefits; and a registry to collect, record, and maintain the benefits measured.[12] In essence, the idea was to have the USDA provide private agricultural interests the scientific and economic data

11. The Hon. Mike Johanns, U.S. Sec'y of Agric., Remarks at the White House Conference on Cooperative Conservation, *in* Press Release, U.S. Dep't of Agric., Press Release No. 0335.05 (Aug. 29, 2005), https://web.archive.org/web/20120917005753/http:/www.usda.gov/wps/portal/usda/usdahome?contentidonly=true&contentid=2005/08/0334.xml [https://perma.cc/Q7A7-DQB5].

12. Food, Conservation & Energy Act of 2008, H.R. 2419, 110th Cong. § 2709 (2008).

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they would need to participate in so-called "payment for ecosystem services" (PES) programs.

To implement section 2709 of the Farm Bill, the USDA established an Office of Ecosystem Services and Markets, now known as the Office of Environmental Markets (OEM).[13] The USDA also established a multiagency Conservation and Land Management Environmental Services Board to assist the Secretary of Agriculture in adopting the technical guidelines to assess ecosystem services provided by conservation and land management activities.[14] The guidelines were intended to focus on scientifically rigorous and economically sound methods for quantifying carbon, air and water quality, wetlands, and endangered species benefits in an effort to facilitate the participation of farmers, ranchers, and forest landowners in emerging ecosystem markets.

While the 2008 Farm Bill focused on how the USDA could promote PES programs for private farmers, ranchers, and forest landowners, it also suggested that public agencies may serve as catalysts for advancing the ecosystem services framework more broadly. For example, one of us suggested at the time that the 2008 Farm Bill "tantalizingly opens the door to thinking about the broader role of federal public lands as an integral part of ecosystem services markets. Take, for example, a national forest unit that could deliver groundwater recharge services to a regional population or carbon sequestration services to a national population."[15] The benefits provided by public lands can therefore be both local (groundwater recharge for nearby communities and farmers) and national (sequestering carbon is valuable in reducing global greenhouse gases wherever it takes place). In short, federal public lands represent a vast store of natural capital capable of delivering a suite of ecosystem services (such as recreation and timber extraction) not only within their boundaries but also to nearby and distant human communities.

This is a very different way of thinking about the role of

13. Office of Environmental Markets, *Ecosystems and the Farm Bill*, U.S. DEP'T AGRIC., http://www.fs.fed.us/ecosystemservices/Farm_Bill/index.shtml (last visited Jan. 31, 2019) [https://perma.cc/RQN7-B3TT].

14. *See* CONSERVATION AND LAND MANAGEMENT ENVIRONMENTAL SERVICES BOARD CHARTER 1–2 (2008), http://www.fs.fed.us/ecosystemservices/pdf/farmbill/ESB_Charter.pdf [https://perma.cc/4LRL-KYJX].

15. J.B. Ruhl, *Ecosystem Services and Federal Public Lands: Start-Up Policy Questions and Research Needs*, 20 DUKE ENVTL. L. & POL'Y F. 275, 287 (2010).

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federal public lands. Traditionally, the value of federal public lands was largely viewed as promoting economic activities in the form of supporting resource extraction industries (provisioning and cultural services) and boosting tourism and recreation economies. Their contributions to regulating and supporting services were either ignored or taken for granted. As one of us argued a decade ago:

> [W]hat about delivery of regulating and supporting services to *offsite* human populations? This is fertile ground for using the concept of ecosystem services to reorient and clarify federal land policy. This is the context in which ecosystem services offer the greatest opportunity to define agency mission, communicate the value of the federal lands to the public, and measure agency performance. Presumably, it would not be news to most people that federal public lands can benefit surrounding and even distant human populations, including in ways consistent with ecosystem services theory. But the existing and potential flow of services is vast and has not been coherently managed and communicated as such. This context . . . is where the greatest payoffs and challenges lie for incorporating ecosystem services into federal public land management policy.[16]

At that time, this was just an idea. As it turns out, ten years later, this is the direction that has made the most progress in federal agency law and policy on ecosystem services, far more than the goal of facilitating private market PES programs that lay behind the 2008 Farm Bill and USDA's creation of OEM.[17]

Ironically, it was not farmers that pushed the ecosystem services framework into decision making and policy, but another branch of the USDA—the United States Forest Service (Forest Service)—which is responsible for managing our nation's 190-million-acre National Forest system. The other federal

16. *Id.* at 281.

17. In a political turf battle, soon after its creation, the OEM was folded into the Office of the Chief Economist rather than functioning as an independent office within USDA. Indeed, the OEM never took over the intended "market maker" role of creating trading protocols to measure, collect, and report service benefits as the basis for a market. Instead, the OEM serves as a clearinghouse for information. Personal communication from Sally Collins, former Deputy Chief Forester, U.S. Dep't of Agric., Forest Serv. (Oct. 10, 2014) (on file with author).

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land management agencies, such as the Department of the Interior's (DOI) Bureau of Land Management (BLM), which oversees 248 million acres of federal public lands in the western states, have also been in the vanguard of applying the ecosystem services framework,[18] as has the science support agency of the DOI, the United States Geological Survey (USGS). Although they are not alone among the suite of federal agencies that have moved the ball forward on ecosystem services, these three agencies have leveraged the federal public lands as a laboratory for promoting both the science and the policy of ecosystem services. In doing so, they have put special focus on how federal public lands are engines for delivering ecosystem services—not only within the boundaries of their land management units but also to human communities outside the boundaries, from local to global in scale. And, perhaps most impressively, they have done so while in large part avoiding the usual contentiousness of environmental and natural resource policy.

Using the Forest Service as its case study, this Article provides a brief account of how this quiet revolution in federal public land management policy has unfolded. Part I traces the policy history from the 2008 Farm Bill to the close of the Obama Administration. Part II provides a summary of the current state of play in the agencies under the Trump Administration, in terms of both the policy and science that agencies have developed and are employing. Part III assesses the reasons behind this quiet revolution and the implications of this decade-long initiative to embed the ecosystem services framework into federal public land management. The Article concludes that the explicit recognition of public lands' role in delivering regulating and supporting ecosystem services beyond their borders provides a strong argument against calls for privatization or greater resource extraction on federal public lands.

18. *See* Lynn Scarlett & James Boyd, *Ecosystem Services and Resource Results in Management: Institutional Issues, Challenges, and Opportunities in the Public Sector*, 115 ECOLOGICAL ECON. 3 (2015); *see, e.g.*, Memorandum from Edwin L. Robinson, Assistant Dir., Renewable Res. and Planning, Dep't of the Interior, on Guidance on Estimating Nonmarket Environmental Values, to All Washington Office and Field Office Officials (Sept. 12, 2013), https://www.blm.gov/policy/im-2013-131-ch1 [https://perma.cc/6R4W-M3CW].

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I. THE RISE OF ECOSYSTEM SERVICES

Although the ecosystem services framework had become mainstream in ecology, economics, and other disciplines related to environmental and natural resources management by the late 1990s, transferring the idea into legal frameworks proved challenging. To be sure, the policy world was talking about ecosystem services even then. In 1998, for example, the President's Council of Advisors on Science and Technology (PCAST) issued a report emphasizing the importance of the nation's "living capital," the term it used to define the natural resources providing ecosystem services.[19] The United Nations embraced the concept as well, relying on measures of ecosystem services throughout the world in an influential 2005 report that explicitly tied ecosystem services to human prosperity.[20] But uptake in actual law on the books was slow to come.

Ecosystem services did not significantly appear in U.S. environmental law until 2008. In overhauling their joint policy on compensatory mitigation under section 404 of the Clean Water Act, the U.S. Army Corps of Engineers and the Environmental Protection Agency issued a joint regulation adopting a watershed-scale focus and declaring that compensatory mitigation decisions would take losses to ecosystem services into account.[21] In that same year, Congress added the ecosystem service markets provisions to the 2008 Farm Bill. In 2013, in response to the Water Resources Development Act of 2007, the White House released updated principles and guidelines for federal water resources planning, requiring that all projects "apply an ecosystem services approach in order to appropriately capture all effects . . . associated with a potential Federal water resources investment."[22] The White House later followed

19. BIODIVERSITY AND ECOSYSTEMS PANEL, PCAST, TEAMING WITH LIFE: INVESTING IN SCIENCE TO UNDERSTAND AND USE AMERICA'S LIVING CAPITAL (1998), https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/pcast-teamingwithlife.pdf [https://perma.cc/2SCU-VKLC].

20. *See* MILLENNIUM ECOSYSTEM ASSESSMENT, *supra* note 2.

21. In simple terms, the government should consider the loss of ecosystem services in determining what and how much compensatory mitigation should be required for development of wetlands. *See* 33 C.F.R. 332.3(d)(1) (2008); *see generally* J.B. Ruhl et al., *Implementing the New Ecosystem Services Mandate of the Section 404 Compensatory Mitigation Program—A Catalyst for Advancing Science and Policy*, 38 STETSON L. REV. 251 (2009).

22. COUNCIL ON ENVTL. QUALITY, PRINCIPLES AND REQUIREMENTS FOR FEDERAL INVESTMENT IN WATER RESOURCES 6–7 (2013), https://

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up with guidelines for implementation that included detailed ecosystem services assessment procedures.[23]

None of these efforts, however, reflected a systematic incorporation of the ecosystem services framework into the fabric of a regulatory regime, much less across multiple agency missions. In 2011, PCAST issued a broad set of recommendations on using ecosystem services for law and policy, advocating a more coordinated, government-wide policy.[24] But such a policy was slow to materialize. Perhaps unexpectedly, ecosystem services first emerged in the context of federal public lands management. In this Part we highlight how the Forest Service spearheaded the effort, starting with promulgation of a new agency rule for management planning of National Forests and following through with various policy and guidance documents to implement the rule in the field.

A. The 2012 Planning Rule: Cementing Ecosystem Services in Agency Practice

The Forest Service manages the National Forests under three principal statutes. Congress first authorized the USDA to manage lands as National Forests in the 1897 Organic Administration Act (OAA),[25] which established the National Forests system to "improve and protect the forest within the reservation, or for the purpose of securing favorable conditions of water flows, and . . . furnish a continuous supply of timber for the use and necessities of citizens of the United States."[26] After many decades of the Forest Service primarily focusing on timber extraction, Congress provided some balance in the Multiple

obamawhitehouse.archives.gov/sites/default/files/final_principles_and_requirements_march_2013.pdf [https://perma.cc/6QXU-XDUG]; *see also* Water Resources Development Act of 2007, Pub. L. 110-114, 121 Stat. 1041 (codified as amended at 33 U.S.C. § 1301 (2007)).

23. COUNCIL ON ENVTL. QUALITY, INTERAGENCY GUIDELINES (2014), https://obamawhitehouse.archives.gov/sites/default/files/docs/prg_interagency_guidelines_12_2014.pdf [https://perma.cc/5S9K-R6YK].

24. *See* PCAST, SUSTAINING ENVIRONMENTAL CAPITAL: PROTECTING SOCIETY AND THE ECONOMY (2011), https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/pcast_sustaining_environmental_capital_report.pdf [https://perma.cc/Q5CL-UJRS].

25. 55 Cong. Ch. 2, 30 Stat. 11, 34–36 (June 4, 1897) (codified as amended at 16 U.S.C. §§ 473–75, 477–82, 551).

26. 16 U.S.C. § 475 (2018).

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Use and Sustained Yield Act of 1960 (MUSYA),[27] expressing "that the national forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes."[28] As its title suggests, MUSYA also specifically incorporated the environmental resources management principles of "multiple use" and "sustained yield," directing the Secretary (acting through Forest Service) "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."[29] Congress defined "multiple use" as the "management of all the various renewable surface resources of the national forests so that they are utilized in the combination that will best meet the needs of the American people"[30] and defined "sustained yield" as "the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the national forests without impairment of the productivity of the land."[31]

In 1976, following intense controversy over the Forest Service's practice of authorizing timber clear-cutting despite its statutory mandate of multiple use management,[32] Congress enacted the National Forest Management Act (NFMA).[33] NFMA expressly adopts the statutory purposes laid out in the Organic Act and MUSYA, establishing a detailed land and resource management scheme that the Forest Service must follow to further those purposes. Congress specifically acknowledged "the necessity for a long term perspective in planning" how renewable forest resources would be managed[34] and, to that end, directed the Forest Service to "develop, maintain, and, as appropriate, revise land and resource management plans for units of the National Forest System."[35] To achieve

27. Pub. L. No. 86-517, 74 Stat. 215 (June 12, 1960) (codified as amended at 16 U.S.C. §§ 528–31).

28. 16 U.S.C. § 528 (2018).

29. *Id.* § 529.

30. *Id.* § 531(a).

31. *Id.* § 531(b).

32. *See* W. Va. Division of Izaak Walton League v. Butz, 522 F.2d 945 (4th Cir. 1975) (condemning the Forest Service's clear-cutting practices and rationale).

33. Pub. L. No. 94-588, 90 Stat. 2949 (Oct. 22, 1976) (originally enacted as the Forest and Rangeland Renewable Resources Planning Act of 1974) (codified as amended at 16 U.S.C. §§ 1600–1614).

34. Pub. L. No. 93-378, § 2, 88 Stat. 476 (Aug. 17, 1974).

35. 16 U.S.C. § 1604(a) (2018).

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this mandate, the Forest Service promulgates a "Planning Rule" governing the Forest Service's development of individual land and resource management plans (LRMPs) for the National Forests.[36] No stranger to controversy, the Forest Service has promulgated five successive versions of the Planning Rule since 1979, each of which has been hotly contested and some of which have been invalidated by federal courts.[37]

The Forest Service's latest Planning Rule, which was promulgated in 2012 and has thus far withstood both judicial review and further agency substantive modification,[38] added a new requirement that LRMPs identify and evaluate ecosystem service benefits that people obtain from National Forests.[39] The Forest Service's "all in" commitment to the ecosystem services framework is evident throughout the final 2012 Planning Rule, with well over one hundred references to "ecosystem services" in the preamble and rule texts. The 2012 Planning Rule's preamble explains that "the rule contains a strong emphasis on protecting and enhancing water resources, restoring land and water ecosystems, and providing ecological conditions to support the diversity of plant and animal communities, while providing for ecosystem services and multiple uses."[40] Two provisions are of particular importance. The statement of purpose explains that LRMPs will guide management of Forest Service lands so that they are ecologically sustainable and contribute to social and economic sustainability; consist of ecosystems and watersheds with ecological integrity and diverse plant and animal communities; and have the capacity to provide people and communities with ecosystem services and multiple uses that provide a range of social, economic, and ecological benefits for the present and into the future.[41]

The final 2012 Planning Rule's description of the multiple use mandate explains that:

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36. *See* 36 C.F.R. § 219 (2019).

37. *See* National Forest System Land Management Planning, 77 Fed. Reg. 21,162, 21,162–64 (Apr. 9, 2012) (to be codified at 36 C.F.R. pt. 219) (covering the history); Citizens for Better Forestry v. USDA, 632 F. Supp. 2d 968 (N.D. Cal. 2009) (explaining history of the rule).

38. National Forest System Land Management Planning, 77 Fed. Reg. at 21,162.

39. 36 C.F.R. § 219.6(b)(7) (2019).

40. National Forest System Land Management Planning, 77 Fed. Reg. at 21,163.

41. 36 C.F.R. § 219.1(c).

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> [A] plan developed or revised under this part must provide for ecosystem services and multiple uses, including outdoor recreation, range, timber, watershed, wildlife, and fish, within Forest Service authority and the inherent capability of the plan area as follows: [ ] Integrated resource management for multiple use. The plan must include plan components, including standards or guidelines, for integrated resource management to provide for ecosystem services and multiple uses in the plan area.[42]

B. The 2015 Planning Directives: Providing the Implementation Details

The Forest Service implements its Planning Rule through policies (not informal rulemakings) known as the Directives, the collection of which is assembled into the Land Management Planning Handbook. The agency amended the Directives in 2015 to reflect the 2012 Planning Rule and its focus on ecosystem services.[43] As outlined in the 2012 Planning Rule, the updated Handbook emphasizes the "influence area" of a National Forest and the goal of "identifying relationships between the management of the plan area and social, cultural, and economic conditions outside the plan area."[44] The Handbook now recognizes that National Forest contributions "include ecosystem services . . . from the plan area that provide benefits to people either directly or indirectly."[45] In that respect, a new Handbook section devoted exclusively to ecosystem services evidences the agency's emerging emphasis on providing regulating and supporting services outside of the boundaries of National Forests.

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42. *Id.* § 219.10.

43. *See 2012 Planning Rule Final Directives*, U.S. DEP'T AGRIC., FOREST SERV., https://www.fs.usda.gov/detail/planningrule/home/?cid=stelprd3828310 (last visited July 8, 2019) [https://perma.cc/67FX-RZ4B]. The Forest Service Handbook is not a book per se, but rather a collection of ongoing directives organized by series of topics. *See Forest Service Handbook (FSH)*, U.S. DEP'T AGRIC., FOREST SERV., https://www.fs.fed.us/im/directives/dughtml/fsh.html (last visited July 8, 2019) [https://perma.cc/ZXQ6-FNSV]. The Planning topic is found in the 1900 series, and the Land and Resources Management Planning Handbook is found in the 1909.12 series. *See Forest Service Handbook (FSH) 1909.12*, U.S. DEP'T AGRIC., FOREST SERV., https://www.fs.fed.us/cgi-bin/Directives/get_dirs/fsh?1909.12 (last visited Sept. 18, 2019) [hereinafter FSH 1909.12] [https://perma.cc/CP57-MTN3].

44. FSH 1909.12, *supra* note 43, at § 13.

45. *Id.* § 13.1.

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As the Handbook explains:

> Management of the plan area will affect the contribution of some ecosystem services, which affect social, cultural, and economic conditions. For example, a cultural service such as access to and protection of a cultural site or area can benefit tourism businesses, cultural values, and traditional uses of nearby communities. A regulating service, such as flood control, can have important beneficial consequences both within and beyond the plan area.[46]

The Handbook thus instructs LRMP development teams to identify and evaluate ecosystem services at the "geographic scale at which the plan area contributes the key ecosystem service (for example, watersheds, counties, regional markets, or ecoregions)" and also recognizes that lands and conditions outside of a National Forest may "influence the plan area's ability to provide the key ecosystem services."[47]

C. The 2015 Strategic Plan: Ecosystem Services Elevated to Major Agency Goal

Soon after amending its Handbook, the Forest Service issued its Strategic Plan for 2015–2020.[48] One of the Strategic Plan's three broad goals is to "Deliver Benefits to the Public," with an objective of having "social, economic, and environmental benefits flow from forest and grassland resources."[49] Among the benefits specifically identified are "clean air and water . . . and many other ecosystem services."[50] Although this is the only reference to ecosystem services in the Strategic Plan, the Plan itself is not an extensive document, and the reference to ecosystem services in one of the three overall goals is the first of its kind in the agency's official strategic plans.

46. *Id.* § 13.12.
47. *Id.*
48. USDA FOREST SERVICE, STRATEGIC PLAN: FY 2015–2020 (2015).
49. *Id.* at 7, 16. The other two goals are sustaining the nation's forests and grasslands and applying knowledge globally.
50. *Id.* at 17.

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D. The 2016 EOC Report: The White House Boosts the Ecosystem Services Profile

The 2011 PCAST report also called for ecosystem service impact analyses, stating that "[f]ederal agencies with responsibilities relating to ecosystems and their services (e.g., EPA, NOAA, DOI, USDA) should be tasked with improving their capabilities to develop valuations for the ecosystem services affected by their decision-making and factoring the results into analyses that inform their major planning and management decisions."[51] PCAST explained that "this will entail expanding current efforts on ecosystem-service valuation in EPA, USDA, and other agencies, as well as generating new knowledge about the ecosystem-service impacts (in both physical and value terms) of activities taking place on both public and private lands."[52] PCAST recommended that three offices within the Executive Office of the President—the Office of Management and Budget (OMB), Council on Environmental Quality (CEQ), and Office of Science and Technology (OST)—"should ensure that the methodologies are developed collaboratively across agencies."[53] On October 7, 2015, OMB, CEQ, and OST did exactly that through their Memorandum for Executive Departments and Agencies on Incorporating Ecosystem Services into Federal Decision Making ("EOP Memorandum").[54]

There was nothing timid about the EOP Memorandum. It directed "agencies to develop and institutionalize policies to promote consideration of ecosystem services, where appropriate and practicable, in planning, investments, and regulatory contexts."[55] The goal of doing so was "to better integrate in Federal decision-making due consideration of the full range of benefits and tradeoffs among ecosystem services associated with potential Federal Actions."[56] The scope of the policy goal was broadly stated to include all federal programmatic and planning activi-

51. PCAST, *supra* note 24, at iii.
52. *Id.*
53. *Id.*
54. Memorandum on Incorporating Services into Federal Decision Making from Shaun Donovan, Dir., Office of Mgmt. and Budget, Christina Goldfuss, Managing Dir., Council on Envtl. Quality, and John Holdren, Dir., Office of Sci. and Tech. Policy (Oct. 7, 2015), https://obamawhitehouse.archives.gov/sites/default/files/omb/memoranda/2016/m-16-01.pdf [https://perma.cc/J3W4-M5SM].
55. *Id.*
56. *Id.*

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ties, including "natural-resource management and land-use planning, climate-adaptation planning and risk-reduction efforts, and, where appropriate, environmental reviews under the National Environmental Policy Act (NEPA) and other analyses of Federally-assisted programs, policies, projects, and regulatory proposals."[57]

To help agencies achieve the EOP Memorandum's goals, the EOC announced a forthcoming guidance document outlining best practices for: (1) describing the action, (2) identifying and classifying key ecosystem services in the location of interest, (3) assessing the impact of the action on ecosystem services relative to baseline, (4) assessing the effect of the changes in ecosystem services associated with the action, and (5) integrating ecosystem services analyses into decision making.[58] To speed the process, the EOP Memorandum required agencies to submit a report within six months describing their current incorporation of ecosystem services in decision making and establishing a work plan.[59] Meanwhile, CEQ committed to assemble a task force of experts from relevant agencies to craft best practices implementation guidance. Once the CEQ guidance was released, agencies were to adjust their work plans as needed. The EOP Memorandum also acknowledged that "ultimately, successful implementation of the concepts in this directive may require Federal agencies to modify certain practices, policies, or existing regulations to address evolving understanding of the value of ecosystem services."[60]

The Forest Service delivered its report on April 4, 2016.[61] The agency organized its response around the three goals of the 2015–2020 Strategic Plan, including its "providing benefits to the public" goal. The report summarizes the Strategic Plan text and covers the basics of the 2012 Planning Rule and the 2015 Directives. Not surprisingly, therefore, the report is filled with discussion of how the National Forests can provide ecosystem services benefits beyond their boundaries and what the agency is doing to advance its science and policies to realize that goal.

57. *Id.*
58. *Id.*
59. The deadline was March 30, 2016. *Id.*
60. *Id.*
61. U.S. DEP'T OF AGRIC., FOREST SERV., USDA FOREST SERVICE RESPONSE TO THE EXECUTIVE OFFICE OF THE PRESIDENT MEMORANDUM OF OCTOBER 7, 2015: INCORPORATING ECOSYSTEM SERVICES INTO FEDERAL DECISION MAKING (2016).

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In particular, the report emphasizes provision of clean water and carbon sequestration and also explains that staff are undergoing training "focused more specifically on impact investing opportunities (a much newer field for federal agencies, including our own)."[62] Overall, the report represented the culmination of almost a decade of gradual but unmistakable movement of the Forest Service toward the ecosystem services framework—to the point that by 2016 it had become central to the agency's mission.

II. CURRENT STATE OF PLAY

The CEQ's best practices implementation guidance was scheduled for delivery in the final days of the Obama Administration, leaving it to the next administration to determine next steps. Given the previous adoption of ecosystem services concepts by *both* Democratic and Republican administrations, it was widely assumed that the trajectory would continue regardless of which party took control of the White House. Indeed, unlike its actions on many other Obama-era environmental and natural resources initiatives,[63] the Trump Administration has thus far not put the EOP Memorandum on the chopping block—but neither has the Administration kept it front and center as a policy goal. The Forest Service was at the leading edge of responding to the EOP Memorandum during the Obama Administration. Since then, the agency has continued to lead, albeit with a more muted approach, through scientific progress and policy development. On the other hand, the fruits of these labors—actual integration of ecosystem services concepts and goals into National Forest LRMPs, particularly for regulating and supporting services—have been slower to gain traction. In this Part we summarize the Forest Service's progress on three fronts: policy, science, and national forest plans.

62. *Id.* at 15.

63. For examples, see Lisa Heinzerling, *Unreasonable Delays: The Legal Problems (So Far) of Trump's Deregulatory Binge*, 12 HARV. L. & POL'Y REV. 13 (2018); J.B. Ruhl & James Salzman, *Presidential Exit*, 67 DUKE L.J. 1729 (2018).

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A. Advancing Science to Enable Ecosystem Service Assessments

In support of its 2012 Planning Rule and other ecosystem services initiatives, the Forest Service has continued to make strong advances in its science and modeling. Whereas the delivery of provisioning and cultural services from a National Forest is usually easy to trace—just follow the timber and the water—it is far more difficult to do so for regulating and supporting services. At a National Forest level, for example, it can prove difficult to trace the delivery of groundwater recharge from wetlands and meadows, as well as the sediment capture by riparian habitat from source to beneficiary.

Part of this initiative has involved using existing tools to help Forest Service officials model ecosystem changes and, where feasible, incorporate ecosystem services. This has occurred in applications ranging from fire management to forest recovery and restoration programs. These advances will also help identify existing gaps in knowledge.

As a more specific example, Forest Service scientists in the southeastern United States have developed a valuation methodology for forest ecosystem services known as "I-TREE." Their approach quantifies annual provision of ecosystem services, develops a spatial catalog of the marginal values of changes in those flows, and accounts for the total value of ecosystem services lost or gained as a result of changes in forest ecosystems.[64] They also set out best practices for quantifying and valuing forests' cultural services, watershed services, air quality and carbon sequestration, and provisioning of non-timber forest products.

B. Policy Quiets Down

On the policy front, nothing like the 2012 Planning Rule has come out of the Forest Service since January 2016. But that is consistent with the uneven progress of a quiet revolution. Not every step along the way to evolving the agency's mission must be "big." Rather, the agency has been solidifying its

64. U.S. DEP'T OF AGRIC., FOREST SERV., TREES AT WORK: ECONOMIC ACCOUNTING FOR FOREST ECOSYSTEM SERVICES IN THE U.S. SOUTH (2017), https://www.srs.fs.usda.gov/pubs/gtr/gtr_srs226.pdf [https://perma.cc/VYR4-YR2T]; *see also* U.S. DEP'T OF AGRIC., FOREST SERV., *supra* note 61, at 10–11.

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new position largely through education of internal and external constituencies. Examples of the former include two comprehensive manuals published in 2017, *Trees at Work, Economic Accounting for Forest Ecosystem Services in the U.S. South*,[65] and *Integrating Ecosystem Services into National Forest Service Policy and Operations*.[66] The first manual provides state-of-the-art economic data on identifying, quantifying, and valuing ecosystem services from forest resources of all kinds. The second summarizes for agency staff where the Forest Service now situates the ecosystem services framework in its National Forests policy:

> Here, we build on past successes and lessons learned to propose an agencywide shift to design, integrate, and implement ecosystem services science, tools, and communications into Forest Service policy and operations. This approach focuses on three key opportunities: (1) consider a broad suite of services in decisionmaking and priority setting, (2) quantify and communicate in terms of benefits to people in measurement and reporting, and (3) connect providers and beneficiaries of ecosystem services through partnership and investments. Each opportunity offers value to the agency and to society but depends on the condition and supply of key ecosystem services.[67]

The Forest Service has also stepped up its efforts to educate the public on the ecosystem services benefits that National Forests supply outside their boundaries. Through its "Nature's Benefits" series of two-to-four-page pamphlets published in 2018, the agency is using punchy text, diagrams, and numbers to illustrate National Forests' economic impact in California. The series includes twenty pamphlets addressing the range of ecosystem services provided in different National Forests.[68] To be sure, most of the dollars touted in the pamphlets are associated with provisioning and cultural services. For example, the

65. U.S. DEP'T OF AGRIC., FOREST SERV., *supra* note 64.

66. U.S. DEP'T OF AGRIC., FOREST SERV., INTEGRATING ECOSYSTEM SERVICES INTO NATIONAL FOREST SERVICE POLICY AND OPERATIONS (2017), https://www.fs.fed.us/pnw/pubs/pnw_gtr943.pdf [https://perma.cc/NN5V-MSPZ].

67. *Id.* at Executive Summary.

68. *Nature's Benefits*, U.S. DEP'T AGRIC., FOREST SERV., https://www.fs.usda.gov/detail/r5/landmanagement/?cid=FSEPRD535860 (last visited July 8, 2019) [https://perma.cc/AF84-DRF4].

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Nature's Benefits: Local Economies pamphlet focuses on jobs and spending associated with resource-extraction industries, tourism, and recreation due to proximity to a National Forest.[69]

C. Superficial Progress in National Forest Plans

For the Forest Service, meaningful implementation of policy occurs through National Forest planning and the final LRMPs. Alas, thus far there has been little progress in terms of actual integration of ecosystem services into LRMPs at levels reflective of the goals of the 2012 Planning Rule and subsequent policy developments. Overall, of the few LRMPs revised using the 2012 Planning Rule, the substantive changes amount to little more than sprinkling in terms like "ecosystem services" and "provisioning services" with few meaningful requirements. The dominant focus remains on provisioning and cultural services. In large part, this can be explained by three factors: (1) the slow timeline of LRMP revision, (2) the agency's traditional fixation on provisioning and cultural services, and (3) the difficulty of tracing regulating and supporting services to human beneficiaries.

1. The LRMP Revision Timeline Bottleneck

To put it bluntly, National Forest LRMP revisions are far behind schedule—in most cases, more than a decade behind the statutorily mandated deadline.[70] The 2012 Planning Rule recognized this timing disconnect and allowed some National Forests to use the 1982 version of the Planning Rule for their next LRMP update.[71] Indeed, sixteen of the LRMPs finalized since 2012 used the 1982 version, and only eighteen used or are using the 2012 Planning Rule for their new LRMPs. All other National Forests in the system will not use the 2012 version until the next round of revisions they undertake, which will occur

69. U.S. DEP'T OF AGRIC., FOREST SERV., NATURE'S BENEFITS: LOCAL ECONOMIES (2017), https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd551249.pdf [https://perma.cc/WZ93-F36D].

70. *See Schedule of Forest Service Land Management Plan Revisions*, U.S. DEP'T AGRIC., FOREST SERV. (Oct. 1, 2016), https://www.fs.fed.us/emc/nfma/includes/LMPscheduleOct2016.pdf [https://perma.cc/7SLY-ZPMJ].

71. *Id.*

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gradually over many years.[72] Also, of the eighteen that used or are using the 2012 Planning Rule, many initiated the process before the 2015 Directives were issued.[73] The result is that, seven years after the 2012 Planning Rule, we are just now seeing the first LRMPs that benefitted from the 2012 Planning Rule and 2015 Directives.[74]

2. Agency Inertia Resists Change

Since its inception, the Forest Service has been in the business of managing National Forests for ecosystem services. Overwhelmingly, though, it has seen its mission as supplying provisioning services (timber, water, food) and cultural services (camping, hiking, boating) rather than regulating services (flood control) and supporting services (nutrient cycling).[75] In this respect, the 2012 Planning Rule only requires grouping these traditional uses under the labels of provisioning and cultural services. It does not require that anything else be

72. *Id.*

73. *Id.*

74. *See* U.S. DEP'T OF AGRIC., FOREST SERV., LMP REVISIONS CURRENTLY UNDERWAY (Mar. 31, 2019), https://www.fs.fed.us/emc/nfma/includes/LMPRevisionScheduleQ2FY2019.pdf [https://perma.cc/N2LZ-Q2KB]; U.S. DEP'T OF AGRIC., FOREST SERV., STATUS OF FOREST SERVICE LAND MANAGEMENT PLANS (Mar. 14, 2018), https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/ fseprd593 201.pdf [https://perma.cc/5BJ3-AYHB].

75. *See, e.g.*, *A Historical Perspective*, U.S. DEP'T AGRIC., FOREST SERV., https://www.fs.fed.us/forestmanagement/aboutus/histperspective.shtml (last visited July 8, 2019) [https://perma.cc/JTK9-AZ9D]. Excellent summaries of Forest Service policies prior to, leading to, and after the enactment of NFMA are found in MICHAEL J. BEAN & MELANIE J. ROWLAND, THE EVOLUTION OF NATIONAL WILDLIFE LAW 340–56 (3d ed. 1997); 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 (1998); Oliver A. Houck, *On the Law of Biodiversity and Ecosystem Management*, 81 MINN. L. REV. 869, 883–929 (1997); and Lawrence Ruth, *Conservation on the Cusp: The Reformation of National Forest Policy in the Sierra Nevada*, 18 UCLA J. ENVTL. L. & POL'Y 1 (2000). The Forest Service's multiple use mandate necessarily requires that the agency deliver provisioning services such as timber and minerals. *See* Jan G. Laitos, *Oil and Gas Leasing on Forest Service Lands*, 5 NAT. RESOURCES & ENV'T 23 (1991); Thomas R. Lundquist, *Providing the Timber Supply from National Forest Lands*, 5 NAT. RESOURCES & ENV'T 6 (1991); Lyle K. Rising, *Public Land and National Forest Access for Mining*, 5 NAT. RESOURCES & ENV'T 16 (1991). The early history of federal and state forest policy is thoroughly explored in J. CAMERON, THE DEVELOPMENT OF GOVERNMENTAL FOREST CONTROL IN THE UNITED STATES (1972); J. P. KINNEY, THE DEVELOPMENT OF FOREST LAW IN AMERICA (1917); and James L. Huffman, *A History of Forest Policy in the United States*, 8 ENVTL. L. 239 (1978).

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changed. The shift to broaden the focus of LRMPs to include the relatively new concepts of regulating and provisioning services requires planners at the National Forest level to develop new expertise, data gathering, and methods.

It should come as no surprise, therefore, that the first few plans guided by the 2012 Planning Rule box tilt heavily toward assessing and describing provisioning and cultural services. The 2017 LRMP for the Colville National Forest is representative. It states that the unit's "principal ecosystem services are timber, wildlife, fish, water, forage, and recreation," all of which are provisioning or cultural services.[76] The 2017 LRMP for the Rio Grande National Forest has a more robust section on ecosystem services than any of the other plans using the 2012 Planning Rule we reviewed, yet its list is limited to provisioning and cultural services, namely: air quality, areas of tribal importance, congressionally designated trails, cultural resources, fire management, forest products, infrastructure, lands, minerals, recreational management, and scenery.[77] Clearly, it will take some time for the agency to translate the 2012 Planning Rule into LRMPs that meaningfully expand the focus on ecosystem services to include regulating and supporting services.

3. Science for Identifying Beneficiaries Is Lagging

To some extent, the agency's slow uptake of regulating and supporting services in LRMPs is attributable to the fact that the science of ecosystem services has focused primarily on the production function of ecosystem services and much less on the delivery of them to human beneficiary communities.[78] This is a larger problem within the ecosystem services discipline.[79] Policy discussions and even scientific studies often conflate ecosys-

76. U.S. DEP'T OF AGRIC., FOREST SERV., COLVILLE NATIONAL FOREST: LAND MANAGEMENT PLAN 3 (Sept. 2018), https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd594831.pdf [https://perma.cc/6777-TPSY].

77. U.S. DEP'T OF AGRIC., FOREST SERV., RIO GRANDE NATIONAL FOREST: DRAFT REVISED LAND MANAGEMENT PLAN 45–68 (2017), https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd560186.pdf [https://perma.cc/3DF7-WEL5].

78. Rebecca Chaplin-Kramer et al., *Global Modeling of Nature's Contributions to People*, 366 SCIENCE 255, 255 (2019).

79. Lydia P. Olander et al., *Benefit Relevant Indicators: Ecosystem Services Measures that Link Ecological and Social Outcomes*, 85 ECOLOGICAL INDICATORS 1262 (2018); Stephen Polasky et al., *Setting the Bar: Standards for Ecosystem Services*, 112 PNAS 7356 (2015).

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tem processes with ecosystem services—the latter are supported by ecosystem processes but only become services when and where humans benefit.[80] This is a rare example of the science of ecosystem services needing to catch up with the law and policy of ecosystem services.

III. A NEW ROLE FOR FEDERAL PUBLIC LANDS

This brief history of how the ecosystem services framework has slowly moved into the law and policy of the U.S. Forest Service suggests three larger questions. First, why did the agency undertake this mission transformation—what explains the rapid uptake and strong interest of the Forest Service in ecosystem services? Second, how did the agency pull it off—what authority did it use to shift to an ecosystem services focus for management of National Forests? And finally, what are the implications—how will this new role for National Forests change how the Forest Service and the public situate National Forests in the larger policy space of public land management?

A. Agency Incentives: The Decline of Timber

The explanation for why the Forest Service embraced the ecosystem services framework begins with the agency's efforts starting in the 1990s to incorporate ecosystem management into its core practices.[81] This included dedicated work on ecological restoration as well as greater use of "forest health" and "sustainability" metaphors in the 1990s and early 2000s,[82] both later firmly implanted in the 2012 Planning Rule. The Forest Service faced a new range of pressing management challenges, from climate change, bark beetle tree kills, and uncontrollable wildfires to urban encroachment on forests and endangered

80. Heather M. Leslie, *A Roadmap to Nature's Benefits*, 332 SCIENCE 1264, 1264 (2011) ("This distinction between processes and services highlights the importance of 'mapping' services explicitly: If no one is living along a particular stretch of coast, then the marsh there does not provide a coastal protection value (although it may well provide other benefits . . .).").

81. This history is provided by a personal communication with Sally Collins, former Deputy Chief Forester, U.S. Forest Service (Feb. 6, 2019) (on file with author). *See also* National Forest System Land and Resource Management Planning, 65 Fed. Reg. 67,514 (Nov. 9, 2000) (codified at 36 C.F.R. pts. 217 and 219) (explaining Forest Service's embrace of ecosystem management, adaptive management, and sustainability).

82. 65 Fed. Reg. 67,514.

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species.[83] The agency's shift in narrative from provision of timber to functioning, healthy forests supported an ecosystem services approach focused on water filtration, soil stabilization, and reduced risk of wildfire.

This shift was also driven, however, by the need for a new management goal for National Forests in the twenty-first century. Following World War II, the construction boom of new houses ensured a powerful and growing timber market. The Forest Service was both proud and clear that its mission was to provide the raw material for America's suburban growth. This was perhaps most obvious in the 1971 case *Sierra Club v. Hardin,* where the Forest Service concluded that the appropriate mix of multiple uses of the Tongass National Forest was best achieved by dedicating the forest *entirely* to timber production.[84] To be sure, the agency performed this mission well. As the graph below makes clear, the timber sold and harvested from National Forests steadily increased from the 1930s through the late 1960s, then leveled off.[85] The timber harvest peaked just above twelve billion board feet in the early 1990s.

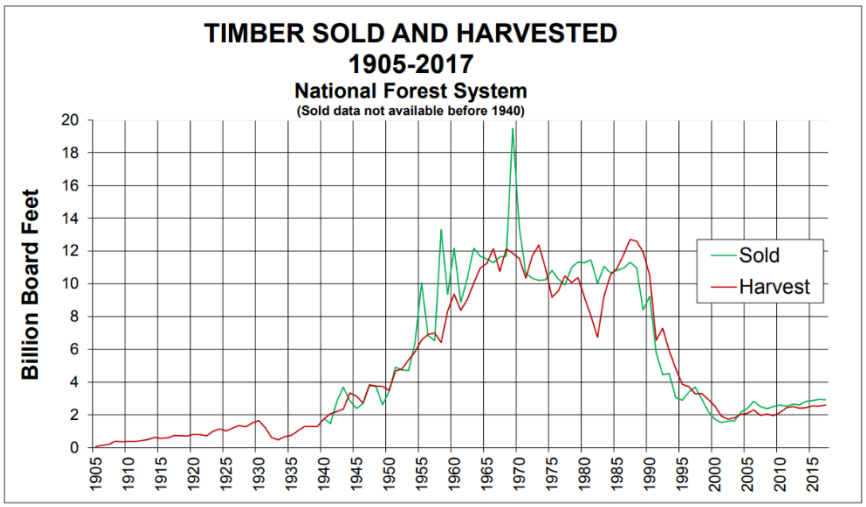


FIGURE 1. Timber Sold and Harvested from 1905 to 2017.

83. Murray Feldman, *National Forest Management under the Endangered Species Act*, 9 NAT. RESOURCES & ENV'T 32 (1992).

84. Sierra Club v. Hardin, 325 F. Supp. 99, 106 (D. Alaska 1971).

85. U.S. DEP'T OF AGRIC., FOREST SERV., FY 1905-2017 NATIONAL SUMMARY CUT AND SOLD DATA AND GRAPHS (Apr. 11, 2018), https://www.fs.fed.us/forestmanagement/documents/sold-harvest/documents/1905-2017_Natl_Summary_Graph.pdf [https://perma.cc/QN4W-RWZA].

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As the 1990s drew to a close, however, logging in the National Forests crashed, declining to just two billion board feet a decade later. This rapid drop was due in part to Endangered Species Act restrictions, in part to the ascent of foreign timber suppliers, and in part to a cooling housing market. The net result, though, called into serious question the Forest Service's mission of managing forests for timber production. If timber production no longer justified management strategies for the National Forests, what should take its place?

Enter ecosystem services.

The timing of the Forest Service's interest in ecosystem service provision was not coincidental. The agency's focus on provision of off-site services happened at exactly the same time that the timber harvests were bottoming out with no clear prospects for an upturn going forward. To be clear, numerous sound legal and policy reasons explain why the Forest Service focused on ecosystem service provision, but self-interest in providing a new mandate going forward was clearly a motivating force.

B. Agency Authority: The Multiple Use Mandate

Of course, even with a will there must be a way. On what authority could the Forest Service make the turn to ecosystem services? Indeed, the timber industry raised that very question in litigation mounted to challenge the 2012 Planning Rule. As the court in *Federal Forest Reserve Coalition v. Vilsak* explained:

> Claims 4, 5, and 6 of the complaint assert that 36 C.F.R. § 219.10 violates the OAA (Claim 4), the NFMA (Claim 5), and the MUSYA (Claim 6), by stating that land management plans "must provide for ecosystem services and multiple uses, including outdoor recreation, range, timber, watershed, wildlife, and fish, within Forest Service authority and the inherent capability of the plan area[.]" 36 C.F.R. § 219.10. According to Plaintiffs, the establishment of a "mandate to provide 'ecosystem services'" runs afoul of the statutory scheme by "establish[ing] an entirely new category of national forest uses" that is nowhere provided for in any

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of the relevant statutes.[86]

The court dismissed the action for lack of standing; with no LRMPs yet revised or updated using the 2012 Planning Rule, the court concluded there had been no injury and thus did not reach the merits of this objection. With no appeal taken, the Forest Service continued apace with its agenda of embedding ecosystem services in its planning process.

What if the objection made by the timber industry in *Forest Reserve Coalition* is made when the Forest Service uses ecosystem services to guide and implement an LRMP? On the one hand, the way in which the Forest Service framed the introduction of the ecosystem services framework in the 2012 Planning Rule—by referring to provision of "ecosystem services *and* multiple uses"—suggests that ecosystem services is an add-on, thus lending support to the objection that the agency tacked on an additional mandate. On the other hand, the multiple uses included in MUSYA—outdoor recreation, range, timber, watershed, and wildlife and fish—are ecosystem services, so one would be strained to argue that the agency cannot manage generally for ecosystem services. More broadly, MUSYA instructs the Forest Service to manage for the "multiple use and sustained yield of the several products and services obtained" from National Forests, with no limitation on the suite of services.[87] The agency channeled these themes in response to comments challenging the introduction of the ecosystem services framework in the 2012 Planning Rule:

> Comment: Ecosystem services. Some respondents objected to the use of "ecosystem services" in Sec. 219.1(b) and throughout the rule. One respondent felt the term diluted the congressionally honored and sanctioned "multiple use" mission of the national forests.
>
> Response: The use of the term "ecosystem services" has been removed from Sec. 219.1(b), added to Sec. 219.1(c), and revised throughout the final rule; however, the final rule retains reference to "ecosystem services." The final rule states that plans must "provide for ecosystem services and multi-

86. Fed. Forest Res. Coal. v. Vilsak, 100 F. Supp. 3d 21, 31 (D.D.C. 2015).
87. 16 U.S.C. § 529 (2018).

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> ple uses" instead of "provide for multiple uses, including ecosystem services" as it was stated in the proposed rule. The Department believes this revised wording is consistent with the MUSYA, which recognizes both resources and services. The MUSYA requires the Forest Service to "administer the renewable surface resources of the national forests for multiple use and sustained yield of the several products and services obtained therefrom." (16 U.S.C. 529). The Act defines "multiple use" as "the management of all the various renewable surface resources of the national forests so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services" (16 U.S.C. 531(a)). The Department believes MUSYA anticipated changing conditions and needs, and the meaning of "several products and services obtained" from the national forests and grasslands incorporates all values, benefits, products, and services Americans know and expect the NFS to provide. Resources like clean air and water are among the many ecosystem services these lands provide.[88]

While the court in *Federal Forest Reserve Coalition* did not reach the merits of that argument, the Forest Service was mindful to point out, accurately, in its response to rulemaking comments that:

> [S]ome of the Agency's past decisions have been challenged in court, leading to judicial decisions interpreting the extent of Forest Service discretion, or judgment, in managing National Forest System lands. Courts have routinely held that the Forest Service has wide discretion in deciding the proper mix of uses within any area of National Forest System lands. In the words of the Ninth Circuit Court of Appeals, the Agency's authority pursuant to the MUSYA "breathes discretion at every pore."[89]

In other words, bring it on! The agency will be ready to use the broad mandates of MUSYA and NFMA to defend its turn to

88. National Forest System Land Management Planning, *supra* note 37, at 21,190.

89. *Id.* at 21,185 (quoting Perkins v. Bergland, 608 F.2d 803, 806 (9th Cir. 1979)).

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ecosystem services. This position can also be a model for other federal public lands and environmental agencies for how to use broad statutory language to leverage ecosystem services science and policy.[90]

C. Implications: Reimagining the National Forests

The Forest Service's management of National Forests has suffered harsh criticism over the past several decades, with a wide range of proposed remedies.[91] Some interest groups defend the status quo, while others—such as environmental protection groups, recreational groups, and extractive industry groups—contend that federal ownership is appropriate but that the forests are mismanaged by favoring one use over another.[92] Even more aggressively, many politicians in western states argue that ownership should be transferred to the states because that was purportedly the original deal between the federal and state governments.[93] Libertarian commentators, meanwhile, have proposed that federal lands be transferred to private ownership because markets will increase the value of the lands and resources as well as ensure their efficient use and development.[94] Advocates for retained federal ownership have lodged strong rebuttals to both proposed ownership transfer approaches, arguing that there is no legal basis for the state ownership theory and that privatization would unduly commodify natural resources.[95] We suggest an additional argument in de-

90. *See* J.B. Ruhl et al., *Implementing the New Ecosystem Services Mandate of the Section 404 Compensatory Mitigation Program—A Catalyst for Advancing Science and Policy*, 38 STETSON L. REV. 251 (2009); J.B. Ruhl, *Ecosystem Services and the Clean Water Act: Strategies for Fitting New Science into Old Law*, 40 ENVTL. L. 1381 (2010).

91. For a spectrum of views, see A VISION FOR THE U.S. FOREST SERVICE (Roger A. Sedjo ed., 2000).

92. Cheever, *supra* note 75; Houck, *supra* note 75; Ruth, *supra* note 75.

93. Jaime Fuller, *The Long Fight Between the Bundys and the Federal Government, from 1989 to Today*, WASH. POST (Jan. 4, 2016), https://www.washingtonpost.com/news/the-fix/wp/2014/04/15/everything-you-need-to-know-about-the-long-fight-between-cliven-bundy-and-the-federal-government/ [https://perma.cc/9NGD-SYZ8]. Other observers propose models that retain a role for the Forest Service in setting national forest management policy but vest greater power in local and private decision-making bodies. *See* ROGER A. SEDJO, THE NATIONAL FORESTS: FOR WHOM AND FOR WHAT?, PERC Policy Series No. PS-23 (2001).

94. *See* RICHARD L. STROUP & JOHN A. BADEN, NATURAL RESOURCES: BUREAUCRATIC MYTHS AND ENVIRONMENTAL MANAGEMENT 118–27 (1983).

95. Ian Bartrum, *Searching for Cliven Bundy: The Constitution and Public*

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fense of retained federal ownership and management: the vast capacity our federal public lands have to deliver regulating and supporting services to human communities from local to global scales. The substantial capacity and benefits of federal provision of ecosystem services are much greater than what state or private ownership could deliver.

To be sure, millions of acres of federal land were transferred to state and private ownership in the early history of our nation. Two-thirds of the original 1.8 billion acres of public domain acquired by the United States were subsequently transferred to individuals, corporations, and states through state land grants, military bounties, grants to railroads, homesteading grants, and similar mechanisms.[96] The shift to a reservation policy did not gain traction until the late 1800s, followed by a period in which federal lands were designated for specific purposes, such as National Forests. Having followed that model for over one hundred years, advocates of state or private ownership can hardly argue that their positions are based in recent experience. More to the point, we described in the Introduction why regulating and supporting ecosystem services have been largely ignored until recently: fragmented political boundaries do not match up with ecosystem services sources and beneficiaries, and the public goods characteristics of regulating and supporting services do not provide incentives for sustained management. These obstacles will only be worsened by abandoning the federal management of public lands.

The state-ownership model, which has received a lot of attention lately but very little actual traction, would fragment the administration of nationwide land systems such as the National Forests, thus eliminating the economies of scale the federal government can leverage for scientific and policy development. More important than these administrative advantages, however, is the ability of the Forest Service to represent national interests in the federalism of ecosystem services management. Regulating and supporting services provided by federal public lands—such as carbon sequestration, groundwater recharge, and flood control—can inure to the benefit of populations both within and outside the states in which the federal

Lands, 5 NEV. L.J. F. 67 (2017).

96. PUBLIC LANDS FOUND., AMERICA'S PUBLIC LANDS: ORIGIN, HISTORY, FUTURE (Dec. 2014). For a variety of defenses, see A VISION FOR THE U.S. FOREST SERVICE, *supra* note 91.

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lands are located: Carbon sequestration benefits the global human population. Groundwater recharge may benefit numerous communities relying on an interstate aquifer as a source of irrigation water. And flood control from riparian habitat may benefit communities many miles downstream and well into another state.

Because there can be significant trade-offs between different ecosystem services operating at different scales—for example, managing forests to maximize global carbon sequestration can decrease local groundwater recharge[97]—national interests in the management of this balance between scales would be severely impeded were all federal land put into state management. Even if a state were to adopt an ecosystem services focus and had the scientific and administrative resources of the Forest Service, sheer politics would drive it to favor managing services that benefit its intrastate interests—for example, to manage for local groundwater recharge instead of the global benefit of carbon sequestration. While that is a perfectly appropriate management decision for a state-owned forest preserve, federal public lands offer the opportunity to consider and manage for a wider set of interests.

The private ownership model received significant scholarly attention during the early 1980s and was a serious agenda item in the Reagan Administration,[98] though it also has gained very little traction. The principal argument offered in support of private ownership has been that markets are better at allocating and pricing timber, minerals, recreation, and so on. In other words, using the language of ecosystem services, there are well-functioning markets for provisioning and cultural services. So why put the (allegedly) inefficient federal bureaucrats in charge of managing how we get those services from lands and resources currently under federal ownership? In short, the argument is that private markets will be more efficient at extracting resources and providing recreational opportunities

97. *See, e.g.*, Elena Bennett et al., *Understanding Relationships Among Multiple Ecosystem Services*, 12 ECOLOGICAL LETTERS 1394 (2009); Robert B. Jackson et al., *Trading Water for Carbon with Biological Carbon Sequestration*, 310 SCIENCE 1944 (2005); A.P. Kinzig, *Paying for Ecosystem Services—Promise and Peril*, 334 SCIENCE 603 (2011).

98. Steve Hanke, *Follow the Founders and Privatize Public Lands*, FORBES (Dec. 17, 2017), https://www.forbes.com/sites/stevehanke/2017/12/17/follow-the-founders-and-privatize-public-lands/#a471ae74db0e [https://perma.cc/SQ9S-YQ6P].

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than will the Forest Service.

Even accepting that as true, however, that argument completely ignores the nonmarket public good properties of regulating and supporting services described in the Introduction. It is inherently problematic for private landowners to charge for delivery of regulating and supporting services such as flood control and nutrient cycling, so why would they manage their lands for delivery of such services for free?[99] Because these benefits are not reflected in markets, neither is their loss, meaning that markets do not take into account the total economic value of ecological resources. According to the market, the best use of a National Forest parcel transferred to private interests may be to clear-cut the timber and convert it to a theme park, but that decision would not have taken into account the value of the lost regulating and supporting ecosystem services previously benefitting nearby and distant human communities. The Forest Service can take those interests into account and has committed to doing so in the 2012 Planning Rule.

In short, if there is anything the federal public land ownership model can do better than the state public land ownership and private land ownership models, it is managing for delivery of a broad suite of regulating and supporting services. Perhaps the Forest Service and other federal land management agencies are less "local" than their state counterparts and less "efficient" than private markets in many respects, but that is precisely what makes them the right land managers for the job of ensuring a sustainable *national* supply of regulating and supporting ecosystem services from the lands they currently manage.

CONCLUSION

The Forest Service—and a number of its fellow land management agencies—is on to something. Sometimes with a splash, but mostly with quiet determination, the Forest Service has ushered in a new era of federal public land management policy by reimagining the National Forests as an engine of ecosystem services. The agency has always touted the value of what we today call provisioning and cultural services—timber,

99. Lant et al., *supra* note 9, at 970–71.

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water, fish, hiking, and so on—but more recently has turned its attention to regulating and supporting services with an intensity that has made it possible for the agency, its constituents, and the public at large to reimagine the National Forests. And, remarkably, the Forest Service has accomplished this feat without need for any amendment to statutes enacted anytime from over a century to forty years ago. A quiet revolution it has been. More work needs to be done to follow through on the ground, but a revolution it has been nonetheless.

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