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**COMPOSITION OVER DIVISION: THE
STATUTES OF THE NATIONAL FOREST
SYSTEM**

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In September 2020, the U.S. Forest Service took the extraordinary step of closing all 18 national forests in California. The risk of catastrophic fire had become so acute that tolerating *any* human visitors—who could ignite more—was no longer tenable.¹ Damages from the fires of 2020 are still being tallied, but the catastrophe is hard to deny. Five of the state’s six largest fires on record occurred in 2020.² Migrating birds dropped from the sky by the thousands from some combination of asphyxiation, exhaustion, and starvation.³ An estimated 80% of California’s watersheds had recently burned by 2019, leaving them immediately vulnerable to mudslides.⁴ The smoke has become the West’s worst air pollution source by far.⁵ Proximity to national forests, long what homebuyers craved, is now a grave threat across the West.⁶

The outlines of the problem are apparent in the Forest Service’s budget. In fiscal year (FY) 2020, Congress spent \$8.2 billion on the agency, 36% more than in FY 2011 in constant dollars.⁷ Almost \$5 billion of that was on fire.⁸ As more people build in fire-prone areas, more has been and will be spent suppressing fires.⁹ A 2011 statute creating a revolving fund has consistently failed to cover those costs—leaving

1. One estimate put ignitions in California at 97% anthropogenic. See J.K. Balch et al., *Human-Started Wildfires Expand the Fire Niche Across the United States*, 114(11) PROC. NAT’L ACAD. SCI. 2946, 2947 (2017).

2. See Andrew Freedman & Diana Leonard, *California Wildfires Erupt Amid Strong Santa Ana Winds, Threat Could Last Into Next Week*, WASH. POST, Dec. 3, 2020, <https://www.washingtonpost.com/weather/2020/12/03/california-wildfires-santa-ana-winds/> (“The state [just had] its worst wildfire season on record, with about 4.2 million acres burned, more than double the acreage in the previous record-breaking year. At least 10,488 structures have been destroyed and 31 people killed. Five of the top six largest fires on record in the state have occurred this season.”).

3. See Kari Paul, *Dying Birds and the Fires: Scientists Work to Unravel a Great Mystery*, THE GUARDIAN, Oct. 18, 2020, available at <https://www.theguardian.com/environment/2020/oct/18/dying-birds-and-the-fires-scientists-work-to-unravel-a-great-mystery>.

4. See CAL. COUNCIL ON SCI. & TECH., THE COSTS OF WILDFIRE IN CALIFORNIA: AN INDEPENDENT REVIEW OF SCIENTIFIC AND TECHNICAL INFORMATION 130-35 (2020) [hereinafter “WILDFIRE IN CALIFORNIA”].

5. See Marshall Burke et al., *The Changing Risk and Burden of Wildfire in the United States*, 118(2) PROC. NAT’L ACAD. SCI. (2021), <https://www.pnas.org/content/pnas/118/2/e2011048118.full.pdf>.

6. See David E. Calkin et al., *How Risk Management Can Prevent Future Wildfire Disasters in the Wildland-Urban Interface*, 111(2) PROC. NAT’L ACAD. SCI. 746 (2014), https://www.fs.fed.us/rm/pubs_other/rmrs_2014_calkin_d002.pdf.

7. See KATIE HOOVER, CONG. RSCH. SERV., R46557, FOREST SERVICE APPROPRIATIONS: TEN-YEAR DATA AND TRENDS (2020).

8. See KATIE HOOVER, CONG. RSCH. SERV., R46583, FEDERAL WILDFIRE MANAGEMENT: TEN-YEAR FUNDING TRENDS AND ISSUES (2020). Counting the Department of Interior wildfire spending, the total was over \$6.1 billion. *Id.* at 3.

9. See Burke et al., *supra* note 5, at 2-6; Volcker C. Radeloff et al., *Rapid Growth of the US Wildland-Urban Interface Raises Wildfire Risk*, 115 PROC. NAT’L ACAD. SCI. 3314 (2018), <https://www.pnas.org/content/115/13/3314>.

the agency to more borrowing from its regular accounts.¹⁰ The more research that has been done on treating fuels, the more unlikely it appears that we will treat our way out.¹¹ Congress, it is fair to say, is hemorrhaging money on fire in the national forests with little prospect of improving.¹²

I. INTRODUCTION: PARTS AND WHOLES

By 1970 a collection of statutes governing the national forests had amassed.¹³ It was then, though, that Congress aimed for more—for a *whole* of integral parts.¹⁴ That whole began from a plurality of land uses persisting over time, later becoming an idealization of that pluralism.¹⁵ Like the Clean Air and Clean Water Acts, the Forest and Rangeland Renewable Resources Planning Act of 1974 (FRRRPA)¹⁶ embodied hopes for an integral legislative scheme.¹⁷ Later Congresses

10. In the 2011 FLAME Act, Pub. L. No. 111-88 (codified at 43 U.S.C. §§ 1748(a)-(b)), Congress created a “no-year” account for wildfire suppression spending where funds unused in the year of appropriation could accumulate until being spent. This reserve fund has frequently failed to cover fire suppression expenses, leaving the Service to a variety of other emergency gap-filling mechanisms, including borrowing from other discretionary spending accounts within the agency. See CONG. RSCH. SERV. R46583, *supra* note 8, at 3-6.

11. See Jason Kreitler et al., *Cost-Effective Fuel Treatment Planning: A Theoretical Justification and Case Study*, 29 INT’L J. WILDLAND FIRE 42, 42 (2020) (noting a Forest Service estimate that 42% of system needed treatment while about \$300 million annually spent on treatment amounted to less than 5% of need); James K. Agee and Carl N. Skinner, *Basic Principles of Forest Fuel Reduction Treatments*, 211 FOREST ECOLOGY & MGMT. 83 (2005) (noting major uncertainties in the efficacy of most treatments).

12. Cf. FRANCIS FUKUYAMA, *POLITICAL ORDER AND POLITICAL DECAY* 456-65 (2014) (calling the U.S. Forest Service the epitome of a decaying system for its handling of fire amid multiple, often conflicting legal mandates).

13. This included the Organic Administration Act of 1897, ch. 2, 30 Stat. 11 (1897), the Weeks Act, ch. 186, 36 Stat. 962 (1911), the Clark-McNary Act, Pub. L. No. 68-270, 43 Stat. 653 (1924), the McSweeney-McNary Act, ch. 678, 45 Stat. 699 (1928), the Knutson-Vandenberg Act, 46 Stat. 527 (1930), the Sustained Yield Forestry Act, ch. 146, 58 Stat. 132 (1944), the Multiple Use Sustained Yield Act, Pub. L. No. 86-517, 74 Stat. 215 (1960) (MUSYA), the Wilderness Act, Pub. L. No. 88-577, 78 Stat. 890 (1964), and Pub. L. No. 88-657, 78 Stat. 1089 (1964).

14. See PAUL W. GATES, *HISTORY OF PUBLIC LAND LAW DEVELOPMENT* 563-606 (1968); James L. Huffman, *A History of Forest Policy in the United States*, 8 ENV’T L. 239, 275-78 (1978); SAMUEL T. DANA & SALLY K. FAIRFAX, *FOREST AND RANGE POLICY* 315-20 (2d ed. 1980).

15. FRRRPA joined Congress’s first references to a “National Forest System” (NFS) to a mandate that the Secretary of Agriculture “take such action as will assure that the development and administration of the renewable resources of the National Forest System are in full accord with the concepts for multiple use and sustained yield of products and services as set forth in the Multiple Use Sustained-Yield Act of 1960.” Pub. L. No. 93-378, § 8, 88 Stat. 476, 479 (1974) (codified at 16 U.S.C. § 1607).

16. Pub. L. No. 93-378, 88 Stat. 476 (1974) (codified as amended at 16 U.S.C. §§ 1601-1610). The Forest Service refers to this statute as the “RPA.”

17. See DENNIS C. LE MASTER, *DECADE OF CHANGE: THE REMAKING OF FOREST SERVICE AUTHORITY DURING THE 1970S* 33-53 (1984).

followed that lead, at least in part.¹⁸ Inter-statutory composites of their kind, whether from some “one-Congress fiction”¹⁹ or notions of legislative supremacy,²⁰ bring special interpretive troubles, though. Congress’s membership, leadership, organization, and interests are always evolving.²¹ For our national forests, though, past statutes have characteristically served to focus present deliberations, new legislation, and institutional evolution. This critical fact is too often overlooked.

FRRRPA’s biggest amendment package arrived only two years later as a “National Forest Management Act” (NFMA).²² NFMA coincided with the Federal Land Policy and Management Act (FLPMA),²³ a statute of similar proportion and ambition aimed principally at the Interior Department lands.²⁴ NFMA was in many respects a culmination of negotiations begun in 1974,²⁵ if not before.²⁶ High-yield timber and other commodity production transitioned through it from a pitched value conflict to so many entries in a balance sheet to be refined into a grand unified

18. The Service’s implementation of RPA and its amendments have long fed a critique of the NFS as a money-losing, mismanaged environmental disaster. *See, e.g.*, FUKUYAMA, *supra* note 12; Robert H. Nelson, *Our Languishing Public Lands*, 161 POL’Y REV. 45, 46 (2012); RANDAL O’TOOLE, *REFORMING THE FOREST SERVICE* (1988).

19. The “one Congress” legal fiction holds that all statutes should be regarded as the product of a singular authority. Professor Buzbee’s account of this fiction in the Supreme Court grounded it in aspirations to inter-statutory consistency, presumptions that Congress knows the state of the law when it legislates, textualism, and precedent. William W. Buzbee, *The One-Congress Fiction in Statutory Interpretation*, 149 U. PA. L. REV. 171 (2000).

20. *See, e.g.*, JOSEPH RAZ, *BETWEEN AUTHORITY AND INTERPRETATION* 276-88 (2009) (arguing that identifying a singular legislative intent reflects the primacy of legislation). The struggle for power between the Congress and President was at a fever pitch during and following 1974. *See* ERIC SCHICKLER, *DISJOINTED PLURALISM: INSTITUTIONAL INNOVATION AND THE DEVELOPMENT OF THE U.S. CONGRESS 194-204* (2001).

21. *See* WALTER J. OLESZEK ET AL., *CONGRESSIONAL PROCEDURES AND THE POLICY PROCESS* 1-37 (11th ed. 2020).

22. Pub. L. No. 94-588, 90 Stat. 2949 (1976) (codified as amended at 16 U.S.C. §§ 1600-1614).

23. Pub. L. No. 94-579, 90 Stat. 2743 (1976) (codified as amended at 43 U.S.C. §§ 1701-1785).

24. Interpreters have been nearly unanimous in the belief that FLPMA and NFMA bore no legislative history in common. *See, e.g.*, George Cameron Coggins, *The Law of Public Rangeland Management IV: FLPMA, PRLA, and the Multiple Use Mandate*, 14 ENV’T L. 1, 5-9 (1983). FLPMA, however, does share important historical and structural similarities with the NFS statutes. *See infra* note 161 and accompanying text.

25. *See* LE MASTER, *supra* note 17, at 55-83.

26. As often noted, some of NFMA’s signals on timber production originated in the so-called “Church Guidelines,” a 1972 report—unpublished—from the Forests Subcommittee of the Senate Committee on Interior and Insular Affairs which set forth specific “guidelines” on “clearcutting” NFS lands. *See* Edward P. Cliff, *Timber Resources*, 54 U. DEN. L.J. 507, 509 (1977). But it was then-Forest Service Chief Cliff who decided after Church’s subcommittee proffered the guidelines that the Service would follow them. *See* Stephen H. Spurr, *Clearcutting on National Forests*, 21 NAT. RES. J. 223, 231 (1981).

calculus.²⁷ Congress incorporated the National Environmental Policy Act (NEPA)²⁸ directly into the statutes,²⁹ no less for its “action forcing” impact statement tool³⁰ than for its declaration of a national “environmental policy.”³¹

Compositing these different statutes into some coherent whole presents difficult questions about their interpretation. FRRRPA, NFMA, and the others, for example, unequivocally took up an ideal first legislated in the monumentally vague Multiple-Use Sustained-Yield Act (MUSYA) of 1960.³² MUSYA commanded the use of “the renewable surface resources of the national forests for multiple use and sustained yield of the several products and services obtained therefrom.”³³ MUSYA

27. Cf. Huffman, *supra* note 14, at 275-79 (observing that such a transition had beginnings as early as 1960).

28. Pub. L. No. 91-190, 83 Stat. 852 (1970) (codified as amended at 42 U.S.C. §§ 4321-4347 (2012)).

29. NEPA, like MUSYA, was cross-referenced repeatedly in FRRRPA and NFMA. *See infra* note 34 and accompanying text.

30. NEPA’s “detailed statements,” to be circulated among other federal agencies with knowledge and/or jurisdictional authority, were Congress’s original uses of peer assessment and self-correction in the face of uncertainty about environmental consequences. *See* SERGE TAYLOR, MAKING BUREAUCRACIES THINK: THE ENVIRONMENTAL IMPACT STATEMENT STRATEGY OF ADMINISTRATIVE REFORM (1984). NFMA § 6(g)(1) directed the Service to “specify[] procedures” assuring the adoption of its land and resource management plans (LRMPs) “in accordance” with NEPA § 102(2)(C)’s impact statement procedures. *See* 16 U.S.C. § 1604(g)(1).

31. NEPA’s declaration of a national “policy” was an innovation emulated in NFMA § 4(d)(1)—where Congress declared it the “policy of the Congress that all forested lands in the [NFS] shall be maintained in *appropriate* forest cover.” 16 U.S.C. § 1601(d)(1) (emphasis added). NEPA’s declaration was also incorporated in FRRRPA § 3’s mandate that “the Program” be developed “in accordance with principles set forth” in NEPA and MUSYA. *See* 16 U.S.C. § 1602. Finally, NEPA’s mandate that all federal agencies “utilize a systematic, interdisciplinary approach” for the “integrated use of the natural and social sciences,” 42 U.S.C. § 4332(2)(A), was echoed in NFMA’s requirement that its LRMPs “be prepared by an interdisciplinary team . . . based on inventories of the applicable resources of the forest,” 16 U.S.C. § 1604(f)(3).

32. *See* Pub. L. No. 86-517, 74 Stat. 215 (1960). NFMA § 19 added a new section to MUSYA, retroactively renaming it “the ‘Multiple-Use Sustained-Yield Act of 1960.’” Pub. L. No. 94-588, § 19, 90 Stat. 2962 (1976) (codified as amended at 16 U.S.C. § 528 note (2012)). MUSYA itself famously—and retroactively—declared it the “policy of the Congress” that “the national forests *are established* and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes.” 16 U.S.C. § 528 (2012) (emphasis added). The establishment purposes of each of the national forests were, if not unique to each, varied historically and geographically. *See* GATES, *supra* note 14, at 531-606.

33. Pub. L. No. 86-517, § 2, 74 Stat. 215, 215 (1960) (codified as amended at 16 U.S.C. § 529 (2012)). The Act, in turn, defined multiple use and sustained yield separately. *See* 16 U.S.C. § 531(a) (defining “multiple use” as “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 over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some land will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output”); *id.* at § 531(b) (defining “sustained yield of the several products and services” as “the

is cross-referenced nine times between FRRRPA and NFMA.³⁴ But MUSYA only directed the Service to maximize its named uses—“outdoor recreation, range, timber, watershed, and wildlife and fish purposes”³⁵—while hedging that these were “supplemental to, but not in derogation of, the purposes for which the national forests were established.”³⁶ Even if that meant simply perpetual non-declining yields, it ignored the likelihood of changed future *valuations* of such yields.³⁷ Furthermore, it was silent as to the spatial or temporal scales at which the maximizing was to be done. Atop all that, the 1978 Forest and Rangeland Renewable Resources Research Act (FRRRRA)³⁸ took over prescribing what Congress’s Public Land Law Review Commission had first recommended³⁹ on the urgent needs for more basic research—prescriptions paralleling those in FRRRPA and NFMA.

Consider the contrast with the 1964 Wilderness Act, a law aimed directly at the national forests that prompted *scores* of follow-on wilderness-designating statutes, which went unmentioned in the NFS statutes.⁴⁰ Wilderness designations

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”).

34. MUSYA had already been construed as less constraint than Congressional guidance before FRRRPA was even being debated. *See* *Sierra Club v. Hardin*, 325 F. Supp. 99, 123 (D. Alaska 1971) (rejecting challenge to timber sale under MUSYA because “Congress ha[d] given no indication as to the weight to be assigned each value and it must be assumed that the decision as to the proper mix of uses within any particular area is left to the sound discretion and expertise of the Forest Service.”).

35. 16 U.S.C. § 528. While this list may have seemed exhaustive in 1960, it omits mention of uses such as artisanal foraging, biomedical prospecting, carbon sequestration, energy development, tourism – and wilderness preservation.

36. *Id.*

37. *See* R.W. Behan, *Political Popularity and Conceptual Nonsense: The Strange Case of Sustained Yield Forestry*, 8 ENV’T L. 309, 315 (1978).

38. *See* Pub. L. No. 95-307, 92 Stat. 352 (1978). FRRRRA was joined by the Cooperative Forestry Assistance Act, Pub. L. No. 95-313, 92 Stat. 365 (1978), and the Renewable Resources Extension Act, Pub. L. No. 95-306, 92 Stat. 349 (1978), each of which amended the funding and coordination of different research and extension works.

39. The Public Land Law Review Commission (PLLRC) was chartered in 1964 by legislation originating in the House and Senate Committees on Interior and Insular Affairs. *See* Hon. Wayne N. Aspinall, *The Public Land Law Review Commission: Origins and Goals*, 7 NAT. RES. J. 149, 152 (1967) (discussing origins of Pub. L. No. 88-606). That comprehensive review of all public land laws culminated in a massive report to the President. *See* PUB. LAND L. REV. COMM’N, ONE THIRD OF THE NATION’S LAND (1970) (explaining PLLRC’s 137 numbered recommendations). FRRRRA began from those recommendations and has since become the hub of Congressional prioritizations on research. *See id.* at 63-64, 80-81.

40. Despite fourteen other statutes NFMA and FRRRPA referenced, not one mention is made of the Wilderness Act. By contrast, FLPMA explicitly incorporated the Wilderness Act and wilderness reviews within its architecture. *See* Pub. L. No. 94-579, § 603, 90 Stat. 2785 (1976) (codified as amended at 16 U.S.C. § 1782). This silence may stem from the tangled history of “roadless areas” and the reviews thereof within the national forests. *See* CRAIG W. ALLIN, THE POLITICS OF WILDERNESS PRESERVATION 160-67 (1982). But the omission is still curious given NFMA’s inclusion of “wilderness” among the “products and services” to be “obtained” from the NFS supposedly “in accordance with”

have been Congress's chief legal constraint on multiple use and, derivatively, the Service.⁴¹ In 118 statutes since 1964, wilderness designations have been concentrated overwhelmingly on the NFS.⁴² The original forest reserves may have been the origin of agency rules with the force of law,⁴³ but every such rule is modally subordinate to statutory constraints like the Wilderness Act's.⁴⁴ Designated wilderness is, thus, a form of legal exclusion from the NFS statutes. For wilderness areas are normative regimes unto themselves⁴⁵ even as they remain integrated into their wider landscapes.⁴⁶

A similar challenge is recognizable in ecosystem science, such as it is. Biologists and ecologists have struggled mightily to find an optimal scale at which to study cells, organisms, populations, meta-populations, communities, etc.⁴⁷ Distinguishing parts from wholes and wholes apart from one another has defined a

MUSYA—which, of course, made no mention of “wilderness” services in 1960. See NFMA § 6(e)(1) (codified at 16 U.S.C. § 1604(e)(1)).

41. The silence is more curious given the Act's origins—through Congressman Aspinall's supposed bargain allowing the Wilderness Act to pass in return for the PLLRC—in the House Interior and Insular Affairs Committee. See DANA & FAIRFAX, *supra* note 14, at 231-32. By 2009 and the mammoth Omnibus Public Land Management Act, Pub. L. No. 111-11, the National Wilderness Preservation System had swelled from approximately nine million to more than 109.7 million acres across more than 750 designated areas. See ROSS W. GORTE, CONG. RSCH. SERV., R41649, WILDERNESS LAWS: STATUTORY PROVISIONS AND PROHIBITED AND PERMITTED USES 1-2 (2011). As John Leshy observed, wilderness statutes controlling NFS governance have been Congress's favorite tool for constraining Forest Service discretion. See John D. Leshy, *Public Land Policy After the Trump Administration: Is This a Turning Point?*, 31 COLO. NAT. RES., ENERGY, & ENV'T L. REV. 471, 472-86 (2020).

42. No fewer than ninety of the 118 total statutes designating wilderness since 1964 have created or rearranged wilderness areas in the NFS. See CONG. RSCH. SERV. R41649, *supra* note 41, at App. B. This close involvement has not been lost on reviewing courts. See *infra* notes 230-35 and accompanying text.

43. See, e.g., *United States v. Grimaud*, 220 U.S. 506 (1911); *Light v. United States*, 220 U.S. 523 (1911); *Utah Power & Light Co. v. United States*, 243 U.S. 389 (1917). Rules of this rank are said to bind the agency until changed. See *United States ex rel. Accardi v. Shaughnessy*, 347 U.S. 260, 265-67 (1954); *United States v. Caceres*, 440 U.S. 741, 753-54 (1979).

44. See KATZMANN, *infra* note 252 and accompanying text.

45. See *infra* notes 232-35 and accompanying text.

46. This is a becoming an important wedge in wildfire science and management. See Carol Miller & Gregory H. Aplet, *Progress in Wilderness Fire Science: Embracing Complexity*, 114(3) J. FORESTRY 373 (2016); James K. Agee, *Wilderness Fire Science: A State-of-Knowledge Review*, USDA Forest Serv. Proc. RMRS-P-15-VOL-5 (2000); see *infra* notes 236-43 and accompanying text.

47. See JAMES MACLAURIN & KIM STERELNY, WHAT IS BIODIVERSITY? 21-26 (2008); Kurt Jax, *Ecological Units: Definitions and Applications*, 81 Q. REV. BIOLOGY 237, 241 (2006) (“The problem of determining boundaries of ecological units has always plagued ecologists.”). The lack of consensus surrounding fundamental units prevents ecology from settling many law-like generalities. See John H. Lawton, *Are There General Laws in Ecology?* 84 OIKOS 177 (1999). Indeed, “the uniqueness of biological entities and phenomena” is first among the “major differences between biology and physical sciences.” ERNEST MAYR, TOWARD A NEW PHILOSOPHY OF BIOLOGY: OBSERVATIONS OF AN EVOLUTIONIST 34 (1988). This is both the *emergence* and *indeterminacy* of biological relationships: “[w]hen two entities are combined at a high level of integration, not all the properties of the new entity are necessarily a logical or predictable consequence of the properties of the components.” *Id.*

century of biological thought.⁴⁸ Nowhere has this been more evident than in forest ecology.⁴⁹ What community dynamics exist, what population dynamics exist, and what is the natural integrity of forested areas—such questions remain unanswered after decades of scientific work.⁵⁰ They are part of a broader, urgent race to resolve the defining entities of ecological science.⁵¹

The 1970s Congresses still believed that major breakthroughs in biology and ecology were *possible* and could potentially transform multiple-use management.⁵² Yet the NFS statutes, like the many wilderness designations since, reflect public political choices.⁵³ Then, as now, the search for environmental quality

48. See MAYR, *supra* note 47, at 100 (calling the “rather unfortunate” focus on units of natural selection the cause of “protracted controversy . . . as to whether the gene, the individual (genotype), the group, or the species is the ‘unit of selection,’ or all of them”); Robert H. Whittaker, *Classification of Natural Communities*, 28(1) BOTANICAL REV. 1, 158 (1962) (noting simultaneous attacks on the unit assumptions of community ecology in Russia, France, and the United States). For many ecologists, scale is the basic property defining all others. See, e.g., Simon A. Levin, *The Problem of Pattern and Scale in Ecology*, 73 ECOLOGY 1943, 1959 (1992) (“[N]o description of the variability and predictability of the environment makes sense without reference to the particular range of scales that are relevant to the organisms or processes being examined.”). Interpreting habitat selection is no exception. See Gordon H. Orians & James F. Wittenberger, *Spatial and Temporal Scales in Habitat Selection*, 137 AM. NATURALIST S29 (1991).

49. See Robert B. Keiter, *The Greater Yellowstone Ecosystem Revisited: Law, Science, and the Pursuit of Ecosystem Management in an Iconic Landscape*, 91 U. COLO. L. REV. 1 (2020) [hereinafter Keiter, “GYE Revisited”]; Robert B. Keiter, *Toward a National Conservation Network Act: Transforming Landscape Conservation on the Public Lands into Law*, 42 HARV. ENV’T L. REV. 61 (2018) [hereinafter Keiter, “National Network”]; Robert B. Keiter, *Ecological Concepts, Legal Standards, and Public Land Law: An Analysis and Assessment*, 44 NAT. RES. J. 943 (2004); Robert B. Keiter, *Beyond the Boundary Line: Constructing a Law of Ecosystem Management*, 65 U. COLO. L. REV. 293 (1994); Robert B. Keiter, *Conservation Biology and the Law: Assessing the Challenges Ahead*, 69 CHI.-KENT L. REV. 911 (1994).

50. See, e.g., LARRY D. HARRIS, *THE FRAGMENTED FOREST: ISLAND BIOGEOGRAPHY AND THE PRESERVATION OF BIOTIC DIVERSITY* 71-92 (1984) (reviewing efforts to derive “species-area relationships” from forested areas with their metaphoric treatment as islands consistent with insular biogeography); OSWALD J. SCHMITZ, *THE NEW ECOLOGY: RETHINKING A SCIENCE FOR THE ANTHROPOCENE* 69-105 (2017) (observing that humans’ “domesticated nature” has shown a surprising tendency to evolve rapidly as habitat fragments, resources change, and phenotypic plasticities yield diverse adaptive capacities).

51. Accessible introductions and explanations of the endeavor include SCHMITZ, *NEW ECOLOGY*, *supra* note 50, and OSWALD J. SCHMITZ, *RESOLVING ECOSYSTEM COMPLEXITY* (2010).

52. See TAYLOR, *supra* note 30, at 17-37, 45-58. The NFMA’s Congressional finding that “new knowledge” derived from “coordinated public and private research programs” would “promote a sound technical and ecological base for effective management, use, and protection” of NFS resources was key. See 16 U.S.C. § 1600(4). Behind these formalized findings lay a great deal of Congressional committee work and “regular order” legislative business wherein the possibilities that science and scientific expertise could resolve multiple-use conflicts had been the center of attention. See LE MASTER, *supra* note 17, at 3-83; PAUL W. HIRT, *A CONSPIRACY OF OPTIMISM: MANAGEMENT OF THE NATIONAL FORESTS SINCE WORLD WAR TWO* 254-65 (1994).

53. See JAMES G. LEWIS, *THE FOREST SERVICE AND THE GREATEST GOOD: A CENTENNIAL HISTORY 187-202* (2005); ALLIN, *supra* note 40; cf. Peter L. Strauss, *The Courts and Congress: Should Judges Disdain Political History?*, 98 COLUM. L. REV. 242 (1998) (distinguishing a “political history” of a statute

was conceived chiefly as the pursuit of diffuse public interests in the face of narrower, more fixed private stakes.⁵⁴ The national forests were, thus, both an American heritage and a wealth of private stakes protected by law.⁵⁵ Not surprisingly, then, in more than 40 years with these statutes, the legal constraints on Service discretion that they have entrenched have been less intentional than circumstantial, even accidental. Though environmental quality disputes remain abundant in the NFS, timber production has yielded to managing for wildfire, drought, watershed protection, atmospheric cycling of CO₂ and water vapor, carbon storage, and the demand for fuel as touchstones.⁵⁶

The ecological sciences' high profile within contemporary forestry arguably has made the NFS statutes into a cautionary tale in legislative problem-solving. As ever, the Service is awash in "data, views, [and] arguments"⁵⁷ sufficient to justify to reviewing courts a vast range of discretionary actions. Yet, it faces too many crises to count. Wildfire is emblematic. Atop mountains of research, guidance, plans, memoranda-of-understanding, and federal appropriations laws, there sit the receipts of billions of dollars spent *fighting* something we barely understand while lives continue to be lost or ruined, communities burned, and the predictive knowledge needed to overcome these tragedies remains out of reach.⁵⁸

We can do better. What I will call *divisionary* interpretations of the NFS statutes took root from the clearcutting controversies that dominated many national forests in the 1970s.⁵⁹ This framing focused on the statutes' discrete provisions, first

from its "legislative history" and arguing that a purposive approach to interpretation paying respectful attention to the former avoids aggrandizing the judicial role).

54. See PAUL J. CULHANE, PUBLIC LAND POLITICS: INTEREST GROUP INFLUENCE ON THE FOREST SERVICE AND THE BUREAU OF LAND MANAGEMENT (1981); Richard B. Stewart, *The Reformation of American Administrative Law*, 88 HARV. L. REV. 1667, 1676-88 (1975) (tracing the "problem of discretion" from New Deal era to present as one of checking administrative power both for its failure to identify public interests and because it too often unduly favors highly organized private interests).

55. Then, as now, the NFS consisted of more than 150 units administered both separately and collectively as more than 175 million acres of United States' property. A tangled history of judicial review of the governance of that property predated the statutes here at issue. See Antonin Scalia, *Sovereign Immunity and Nonstatutory Review of Federal Administrative Action: Some Conclusions from the Public-Lands Cases*, 68 MICH. L. REV. 867 (1970).

56. See, e.g., Virginia H. Dale et al., *How is Wood-Based Pellet Production Affecting Forest Conditions in the Southeastern United States?*, 396 FOREST ECOLOGY & MGMT. 143, 143 (2017) (noting increasing interactivity of European demand for bioenergy, U.S. pellet production, and carbon sequestration in U.S. forests); Richard Birdsey et al., *Climate, Economic, and Environmental Impacts of Producing Wood for Bioenergy*, 13 ENV'T RSCH. LETTERS 05201 (2018).

57. As Michael Hertz once observed, this phrase—from the first sentence of 5 U.S.C. § 553(c), the APA's provision on notice and comment rulemaking—assumes that those contributing "data, views, or arguments" have something *valuable* to contribute. See Michael Herz, "Data, Views, or Arguments": *A Rumination*, 22 WM. & MARY BILL OF RTS. J. 351, 357 (2013).

58. Part IV suggests comparisons to programs where the law has effectively co-evolved with and spurred the development of usable scientific knowledge. See *infra* note 325 and accompanying text.

59. Wilkinson and Anderson's meticulous study of the FRRRPA and NFMA is the *locus classicus* of this narrative. See CHARLES F. WILKINSON & H. MICHAEL ANDERSON, LAND AND RESOURCE

on timber production,⁶⁰ later on others. They stressed the political struggle over Forest Service *discretion*—which the Service was said to have won—surrounding the individual provisions.⁶¹ Each of the provisions legislated pertaining to the Service’s management choices, these interpreters argued, eventually boiled down to little or no *judicially enforceable* constraint on the Service.⁶² Most judicial opinions construing the statutes largely (if not uniformly) confirm that assessment.⁶³ Indeed, such

PLANNING IN THE NATIONAL FORESTS (1986). The accounts following them in whole or in part are many. See ALYSON FLOURNOY ET AL., REGULATIONS IN NAME ONLY: HOW THE BUSH ADMINISTRATION’S NATIONAL FOREST PLANNING RULE FREES THE FOREST SERVICE FROM MANDATORY STANDARDS AND PUBLIC ACCOUNTABILITY (2005); 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); Julie A. Weiss, *Eliminating the National Forest Management Act’s Diversity Requirement as a Substantive Standard*, 27 ENV’T L. 641 (1997); Charles Wilkinson, *The National Forest Management Act: the Twenty Years Behind, the Twenty Years Ahead*, 68 U. COLO. L. REV. 659 (1997); Jack Tuholske & Beth Brennan, *The National Forest Management Act: Judicial Interpretation of a Substantive Environmental Statute*, 15 PUB. LAND L. REV. 53 (1994); Michael C. Blumm, *Public Choice Theory and the Public Lands: Why “Multiple Use” Failed*, 18 HARV. ENV’T L. REV. 405, 419-22 (1994); Stephanie M. Parent, *The National Forest Management Act: Out of the Woods and Back to the Courts?*, 22 ENV’T L. 699 (1992); George C. Coggins, *The Developing Law of Land Use Planning on Federal Lands*, 61 U. COLO. L. REV. 307, 336-44 (1990). Wilkinson and Anderson’s study even appeared in several important judicial opinions as well. See, e.g., *Sierra Club v. Glickman*, 974 F. Supp. 905, 917 (E.D. Tex. 1997); *Sierra Club v. Marita*, 46 F.3d 606, 611 (7th Cir. 1995).

60. The Forest Service itself seeded this narrative in a publication it styled *Current Information Report No. 16* in December 1976. See USDA FOREST SERV., CI-16, THE NATIONAL FOREST MANAGEMENT ACT OF 1976 2 (Dec. 1976) (“It should be emphasized that the Congressional action was one of additional policy direction and endorsement, rather than rebuke. . . . In many areas, Congress indicated it rather liked what the Forest Service was doing . . .”). Wilkinson and Anderson framed their opus into range, timber, water, minerals, wildlife, recreation, and wilderness, and drew out histories thereof, culminating in the 1970s statutes. See WILKINSON & ANDERSON, *supra* note 59, at v. Their framing of discrete resources, the Service’s “timber bias,” and its discretionary balancing of all the uses and values may not have been original with them. See, e.g., Cliff, *supra* note 26; Spur, *supra* note 26. But their exhaustive documentation and limning of various legislators’ roles, the Service’s involvement and regulatory history, and provision-by-provision analyses set the standard for scholarship on the statutes.

61. See WILKINSON & ANDERSON, *supra* note 59, at 69-90; Cheever, *supra* note 59, at 635-56; Blumm, *supra* note 59, at 422-28; Parent, *supra* note 59, at 708-28. Agencies are thought to be among the most effective political actors. See, e.g., J.R. DeShazo & Jody Freeman, *Public Agencies as Lobbyists*, 105 COLUM. L. REV. 2217 (2005) (describing Congressional use of agencies to check other agencies). And several accounts maintain that the Service “won” the struggle over its discretion in Congress as the bills were being formulated. See, e.g., Cheever, *supra* note 59, at 643; O’TOOLE, *supra* note 18, at 98-110; HIRT, *supra* note 52, at 260-65. Others locate that victory in the courts and the cases later brought challenging the Service’s practices under the statutes. See, e.g., Weiss, *supra* note 59, at 650-55; Cheever, *supra* note 59, at 656-91.

62. See Wilkinson, *supra* note 59, at 677-80 (concluding that the statutes require extensive planning and coordination by the Forest Service without requiring demonstrable results); Cheever, *supra* note 59, at 705 (concluding the statutes’ standards are “inadequate” and “fail to communicate an intelligible message”); Weiss, *supra* note 59, at 642 (finding that the statutes’ “seemingly clear and decisive language” proved difficult to translate from their “congressional intent”).

63. See *infra* Part III(B).

framing has become so familiar it begs the question: why an effort to challenge it now?⁶⁴

Wilkinson and Anderson's 1985 study, which was the deepest plumbing of the timber conflicts roiling the 93rd and 94th Congresses, lacked the hindsight of 35 years with the laws' interlocking pieces. Decades of experience with these laws, in tandem with late developments in the special biological sciences, have revealed what Wilkinson and others could not have known. Second, and just as important, the norms of statutory interpretation in our courts have shifted considerably toward textualism since the 1970s and even since the 1980s and '90s, when the divisionary framing had taken root.⁶⁵ It is hard to overstate the importance of these changes to the law's practical effect in the forest. Combined, they have put the statutes in a different light,⁶⁶ one that reveals more *compositional* intentions.

The compositional intentions emerge when we appreciate the epistemic and coordination problems Congress was aiming to resolve. First, Congress faced serious principal/agent issues⁶⁷ on NFS lands. Its expert agency, the Forest Service, had long been pursuing a *constrained optimization* of daunting scale and scope.⁶⁸ It was a history that set the Service apart from the typical agency Congress stands up.⁶⁹ The Service was the prototypical "expert system" social scientists had promised could solve complex, emergent public problems.⁷⁰ Second, by the 1970s the Service had accrued

64. Several histories of the Forest Service and NFS mirror Wilkinson and Anderson's divisionary framing. See, e.g., LEWIS, *supra* note 53, at 158-61; JOHN FEDKIW, *MANAGING MULTIPLE USES ON NATIONAL FORESTS, 1905-1995* 99-112 (1996); HIRT, *supra* note 52, at 254-65; DAVID A. CLARY, *TIMBER AND THE FOREST SERVICE 190-94* (1986).

65. In essence, "legislative history" employing "bits and pieces of legislative reports or debates to resolve particular issues of meaning" has lost most of its significance in our statutory interpretation practices. Strauss, *supra* note 53, at 243 n.3. By contrast, fitting the several statutes enacted in the 93d, 94th, 95th Congresses together to cohere is more the kind of legislative history that matters.

66. Cf. Ganesh Sitamaran, *The Origins of Legislation*, 91 NOTRE DAME L. REV. 79, 82-83 (2015) (arguing that academics have recently dug deeper into legislative practices and procedures and that, "in path-breaking articles, Professors Nourse, Bressman, and Gluck have conducted empirical research on legislative drafting" that has refuted long-held beliefs in the legal academy and profession).

67. See Kathleen M. Eisenhardt, *Agency Theory: An Assessment Review*, 14 ACAD. MGMT. REV. 57, 61 (1989) ("The agency problem arises because (a) the principal and the agent have different goals and (b) the principal cannot determine if the agent has behaved appropriately.").

68. A constrained optimization is any effort to optimize an *objective function* as to some number (n) of variables given certain constraints thereon. The objective function may be a cost/energy function (to be *minimized*) or a benefit/utility function (to be *maximized*), while constraints may be *hard* (setting conditions for the n variables that must be met) or *soft* (with varying penalties if and to the extent goals are not met).

69. We might say the Service presented Congress with a novice/expert problem. See Alvin I. Goldman, *Experts: Which Ones Should You Trust?*, 63 PHIL. & PHENOMOLOGICAL RSCH. 85, 89-90 (2001) (describing a novice/expert problem as one in which a party who lacks the basis necessary to evaluate another's claims to knowledge must do so and contrasting it with expert/expert problems in which two parties with the same expertise must evaluate each other's claims).

70. See HERBERT KAUFMAN, *THE FOREST RANGER: A STUDY IN ADMINISTRATIVE BEHAVIOR* (RFF Press 1960). Kaufman's classic examined the Service from the ranger and ranger district to its top

prominent critics.⁷¹ Yet its unique role of either conducting or funding the bulk of the original research into its own central questions dated at least to the 1920s,⁷² if not earlier.⁷³ In the so-called McSweeney-McNary Act, Congress directed the service to

conduct such investigations, experiments and tests [as needed to] . . . determine, demonstrate, and promulgate the best methods of reforestation and of growing, managing, and utilizing timber, forage, and other forest products, of maintaining favorable conditions of water flow and the prevention of erosion, of protecting timber and other forest growth from fire, insects, disease, or other harmful agents, of obtaining the fullest and most effective use of forest lands, and to determine and promulgate the economic considerations which should underlie the establishment of sound policies for the management of forest land and the utilization of forest products.⁷⁴

The vast network of research stations, experimental forests, cooperative reforestation programs, and state administrative counterparts this fostered not only formed the modern practice of professional forestry in the U.S.,⁷⁵ it yielded the institutional, cultural, and knowledge backdrop of the 1970s legislation. Or at least it seemed like knowledge. Professional forestry's heyday stemmed in large part from

echelons through its manuals, chains of command, personnel, norms, budget, and characteristic modes of decision-making. His conclusion was that the Service had managed to sustain a high degree of *unity* while avoiding the perils of uniformity or hierarchical rigidity. *See id.* at 203-31.

71. *See* MICHAEL FROME, *THE FOREST SERVICE* (1971); *see also* *A University View of the Forest Service*, S. Doc. 91-115, 91st Cong., 2d Sess. (1970).

72. *See* LEWIS, *supra* note 53, at 68-73; CLARY, *supra* note 64, at 34-66.

73. The first known Forest Service report on the nation's timber production, named for Arthur Capper, the Kansas senator who sponsored the resolution requesting it, was delivered to the Senate in late 1920. HAROLD K. STEEN, *THE U.S. FOREST SERVICE: A HISTORY 181-83* (1976) (Forest Hist. Soc'y 2004) (describing the Capper Report's conclusion that serious timber depletion had led to record high timber prices); *but see* FROME, *supra* note 71, at 131 (describing an 1876 payment to a Dr. Franklin Hough for a report to Congress on the best means to renew forests). By the time "multiple use" first appeared in agency lingo in the 1930s it was typically meant to contrast with "single use" lands that had been placed in watershed and "primitive area" protective designations. *See* HIRT, *supra* note 52, at 36.

74. Pub. L. No. 70-466, 45 Stat. 699, 699-700 (1928), *repealed by* Pub. L. No. 95-307, 92 Stat. 353 (1978) (FRRRRA). This Act coincided with—and may have been precipitated by—a "substantial overproduction" of timber and the resultant "downward spiral" in prices that year, a "timber bust" that did not end until World War II. *See* CLARY, *supra* note 64, at 83.

75. *See* LINCOLN BRAMWELL, *FOREST MANAGEMENT FOR ALL: STATE AND PRIVATE FORESTRY IN THE U.S. FOREST SERVICE* (2013); LEWIS, *supra* note 53, at 72-73, 80-81; DANA & FAIRFAX, *supra* note 14, at 114-15, 121-31; STEEN, *supra* note 73, at 140-44, 187-95. An early retrospective was to similar effect. *See* Earle H. Clapp, *The Decennial of the McSweeney-McNary Act*, 36(9) J. FORESTRY 832 (1938). Congress currently funds seven research stations, eighty-one experimental forests and ranges, a Joint Fire Science Program, the Forest Inventory and Analysis (FIA) program, and State and Private Forestry (SPF) grants. *See* CONG. RSCH. SERV. R46557, *supra* note 7, at 9-10.

overestimations of what ecology and economics could reveal.⁷⁶ And although both have since foundered in methodological disputes, forestry research funded in whole or in part by the American taxpayer continues unabated.⁷⁷ On timber, wood products, and wildfire, the Service has remained the dominant source of research and research funding for over a century.⁷⁸ Yet, by contrast, its contributions to the long-term study of ecosystem integrity have been minor.

The statutes also reveal a struggle to establish coordination norms in Congress.⁷⁹ Coordination problems involve those with shared but not fully coincident interests.⁸⁰ The NFS is special in that it most immediately concerns only a cross-section of the country.⁸¹ Commodities and other goods *derived from* NFS lands do concern the American public at large.⁸² Whether for timber, water,

76. See WILLIAM G. ROBBINS, *AMERICAN FORESTRY: A HISTORY OF NATIONAL, STATE, AND PRIVATE COOPERATION* (1985). It is no exaggeration to say that the discovery that wood fiber grows faster in younger than in older trees by itself sparked the applied science of silviculture. Refinements thereof have continued for centuries. See MICHAEL WILLIAMS, *DEFORESTING THE EARTH: FROM PREHISTORY TO GLOBAL CRISIS* 260-62 (2006). But ecologists today fit such facts into the study of intra- and inter-specific competition/coexistence. See Ray Dybzinski & David Tilman, *Competition and Coexistence in Plant Communities*, in *THE PRINCETON GUIDE TO ECOLOGY* 186 (Simon A. Levin ed., 2009).

77. For FY 2011-20, Congress appropriated an average of \$295.6 million (constant dollars) to the Service for “forest and rangeland research” and another \$271.8 million on average for state and private forestry grants. See R46557, *supra* note 7, at Table 3.

78. See CARLOS RODRIGUEZ-FRANCO, *A CENTURY OF WILDLAND FIRE RESEARCH: CONTRIBUTIONS TO LONG-TERM APPROACHES FOR WILDLAND FIRE MANAGEMENT* 5-11 (2017) (hereafter “Fire Research”); FROME, *supra* note 71, at 131-40.

79. Such institutional development in Congress, while surely “path dependent” and influenced by history, can be catalyzed by disparate forces. See PAUL PIERSON, *POLITICS IN TIME: HISTORY, INSTITUTIONS, AND SOCIAL ANALYSIS* 134-39 (2004). But once an institutional equilibrium arises among those who still may disagree over a “better” outcome, each member can have strong incentives to maintain an equilibrium. See *id.* at 143-66.

80. See DAVID LEWIS, *CONVENTION* 5-8 (Blackwell Publishers 2002) (1969). Legislators with a common interest in reducing their own uncertainty need not share any other interests. If we further assume that knowledge and/or policy expertise is costly to acquire but potentially useful to all members once acquired, one coordination problem Congress may face is in being *informationally efficient*. See Thomas W. Gilligan & Keith Krehbiel, *Organization of Informative Committees by a Rational Legislature*, 34 *AM. J. POL. SCI.* 531, 536-38 (1990); KEITH KREHBIEL, *INFORMATION AND LEGISLATIVE ORGANIZATION* 73-76 (1991).

81. The NFS statutes all originated from three House and Senate committees: the House and Senate committees on Interior and Insular Affairs and the Senate Agriculture and Forestry Committee. NFS issues of national concern—budget consequences, commodity production, long-term productivity—played varying roles in those committees. But by 1970, they had long been home to several senior Western members. See Hirt, *supra* note 52, at 193-215.

82. Timber and timber receipts, though no longer as big a driver of local, regional, or national markets as when the statutes were enacted, remain the paradigmatic example. The economy was and is vitally affected by lumber, pulp, and fiber prices. Cf. JAMES L. HOWARD & KWAMEKA C. JONES, *FPL-RP-679, U.S. TIMBER PRODUCTION, TRADE, CONSUMPTION AND PRICE STATISTICS, 1965-2013* at 13 (Feb. 2016) (calculating that total volume of wood products produced in the U.S. had fallen from a high of 18 billion cubic feet in the 1980s to 13.6 billion cubic feet in 2013 while total primary wood paper

biodiversity, carbon storage, or any other emergent good, the NFS has been and will be valued and evaluated as a *whole*.⁸³ Yet then, as now, more than four-fifths of NFS lands were found in only fifteen states,⁸⁴ concentrating the interests in NFS land use spatially and politically.⁸⁵ This divides those interests that rightly factor into local optimizing from other interests in more “global” optima across the NFS as a whole system. The NFS states are a discrete group in Congress. While its senate delegations have comprised less than a third of their chamber since Alaska’s statehood in 1959, the House delegations have expanded slightly from about a fifth in 1976 to about a quarter of that chamber after the most recent reapportionment in 2013.⁸⁶ This imbalance of interests in NFS land use is important to keep in mind.⁸⁷

The spread and concentration of costs and benefits over space and time surely must inform any claim to some unitary Congressional intent within the statutes.⁸⁸ But so does the difference between abundant information and scarce

products fell from a high of 220 million tons in 1991 to 140.2 million tons in 2013 with variable decreases in value); *see also* STEEN, *supra* note 73, at 246-323; CLARY, *supra* note 64, at 195-99.

83. *See* USDA FOREST SERV., GTR-WO-87, FUTURE OF AMERICA’S FORESTS AND RANGELANDS: FOREST SERVICE 2010 RESOURCES PLANNING ACT ASSESSMENT 3-9 (2012). Many of the supporting technical reports behind these synthesis reports are far more granular. For example, by 2011 the NFS supplied only 2% of U.S. wood and paper products. *See* Sonja Oswalt et al., GTR-WO-91, FOREST RESOURCES OF THE UNITED STATES, 2012: A TECHNICAL DOCUMENT SUPPORTING THE FOREST SERVICE UPDATE OF THE 2010 RPA ASSESSMENT 3 (2014).

84. They are Alaska, Arizona, California, Colorado, Idaho, Kansas, Montana, Nevada, New Mexico, North Dakota, South Dakota, Oregon, Utah, Washington, and Wyoming. *See* U.S. DEP’T OF AGRIC., LAND AREAS OF THE NATIONAL FOREST SYSTEM 198 (2011).

85. The control of “land use” has been distinguished from environmental quality regulation repeatedly in the national forest context. *See, e.g.*, Cal. Coastal Comm’n v. Granite Rock Co., 480 U.S. 572, 584-89 (1987) (holding that NFMA did not preempt state statute in part because the former was a land use planning law and the latter was aimed at “environmental protection”); Bohmker v. Oregon, 903 F.3d 1029, 1038-52 (9th Cir. 2018).

86. The House delegations of those fifteen states stood at eighty-six as of 1973 and, after the Twenty-third Census reapportionment in 2013, at 108 (both out of 435). This was also a period of rapid metropolitan expansion throughout the West, bringing acute demands for water and energy. *See* RICHARD WHITE, “IT’S YOUR MISFORTUNE AND NONE OF MY OWN”: A NEW HISTORY OF THE AMERICAN WEST 541-52, 553-58 (1991). Five of these states (Alaska, Wyoming, Montana, and the Dakotas) remain among the ten smallest by population and three of them (Wyoming, Alaska, and North Dakota) in the five smallest. All fifteen NFS states except California are overrepresented in the Senate and Electoral College. Including California, the thirty senators represent an average of 2.72 million people—well below the national average of 3.28 million. Excluding California, the twenty-eight senators represent less than half the national average at 1.5 million per senator.

87. I hasten to note that comparatively small NFS units dot landscapes in dozens of other states, including West Virginia where the notorious Monongahela dispute arose. *See* Spurr, *supra* note 26, at 237-39. These forests are fundamentally different in scale and proportion from those of the fifteen NFS states, however. *See* CHRISTOPHER JOHNSON & DAVID GOVATSKI, FORESTS FOR THE PEOPLE: THE STORY OF AMERICA’S EASTERN NATIONAL FORESTS 316-19 (2013).

88. *See* William N. Eskridge, Jr., *Politics Without Romance: Implications of Public Choice Theory for Statutory Interpretation*, 74 VA. L. REV. 275, 283-95 (1988) (contrasting politically concentrated from politically diffuse interests and their relative influence in forming and maintaining legislating coalitions). Thus, although a “general interest” in the NFS lands outside our fifteen NFS states may well be more

knowledge. Three Congressional committees—subsets and delegates of their chambers⁸⁹—were central in the framing and enactment of the statutes.⁹⁰ These committees collected testimony, data, and supposedly *expertise*.⁹¹ But with major legislative reorganizations in 1971 and 1974,⁹² committee dynamics evolved quickly over the formative period, as did the Congress's interests in budgeting and deficits.⁹³ That divergence—or at least differentiation—of interests in NFS optimization can also shed light on the twin dilemmas and on Congress's response. Part II describes the architecture that resulted with an emphasis on how today's Congress is positioned as a result.

II. THE MODAL ARCHITECTURE OF THE NFS STATUTES: CONSTRAINING AN OPTIMIZATION

The 1970s congresses were preoccupied with budget deficits, unaccountable spending, and White House responsibility for both.⁹⁴ Budgeting based on economic forecasting and not *ad hoc* conflict resolution became, for a critical period in the 1970s,

attenuated or more diffuse than those interests prevalent nearby them, it is quite incorrect to say that *no general interests* exist or existed in the 1970s. *But see* DANA & FAIRFAX, *supra* note 14, at 232.

89. Congressional committees are among the most well-studied phenomena in politics. *See* KENNETH A. SHEPSLE, *THE GIANT JIGSAW PUZZLE: DEMOCRATIC COMMITTEE ASSIGNMENTS IN THE MODERN HOUSE* 3-7 (1978). Committee assignments have long been a key form of internal organization. And the most prevalent theory of Congress—that members serve their own interests and deal transactionally with each other—gives little quarter to Congress acting on its *institutional* interests. In this familiar light, committees reflect members' relative bargaining power. *See, e.g.*, Kenneth A. Shepsle & Barry R. Weingast, *The Institutional Foundations of Committee Power*, 81 AM. POL. SCI. REV., 90 (1987). Yet gains from any *trade* can be difficult to capture amid uncertainty, leading some to argue that such "distributive" theories take insufficient account of members' strategic responses to their own ignorance and the fact that policy expertise can be useful to all in the legislative process. *See, e.g.*, Gilligan & Krehbiel, *supra* note 80; DAVID EPSTEIN & SHARYN O'HALLORAN, *DELEGATING POWERS: A TRANSACTION COST POLITICS APPROACH TO POLICY MAKING UNDER SEPARATE POWERS* 10-11 (1999).

90. In the Senate, the Agriculture and Forestry and the Interior and Insular Affairs committees both played active roles in gathering evidence and framing the principal bills as did the Committee on Agriculture and Forestry in the House. *See* BUSINESS MEETINGS ON NATIONAL FOREST MANAGEMENT ACT OF 1976, COMM. ON AGRICULTURE (94th Cong., 2d Sess.) (Dec. 1976); REPORT OF THE COMM. ON AGRIC. AND FORESTRY TO ACCOMPANY S. 3091 (94th Cong., 2d Sess.) (May 1976); AN ANALYSIS OF FORESTRY ISSUES IN THE FIRST SESSION OF THE 92D CONGRESS, COMM. ON INTERIOR AND INSULAR AFFS. (92d Cong., 2d Sess.) (1972).

91. Members' investments in their own committee duties will trade off of their efforts to other ends. This may mean a divergence of committees' and their parent chambers' distributive goals. *See* Gilligan & Krehbiel, *supra* note 80, at 532.

92. *See* SHEPSLE, *supra* note 89, at 262-81. Anecdotal evidence suggests that institutional changes in Congress almost always reflect multiple overlapping interests supporting them. *See* SCHICKLER, *supra* note 20, at 249-69.

93. *See* SHEPSLE, *supra* note 89, at 242; SHICKLER, *supra* note 20, at 195.

94. *See* Lance T. LeLoup, *Process Versus Policy: the U.S. House Budget Committee*, 4(2) LEGIS. STUD. Q. 227, 247-49 (1979); SCHICKLER, *supra* note 20, at 190-93.

a bipartisan agenda.⁹⁵ The NFS statutes were an outgrowth of that and, as a whole, prescribe a structured “Program” deliberately uniting all aspects of the NFS—appropriations, management, protection, study—to maximize its net value over the long term.⁹⁶ The forests’ commodities and familiar reforestation techniques invited such optimizing.⁹⁷ Congress clearly signaled that it (not the President) was to be the principal.⁹⁸ The Program was to be built from inventory assessment,⁹⁹ enhanced

95. The Congressional Budget and Impoundment Control Act of 1974, Pub. L. No. 93-344, 88 Stat. 297 (1974), entrenched a fixed and coordinated budget process and a Congressional Budget Office (CBO) to pair revenue with spending decisions. See SCHICKLER, *supra* note 20, at 195-200. Designed to “strengthen congressional control over the size and shape of the federal budget,” Louis Fisher, *Congressional Budget Reform: The First Two Years*, 14 HARV. J. LEGIS. 413, 413 (1977), this Congressional Budget Act restructured an ad hoc process authorizing federal spending, *id.* at 416-18, principally as a means of limiting deficit spending and increasing Congress’s control over all spending, *id.* at 418-21.

96. See FRRRPA § 3 (codified as amended at 16 U.S.C. § 1602) (setting out itemized elements of the “Renewable Resource Program” including an analysis of present and anticipated uses, demand for, and supply of the renewable resources of the NFS, an inventory of present and potential renewable resources, a description of Forest Service research and cooperative programming on the NFS, and a “discussion of important policy considerations” expected to influence use and management of NFS lands, and declaring that the Program was to “cover each of the four fiscal decades next following”); see also NFMA § 6(e) (codified as amended at 16 U.S.C. § 1604(e)) (requiring Secretary to “assure” that land and resource management plans “provide for multiple use and sustained yield” “in accordance” with MUSYA which, in turn, requires “achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources” “without impairment of the productivity of the land”).

97. Compare NFMA § 2(7) (codified as amended at 16 U.S.C. § 1600(7)) (“[T]he Forest Service should expand its research in the use of recycled and waste timber product materials, develop techniques for the substitution of these secondary materials for primary materials, and promote and encourage the use of recycled timber product materials”) with FRRRPA § 2(a)(7) (codified as amended at 16 U.S.C. § 1641(a)(7)) (“Better and more frequent forest inventoring and analysis is necessary to identify productivity-related forestry research needs and to provide forest managers with the current data necessary to make timely and effective management decisions.”).

98. FRRRPA § 7(a) prescribed in detail presidential actions subject to one-house legislative vetoes which became unenforceable in the wake of *INS v. Chadha*, 462 U.S. 919 (1983). Much more lasting were FRRRPA and NFMA’s prescriptions for NFS budgeting and the process by which appropriations would be made. See Fisher, *supra* note 95, at 414-18; cf. LE MASTER, *supra* note 17, at 48-49 (noting FRRRPA’s close affiliation with the Budget Impoundment and Control Act and concluding that FRRRPA was “conceived in Congress” and was not an “administration bill” like MUSYA); HIRT, *supra* note 52, at 259-60 (arguing that FRRRPA reflected Congress’s need “to find a course of action that would minimize dissatisfaction,” that “provided interest groups more access to Forest Service decision making,” and that it reflected the “political feasibility” at the time). The required annual reports on each of the “component elements of the Program” to be submitted in tandem with the Administration’s annual budget proposal were the levers of fiscal control. FRRRPA § 7(c) (codified as amended at 16 U.S.C. § 1605(c)). This had the practical effect of shifting power to the then-new Congressional Budget Office (CBO) and, thus, Congress’s oversight of the Program. See Lance T. LeLoup, *Discretion in National Budgeting: Controlling the Controllables*, 4(4) POL’Y ANALYSIS 455, 474 (1978). Finally, the CBO’s alignment of NFS spending with budget committees in both chambers, see Fisher, *supra* note 95, at 430-31, 435-40, further polarized an already contentious process while reducing the subject matter committees’ power, see *id.* at 435-40; LE MASTER, *supra* note 17, at 144-56.

99. See FRRRPA § 4 (codified as amended at 16 U.S.C. § 1603) (requiring a “comprehensive and appropriately detailed inventory of all [NFS] lands and renewable resources”).

research,¹⁰⁰ national planning,¹⁰¹ and unit-level planning with local stakeholders,¹⁰² and was to employ a “systematic, interdisciplinary approach” to the foregoing intended to “achieve integrated consideration of physical, biological, economics, and other sciences.”¹⁰³ This echoed a then-new “policy statement” in the National Environmental Policy Act (NEPA).¹⁰⁴ As Part II explains, Congress’s constraints on this Program were ordered quite subtly and not as the divisionary interpreters have had it.

A. Paper Restraints? Choices of Modality in the NFS Statutes

The NFS Program was to “be developed in accordance with principles set forth” in NEPA and MUSYA,¹⁰⁵ “principles” that, then as now, were uncertain at best.¹⁰⁶ *Optimization*, however, was self-evidently the goal.¹⁰⁷ Even the Service’s field

100. See FRRRPA § 2(3) (codified as amended at 16 U.S.C. § 1601(3)) (requiring a decadal assessment that “shall include but not be limited to . . . a description of Forest Service programs and responsibilities in research, cooperative programs and management of the [NFS]”).

101. See FRRRPA § 3 (codified as amended at 16 U.S.C. § 1602) (requiring “Program” to be delivered to the President to “cover” “at least each of the four fiscal decades next following” the first “period” of October 1976 to October 1980).

102. See FRRRPA § 5(a) (codified as amended at 16 U.S.C. § 1604(a)). FRRRPA included the first statutory requirement that the Service create unit-level “land and resource management plans” (LRMPs), a requirement that has become central to its legacy.

103. See FRRRPA § 5(b) (codified as amended at 16 U.S.C. § 1604(b)).

104. NEPA declared a “national policy” of using “all practicable means and measures . . . in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.” Pub. L. No. 91-190, § 101(a), 83 Stat. 852, 852 (1970) (codified as amended at 42 U.S.C. § 4331(a)). It also directed that all federal agencies “shall utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decisionmaking which may have an impact on man’s environment.” *Id.* at § 102(2)(A) (codified at 42 U.S.C. § 4332(2)(A)).

105. See FRRRPA § 3 (codified as amended at 16 U.S.C. § 1602).

106. MUSYA applied only to the national forests yet was regarded as vague and standardless virtually from its inception. See, e.g., J. Michael McCloskey, Note and Comment, *The Multiple Use-Sustained Yield Act of 1960*, 41 OR. L. REV. 49, 73-77 (1961). NEPA’s declaration of national policy, by contrast, was much broader yet was left to a succession of presidential administrations that relegated it to subordinate status. See Jamison E. Colburn, *Administering the National Environmental Policy Act*, 45 ENV’T L. REP. 10287 (2015).

107. To *optimize* for multiple goals is to choose only those alternatives that are at least as maximizing of each as any other available alternative. See AMARTYA SEN, COLLECTIVE CHOICE AND SOCIAL WELFARE xxix (2d ed. 2017). The pursuit of multiple goals, though, can entail trade-offs unless every goal is perfectly complementary with the other(s). *Cf. id.* at 454-566 (“We can diagnose a failure of reasoned decision-making if we choose to reject an identifiably better alternatives, but that problem does not arise if there is no such option . . .”). For all that Congress has legislated, the NFS is to be put to multiple, non-complementary uses maximally. See *supra* notes 14-46 and accompanying text. For example, of the two “[r]equired assurances” Congress ordered from the Secretary, one is that s/he “shall assure” that unit-level plans “provide for multiple use and sustained yield of the products and services” obtained from the NFS “in accordance with [MUSYA].” NFMA § 6 (codified as amended at 16 U.S.C. § 1604(e)(1) (2012)).

offices were to be “so situated as to provide the optimum level of convenient, useful services to the public.”¹⁰⁸ The active questions all went to the degree to which the optimizing would be *constrained*.¹⁰⁹ It was common knowledge that the knowledge needed to do such optimizing with any confidence was lacking.¹¹⁰ In 1970, the PLLRC had put research among the keys to more optimal use of the public lands.¹¹¹ The 1978 FRRRRA further underscored the role Forest Service research was to play.¹¹² The Service’s leadership maintained that all the statutes’ restraints were administrative, flexible, and consonant with existing practice.¹¹³ And, indeed, the NFS statutes enlisted the Service to create its own constraints without specifying any decision procedure more specific than plan-act-adapt.¹¹⁴

It is unsound, however, to ignore the statutes’ specific terminology and structure. Congress required the Service to promulgate “regulations” setting forth

And for its part, ever since what has been called forestry’s “golden era” of 1898-1910, the Service has espoused an essentially utilitarian ordering of priorities. See DANA & FAIRFAX, *supra* note 14, at 72.

108. See FRRRPA § 10(b) (codified as amended at 16 U.S.C. § 1609(b)).

109. Statutory “constraints” here can take several forms. The modality by which delegative statutes operate—permitting, prohibiting, or requiring—affect *horizontal* relations among Congress, President, and judiciary, as well as *vertical* relations within our federalism. Modal variations can be subtle, though. For example, Congress’s declared “policy” that “appropriate forest cover” mark the NFS’s “forested lands,” begs the question of a “policy” establishment of this kind and its practical difference. Experience with NEPA’s declaration of national policy before the bulk of the NFS statutes were enacted had not yet relegated NEPA to ‘mere’ procedure. See Sam Kalen, *The Devolution of NEPA: How the APA Transformed the Nation’s Environmental Policy*, 33 WM. & MARY ENV’T L. & POL’Y REV. 483 (2009).

110. See, e.g., MARION CLAWSON, *THE ECONOMICS OF NATIONAL FOREST MANAGEMENT* 34-37 (1976) (calling essential but missing knowledge of input-to-output ratios for different uses, the degree to which uses trade off one another, shadow prices for goods and service not traded in markets and standing timber’s capitalization value(s)); FROME, *supra* note 71, at 138-40 (noting how little the Service’s “basic research” into timber and timber production had resolved in decades of work).

111. See ONE THIRD OF THE NATION’S LAND, *supra* note 39, at 80-81; cf. Behan, *supra* note 37, at 310-21, 336-41 (arguing that the Service’s “sustained yield” policies of the 1970s were incoherent because repeating maximum annual tree growth indefinitely had not yet been achieved in practice).

112. FRRRRA § 2 originally declared both that it “shall be deemed to complement the policies and direction set forth in” FRRRPA and that Congress had found “that scientific discoveries and technological advances must be made and applied to support the protection, management, and utilization of the Nation’s renewable resources.” FRRRRA § 2(a)-(b) (codified as amended at 16 U.S.C. § 1641(a)-(b)).

113. See CI-16, *supra* note 60; cf. Cliff, *supra* note 26, at 514-19 (comparing the Service’s standard operating procedures to what would following under the NFS statutes).

114. See, e.g., NFMA § 6(g)(1) (codified at 16 U.S.C. § 1604(g)(1)) (requiring Service to “specify[] procedures”); *id.* at § 6(k) (requiring Secretary to “review” any decision to identify lands as “not suited for timber production” “at least every 10 years”). The NFS statutes put long- and short-term reporting duties on the Service independent of its resource planning. But resource planning was to progress in sequence from inventorying to optimizing through actions like “permits, contracts, and other instruments for the use and occupancy” of NFS lands. NFMA § 6(i) (codified at 16 U.S.C. § 1604(i)) (requiring resource plans, permits, contracts and other instruments to be “consistent” with LRMPs); see also *id.* at § 1604(f)(3) (requiring an “interdisciplinary team” to prepare unit-level plans “based on inventories of the applicable resources of the forest”); Robert Brazeale, *Is Something Wrong with the National Forest Management Act?*, 21 J. LAND, RES., & ENV’T L. 329 (2001).

“standards” and “guidelines” for “plans” for land uses and actions pursuing the plans, while addressing the different information demands of the foregoing.¹¹⁵ It required that these “guidelines” either “provide for” or “insure” the achievement of its listed objectives.¹¹⁶ And while the process for creating land use plans was carefully ordered by Congress,¹¹⁷ the references to timber and timber production were couched in the Service’s professional jargon—hardly a way to bind it to paths unknown.¹¹⁸ Congress’ modal differentiations could not have been accidental.¹¹⁹ The actual structure—“regulations” with “guidelines” for the creation of “plans” ordering specific actions—has often been oversimplified.¹²⁰ In at least one case, it has been ignored.¹²¹ But the

115. See NFMA § 6(f)-(j) (codified as amended at 16 U.S.C. § 1604(f)-(j)).

116. NFMA subsections 6(g)(1)-(3) fill out what the “guidelines” shall include and in only one instance do they “require the identification of the suitability of lands for resource management.” *Id.* at § 6(g)(2)(A) (emphasis added). Because this is all that Congress required be a requirement, it stands apart from the other sixteen. Nonetheless, the significance of the imperative operator for this one purpose may be diminished by its substance: the Service need only require that land’s suitability for resource management be identified *ex ante*.

117. NFMA § 6(d) (codified at 16 U.S.C. § 1604); *cf.* Mark D. Squillace, *Rethinking Public Land Use Planning*, 43 HARV. ENV’T L. REV. 415, 426 (2019) (noting that the statutes detail a “robust public participation process”). Because the APA’s rulemaking provision has always exempted matters “relating to . . . public property,” see 5 U.S.C. § 553(a)(2), Congress explicitly required that these regulations be adopted “in accordance with the procedures set forth in” 5 U.S.C. § 553, see 16 U.S.C. § 1604(g). This is the only mandate of its kind in the NFS statutes.

118. See Cheever, *supra* note 59, at 644-56 (describing the origin of “culmination of mean annual increment (CMAI),” rotation restocking standards, even-aged management, etc.).

119. NFMA § 11, adding a section 15 to FRRRPA, directed that the Secretary “shall prescribe such regulations as he determines necessary and desirable to carry out the provisions of this subchapter.” 16 U.S.C. § 1613. Supreme Court precedent at the time distinguished quite noticeably between “regulations” populating the Code of Federal Regulations and the vast range of agency guidance, guidelines, interpretive rules, etc., that did not rise to that level of force or permanence. See, e.g., *Griggs v. Duke Power Co.*, 401 U.S. 424, 433-34 (1971); *Morton v. Ruiz*, 415 U.S. 199, 236 (1974); *Gen. Elec. Co. v. Gilbert*, 429 U.S. 125, 141 (1976); *Chrysler Corp. v. Brown*, 441 U.S. 281, 306 (1979).

120. See, e.g., *Lamb v. Thompson*, 265 F.3d 1038, 1042 (10th Cir. 2001) (describing NFS statutes as establishing a “two-step process for forest planning”); *Neighbors of Cuddy Mountain v. U.S. Forest Serv.*, 137 F.3d 1372, 1376 (9th Cir. 1998) (same); *Inland Empire Pub. Lands Co. v. U.S. Forest Serv.*, 88 F.3d 754, 757 (9th Cir. 1996) (same); *but cf.* *Citizens for Better Forestry v. U.S. Dep’t of Agric.*, 341 F.3d 961, 965 (9th Cir. 2003) (observing that the Forest Service “utilizes a three-tiered approach to forest management” as prescribed by the NFS statutes).

121. In *Nat’l Wildlife Fed’n v. U.S. Forest Serv.*, the court held that the 1971 Church Guidelines somehow bound the Service through NFMA, erroneously citing one case, *California v. Block*, 690 F.2d 753 (9th Cir. 1982), claiming it had “recognize[d] the binding authority of the Church guidelines,” *Nat’l Wildlife Fed’n v. U.S. Forest Serv.*, 592 F. Supp. 931, 937 (D. Or. 1984) (it did not), and another claiming that it had held “that Congress had explicitly intended to permit clearcutting on federal land as long as the [Service] complied with the Church Guidelines.” *Id.* (citing *Tex. Comm. on Nat. Res. v. Bergland*, 573 F.2d 201 (5th Cir. 1978)). *Bergland* predated the Service’s original regulations and held that whatever force the Church Guidelines might have was not for judicial resolution without Service regulations and plans to construe. See 573 F.2d at 210-12. *National Wildlife Federation* has never been followed by any court.

different facets are meaningfully distinguishable as a matter of law and readily recognized in the modal force our courts have ascribed to various agency outputs.¹²²

The “regulations” were to be reviewed by “a committee of scientists who are not officers or employees of the Forest Service” and who were to “provide scientific and technical advice and counsel . . . [and] assure that an effective interdisciplinary approach is proposed and adopted.”¹²³ No fewer than *seventeen* objectives were to be pursued through those regulations, though.¹²⁴ There were no scientists then, nor are there many today, who specialized in reducing biological (or ecological) uncertainties in the present so as to protect a mix of benefits to be had from the environment of the future.¹²⁵ Any such “program” will therefore struggle to settle its prescribed land uses. From this Program’s outset, that has been the core dilemma.¹²⁶ And Congress put it to the Service in unmistakably mandatory terms:

122. This was as true then as it is today. *See, e.g.*, *Fed. Trade Comm’n v. Standard Oil Co. of Cal.*, 449 U.S. 232, 236 (1980); *Chrysler Corp. v. Brown*, 441 U.S. 281, 301-04 (1979); *Batterton v. Francis*, 432 U.S. 416, 425-26 (1977); 2 KENNETH C. DAVIS, *ADMINISTRATIVE LAW TREATISE* 54-60 (2d ed. 1979). This is not to say that courts have always appreciated this architecture. For example, a court that maintains that “NFMA requires that forest plans ‘provide for diversity of plant and animal communities based on the suitability and capability of the specific land area,’” *Ecology Ctr. v. Castaneda*, 574 F.3d 652, 656 (9th Cir. 2009) (quoting 16 U.S.C. § 1604(g)(3)(B)), mistakes the statute’s requirement that the *guidelines* within the § 6(g) “regulations” should do so. Though perhaps subtle, the mistake should be obvious when, *in the very same opinion*, that court rejects a claim that the Service had failed to follow its own plan by holding that the part of the plan in question, embodied in “merely advisory or aspirational” guidelines, could not be violated *per se*. *See id.* at 660-61.

123. NFMA § 6(h)(1) (codified as amended at 16 U.S.C. § 1604(h)(1)). This “committee of scientists” (COS) has been convened twice, once for the original 1979 regulations—reconvening briefly for the 1982 amendments—and once for the ill-fated 2000 revisions. *See* Charles F. Wilkinson, *A Case Study in the Intersection of Law and Science: The 1999 Report of the Committee of Scientists*, 42 ARIZ. L. REV. 307, 307-09 (2000). In the 2012 rulemaking, the Obama Administration appointed a broader committee of stakeholders pursuant to the Federal Advisory Committee Act, ignoring § 6(h)(1). *See* Susan Jane M. Brown & Martin Nie, *Making Forest Planning Great Again? Early Implementation of the Forest Service’s 2012 National Forest Planning Rule*, 33(3) NAT. RES. & ENV’T 1, 1 (Winter 2019).

124. NFMA § 6(g)(1)-(3) as amended includes seventeen itemized elements in the “regulations” that the Service “shall include, but not be limited to.” 16 U.S.C. § 1604(g)(3)(B). An A.L.R. annotation inventoried almost three dozen published opinions from courts of appeal construing Section 6(g) as of 2020. *See* Deborah F. Buckman, Annotation, *Construction and Application of 16 U.S.C.A. 1604(g) and Implementing Regulations Calling for Environmental Consideration, Resource, and Land Management Guidelines for Forest System Land and Resource Management Plans for Units of the National Forest System*, 5 A.L.R. Fed. 3d Art. 7 (2015) (current as of November 2020).

125. For example, from among twenty-five “tasks” the Service found within NFMA, itemized and paired to specified “actions,” *see* CI-16, *supra* note 60, at 6-16, the Service summarized the statute as having equipped the agency “with the tools needed to practice scientific forest management,” *id.* at 20. Yet not one of its tasks or actions pertained to new scientific expertise to be developed or acquired.

126. President Ford’s “Statement of Policy” for the Program, delivered to Congress as required by FRRRPA § 7(a) in March 1976, stated that its preparation was “an extremely difficult task,” complicated by “a lack of adequate and accurate data on program input/output relationships,” troubles “determining the relative priority of competing uses,” and uncertainty over both rates of future growth and “demand and supply relationships for each competing use.” *Statement of Policy under the Forest and Rangeland Renewable Resources Planning Act of 1974*, 1 PUB. PAPERS 503, 504 (Mar. 2, 1976).

the regulations “shall” “insure research on and (based on continuous monitoring and assessment in the field) evaluation of the effects of each management system to the end that it will not produce substantial and permanent impairment of the productivity of the land.”¹²⁷

B. Maximizing “Productivity”: Audited Self-Regulation

Timber production had, until recently, receded from national attention. Except for Alaska’s Tongass, timber production is rarely the biggest issue in a national forest.¹²⁸ All timber production from federal lands sank to historic lows in the 1990s and has remained there for decades.¹²⁹ Nontimber forest products (NTFPs) are the NFS’s emergent commodities of today,¹³⁰ along with woody biomass for energy recovery.¹³¹ Augmented timber production is only a matter of time, though.¹³² The budget consequences have been and could again be dramatic.¹³³ States’ shares in federal timber receipts, though long significant,¹³⁴ have dwindled.¹³⁵ Reforestation, long thought to be the key to sustaining timber production, has since come under searching scrutiny for its cost and its role in wildfire management.¹³⁶ Thus, although the system seems poised for an upturn in timber output, it will confront considerable frictions if it does.

127. NFMA § 6(g)(3)(C) (codified at 16 U.S.C. § 1604(g)(3)(C)).

128. See Coral Davenport, *Trump Administration Releases Plan to Open Tongass Forest to Logging*, N.Y. TIMES (Sept. 24, 2020), <https://www.nytimes.com/2020/09/24/climate/tongass-logging.html>.

129. See ANNE A. RIDDLE, CONG. RSCH. SERV., R45688, TIMBER HARVESTING ON FEDERAL LANDS 8 (2021).

130. See USDA FOREST SERV., GTR-SRS-232, ASSESSMENT OF NONTIMBER FOREST PRODUCTS IN THE UNITED STATES UNDER CHANGING CONDITIONS 121-46 (2018) (finding that several NTFPs have annual sales figures in the hundreds of millions of dollars but that no reliable data exist for the vast majority of NTFPs).

131. See Dale et al., *supra* note 56, at 144-46; Birdsey et al., *supra* note 56, at 1-2.

132. New technologies may spur new and different demands in the coming decade. See *infra* note 311 and accompanying text.

133. The Service estimates that urban areas increased by 45% between 1990 and 2010. See USDA FOREST SERV., GTR-WO-94, FUTURE OF AMERICA’S FORESTS AND RANGELANDS: UPDATE TO THE FOREST SERVICE 2010 RESOURCES PLANNING ACT ASSESSMENT 2-1 (2016). But the RPA reports since 2010 have noted higher-than-average increases in areas adjacent to national parks, national forests, and wilderness areas. *Id.* at 2-2. State and local revenue sources, thus, shift significantly from such land use changes.

134. See *Organized Vill. of Kake v. U.S. Dep’t. of Agric.*, 795 F.3d 956, 963 (9th Cir. 2015) (citing 16 U.S.C. § 500) (observing that “[f]rom 1970 through 2001, Alaska received more than \$93 million in Tongass receipts,” making Alaska “directly affected” by Tongass timber production).

135. See CONG. RSCH. SERV. R45688, *supra* note 129, at 8, 13-14. As timber sales have waned, states have opted for alternative payments from the federal government. *Id.*

136. See Malcolm P. North et al., *Tamm Review: Reforestation for Resilience in Dry Western U.S. Forests*, 432 FOREST ECOLOGY & MGMT. 209 (2019).

By far, the most noted (and contested) Congressional objective besides timber was that the guidelines for plan development “provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives.”¹³⁷ This language does anything *but* prioritize plant and animal communities above the timber objective.¹³⁸ It requires that the guidelines within the regulations *provide for* (i.e., foster, enable, support) diverse plant and animal “communities.”¹³⁹ To be sure, practical necessities might demand subordinating timber (or other objectives) if community diversity is to be protected.¹⁴⁰ But the bare text does not. On its face, the text qualifies the objective (“diversity” of “communities”) with a spatially drawn proviso: local land “capability.”¹⁴¹ We might even think of this as a constrained constraint in the constrained optimization!¹⁴²

137. Tuholske and Brennan dubbed this the “diversity requirement,” *see* Tuholske & Brennan, *supra* note 59, at 77, arguing that it provided courts the legal basis necessary to review and set aside Forest Service actions alleged to be insufficiently protective of wildlife, *see id.* at 73 (discussing *Seattle Audubon Soc’y v. Moseley*, 798 F. Supp. 1473 (W.D. Wash. 1992)). Weiss likewise dubbed it the “diversity mandate” and emphasized it above all other “substantive” standards in the statutes. *See* Weiss, *supra* note 59, at 647-50. The first Committee of Scientists declared that this provision was the most perplexing of all. *See* National Forest System Land and Resource Management Planning, 44 Fed. Reg. 26,554, 26,698 (proposed May 4, 1979) (to be codified at 36 C.F.R. pt. 219).

138. The provision continues that the Secretary also “provide, where appropriate, and to the degree practicable, for steps to be taken to preserve the diversity of tree species similar to that existing in the region controlled” by an LRMP. NFMA, 16 U.S.C. § 1604(g)(3)(B). Contrast this duty, such as it is, to Leopold’s land ethic: “A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.” ALDO LEOPOLD, *A SAND COUNTY ALMANAC AND SKETCHES HERE AND THERE* 224-25 (1949).

139. Congress could have simply required the Service to *achieve* or to *insure* diversity of plant and animal communities, for example. Likewise, Congress put a considerable burden of production on the Service in its use of even-aged timber harvests. *See* NFMA § 6(g)(3)(F) (directing Service to “specify[] guidelines which” “insure that clearcutting . . . and other cuts designed to regenerate an even-aged stand of timber will only be used as a cutting method” after a determination that it is the “optimum method,” after an interdisciplinary review, and where three other provisos are met).

140. This is precisely the contention in most legal challenges to Forest Service actions grounded in § 6(g)(3)(B). *See infra* notes 212-14 and accompanying text. But, as the first Committee of Scientists acknowledged in studying the provision and its drafting history, its “[t]ranslation” into requirements for planners in the regulation was a “formidable task.” *See* 88 Fed. Reg. at 26,609.

141. Wilkinson and Anderson noted that the provision had been “born out of a patchwork” of bills that the “drafters cut and spliced until they achieved a suitable compromise.” WILKINSON & ANDERSON, *supra* note 60, at 291. The net result, they concluded, was of “broad significance” to the NFS, but that it was “difficult to discern any concrete legal standards” therefrom. *Id.* at 296.

142. As mentioned, constraints in any optimization can be both “hard,” i.e., firm conditions, and “soft,” i.e., penalties. NFMA § 6(g)(3)(B) expressly conditions upon local circumstances its directive that the Service provide for community diversity, embedding the assumption that (I) some local conditions may be incompatible with the objective; (II) other obligations may be less than complementary to the objective; or (III) both (I) and (II) may be true. But it also arguably enables the “penalizing” of the Service through litigation challenging its actions for their fit with the provision. *See* William M. Landes & Richard A. Posner, *The Independent Judiciary in an Interest Group Perspective*, 18 J.L. & ECON. 875, 879 (1975).

Experience with this provision in context has revealed Congress's plan in its several dimensions.¹⁴³ The science of how one might even *conceivably* provide for the "diversity" of biota and biotic communities amidst commodity extraction in perpetuity, to say nothing of their *optimization* in perpetuity, was unformed then and remains controversial today.¹⁴⁴ Congress's legislated findings hint at the complexity of the mission being assigned. Knowledge in place of views or arguments was key¹⁴⁵ no doubt because, with multiple tasks come multiple paths by which an agent can fail—or be *perceived* to have failed.¹⁴⁶ Community ecology is and has long been an epistemic and methodological minefield.¹⁴⁷ Professional ecologists still fight wars over their most basic axioms.¹⁴⁸ Indeed, in hindsight, it seems that Congress's reluctance to demand community protection amidst commodity production may have had a deeper foundation than earlier interpreters allowed.¹⁴⁹

143. See *infra* notes 138-68 and accompanying text.

144. Strikingly, the original Committee of Scientists settled on its viable populations approach reportedly from a dictionary definition of "diversity" ("variety") and without any attention to the provision's other term—*community*. See National Forest System Land and Resource Management Planning, 44 Fed. Reg. 26,609. Keiter, *National Network*, *supra* note 49, at 91-93 (observing that "ecology-based" land management would entail many more active protections for imperiled species than have been implemented, including "assisted translocation" and combining management areas into continentally scaled multi-unit networks to reflect what conservation biologists now prescribe).

145. In 1976, Congress found that to "serve the national interest" the renewable resource program must be "based on a comprehensive assessment" of present and future demands and the impacts thereof. See NFMA § 2(3). In 1978, after the first such assessment had been prepared and submitted to Congress, Congress found that "scientific discoveries and technological advances must be made and applied" if the Nation's renewable resources were to be optimally utilized, managed, and protected. FRRRRA § 2(a) (codified as amended at 16 U.S.C. § 1641(a)).

146. Agents tasked with more than one goal can present optimization problems to their principals. See Avinash Dixit, *Incentives and Organizations in the Public Sector: An Interpretative Review*, 37(4) J. HUM. RES. 696, 704 (2002) ("The effects of interaction among multiple actions and outcomes on the power of incentives depends on whether the actions are substitutes or complements in the agent's cost function."). *Observability* is often a major factor in such relationships where the principal values the goals differently. *Id.* at 706-07.

147. Ecologists party to the great null hypothesis debate that attended the rise of island biogeography left a long record of these battles. See James F. Quinn & Arthur E. Dunham, *On Hypothesis Testing in Ecology and Evolution*, 122 AM. NATURALIST 602, 602 (1983) (noting that explicit hypothesis testing had become a major divide within the field and that the "intellectual basis for this discussion" traced to Bacon's *Novum Organum*); Lawton, *supra* note 47, at 188 (arguing that laws and rules of ecology are inherently contingent).

148. Compare Edward F. Connor et al., *The Checkered History of Checkerboard Distributions*, 94(11) ECOLOGY 2403, 2413 (2013) (describing their study as "the latest installment in a controversy [over interspecific competition as cause of biogeographic variation] that has lasted more than 30 years"), with Jared M. Diamond & Michael E. Gilpin, *Examination of the "Null" Model of Connor and Simberloff for Species Co-occurrences on Islands*, 52 OECOLOGIA 64, 73 (1982) (arguing that "a little reflection shows how unwarranted is the dogmatic assertion" by Connor, Simberloff, and others that all researchers of biogeographic variation on islands as some function of interspecific competition must employ strict hypothesis testing methods).

149. Introductory ecology texts today all acknowledge the *contingency* of scientific claims about community structure. See RICK RELYEA & ROBERT RICKLEFS, *ECOLOGY: THE ECONOMY OF NATURE*

Facing the dilemmas it was, Congress adopted a distinctive solution: *audited self-regulation*.¹⁵⁰ Because Congress itself could not specify the appropriate constraints—nor even conduct a good compliance audit—without acquiring and trusting in a considerable degree of expertise, and because those constraints would, in any event, have to be adapted if they were to keep pace with scientific advances, it called on its agent to do so subject to Congress’s imperfect¹⁵¹ but continuing oversight.¹⁵² This solution, though misunderstood in the years since, explains the statutes’ compound structure and myriad deliverables.¹⁵³ It is reinforced by the Congress’s findings prefacing the statutes.¹⁵⁴ In places, Wilkinson and others paid

413 (8th ed. 2018); CHARLES J. KREBS, *ECOLOGY: THE EXPERIMENTAL ANALYSIS OF DISTRIBUTION AND ABUNDANCE* 436 (6th Pearson New Int’l Ed. 2014); Michel Loreau, *Communities and Ecosystems*, in *THE PRINCETON GUIDE TO ECOLOGY* 253, 254 (Simon A. Levin ed., 2009). Still, Congress found that “to serve the national interest,” the Forest Service had to assess and plan for “present *and anticipated* uses, demand for, and supply of renewable resources. . . .” NFMA § 2(3) (emphasis added). This finding, like the first declaring that “the uses, demand for, and supply of the various resources are subject to change over time,” *id.* at § 1600(1), made unmistakable Congress’s expectation of *changing* demand, supply, and inventories.

150. Audited self-regulation—putting the regulated party under a duty to create and adhere to its own conduct norms subject to *ex post* review—has shown that it may resolve a variety of challenges, including information asymmetries, administrative costs from inflexibility, fairness to the regulated, etc. See Kenneth A. Bamberger, *Regulation as Delegation: Private Firms, Decisionmaking, and Accountability in the Administrative State*, 56 DUKE L.J. 377 (2006); Douglas C. Michael, *Federal Agency Use of Audited Self-Regulation as a Regulatory Technique*, 47 ADMIN. L. REV. 171 (1995).

151. Congress’s limited oversight capacities have long been thought to compromise its control over delegates. See Ethan Bueno de Mesquita & Matthew C. Stephenson, *Regulatory Quality Under Imperfect Oversight*, 101 AM. POL. SCI. REV. 605, 605 (2007) (describing challenges Congress faces in delegating authority). Of course, Congress may enlist the judiciary as overseer. See Mathew D. McCubbins et al., *Administrative Procedures as Instruments of Political Control*, 3 J.L. ECON. & ORG. 243 (1987); Mathew D. McCubbins et al., *Structure and Process, Politics and Policy: Administrative Arrangements and the Political Control of Agencies*, 75 VA. L. REV. 431 (1989).

152. The decadal RPA assessments were the long-term products Congress demanded. RPA reports at decadal intervals were almost immediately deemed insufficient, however, and supplemented on an inter-interval basis. See ROBBINS, *supra* note 76, at 258. As of this writing, the 2020 assessment is not yet final but five past assessments (1975, 1979, 1989, 2000, 2010), four five-year updates (1984, 1993, 2007, 2017), and dozens of supporting documents for 2020 exist. See U.S. Forest Service, *Previous Assessments*, <https://www.fs.fed.us/research/rpa/previous/>.

153. Then, as now, the variety of agency outputs that prescribe or interpret law or policy leave “regulations” in their own category. Compare Kenneth Culp Davis, *Administrative Rules—Interpretative, Legislative, and Retroactive*, 57 YALE L.J. 919, 919 (1948) (“Administrative agencies make rules which if valid have the full force of law, they issue interpretative rules having varying degrees of authoritative weight, they publish many kinds of announcements and releases and opinions and rulings whose legal effect is frequently unclear; and they establish and follow practices and usages which in some practical respects are almost the equivalent of rules.”), with Peter L. Strauss, *Publication Rules in the Rulemaking Spectrum: Assuring Proper Respect for an Essential Element*, 53 ADMIN. L. REV. 803, 828 (2001) (“Statutes, if valid, are indisputable . . . Regulations adopted following statutorily commanded procedures are treated in just the same way.”).

154. Seven declarations denominated as “findings” and codified with the statutes entrench the predicate facts against which the statutes should be understood. See NFMA § 2 (codified at 16 U.S.C. § 1600(1)-(7)). Each declaration—from the first asserting that “management of the Nation’s renewable

too little heed to Congress's careful use throughout of terms like "standards," "guidelines," "policy," and "plans" that were to be incorporated or reflected in a regulation.¹⁵⁵ Most importantly, they keyed on the Service's *discretion* to the exclusion of its *performance*.¹⁵⁶ They paid little attention to the congressional committees' quick follow-up with the Service's preparation and use of Program research,¹⁵⁷ to the collection of RPA data that resulted,¹⁵⁸ to the frequent wilderness and other place-based designations excluding multiple use,¹⁵⁹ and to important parallels with FLPMA.¹⁶⁰ And, of course, they could scarcely have anticipated the emergence of wildfire as the NFS's principal timber-related challenge.

resources is highly complex," *id.* at § 1600(1), to the last stating that "recycled timber product materials are as much a part of our renewable forest resources as are the trees from which they originally came," *id.* at § 1600(7)—is as much a statement of *purpose* as of *fact*. Though not abnormal, this can shift the practical effect of such a declaration. *Cf.* Daniel A. Crane, *Enacted Legislative Findings and the Deference Problem*, 102 GEO. L.J. 637, 657-58 (2014) (arguing that merely because a Congressional finding "may not be scientifically falsifiable does not deprive it of an essentially factual character").

155. *Cf.* WILKINSON & ANDERSON, *supra* note 60, at 296 (arguing that "when the section is read in light of the historical context and overall purposes of the NFMA, as well as the legislative history of the section, it is evident that section 6(g)(3)(B) requires Forest Service planners to treat the wildlife resource as a controlling, co-equal factor in forest management and, in particular, as a substantive limitation on timber production").

156. *See, e.g.*, LE MASTER, *supra* note 17, at 58-63; WILKINSON & ANDERSON, *supra* note 60, at 69-90. The elements of this consensus began from the "clear cutting controversies" of the mid-1970s but by no means ended there. As Federico Cheever argued, the Service's regulations implementing the timber production objectives generally kept substantial advantages in any challenges to the Service. *See* Cheever, *supra* note 59, at 644-91; *see also* FLOURNOY ET AL., *supra* note 60, at 3-15. Tuholske and Brennan, whose article advanced the broadest claims of mandatory contents in the statutes, argued that "[m]any participants in the legislative process believed that NFMA imposed unprecedented limitations on forestry practices." Tuholske & Brennan, *supra* note 59, at 67. Neither the truth nor the relevance of this claim is obvious, though. When they wrote in 1994, only one appellate court had treated the diversity provision to which so much of their work was aimed and that was only to hold that it "applied" regardless of endangered species involvement. *See id.* at 70 (discussing *Seattle Audubon Soc'y v. Evans*, 952 F.2d 297, 301-02 (9th Cir. 1991)). Scores of precedents have accumulated since. *See infra* notes 210-15 and accompanying text.

157. *But see* LE MASTER, *supra* note 17, at 138-41 (recounting the 94th Congress's hearings on the 1975 RRA and push to prepare the 1979 RRA).

158. *See supra* note 152.

159. *See, e.g.*, CONG. RSCH. SERV. R41649, *supra* note 41. Congress also routinely enacts area-specific provisions in omnibus legislative packages, once known as "Hatfield Riders," in response to localized conflicts and congressional delegations' preferences. *See* MARTIN NIE, *THE GOVERNANCE OF WESTERN PUBLIC LANDS: MAPPING ITS PRESENT AND FUTURE* 184-88, 184 n.95 (2008). "The use of riders to make policy decisions both facilitates and subverts the democratic process. . . . [T]he winning side refers to them as "amendments," and the losing side calls them "sneaky rider" provisions." *Id.* at 187. Such riders may exceed the bounds of legislative authority if they interfere with judicial (including consent) decrees. *See* *Biodiversity Assocs. v. Cables*, 357 F.3d 1152, 1165-66 (10th Cir. 2004).

160. FLPMA also pairs a national "policy" to several subtle modal variations while setting a flat prohibition on "permanent impairment" of the "productivity" of its lands; re-asserts a multiple use mandate first given in 1964 through Pub. L. No. 88-607; also levies a unit-level planning requirement for lands that were (and are) of overwhelming importance in only a small minority of states; and resulted

Reviewing courts, in contrast, have been alert to the statutes' modal subtleties.¹⁶¹ Take, for example, the requirement that the Service's action-level choices "shall be consistent" with the applicable plan.¹⁶² The statutes hedge even this requirement, allowing plans to be "amended in any manner whatsoever."¹⁶³ Law that may be amended in any manner whatsoever is a curious type of law. That has left reviewing courts to weigh just how "binding" these plans really are or should be.¹⁶⁴ Congress required that "significant" amendments be afforded the same process as full revisions,¹⁶⁵ but this merely shifted the focus to the significance of any given amendment(s).¹⁶⁶ Such as they are, the constraints on timber production, long the

from a conference committee's extemporaneous assembly of different bills. *See* H.R. REP. NO. 94-1724 (1974) (Conf. Rep.).

161. Federico Cheever's patient study of the statutes' timber production provisions in court indirectly confirmed the point. Concerted efforts to challenge the Service's application of what he called "substantive timber management provisions" mostly ended in refusals of judicial relief. *See* Cheever, *supra* note 59, at 656-91. Even after sustained critique of the Service's timber sales for losses, *see* O'TOOLE, *supra* note 18, 299-301, the judicial response was minimal, *see, e.g.*, *Rocky Mountain Wild. v. Vilsack*, 843 F. Supp. 2d 1188, 1198-1200 (D. Colo. 2012); *Curry v. U.S. Forest Serv.*, 988 F. Supp. 541, 554-56 (W.D. Pa. 1997); *Ayers v. Espy*, 873 F. Supp. 455, 463-71 (D. Colo. 1994); *Sierra Club v. Cargill*, 11 F.3d 1545, 1548-50 (10th Cir. 1993); *Res. Ltd. v. Robertson*, 789 F. Supp. 1529, 1536-37 (D. Mont. 1991).

162. *See* NFMA § 6(i) (codified at 16 U.S.C. § 1604(i)). An A.L.R. annotation records almost five dozen reported opinions in the courts of appeal construing this provision in resolving challenges to the Service. *See* Elizabeth Williams, Annotation, *Validity, Construction, and Application of 16 U.S.C. § 1604(i) and Implementing Regulations Requiring Consistency of Resource Plans, Contracts, and Other Instruments with Forest System Land and Resource Management Plans for Units of National Forest*, 8 A.L.R. Fed. 3d (2016) (current as of November 2021).

163. 16 U.S.C. § 1604(f)(4); *cf.* *All. for the Wild Rockies v. Bradford*, 720 F. Supp. 2d 1193, 1216-18 (D. Mont. 2010) (holding that Service violated NFMA because proposed action's compliance with applicable plan could not be determined from the record); *Citizens' Comm. to Save Our Canyons v. U.S. Forest Serv.*, 297 F.3d 1012, 1032-34 (10th Cir. 2002) (holding that how forest plan is to be amended falls to supervisor's judgment); *Native Ecosystems Co. v. Dombeck*, 304 F.3d 886, 900 (9th Cir. 2002) (holding that timber sales could amend plan consistent with NFMA § 6).

164. *See, e.g.*, *Intermountain Forest Indus. Ass'n v. Lyng*, 683 F. Supp. 1330, 1339-44 (D. Wyo. 1988); *Forest Guardians v. Dombeck*, 131 F.3d 1309, 1312-13 (9th Cir. 1997); *Friends of the Se.'s Future v. Morrison*, 153 F.3d 1059, 1070 (9th Cir. 1998); *Navajo Nation v. U.S. Forest Serv.*, 408 F. Supp. 2d 866, 880-81 (D. Ariz. 2006); *Silverton Snowmobile Club v. U.S. Forest Serv.*, 433 F.3d 772, 785-86 (10th Cir. 2006); *Sierra Nevada Forest Protect. Campaign*, 573 F. Supp. 2d 1316, 1333-37 (E.D. Cal. 2008); *Sierra Forest Legacy v. Sherman*, 646 F.3d 1161, 1187-92 (9th Cir. 2011); *Friends of the Wild Swan v. Weber*, 767 F.3d 936, 947-48 (9th Cir. 2014); *Wild Wilderness v. Allen*, 871 F.3d 719, 725-26 (9th Cir. 2017); *Greenpeace, Inc. v. Cole*, 50 F. Supp. 3d 1158, 1166-69 (D. Alaska 2014); *In re Big Thorne Project*, 857 F.3d 968, 973-76, 974 n.3 (9th Cir. 2017); *Native Ecosystems Council v. Marten*, 883 F.3d 783, 791-94 (9th Cir. 2018); *All. for the Wild Rockies v. U.S. Forest Serv.*, 907 F.3d 1105, 1112-14 (9th Cir. 2018).

165. *See* 16 U.S.C. § 1604(f)(4); *see also* 36 C.F.R. § 219.10(f) (1983); 36 C.F.R. §§ 219.13(a)-(c) (2020).

166. On the judicial construction of this "significance" test, *see* *Native Ecosystems Council v. U.S. Forest Serv.*, 418 F.3d 953, 958 (9th Cir. 2005), *Ariz. Cattle Growers' Ass'n v. Cartwright*, 29 F. Supp. 2d 1100, 1115-16 (D. Ariz. 1998), *All. for Wild Rockies*, 907 F.3d at 1113-14. In holding that the plans were *not* binding and so not to be reviewed, the Court reasoned in *Ohio Forestry Ass'n v. Sierra Club*, 523 U.S. 726, 733 (1998), that the LRMP being challenged did not "command anyone to do anything or to refrain from doing anything," nor did it "grant, withhold, or modify any formal legal license, power, or authority,"

sole focus of challengers,¹⁶⁷ have interlocked with those on biodiversity and fire planning just when scientists active in these fields are themselves stressing how little we really know from their work. In short, the statutes are a composite of related pieces that have yet to be developed into a coherent whole. The judicial experience makes this unmistakable, as Part III explains.

III. THE NFS STATUTES IN COURT: DECADES OF LITIGATION IN RETROSPECT

Though uncertain in the 1970s, the Supreme Court and the lower federal courts have since made it abundantly clear that statutory constraints on agency discretion face a range of curbs on their judicial enforcement.¹⁶⁸ Article III standing doctrine, the prerequisites of reviewable agency action under our Administrative Procedure Act (APA), and “ripeness” notions have all grown considerably in the last three decades. The Supreme Court has stressed repeatedly that federal courts are ill-equipped to judge agencies’ technical or scientific choices¹⁶⁹ and that agencies’ interpretations of their own rules are ordinarily afforded deference.¹⁷⁰ The lane in which Service optimizing judgments are reviewed for their fit with the statutes is narrow, increasingly crowded, and heavily strategized. It is one thing for personnel in Congress to expect the Service to perform for Congress.¹⁷¹ It is something else to distinguish the constraints reviewing courts ought to *enforce* from those they ought

nor “subject anyone to any civil or criminal liability,” *id.* Nevertheless, several opinions in the lower federal courts since *Ohio Forestry* have faulted the Service for failing to follow its own plans and have remanded challenged actions on that basis alone. *See supra* note 164 and accompanying text.

167. *See Weiss, supra* note 59, at 646-50; Cheever, *supra* note 59, at 623-44; Parent, *supra* note 59, at 708-11; Tuholske & Brennan, *supra* note 59, at 63-95; WILKINSON & ANDERSON, *supra* note 59, at 117-88.

168. Not until 1970 did the Court resolve that “standing” to file an APA petition had a constitutional dimension. *See Ass’n of Data Processing Serv. Orgs. v. Camp*, 397 U.S. 150, 153-56 (1970). And only in 1977 did the Court finally resolve that the APA’s provisions on review supplied neither subject matter jurisdiction nor an independent cause of action for that review. *See Califano v. Sanders*, 430 U.S. 99, 104-07 (1977). In short, judge-made law has long comprised the forms and scope of actions for petitioning Article III courts to review Forest Service actions. *See Scalia, supra* note 55, at 884-909.

169. *See, e.g., Dep’t of Com. v. New York*, 139 S. Ct. 2551, 2569-72 (2019); *EPA v. EME Homer City Generation, L.P.*, 572 U.S. 489, 514-24 (2014); *Babbitt v. Sweet Home Chapter of Cmty. for a Great Or.*, 515 U.S. 687, 700-04 (1995); *Balt. Gas & Elec. Co. v. Nat. Res. Def. Council*, 462 U.S. 87, 100-03 (1983).

170. *See, e.g., Long Island Care at Home, Ltd. v. Coke*, 551 U.S. 158, 170-71 (2007); *Auer v. Robbins*, 519 U.S. 452, 462 (1997); *Stinson v. United States*, 508 U.S. 36, 44-45 (1997); *Thomas Jefferson Univ. v. Shalala*, 512 U.S. 504, 512 (1994); *Pauley v. BethEnergy Mines, Inc.*, 501 U.S. 680, 699-706 (1991); *Udall v. Tallman*, 380 U.S. 1, 16-17 (1965); *Bowles v. Seminole Rock & Sand Co.*, 325 U.S. 410 (1945).

171. *Cf. Abbe R. Gluck & Lisa Schultz Bressman, Statutory Interpretation from the Inside—An Empirical Study of Congressional Drafting, Delegation, and the Canons: Part II*, 66 STAN. L. REV. 725, 765 (2014) (noting from their survey research in Congress that individual respondents viewed Congress’s primary interpretive relationship as being with agencies, not courts).

to *observe* to that end. As Section A explains, the legal interests that qualify for adjudication are quite specialized. And as Section B shows, they animate only a small part of the NFS statutes.

A. Of Article III and Equitable Discretion: The Entitlement to a Forum

The entitlement to a federal forum has evolved considerably over the past century.¹⁷² The jurisdictional prerequisites have changed the most.¹⁷³ Plaintiffs today need a sufficiently private stake, a “litigable interest,”¹⁷⁴ before there can be jurisdiction and, thus, law exposition by a court. In 1972, *Sierra Club v. Morton*¹⁷⁵ outlined a constitutional standing doctrine for “environmental” plaintiffs.¹⁷⁶ This was the backdrop for the rise of the NFS statutes, 1974-78. In the decades since, however, the Court’s precedents have turned *Morton*’s innovation into a revolution.¹⁷⁷

172. Historically, a “cause of action” was that merger of facts, relationships, status, and alleged harm(s) that, when pled and proven, entitled one to judicial relief. See Anthony J. Bellia, *Article III and the Cause of Action*, 89 IOWA L. REV. 777, 782-92 (2004); Susan Bandes, *The Idea of a Case*, 42 STAN. L. REV. 227, 230-58 (1990); William F. Fletcher, *The Structure of Standing*, 98 YALE L.J. 221, 232-50 (1988); Louis L. Jaffe, *The Citizen as Litigant in Public Actions: The Non-Hohfeldian or Ideological Plaintiff*, 116 U. PA. L. REV. 1033 (1968); Louis L. Jaffe, *Standing to Secure Judicial Review: Public Actions*, 74 HARV. L. REV. 1265, 1269-82 (1961).

173. Following the adoption of the federal rules merging law and equity in 1938 and the APA’s passage in 1946, the cause of action as a concept splintered, allowing jurisdiction, standing, and remedial discretion into the gaps. See Bellia, *supra* note 172, at 827-38; Fletcher, *supra* note 172, at 224-28; Jaffe, *supra* note 172, at 1307-14; Louis L. Jaffe, *Standing to Secure Judicial Review: Private Actions*, 75 HARV. L. REV. 255, 261-288 (1961). The Court held in *Bell v. Hood*, 327 U.S. 678 (1946), that jurisdiction cannot be defeated on the grounds that a plaintiff’s claims, there brought directly under the Constitution, lacked a discrete cause of action because the cause of action went to the merits of a case and not its jurisdiction. See *id.* at 682-84.

174. See James E. Pfander, *Standing, Litigable Interests, and Article III’s Case or Controversy Requirement*, 65 UCLA L. REV. 170, 213-17, 223-28 (2018). A vast literature tracks these developments in environmental and natural resources law generally. A succinct recent review as to public lands is James M. McElfish, Jr., *Developments in Standing for Public Lands and Natural Resources Litigation*, 48 ENV’T L. REP. 11098 (2018).

175. 405 U.S. 727 (1972).

176. See *id.* at 740-41. As the *Morton* Court stressed, the “environmental” plaintiff typically sues to protect interests shared broadly with an indefinite class of others. See *id.* at 734 (“[T]he fact that particular environmental interests are shared by the many rather than the few does not make them less deserving of legal protection through the judicial process.”). *Morton* followed the Court’s opinion in *Camp* treating the personal injury element as an aspect of Article III. After decades of experience, however, a growing “chorus” of jurists maintain that this requirement is circular and incoherent. See *Sierra v. City of Hallandale Beach*, 996 F.3d 1110, 1115-40 (11th Cir. 2021) (Newsom, concurring).

177. See *Laird v. Tatum*, 408 U.S. 1, 11-16 (1972); *Warth v. Seldin*, 422 U.S. 490, 501 (1975); *Los Angeles v. Lyons*, 461 U.S. 95, 98-100 (1983); *Allen v. Wright*, 468 U.S. 737, 754 (1984); *Lujan v. Def. of Wildlife*, 504 U.S. 555 (1992); *Raines v. Byrd*, 521 U.S. 811, 819-20 (1997); *Steel Co. v. Citizens for a Better Env’t*, 523 U.S. 83 (1998); *Fed. Elections Comm’n v. Akins*, 524 U.S. 11 (1998); *Friends of the Earth, Inc. v. Laidlaw Env’t Servs.*, 528 U.S. 167 (2000); *DaimlerChrysler Corp. v. Cuno*, 547 U.S. 332 (2006); *Massachusetts v. EPA*, 549 U.S. 497 (2007); *Summers v. Earth Island Inst.*, 555 U.S. 488 (2009); *Clapper v. Amnesty Int’l*, 568 U.S. 398 (2013); *Susan B. Anthony List v. Driehaus*, 573 U.S. 149 (2014);

The touchstone has been whether the plaintiff's alleged interest and the forum's potential protection thereof are sufficiently fixed and related.¹⁷⁸ That nexus has only grown more opaque as the NFS statutes have aged.¹⁷⁹ Article III standing is now the Justice Department's favorite answer to challenges to the Forest Service and for good reason: the right to a forum, even supposing the Service's actions are contrary to law, is now embedded in scores of fact-specific judgments about what suffices as a litigable interest in the NFS.¹⁸⁰ For added measure, even claims aligned with an urgent public need can be rejected as beyond Article III if the court views them as especially difficult factually or politically.¹⁸¹

Ariz. State Legis. v. Ariz. Indep. Redistricting Comm'n, 576 U.S. 787 (2015); Spokeo, Inc. v. Robins, 136 S. Ct. 1540 (2016); Pfander, *supra* note 174, at 201-12; *see generally* Richard H. Fallon, Jr., *The Fragmentation of Standing*, 93 TEX. L. REV. 1061 (2015); Heather Elliott, *The Functions of Standing*, 61 STAN. L. REV. 549 (2008).

178. In *Lujan*, no majority could agree how proximate in time or space a threatened injury must be to the plaintiff's claimed interests. *See* 504 U.S. at 572-81 (Kennedy and Souter, JJ., concurring). But in *Summers* a majority squarely rejected the contention that a "statistical probability" of future injury from the agency action(s) in question would suffice for Article III purposes. *See* 555 U.S. at 497-501. Because "[a] plaintiff must demonstrate standing separately for each form of relief sought," *Friends of the Earth*, 528 U.S. at 185, this has left open the possibility that even allegedly "imminent" injuries threatened but not yet realized face special pleading or proof burdens. *Compare* *Babbitt v. United Farmworkers Nat'l Union*, 442 U.S. 289, 298 (1979) ("One does not have to await the consummation of threatened injury to obtain preventive relief. If the injury is certainly impending that is enough."), *with* *Summers*, 555 U.S. at 496 ("Accepting an intention to visit the National Forests as adequate to confer standing to challenge any Government action affecting any portion of those forests would be tantamount to eliminating the requirement of a concrete, particularized injury in fact.").

179. *See, e.g.*, *Sharps v. U.S. Forest Serv.*, 823 F. Supp. 668, 672-74 (D.S.D. 1993); *Res. Ltd., Inc. v. Robertson*, 789 F. Supp. 1529, 1533-34 (D. Mont. 1991), *rev'd*, 35 F.3d 1300, 1304-08 (9th Cir. 1993); *Region 8 Forest Serv. Timber Purchasers Co. v. Alcock*, 993 F.2d 800, 804-11 (11th Cir. 1993); *Sierra Club v. Robertson*, 28 F.3d 753, 757-60 (8th Cir. 1994); *Sierra Club v. Marita*, 46 F.3d 606, 611-13 (7th Cir. 1995); *Mountain States Legal Found. v. Glickman*, 92 F.3d 1228, 1232-35 (D.C. Cir. 1996); *Neighbors of Cuddy Mountain v. Alexander*, 303 F.3d 1059, 1066-67 (9th Cir. 2002); *Wyo. Sawmills Inc. v. U.S. Forest Serv.*, 383 F.2d 1241, 1246-49 (10th Cir. 2004); *Heartwood, Inc. v. Agpaa*, 628 F.3d 261, 266-69 (6th Cir. 2010); *Ctr. for Food Safety v. Vilsack*, 636 F.3d 1166, 172 (9th Cir. 2011); *Sierra Forest Legacy v. Sherman*, 646 F.3d 1161, 1177-78 (9th Cir. 2011); *Jayne v. Sherman*, 706 F.3d 994, 999 (9th Cir. 2013); *WildEarth Guardians v. U.S. Dep't of Agric.*, 795 F.3d 1148 (9th Cir. 2015); *Cottonwood Env't Law Ctr. v. U.S. Forest Serv.*, 789 F.3d 1075, 1081 (9th Cir. 2015).

180. *See* *Juliana v. United States*, 947 F.3d 1159, 1169-75 (9th Cir. 2020) (reviewing standing doctrine as applied to claimed interests and injuries from climate change); *Organized Vill. of Kake v. U.S. Dep't of Agric.*, 795 F.3d 956, 965-66 (9th Cir. 2015) (same); Fallon, *supra* note 177, at 1064-92; Elliott, *supra* note 177, at 465-500; Evan Tsen Lee & Josephine Mason Ellis, *The Standing Doctrine's Dirty Little Secret*, 107 NW. L. REV. 169, 175-202 (2012).

181. *Cf.* *Rucho v. Common Cause*, 129 S. Ct. 2484, 2499 (2019) (holding that because "federal courts are not equipped to apportion political power as a matter of fairness" and because "[t]here are no legal standards discernible in the Constitution for making such judgments," complaints about partisan gerrymandering were nonjusticiable and beyond Article III). *Rucho* has not yet appeared in an NFS case. It cannot be far off, though.

Ripeness has become a looming presence in the circuits of the NFS states as well.¹⁸² Because so many of the Service's statutory constraints operate only through the regulations they anticipate, challengers arguably must prove that no conceivable set of circumstances could support the Service's policy choices.¹⁸³ It remains to be seen what the Court has in store for its Article III doctrines,¹⁸⁴ but it is increasingly evident that at present they are aligned decidedly against most challenges to the Forest Service's policy judgments.¹⁸⁵

Lastly, APA review reaches only "final" agency actions.¹⁸⁶ The Court has stressed that agency actions marking the "consummation" of administrative decision-making in which "rights or obligations have been determined" and from which "legal consequences will flow" are final and qualify for review.¹⁸⁷ Here, too, the issue has become *how* immediate or direct the connection between agency action and legal interest must be.¹⁸⁸ Because intermediacy, spatial imprecision, and temporal lagging

182. *See, e.g.*, *Sierra Club v. Marita*, 46 F.3d 606, 614 (7th Cir. 1995); *Coal. for Sustainable Res., Inc. v. U.S. Forest Serv.*, 259 F.3d 1244, 1249-50 (10th Cir. 2001); *Wilderness Soc'y v. Thomas*, 188 F.3d 1130, 1133-34 (9th Cir. 1999); *San Juan Citizens All. v. Stiles*, 654 F.3d 1038, 1046-50 (10th Cir. 2011); *WildEarth Guardians v. Mont. Snowmobile Ass'n*, 790 F.3d 920, 933-34 (9th Cir. 2015); *Or. Nat. Desert Ass'n v. U.S. Forest Serv.*, 957 F.3d 1024, 1031-32 (9th Cir. 2020).

183. *Cf. Reno v. Flores*, 507 U.S. 292, 300-02 (1993) (quoting *United States v. Salerno*, 481 U.S. 739, 745 (1987)). At least one court denied even declaratory relief against the United States under FRRRPA, citing the President and Secretary's budgetary and other powers delegated by Congress. *See Nat'l Wildlife Fed'n v. United States*, 626 F.2d 917, 926-28 (D.C. Cir. 1980).

184. *Cf. Henry Paul Monaghan, A Cause of Action, Anyone?: Federal Equity and the Preemption of State Law*, 91 NOTRE DAME L. REV. 1807, 1824-29 (2016) (discussing *Shaw v. Delta Air Lines, Inc.*, 463 U.S. 85 (1983), *Alexander v. Sandoval*, 532 U.S. 275 (2001), *Verizon Md., Inc. v. Pub. Serv. Comm'n*, 535 U.S. 635 (2002), *Lexmark Int'l, Inc. v. Static Control Components, Inc.*, 572 U.S. 118 (2014), and the Supreme Court's uneven demand that federal statutes include discrete causes of action before lower federal courts may entertain private claims for their enforcement).

185. *See, e.g.*, *Fed. Forest Res. Coal. v. Vilsack*, 100 F. Supp. 3d 21, 42-47 (D.D.C. 2015) (dismissing timber concerns' challenges to 2012 planning regulation amendments for lack of standing); *Sierra Club v. Petersen*, 228 F.3d 559, 562-70 (5th Cir. 2000).

186. *See* 5 U.S.C. §§ 704, 701(b)(2), 551(3); *Lujan v. Nat'l Wildlife Fed'n*, 497 U.S. 871, 885-900 (1990). Because the NFS statutes lack a private cause of action, challengers are left to the APA for petitions to review Service actions. *See U.S. Army Corps Eng'rs v. Hawkes Co., Inc.*, 136 S. Ct. 1807, 1813-16 (2016); *Sackett v. EPA*, 566 U.S. 120, 125-28 (2012); *Norton v. S. Utah Wilderness All.*, 542 U.S. 55, 61-65 (2004); *Bennett v. Spear*, 520 U.S. 154, 177-78 (1997); *Franklin v. Massachusetts*, 505 U.S. 788, 796-801 (1992); *Lujan*, 497 U.S. at 890-91; *Fed. Trade Comm'n v. Standard Oil Co.*, 449 U.S. 232, 239-43 (1980).

187. *Bennett*, 520 U.S. at 177-78. *Bennett* has been criticized by more than one commentator for its ahistorical approach to the APA and vagueness as applied in the lower courts. *See, e.g.*, Steven J. Lindsay, Note, *Timing Judicial Review of Agency Interpretations in Chevron's Shadow*, 127 YALE L.J. 2448, 2474-80 (2017) (collecting commentary and extending it).

188. *See, e.g.*, *Kettle Range Conservation Grp. v. U.S. Forest Serv.*, 148 F. Supp. 2d 1107, 1114 (E.D. Wash. 2001); *Coal. for Sustainable Res.*, 259 F.3d at 1251-53; *Siskiyou Reg'l Educ. Proj. v. U.S. Forest Serv.*, 565 F.3d 545, 553-54 (9th Cir. 2009); *Utah Native Plant Soc'y v. U.S. Forest Serv.*, 923 F.3d 860, 865-75 (10th Cir. 2019).

are all so common to the forests and the NFS statutes,¹⁸⁹ a great deal of Service programming is unreviewable for lack of an adequate APA target.

Between them, standing, ripeness, and finality entangle three of the four aspects of the NFS statutes' subtle structure—the regulation, resulting guidelines and standards, and the unit-level plans implementing them—in precedents limiting the availability of a forum. Land and resource Management Plan (LRMP) revisions were the focus in *Ohio Forestry Association v. Sierra Club*.¹⁹⁰ The petitioners had challenged the final Wayne National Forest's LRMP's consistency with the statutes.¹⁹¹ The court of appeals had credited the claims, remanding the plan as inconsistent with the statute's "protective spirit" regarding high-yield forestry.¹⁹² The Supreme Court reversed, though, with an opinion drawing most claims against LRMP revisions into doubt as not presenting sufficiently tangible injuries "of a strictly legal kind."¹⁹³ If the Wayne LRMP was "law," it was not law the federal courts were to review for fit with the statutes. Some other, more immediately injurious action was needed. That holding, even if consonant with earlier equitable doctrines,¹⁹⁴ went above and beyond the APA's finality requirements in challenges to NFS policies, guidance, rules, etc.¹⁹⁵ *Ohio Forestry* is known across the NFS, and, in retrospect, the precedents following it have shifted the federal courts' role in Congress's scheme considerably. Diminished judicial oversight of the sort that has resulted from these changes in the availability of a federal forum, though, can still be significant. Part B sharpens the focus there.

189. See, e.g., *Ecology Ctr., Inc. v. U.S. Forest Serv.*, 192 F.2d 922, 924-26 (9th Cir. 1999); *Sharps v. U.S. Forest Serv.*, 28 F.3d 851, 855 (8th Cir. 1994); cf. *Summers v. Earth Island Inst.*, 555 U.S. 488, 496 (denying standing to petitioner who had sworn affidavits of his intent to visit the national forest on the grounds that specific areas within the forest had not been identified).

190. 523 U.S. 726 (1998).

191. See *Sierra Club v. Thomas*, 105 F.3d 248, 249-52 (6th Cir. 1997).

192. See *id.* at 252.

193. *Ohio Forestry Ass'n v. Sierra Club*, 523 U.S. at 733. The Court was unequivocal, stating that LRMPs "do not command anyone to do anything or to refrain from doing anything; they do not grant, withhold, or modify any formal legal license, power, or authority; they do not subject anyone to any civil or criminal liability; they create no legal rights or obligations." *Id.* (paraphrasing *United States v. L.A. & Salt Lake R.R. Co.*, 273 U.S. 299, 309-10 (1927)).

194. The Court's resort to equity in *Ohio Forestry* was tacit but it tapped a deep root. See, e.g., *Port of Bos. Marine Terminal Ass'n v. Rederiaktiebolaget Transatlantic*, 400 U.S. 62, 68-71 (1970); *Columbia Broad. Sys., Inc. v. United States*, 316 U.S. 407, 410-12 (1942); *Rochester Tele. Corp. v. U.S.*, 307 U.S. 754, 129-32 (1939); *L.A. & Salt L. R.R. Co.*, 273 U.S. at 309-10.

195. The *Ohio Forestry* Court, like the *Abbott Labs* Court, only loosely distinguished finality from ripeness. But it did highlight the equitable balancing being done. See *Ohio Forestry*, 523 U.S. at 735-37; see also *Nat'l Park Hosp. Ass'n v. Dep't Interior*, 538 U.S. 803, 814 (2003) (Stevens, J., concurring) ("Both aspects of the inquiry involve the exercise of judgment, rather than the application of a black-letter rule."). Indeed, the *Ohio Forestry* Court expanded *Abbott Labs*' two factors to three: (1) whether delayed review would cause hardship to the plaintiffs; (2) whether judicial intervention would inappropriately interfere with further administrative action; and (3) whether the courts would benefit from further factual development of the issues presented. *Id.* at 733.

B. Applying the Constraints: Precedent, Deference, and Data on the NFS

As already mentioned, an especially contentious part of the constrained optimization has been the Service's 'provision for' "diversity" of "plant and animal communities."¹⁹⁶ The original regulations¹⁹⁷ levied a series of "minimum requirements" for discrete forest resources,¹⁹⁸ including that "[f]orest planning shall provide for diversity of plant and animal communities and tree species *consistent with the overall multiple use objectives* of the planning area,"¹⁹⁹ while separately specifying a second set of requirements, including that

"[m]anagement prescriptions, where appropriate and to the extent practicable, shall preserve and enhance the diversity of plant and animal communities, including endemic and desirable naturalized plant and animal species, so that it is at least as great as that which would be expected in a natural forest and the diversity of tree species similar to that existing in the planning area."²⁰⁰

As to the fish and wildlife "purpose," the expectations were more manifest but hardly explicit.²⁰¹ The core ambiguity was whether protecting *habitat* or

196. See *supra* note 138 and accompanying text.

197. The 1979 regulation, heavily influenced by the independent "Committee of Scientists," was overhauled in 1982 following the Reagan Administration's review. See National Forest Service System Land and Resource Management Planning, 47 Fed. Reg. 7678, 7679-81 (proposed Feb. 22, 1982); National Forest System Land and Resource Management Planning, 47 Fed. Reg. 43,026, 43,036 (1982). The 1982 regulation formed the basis of every LRMP that was in effect by the time the 2012 regulation was being prepared. See National Forest System Land Management Planning, 76 Fed. Reg. 8480, 8481 (proposed Feb. 14, 2011). Significantly, however, the 1982 regulation's restructuring created several key ambiguities as to the responsibilities toward diversity being levied on unit-level planning.

198. The 1982 regulation's sections 219.14 to 219.26 set forth "minimum requirements for integrating individual forest resource planning into the forest plan." See 47 Fed. Reg. 43,026 at § 219.13. These treated timber, wilderness, fish and wildlife, grazing, recreation, minerals, water and soil, cultural and historical, and research natural areas as well as diversity. See *id.* at §§ 219.14-219.26. *Diversity* was defined as "[t]he distribution and abundance of different plant and animal communities and species within the area covered" by an LRMP. See *id.* at § 219.3.

199. 36 C.F.R. § 219.26 (emphasis added). The consistency proviso mirrored that in NFMA § 6(g)(3)(B).

200. 36 C.F.R. § 219.27(g). Section 219.27, entitled "[m]anagement requirements," became a separate, independent list of prescriptions in the 1982 revision, derived from the 1979 version but recoded and renamed "minimum specific management requirements to be met in accomplishing goals and objectives for the [NFS]." *Id.*; see 47 Fed. Reg. at 43,035-36, 43,050-52. In that second list of requirements intended to "guide the development, analysis, approval, implementation, monitoring and evaluation of forest plans," "diversity" was twice referenced. See §§ 219.27(a)(5), 219.27(g). The regulation said nothing of the different sets of prescriptions' intended or expected interoperation(s).

201. The "minimum requirement" for fish and wildlife was that "[f]ish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area." *Id.* at § 219.19. It continued that "[i]n order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals

protecting select *populations* was to be the goal.²⁰² “Management indicator species” [MISs] were to be chosen, and their population changes used to “indicate the effects of management activities on other species of selected major biological communities or on water quality.”²⁰³ The Service eventually decided the regulation required only its management of habitat.²⁰⁴ The decade of litigation that ensued faced not just the regulation’s meaning but myriad agency judgments and compounding judicial precedents as well.²⁰⁵ Then, as now, such management prescriptions depended directly on the means of verification.²⁰⁶ And what data must, should, or may be used

and that habitat must be well distributed so that those individuals can interact with others in the planning area.” *Id.* A further, “minimum specific management requirement,” *id.* at § 219.27(a), was that plans “[p]rovide for adequate fish and wildlife habitat to maintain viable populations of existing native vertebrate species and provide that habitat for [management indicator species] is maintained and improved to the degree consistent with multiple-use objectives established in the plan,” *id.* at § 219.27(a)(5).

202. The fish and wildlife “minimum requirement” included seven itemized subsections pertaining to: (1) the selection of “management indicator species,” (2) the selection of planning alternatives; (3) monitoring and consideration of different data types surrounding wildlife abundance. *See id.* at § 219.19(a)(1)-(7). Whether habitat or populations were to be the objective, however, was not clear. *See* Biodiversity Conservation All. v. Jiron, 762 F.3d 1036, 1061-68 (10th Cir. 2014) (concluding that either interpretation was “reasonable” and deferring to Service’s interpretation because regulation was ambiguous). The litigation testing these requirements only began once LRMPs prepared pursuant to the 1982 rule were finalized and Forest Service actions implementing those plans were being planned or undertaken. *See* Env’t Protect. Info. Ctr. v. Blackwell, 389 F. Supp. 2d 1174, 1205-14 (N.D. Cal. 2004); Sierra Club v. Marita, 46 F.3d 606, 619-21 (7th Cir. 1995).

203. 36 C.F.R. 219.19(a)(1) (1983).

204. This split the courts of appeal, as acknowledged in *Sierra Club v. Martin*, 168 F.3d 1, 6-7, 7 n.10 (11th Cir. 1999) (holding that the regulation required plans to protect viable populations of MIS and other species in the planning area); *see also* *Colo. Env’t Coal. v. Dombeck*, 185 F.3d 1162, 1168-71 (10th Cir. 1999) (holding that regulation required only the management of habitat for fish and wildlife purposes); *Inland Empire Pub. Lands Co. v. U.S. Forest Serv.*, 88 F.3d 754, 760-63 (9th Cir. 1996) (same).

205. The alignment of habitat as proxy for populations and populations as proxy for diversity (or “fish and wildlife” purposes) became known throughout the Ninth Circuit as the “proxy-on-proxy” war. *See Colo. Env’t Coal.*, 185 F.3d at 1169-70; *Idaho Sporting Cong. v. Thomas*, 137 F.3d 1146, 1153-54 (9th Cir. 1998); *Idaho Sporting Cong. v. Rittenhouse*, 305 F.3d 957, 971-73 (9th Cir. 2002); *Blackwell*, 389 F. Supp.2d at 1214-20; *Lands Co. v. Powell*, 395 F.3d 1019, 1036-37, 1036 n.23 (9th Cir. 2005); *Native Ecosystems Co. v. U.S. Forest Serv.*, 428 F.3d 1233, 1250-51 (9th Cir. 2005); *Ecology Ctr. v. Austin*, 430 F.3d 1057, 1064-65 (9th Cir. 2005); *Earth Island Inst. v. U.S. Forest Serv.*, 442 F.3d 1147, 1173-77 (9th Cir. 2006); *Env’t Prot. Info. Ctr. v. U.S. Forest Serv.*, 451 F.3d 1005, 1017-18 (9th Cir. 2006); *Or. Nat. Res. Council Fund v. Goodman*, 505 F.3d 884, 889-91 (9th Cir. 2007); *Native Ecosystems Council v. Tidwell*, 599 F.3d 926, 933-36 (9th Cir. 2010); *Hapner v. Tidwell*, 621 F.3d 1239, 1246-48 (9th Cir. 2010); *Earth Island Inst. v. Carlton*, 626 F.3d 462, 469-72 (9th Cir. 2010); *Earth Island Inst. v. U.S. Forest Serv.*, 697 F.3d 1010, 1013-19 (9th Cir. 2012); *Friends of the Wild Swan v. Weber*, 767 F.3d 936, 948-49 (9th Cir. 2014); *In re Big Thorne Project*, 857 F.3d 968, 974-76 (9th Cir. 2017).

206. Indicator metrics generally raise troublesome questions in ecology and NFS indicator species have been no exception. *See* Ryan P. Kelly & Margaret R. Caldwell, “Not Supported by Current Science”: *The National Forest Management Act and the Lessons of Environmental Monitoring for the Future of Public Resources Management*, 32 STAN. ENV’T L.J. 151 (2013). As Kelly and Caldwell noted, because the 1982 regulation did not direct forest supervisors to use MIS for any specific purpose, managers were free to use or not use them for any number of permissible aims—leading to confusion and frustration. *Id.* at 184.

to inform Service judgments, whether for “diversity” or for fish/wildlife purposes, was never clear from the original regulation.²⁰⁷ Indeed, contests over monitoring duties soon consumed the legal disputes over protecting biotic and community integrity.²⁰⁸ But it was never lost on the Service that biologists predisposed toward “conservation” could beg the very questions they were asked to answer: there can be no statements of biological fact which are dictated by value priorities.²⁰⁹

The Service forged ahead, though, undeterred by challengers seeking more attention to populations, with what it has styled “habitat analysis.”²¹⁰ By drastically

207. The 1982 regulation stated that every forest plan “shall contain” “[m]onitoring and evaluation requirements that will provide a basis for a periodic determination and evaluation of the effects of management practices.” 36 C.F.R. § 219.11(d) (1983). This mandate was independent of a prescription that Forest Supervisors “shall obtain and keep current inventory data appropriate for planning and managing the resources” within that supervisor’s jurisdiction. *Id.* at § 219.12(d). Finally, the regulation stated that “[i]nventories shall include quantitative data making possible the evaluation of diversity in terms of its prior and present condition.” *Id.* at § 219.26.

208. See Kelly & Caldwell, *supra* note 206, at 181. Several early opinions from the courts of appeal differed over the Service’s duties to collect population-oriented or habitat-oriented data. See, e.g., Swanson v. U.S. Forest Serv., 87 F.3d 339, 344-45 (9th Cir. 1996); *Inland Empire Pub. Lands Co.*, 88 F.3d at 760-63 (holding that habitat-oriented information was sufficient); *Martin*, 168 F.3d at 5-8 (holding that habitat-oriented information was insufficient and that Service’s interpretation of regulation was entitled to deference); *Colo. Env’t Coal.*, 185 F.3d at 1170. That split in the circuits led to highly strategized advocacy surrounding the original regulation’s terms and intent. See Ecology Ctr. v. U.S. Forest Serv., 192 F.3d 922, 924-26 (9th Cir. 1999); *Forest Guardians v. U.S. Forest Serv.*, 180 F. Supp. 2d 1273, 1279-80 (D.N.M. 2001); *Utah Env’t Cong. v. Zieroth*, 190 F. Supp. 2d 1265, 1268-72 (D. Utah 2002); *Neighbors of Cuddy Mountain. v. Alexander*, 303 F.3d 1059, 1066-71 (9th Cir. 2002); *Idaho Sporting Cong.*, 305 F.3d at 967-68; *Forest Guardians v. U.S. Forest Serv.*, 329 F.3d 1089, 1098-1100 (9th Cir. 2003); *Utah Env’t Cong. v. Bosworth*, 372 F.3d 1219, 1224-28 (10th Cir. 2004); *Lands Council v. Powell*, 395 F.3d 1019, 1027-28 (9th Cir. 2005); *Sierra Club v. Bosworth*, 352 F. Supp. 2d 909, 917-18 (D. Minn. 2005); *Utah Env’t Cong. v. Bosworth*, 439 F.3d 1184, 1190-94 (10th Cir. 2006); *Utah Env’t Cong. v. Richmond*, 483 F.3d 1127, 1132, 1135-37 (10th Cir. 2007); *Utah Env’t Cong. v. Troyer*, 479 F.3d 1269, 1282-88 (10th Cir. 2007); *Forest Guardians v. U.S. Forest Serv.*, 641 F.3d 423, 443-44 (10th Cir. 2011); *Biodiversity Conserv. All. v. Jiron*, 762 F.3d 1036, 1061-63 (10th Cir. 2014).

209. In the 2002 proposal and ill-fated 2005 finalized revision of the planning regulations, the Service eliminated species-specific LRMP requirements in favor of vague “sustainability” criteria. See National Forest System Land Management Planning, 70 Fed. Reg. 1023, 1027, 1048-49 (2005). It cited the biological uncertainties of a species or population focus, rejecting the recommendations of both Committees of Scientists. *Id.* at 1048. By the turn of this century, not coincidentally, the one basic “law of ecology” biologists had generally accepted—that species diversity always increases with area—had become a matter of considerable professional debate. See Mark V. Lomolino, *The Species–Area Relationship: New Challenges for an Old Pattern*, 25(1) PROG. PHYS. GEOG. 1 (2001) (maintaining that the law is either tautological or in need of significant revision and qualification). Indeed, that lost consensus coincided with a splintering of support for conservation biology’s approach to hypothesis uncertainty—an approach supposedly grounded in ‘erring on the side of caution.’ See Graeme Caughley, *Directions in Conservation Biology*, 62 J. ANIMAL ECOLOGY 215 (1994) (contrasting “small population” with “declining population” work on biotic abundance and persistence and showing inconsistent prevailing statistical methods).

210. See *Lands Council v. McNair*, 629 F.3d 1070, 1076-79 (9th Cir. 2010); *Lands Council v. McNair*, 537 F.3d 981, 994-99 & nn. 10-12 (9th Cir. 2008). This “habitat analysis” remained the focus in both the 2005 and 2012 regulations. See National Forest System Land Management Planning, 70 Fed. Reg. 1023, 1028-29 (2005) (describing 2005 rule’s reliance on overall “sustainability” and its components); National Forest System Land Management Planning, 77 Fed. Reg. 21,162, 21,174-76 (2012) (describing a

limiting the populations-as-surrogate tool in its 2012 rule,²¹¹ the Service claimed to acknowledge for the first time (in the regulation) that there “are limits to Agency authority and the inherent capability of the land” in sustaining extant biota in place.²¹² Measuring and managing for habitat, though, is at best a poor substitute for monitoring and maintaining the distribution and abundance of biota.²¹³ As conducted thus far, it is utterly devoid of transparency and the accountability it brings.²¹⁴ It is also a strange way to ease information burdens: habitat is typically some collection of necessary and sufficient conditions for an organism.²¹⁵ Unsurprisingly, the Service has yet to demonstrate any scientific merit to its habitat analyses.²¹⁶ Indeed, the

shift to monitoring “focal species” as surrogates for the “ecological conditions necessary to maintain the diversity of plant and animal communities”).

211. See 77 Fed. Reg. at 21,175, 21,212-19 (explaining the replacement of MIS and MIS monitoring requirements with a mandate for “ecological sustainability” employing a “coarse filter” and “fine filter” approach making sparing use of “focal species” and “species of conservation concern” only as needed); 36 C.F.R. § 219.9(b) (2020) (leaving species-specific plan components contingent on a finding of necessity by responsible official).

212. 77 Fed. Reg. at 21,213.

213. See Courtney A. Schultz et al., *Wildlife Conservation Planning Under the United States Forest Service’s 2012 Planning Rule*, 77(3) J. WILDLIFE MGMT. 428, 436-38 (2013). It is worth noting that the second Committee of Scientists—the last the Service empaneled—also concluded that “[h]abitat alone cannot be used to predict wildlife populations,” and that “diversity is sustained only when individual species persist; the goals of ensuring viability [of species] and providing for diversity are inseparable.” COMM. OF SCIENTISTS, SUSTAINING THE PEOPLE’S LANDS 19, 38 (1999), <https://www.fs.fed.us/emc/nfma/includes/cosreport/Committee%20of%20Scientists%20Report.htm>. Finally, the Service’s own technical manual acknowledges as much, prefacing its ten chapters with the disclaimer that “[t]he emphasis on habitat monitoring in this guide does not replace the need to assess population status and trend.” USDA FOREST SERV., GTR-WO-89, A TECHNICAL GUIDE FOR MONITORING WILDLIFE HABITAT § 1.3.2 (2013).

214. This has been a problem in ecological research generally. See Timothy H. Parker et al., *Transparency in Ecology and Evolution: Real Problems, Real Solutions*, 31 TRENDS IN ECOLOGY & EVOLUTION 711, 711-12 (2016); Aaron M. Ellison, *Repeatability and Transparency in Ecological Research*, 91 ECOLOGY 2536 (2010). The Service’s habitat focus is emblematic, though. See Parker et al., *supra*, at 711-17.

215. In the 2012 rulemaking, the Service defended its approach by arguing that monitoring’s costs trade-off of other management priorities. See 77 Fed. Reg. at 21,255-21,256. But as its own specialists have observed, it is specific attributes of an environment that organisms select as their habitat (generally a collocation of both biotic and abiotic resources). See TECHNICAL GUIDE, *supra* note 213, at §§ 1.3.1, 2.1, 2.2. This would seem to multiply the aspects of the environment to be monitored—or, barring that, the ways in which the analysis can be confounded. See *id.* at § 5.2.2 (noting that single-attribute habitat classifications are prone to over-estimations because “[h]abitat quality is often a conditional function of the simultaneous conditions of several attributes, such that measuring one or a few attributes does not sufficiently assess their joint contribution toward habitat quality”).

216. Cushman and colleagues, from the largest dataset ever employed in such analyses, found that sufficiency of vegetation community types as proxies for habitat was highly dependent on the attributes and spatial scales by which communities were defined and that, at most, cover type could explain only about 4% of total variance in bird abundance. See Samuel A. Cushman et al., *Do Forest Community Types Provide a Sufficient Basis to Evaluate Biological Diversity?*, 6 FRONTIERS IN ECOLOGY & ENV’T 13, 17 (2008). The Service’s own technical manual agrees. See TECHNICAL GUIDE, *supra* note 213, at 2.2.2 (noting that most vegetation attributes measured as habitat are really proxies for the attribute of interest,

existence and strength of associations between habitat change and biodiversity remain quite controversial among professional ecologists.²¹⁷ What those associations reveal about relevant *causes* is still more uncertain,²¹⁸ not least because the Service usually does not share data from its habitat analyses.²¹⁹ The more judgments about habitat analysis instead of place-based population monitoring that were litigated, though, the less reviewing courts seemed inclined to oblige the challengers.²²⁰ Courts confronted with judgments optimizing for competing objectives amid multiple uncertainties confront the same epistemic dilemmas Congress worked to overcome with an elaborate architecture—yet do so within the confines of a single case or

leaving any such measurement at least two steps removed from population abundance or ecological integrity).

217. Species richness and abundance have long divided community ecologists, with both deterministic and stochastic theories vying for attention. *Compare* STEPHEN P. HUBBELL, *THE UNIFIED NEUTRAL THEORY OF BIODIVERSITY AND BIOGEOGRAPHY* 10 (2001) (“I believe that we should seriously question *why* our theories in ecology always start with the presumption of the indefinite coexistence of all species. All the evidence of which I am aware supports entirely the opposite conclusion—namely, that all species are transient and ultimately go extinct.”), *with* Quinn & Dunham, *supra* note 147, at 609 (“Effects of interspecific interaction are notoriously difficult to measure directly without recourse to experimental techniques, which in many cases are infeasible.”).

218. David Tilman, *Ecological Experimentation: Strengths and Conceptual Problems*, in *LONG-TERM STUDIES IN ECOLOGY: APPROACHES AND ALTERNATIVES* 136 (G.E. Likens ed., 1989) (arguing that ecology is the study of causes of patterns in nature and that observation is only sufficient if paired with experimentation and theory).

219. This is especially noteworthy because data transparency has been a major change agent in ecological research over the past decade. *See* B.A. Nosek et al., *Promoting an Open Research Culture*, 348 *SCIENCE* 1422 (June 2015); Michael C. Whitlock, *Data Archiving in Ecology and Evolution: Best Practices*, 26 *TRENDS IN ECOLOGY & EVOLUTION* 61 (2011).

220. *See, e.g.*, *League of Wilderness Def. v. U.S. Forest Serv.*, 445 F. Supp. 2d 1186, 1197-1200 (D. Or. 2006), *rev'd in part on other grounds*, 549 F.3d 1211, 1222-23 (9th Cir. 2008); *Forest Guardians v. U.S. Forest Serv.*, 495 F.3d 1162, 1168-71 (10th Cir. 2007); *Utah Env't Cong. v. Russell*, 518 F.3d 817, 827-32 (10th Cir. 2008); *Ecology Ctr. v. Castaneda*, 574 F.3d 652, 664-66 (9th Cir. 2009); *Hapner v. Tidwell*, 621 F.3d 1239, 1246-50 (9th Cir. 2010); *Earth Island Inst. v. Carlton*, 626 F.3d 462, 469-72 (9th Cir. 2010); *Forest Guardians v. U.S. Forest Serv.*, 641 F.3d 423, 440-43 (10th Cir. 2011); *San Juan Citizens All. v. Stiles*, 654 F.3d 1038, 1045-49 (10th Cir. 2011); *Native Ecosystems Council v. Weldon*, 697 F.3d 1043, 1056-59 (9th Cir. 2012); *Earth Island Inst. v. U.S. Forest Serv.*, 697 F.3d 1010, 1013-18 (9th Cir. 2012); *Biodiversity Conservation All. v. Jiron*, 762 F.3d 1036, 1061-82 (10th Cir. 2014); *Friends of the Wild Swan v. Weber*, 767 F.3d 936, 947-50 (9th Cir. 2014); *In re Big Thorne Project*, 857 F.3d 968, 974-77 (9th Cir. 2017); *All. for the Wild Rockies v. Pena*, 865 F.3d 1211, 1217-21 (9th Cir. 2017); *Native Ecosystems Council v. Marten*, 883 F.3d 783, 791-94 (9th Cir. 2018); *Or. Nat. Desert Ass'n v. U.S. Forest Serv.*, 957 F.3d 1024, 1036-37 (9th Cir. 2020).

controversy.²²¹ Eventually, the volume of judicial precedent itself attenuates any such claim's chances legally.²²²

Empirical analysis of these outcomes would amount to little, practically.²²³ Counsel quickly, consciously adapt tactics in repeat-play contexts and judges may view every precedent (or opinion) as shading the landscape anew. In short, data from subjects that adapt to the intervention or "test" in the field do not merit the label of "data."²²⁴ Still, some patterns are worth noting, especially in view of the Wilderness Act's separate but parallel operation and legacy. Wilderness areas *exclude* multiple use and yet have evolved along similar lines.

221. See Scott Brewer, *Scientific Expert Testimony and Intellectual Due Process*, in *THE PHILOSOPHY OF EXPERTISE* 111 (Evan Selinger & Robert P. Crease eds., 2006) (arguing that American judges and juries must necessarily accept or reject expert testimony arbitrarily and will of necessity resort to credential, demeanor, reputation or other similar kinds of evidence to judge the veracity of the testimony). Similar outcomes are evident in other optimization areas. See, e.g., Robin K. Craig & Catherine Danley, *Federal Fisheries Management: A Quantitative Assessment of Federal Fisheries Litigation Since 1978*, 32 J. LAND USE & ENV'T L. 381, 405-21 (2017); Erin Ryan, *Fisheries Without Courts: How Fishery Management Reveals Our Dynamic Separation of Powers*, 32 J. LAND USE & ENV'T L. 431, 447-50 (2017).

222. High profile opinions in both the Ninth and Tenth circuits set precise precedents at the height of the great proxy-on-proxy war, limiting the circumstances in which scientific judgments could be reviewed. See *Utah Env't Cong. v. Bosworth*, 372 F.3d 1219, 1225-27 (10th Cir. 2004) (holding that 1982 version of 36 C.F.R. § 219.19 required project-level MIS population monitoring); *Utah Env't Cong. v. Bosworth*, 443 F.3d 732, 749-52 (10th Cir. 2006) (holding that monitoring plans implementing LRMPs may be reviewable as such); *Forest Guardians*, 495 F.3d at 1168-69 (quoting *Bosworth*, 443 F.3d at 748, and holding that LRMP at issue did not adopt 1982 regulation's requirements on monitoring); *Ecology Cir. v. Austin*, 430 F.3d 1057, 1064-65 (9th Cir. 2005) (holding that Service's methodological choices were reviewable for arbitrariness and that a refusal to monitor population-level effects was arbitrary); *Lands Council v. McNair*, 494 F.3d 771, 775-76 (9th Cir. 2007) (quoting *Austin*, 430 F.3d at 1064, and holding that Service's methodological choices may not be "predicated on an unverified hypothesis" and must be "verified with observation"), *reh'g en banc*, 537 F.3d 981, 990-92 (9th Cir. 2008) (overruling *Austin* and holding that the court will be at its "most deferential" when the agency is "making predictions, within its [area of] special expertise, at the frontiers of science") (quoting *Balt. Gas & Elec. Co. v. Nat. Res. Def. Council*, 462 U.S. 87, 105 (1983)).

223. Noted studies of agency win/loss records in the federal courts may suggest otherwise. See, e.g., Jacob Gersen & Adrian Vermeule, *Thin Rationality Review*, 114 MICH. L. REV. 1355 (2016); David Zaring, *Reasonable Agencies*, 96 VA. L. REV. 135 (2010); Thomas J. Miles & Cass R. Sunstein, *The Real World of Arbitrariness Review*, 75 U. CHI. L. REV. 761 (2008). None of these studies, however, focus narrowly on a single issue or issue set as it has developed in sequence over decades.

224. See Niels Keiding & David Clayton, *Standardization and Control for Confounding in Observational Studies: A Historical Perspective*, 29 STAT. SCIENCE 529, 538 (2014). Drawing methodologically sound empirical inferences from such samples is hard to imagine. Cf. RONALD N. GIERE ET AL., *UNDERSTANDING SCIENTIFIC REASONING* 198-205 (5th ed. 2006) (explaining the difference between deterministic and probabilistic models of individuals and the potential failures in both of identifying the causal factors at work); Joseph P. Simmons et al., *False-Positive Psychology: Undisclosed Flexibility in Data Collection and Analysis Allows Presenting Anything as Significant*, 22 PSYCH. SCI. 1359 (2011) (showing how degrees of freedom in data collection often allow social scientists to amass data showing spurious correlations lacking any real account of causation). Thus, even supposing the familiar selection effects could be controlled, see George L. Priest & Benjamin Klein, *The Selection of Disputes for Litigation*, 13 J. LEGAL STUD. 1 (1984), I will leave all such inferences to others.

In a patient study of challenges to the land management agencies under the Wilderness Act, Professor Appel noticed a pronounced ‘pro-wilderness’ tilt from reviewing courts, both for and against the agencies.²²⁵ The Forest Service, of course, famously opposed many wilderness designations throughout the NFS.²²⁶ The tendencies Appel noted arguably stemmed from the single most important contrast with the NFS statutes: deliberate, routine Congressional intervention clearly aimed at constraining agency discretion.²²⁷ As I have argued elsewhere, as a biodiversity protection tool, the Wilderness Act is imperfect at best.²²⁸ It cares little for ecology.²²⁹ But it surely *has* been Congress’s chief constraint on NFS multiple use.²³⁰ Although the average wilderness may not be the “minimum dynamic area” to withstand typical disturbances as habitat,²³¹ wilderness areas are readily incorporated

225. See Peter A. Appel, *Wilderness, the Courts, and the Effect of Politics on Judicial Decisionmaking*, 35 HARV. ENV’T L. REV. 275, 294-312 (2011); Peter A. Appel, *Wilderness and the Courts*, 29 STAN. ENV’T L. REV. 62, 96, 113 (2010).

226. See Appel, *supra* note 225, at 84; ALLIN, *supra* note 40, at 165.

227. See Appel, *supra* note 225, at 120-21 (noting that the Wilderness Act has long-standing and widespread support in Congress); ALLIN, *supra* note 40, at 186-203 (recounting several key additions to the National Wilderness Preservation System and the political support of host-state delegations). Wilderness Act claims, moreover, rarely involve courts in assessing complex optimizations or scientifically untested professional judgments.

228. See Jamison E. Colburn, *The Indignity of Federal Wildlife Habitat Law*, 57 ALA. L. REV. 417, 455-60 (2005).

229. See Sara Dant, *Making Wilderness Work: Frank Church and the American Wilderness Movement*, 77(2) PAC. REV. 237 (2008); ALLIN, *supra* note 40, at 143-66. In contrast to the NFS statutes, all of which grew from a common impetus in Congress (and before that in the PLLRC) to join more land use decision-making to the systematic study and prediction of environmental impact, the Wilderness Act demands that the Service manage designated areas “for preserving the wilderness character of the area” while defining wilderness in aesthetic and spiritual terms. See 16 U.S.C. §§ 1133(b), 1131(c).

230. See Leshy, *supra* note 41, at 479-82; Appel, *supra* note 225, at 119-120.

231. Some island biogeographers maintain that habitat reserves should be larger than the largest disturbance area size if reserves are to maintain habitat and populations intact over time. See, e.g., S.T.A. Pickett & John N. Thompson, *Patch Dynamics and the Design of Nature Reserves*, 13 BIOLOGICAL CONSERVATION 27, 34 (1978) (calling this the “minimum dynamic area”).

into wider conservation planning²³² and broader, system-wide goal-setting.²³³ Congress can and has done so in places even where local Forest Service personnel objected.²³⁴ Wilderness areas are, furthermore, increasingly vital to fire science and the study of ignitions, fuels, fire behavior, treatment efficiency, and climate change.²³⁵ They are, in short, as much a focus of the NFS's future as a window into its institutional and legal past.

Multiple use, wilderness, and fire are an increasingly contentious intersection, though. As with community ecology,²³⁶ the Service's cause-to-effect knowledge is quite scarce.²³⁷ Whether it is risk in the wildland-urban interface

232. See, e.g., Keiter, *GYE Revisited*, *supra* note 49, at 124-36 (describing Greater Yellowstone). About half of the habitat reserved to the northern spotted owl (*Strix occidentalis caurina*) and other late successional/old growth-dependent species in the noted Northwest Forest Plan (NFP) was preexisting wilderness. See Jack Ward Thomas et al., *The Northwest Forest Plan: Origins, Components, Implementation Experience, and Suggestions for Change*, 20 CONSERVATION BIOLOGY 277, 282 (2006). The NFP, a regional plan to protect biotic and community diversity across seventeen national forests of the Pacific Northwest, has been plagued by fire and non-native species invasions that have rendered its original goals insufficient to protect owl populations. See Thomas A. Spies et al., *Old Growth, Disturbance, Forest Succession, and Management in the Area of the Northwest Forest Plan*, in PNW-GTR-966, SYNTHESIS OF SCIENCE TO INFORM LAND MANAGEMENT WITHIN THE NORTHWEST FOREST PLAN AREA VOL. 1 95, 183-89 (2018).

233. See Thomas et al., *supra* note 232, at 280-83. As carbon storage has become a focal metric in the RPA assessments, wilderness areas—where commercial logging is prohibited—have taken on a renewed significance. See CONG. RSCH. SERV. GTR-WO-94, *supra* note 133, at 8-2.

234. See, e.g., Christine H. Colburn, *Forest Policy and the Quincy Library Group*, in Ronald D. Bunner et al., FINDING COMMON GROUND: GOVERNANCE AND NATURAL RESOURCES IN THE AMERICAN WEST 159 (2002).

235. See Miller & Aplet, *supra* note 46, at 375-79; Marc D. Meyer et al., *Structure, Diversity, and Health of Sierra Nevada Red Fir Forests with Reestablished Fire Regimes*, 28 INT'L J. WILDLAND FIRE 386 (2019); Michael S. Hand et al., *Examining Heterogeneity and Wildfire Management Expenditures Using Spatially and Temporally Descriptive Data*, 22 J. FOREST ECON. 80, 80-82 (2016).

236. Where the Service has studied population trends in place, the findings have been alarming. With more than twenty-five years of experience in the Northwest Forest Plan, a single large fire in the planning area in 2002 and continued interspecific competition from another owl species unraveled the reserve strategy for protecting northern spotted owls. See Spies et al., *supra* note 232, at 187; Katie M. Dugger et al., *The Effects of Habitat, Climate, and Barred Owls on Long-term demography of Northern Spotted Owls*, 118 CONDOR 57 (2016) (estimating 3.8% per year declines range-wide from 1985-2013).

237. See Elizabeth Kalies & Larissa L. Yocum Kent, *Tamm Review: Are Fuel Treatments Effective at Achieving Ecological and Social Objectives? A Systematic Review*, 375 FOREST ECOLOGY & MGMT. 84, 94 (2016) (“Despite millions of dollars spent annually on fuel treatments, and despite the general consensus that fuel treatments are indeed effective, there is surprisingly little data on fuel treatment effectiveness in North America, especially as it relates to outcomes other than overstory and fire behavior.”).

(WUI),²³⁸ mandatory reforestation,²³⁹ or fuel treatment effectiveness,²⁴⁰ bare statistical associations have stood in for causal knowledge and the effects of this approach on understanding and prediction are becoming clear. Forestry claims of this kind invite their own rejection in today's political climate, and they invariably elicit mixed results. Of course, as is true of NEPA,²⁴¹ the *threat* of judicial review keeps an edge. So as carbon storage rises as an objective on the NFS and rapidly expanding timber production looms,²⁴² how biotic and community diversity can be maintained amidst threats from fire, climate, and multiple use will remain a troubled intersection. Without knowing much more about the interacting causes and effects of fire, reforestation, or biotic relationships, few alternatives can be *foreclosed* by the scientific evidence or the statutory constraints because few *necessary* incompatibilities can be proven.²⁴³

Today, as the bulk of the reported cases challenging Service management choices involve fire restoration and/or fuel reductions, usually in older forests,²⁴⁴ deep uncertainties and old antipathies are leaving stakeholders and other participants

238. See Jack D. Cohen, *Preventing Disaster: Home Ignitability in the Wildland Urban Interface*, 98 J. FORESTRY 15 (2000) (arguing that WUI losses to wildfire are not caused solely by fire but by fire and a failure to build appropriately in fire prone areas).

239. Cf. North et al., *supra* note 136, at 213 (noting that harvesting and regeneration should emulate natural disturbance regimes but that doing so amidst rapidly shifting climate patterns may be impossible).

240. Cf. Agee & Skinner, *supra* note 11, at 92-93 (noting that if treatments are small and scattered or long intervals elapse between treatments, they will be less effective at reducing fuel loads).

241. Cf. TAYLOR, *supra* note 30, at 267 (“[E]ven though the rules found in the case law are rather general, the courts do more than they say they do. As judges have become more concerned with limiting unreviewable administrative discretion . . . the agencies have had to worry more about unreviewable judicial discretion.”).

242. See Kenneth E. Skog et al., *Desirable Properties of Wood for Sustainable Development in the Twenty-first Century*, 72 ANN. FOREST SCI. 671, 675-76 (2015) (noting that carbon sequestration factoring would create significant new demand for structural timber); see Theodore Wegner et al., *Uses and Desirable Properties of Wood in the 21st Century*, 108 J. FORESTRY 165, 172 (2010) (same).

243. Cf. Ryan, *supra* note 221, at 445-48 (noting how frequently challenges to fishery management optimizing are filed and lost and explaining that challengers sue in proportion to their own degrees of desperation).

244. See, e.g., *Kettle Range Conservation Group v. U.S. Forest Serv.*, 148 F. Supp. 2d 1107, 1121-22 (E.D. Wash. 2001); *League of Wilderness Def. v. Forsgren*, 184 F. Supp. 2d 1058, 1064-65 (D. Or. 2002); *Sierra Club v. Eubanks*, 335 F. Supp. 2d 1070, 1073-75 (E.D. Cal. 2004); *Cascadia Wildlands Project v. Goodman*, 393 F. Supp. 2d 1041, 1045 (D. Or. 2004); *Utah Env't Cong. v. Bosworth*, 439 F.3d 1184, 1187-88 (10th Cir. 2006); *League of Wilderness Def. v. U.S. Forest Serv.*, 445 F. Supp. 2d 1186, 1191-92 (D. Or. 2006); *Earth Island Inst. v. U.S. Forest Serv.*, 442 F.3d 1147, 1153-56 (9th Cir. 2006); *Ecology Ctr. v. U.S. Forest Serv.*, 451 F.3d 1183, 1187-88 (10th Cir. 2006); *Utah Env't Cong. v. Bosworth*, 443 F.3d 732, 736-39 (10th Cir. 2006); *League of Wilderness Def. v. Brooks Smith*, 491 F. Supp. 2d, 983-84 (D. Or. 2007); *Utah Env't Cong. v. Troyer*, 479 F.3d 1269, 1274-80 (10th Cir. 2007); *Decker v. U.S. Forest Serv.*, 780 F. Supp.2d 1170, 1172-74 (D. Colo. 2011); *Sierra Forest Legacy v. Sherman*, 951 F. Supp.2d 1100, 1104-05 (E.D. Cal. 2013); *Friends of the Wild Swan v. Weber*, 767 F.3d 936, 940-42 (9th Cir. 2014); *All. for the Wild Rockies v. Pena*, 865 F.3d 1211, 1215-16 (9th Cir. 2017); *Native Ecosystems Council v. Marten*, 883 F.3d 783, 792-96 (9th Cir. 2018); *All. for the Wild Rockies v. U.S. Forest Serv.*, 907 F.3d 1105, 1112-16 (9th Cir. 2018).

with a sense of process overload and gridlock.²⁴⁵ We must and can, however, make these laws into more than they have been. Part IV charts a path to renovating this legal legacy.

IV. THE NFS STATUTES AS PUBLIC LAW: FOR INTERPRETIVE FIDELITY

Legal theorists' interest in legislation runs deep.²⁴⁶ Bentham first observed that statutes can take forms beyond the familiar modal imperatives of forbidding, permitting, and requiring.²⁴⁷ They can, for example, *delegate* the authority to make law.²⁴⁸ Delegation endows another authority,²⁴⁹ but if it does so without constraint questions about the validity of such authority will arise.²⁵⁰ This remains true today, even in the wake of centuries of delegation.²⁵¹ Section A explains the necessity and propriety of finding and following legislative intent within every delegation, while Section B isolates and highlights that intent within our NFS statutes.

245. See Matthew McKinney, *Whither Public Participation in Federal Land Management? Replicating Homegrown Innovations in Shared Problem Solving*, 48 ENV'T L. REP. 10015, 10017-18 (2018); Squillace, *supra* note 117, at 434-47.

246. See Jeremy Bentham, *Of Laws in General* (1775), in THE COLLECTED WORKS OF JEREMY BENTHAM (Athlone Press 1970); JOHN AUSTIN, LECTURES ON JURISPRUDENCE 219-342 (Robert Campbell ed., 1885). More recently, legislation in legal theory has been understood from the perspective of the judge(s) who must figure it into contested cases. See, e.g., RONALD DWORKIN, LAW'S EMPIRE 313-54 (1986).

247. See H.L.A. HART, ESSAYS ON BENTHAM: JURISPRUDENCE AND POLITICAL THEORY 105-26 (1982) (recounting Bentham's view that law is, as an expression of the lawmaker's will or volition, dependent upon a "logic of the will" unique to imperative descriptions). Importantly, Bentham also noticed that laws can offer rewards for conduct desired as well as punishing conduct to be deterred. *Id.* at 118 (describing "praemiary" or "invitative" laws as expressions of the lawmaker's volition similar to other modal forms).

248. See Thomas W. Merrill, *Rethinking Article I, Section 1: From Nondelegation to Exclusive Delegation*, 104 COLUM. L. REV. 2097 (2004).

249. See Peter H. Aronson et al., *A Theory of Legislative Delegation*, 68 CORNELL L. REV. 1, 4-5 (1982) (linking attacks on delegation by Locke, Montesquieu, and Madison to this basic fact).

250. See *id.* at 7-21; THEODORE J. LOWI, THE END OF LIBERALISM: THE SECOND REPUBLIC OF THE UNITED STATES 94-126 (2d ed. 1979); Edward L. Rubin, *Law and Legislation in the Administrative State*, 89 COLUM. L. REV. 369, 380-85 (1989); JERRY L. MASHAW, GREED, CHAOS, AND GOVERNANCE: USING PUBLIC CHOICE TO IMPROVE PUBLIC LAW 1-29 (1997).

251. See Merrill, *supra* note 248, at 2117 (reviewing a range of interpretations of Article I and its consistency with several forms of delegated authority); Aronson et al., *supra* note 249, at 7-17 (reviewing judicial precedents construing Article I's control of delegation). Of course, if an interpreter claims its *own* authority independent of the legislation, then it may not be the legislature's "agent," proper. See FRANK B. CROSS, THE THEORY AND PRACTICE OF STATUTORY INTERPRETATION 3 (2009). Indeed, that interpreter may come to *rival* the legislature's agent. Cf. *Chevron v. Nat. Res. Def. Council*, 467 U.S. 837, 843 n.9 (1984) ("The judiciary is the final authority on issues of statutory construction and must reject administrative constructions which are contrary to clear congressional intent. If a court, employing traditional tools of statutory construction, ascertains that Congress had an intention on the precise question at issue, that intention is the law and must be given effect.").

A. From 'Text v. Intent' to Original Public Meaning

The interpretive problem has twin aspects. First, linguistic meaning is under-determinative. The raw semantic content of a text is too often insufficient to establish its meaning. Second, the institutional context of the average legislature undermines our standard means of clarification: resort to author *intentions*.²⁵² As Dean John Manning once put it, “[i]t is impossible to find the ‘will,’ ‘design,’ ‘intent,’ or ‘mind’” of 100 senators, 435 representatives and a president—three distinct institutions—without making “*some* value judgment about what should count as that legislature’s intended decision and why.”²⁵³ And value judgments there may be: linguistic intuitions, semantics, and other tools rooted in the mechanics of language are often inadequate.²⁵⁴

Although it may be fundamentally unsound to identify the legislature’s intent with the intentions or expectations of its members,²⁵⁵ that is not the last word. For intention is intrinsically a part of a collective act like legislating.²⁵⁶ Legislators

252. “Speaker meaning” touches stubborn philosophical questions. See SCOTT SOAMES, *PHILOSOPHY OF LANGUAGE* 10-20 (2010) (explaining the philosopher Gottlob Frege’s foundational distinction between sense and reference and several logical contradictions that emerge where speaker meaning can depart from literal propositional content). Statutes authored by an internally plural author like Congress, though, clearly are texts with a context. See ROBERT A. KATZMANN, *JUDGING STATUTES* 13-16 (2014); DWORKIN, *supra* note 246, at 318-27, 338.

253. John F. Manning, *Without the Pretense of Legislative Intent*, 130 HARV. L. REV. 2397, 2431 (2017); see also Max Radin, *Statutory Interpretation*, 43 HARV. L. REV. 863, 870-71 (1930); DWORKIN, *supra* note 246, at 314-17.

254. Compare Richard H. Fallon, Jr., *The Statutory Interpretation Muddle*, 114 NW. U. L. REV. 269, 311-21 (2019) (arguing that, in the gap that arises between linguistic intuitions and well-reasoned linguistic judgments, legislation’s interpreters should have recourse to moral and political values tracking those of the legislature that authored the legislation), with WILLIAM N. ESKRIDGE, JR., *DYNAMIC STATUTORY INTERPRETATION* 1-47 (1994) (arguing that textualism fails as a “foundational, constraining methodology,” as does intentionalism and purposivism, and that “the consequences of accepting one interpretation over another” must factor into any proper statutory analysis).

255. A noted critique of aggregating individuals’ views or expressions is Radin, *supra* note 253; see also Kenneth A. Shepsle, *Congress Is a ‘They,’ Not an ‘It’: Legislative Intent as Oxymoron*, 12 INT’L REV. L. & ECON. 239 (1992); GUIDO CALABRESI, *A COMMON LAW FOR THE AGE OF STATUTES* 87 (1982) (arguing that the Hart and Sacks legal process school’s “main line” was that “[l]egislative intent—if we are to be honest with ourselves—rarely exists in any unambiguous way”). Much more recent scholarship has sought to redeem the notion of legislative intent against the dismissals by judges and commentators following Radin. See, e.g., Daniel A. Farber & Philip P. Frickey, *Legislative Intent and Public Choice*, 74 VA. L. REV. 423 (1988); Lawrence Solan, *Private Language, Public Laws: The Central Role of Legislative Intent in Statutory Interpretation*, 93 GEO. L.J. 327 (2005); RICHARD EKINS, *THE NATURE OF LEGISLATIVE INTENT* (2012); VICTORIA NOURSE, *MISREADING LAW, MISREADING DEMOCRACY* (2016).

256. Cf. Ryan D. Doerfler, *Who Cares How Congress Really Works?*, 66 DUKE L.J. 995-999 (2017) (arguing that “[s]tatutory interpretation as practiced involves widespread attribution of legislative intent” likely because “the Constitution refers to Congress as a *single body* as opposed to a collection of individuals”); Henry S. Richardson, *Democratic Intentions*, in *DELIBERATIVE DEMOCRACY: ESSAYS ON REASON AND POLITICS* 349, 354-57 (James Bohman & William Rehg eds., 1997) (arguing that seeking and entrenching reasonable compromises among multiple competing ends held by those deliberating with each other presupposes a shared intention to project whatever volition results).

share a common agency organized around rules and plans for realizing that agency.²⁵⁷ Shared agency, we have come to understand, consists to a great extent in joint intentions.²⁵⁸ But *which* joint intentions are either necessary or sufficient to constitute the kind of shared agency we rightly ascribe to legislators?²⁵⁹

First, and not surprisingly, to act in a legislative capacity is to act to prescribe law.²⁶⁰ Legislation is, in this sense at least, *volitional*.²⁶¹ Everywhere legislatures exist they serve a need to make or to change the law.²⁶² Plans, subplans, and precursory actions can precede action prescribing law, certainly.²⁶³ But making

257. Cf. NOURSE, *supra* note 255, at 135-60 (arguing that group agency in a legislature may be inferred from its group actions, which are taken by means of internal procedures, and evidence of decisions that comprise those actions); EKINS, *supra* note 255, at 219 (“The defining end of the assembly is the exercise of legislative capacity, which is to be in a fit state to legislate on particular occasions for the common good.”); JEREMY WALDRON, LAW AND DISAGREEMENT 69-87 (1999) (arguing that legislators do not speak to each other as conversationalists but rather as representatives, that their numerosity and diversity necessitate rules of order, and that voting for or against word-for-word texts is the most practical means of decision).

258. See MARGARET GILBERT, ON SOCIAL FACTS 408-16 (1989) (arguing that “[i]t is logically necessary and sufficient for the existence of collectives that each of a set of individuals volunteer” his or her “will (*voluntas*, in Latin)” and manifestly cause the “meshing” of those wills which jointly constitute the plural subject).

259. Cf. BRIAN BIX, LAW, LANGUAGE AND LEGAL DETERMINACY 183-89 (1993) (arguing that adapting the “talk” of intention regarding individuals to legislatures as collectives formed for the purpose of making law is not as difficult as many legal theorists have made it seem). Waldron’s original contribution to the theory of legislative choice defends the use of majority voting against deliberativists’ charges of irrationality with what he calls “the prospect of persisting disagreement.” See JEREMY WALDRON, THE DIGNITY OF LEGISLATION 153 (1999). “[O]ur common basis for action in matters of justice has to be forged in the heat of our disagreements, not predicated on the assumption of a cool consensus that exists only as an ideal.” *Id.* at 155.

260. Hart’s renewal of Bentham’s account of the lawmaker’s *volition* has been both illuminating and influential. See GERALD J. POSTEMA, BENTHAM AND THE COMMON LAW TRADITION 256-62 (1986). From Bentham and Hart there emerged a now conventional distinction between the common law’s judge, whose office was not to make but to expound the law as a dynamic, constantly changing organic social entity, and that judge’s counterpart—the legislator. See *id.* at 3-80.

261. See Radin, *supra* note 253, at 876-78. Purposes, of course, are often spelled out in the statute itself. See Jarrod Shobe, *Enacted Legislative Findings and Purposes*, 86 U. CHI. L. REV. 669 (2019). See also *id.* at 724 (“Enacted findings and purposes are often the most accurate reflection of the legislative background and Congress’s intent and purposes . . .”). Still, an ascribed purpose can be no excuse to ignore legislation’s selection of ends, means, and specific phrasings. See John F. Manning, *The New Purposivism*, 2011 SUP. CT. REV. 113, 148-50 (2011). But a text can do *no more* than set boundaries on its own interpretation. See AAHRON BARAK, PURPOSIVE INTERPRETATION IN LAW 17-20 (2005) (categorically excluding the purpose or point of legislative action from its interpretation, thus, seems unsound).

262. See EKINS, *supra* note 255, at 113 (“Rational lawmaking is action to change the law in specific ways for (what the legislature takes to be) good reasons.”); WALDRON, LAW AND DISAGREEMENT, *supra* note 257, at 76 (“Many political scientists have noted the remarkable similarity in parliamentary procedures around the world. . . . [T]he similarity can . . . be understood as a common human response to a similar set of problems: the circumstances of procedure, so to speak.”).

263. As Waldron observes, in real legislatures these, too, are typically text-oriented acts and communication. See WALDRON, *supra* note 257, at 69-87.

or changing the law, and perhaps even doing so for (what the legislators take to be) *good reasons*, is the point of acting legislatively.²⁶⁴

Second, shared intentions *may*, notwithstanding the skepticism, amount to legislative intent.²⁶⁵ As Margaret Gilbert, Michael Bratman, and others' work on shared cooperative activity demonstrated, groups of people clearly *can* share intentions.²⁶⁶ It is more an empirical question of *when* their interlocking intentions emerge and sustain cooperative activity than whether they ever do. Furthermore, the prospect of "strategic" action is no more a challenge in the legislature than anywhere else,²⁶⁷ and sincerity seems much more the norm in any event.²⁶⁸

Third, it is at least *possible* that legislative action has a common meaning for those authoring it.²⁶⁹ If it has a common meaning, of course, it is at least more likely to elicit shared intentions (and votes) for or against.²⁷⁰ Several legislation scholars have shown how Congress's procedural norms and internal divisions of labor enable its members to grasp and to respond to such meaning and to make their own elections that either advance or defeat cooperation.²⁷¹ Individual intentions that interlock with

264. See EKINS, *supra* note 255, at 247-49; WALDRON, *supra* note 257, at 84-86, 129-42; KATZMANN, *supra* note 252, at 11-22 (explaining Congress's internal organization and delegation of roles to staff and committees in terms of organizing to legislate intentionally); see also James N. Landis, *A Note on "Statutory Interpretation,"* 43 HARV. L. REV. 886, 888-90 (1930) (same) (response to Radin).

265. Cf. NOURSE, *supra* note 255, at 142-53 (rejecting the "intent-as-state-of-mind" tradition and arguing that intent may be inferred from joint actions, taken sequentially and from feedback, that yield a group outcome); Larry Alexander, *All or Nothing at All? The Intentions of Authorities and the Authority of Intentions*, in LAW AND INTERPRETATION: ESSAYS IN LEGAL PHILOSOPHY 357, 360-63 (Andrei Marmor ed. 1995). It is worth noting that "minimalist intention" accounts posit that legislative *supremacy*—legislators controlling the law they prescribe—*requires* at least some residuum of intent. See, e.g., Joseph Raz, *Intention in Interpretation*, in THE AUTONOMY OF LAW: ESSAYS ON LEGAL POSITIVISM 249, 267 (Robert P. George ed., 1996); Frank H. Easterbrook, *The Role of Original Intent in Statutory Construction*, 11 HARV. J.L. & PUB. POL'Y 59 (1988). That form of intention, though, is little more than legal fiction. See Doerfler, *supra* note 256, at 1022-31 (describing a minimalist, fictional intent derived from context and "objectified" intent).

266. See, e.g., Michael E. Bratman, *Shared Intention*, 104 ETHICS 97, 108-12 (1993); Michael E. Bratman, *Shared Cooperative Activity*, 101 PHIL. REV. 327 (1992); GILBERT, *supra* note 258.

267. See André Blais & Arianna Degan, *The Study of Strategic Voting*, in THE OXFORD HANDBOOK OF PUBLIC CHOICE 292 (Roger D. Congleton et al. eds., 2018).

268. See Blais & Degan, *supra* note 267.

269. See Solan, *supra* note 255, at 442-49; BIX, *supra* note 259, at 188; Joseph Raz, *Interpretation Without Retrieval*, in LAW AND INTERPRETATION: ESSAYS IN LEGAL PHILOSOPHY 155, 156-72 (Andrei Marmor ed., 1995).

270. Even leading legislation scholars have mistakenly inferred that because legislative intent is often "unknowable," it is therefore practically irrelevant. See, e.g., ESKRIDGE, *supra* note 254, at 16-25. But we need not commit to such fallacies. It is possible that some legislation has shared intentions backing it while some does not. As Alexander put it, "the price of denying the facticity of intentions is quite high." Alexander, *supra* note 265, at 379. Without it, "there is nothing but the norms and beliefs of the interpreter to determine what ought to be done at any later time, norms and beliefs that themselves cannot be projected authoritatively into the future." *Id.*

271. See, e.g., Sitamaran, *supra* note 66, at 119-24; Jarrod Shobe, *Intertemporal Statutory Interpretation and the Evolution of Legislative Drafting*, 114 COLUM. L. REV. 807, 843-47 (2014); Gluck & Bressman, *supra*

one another to form such unities should be little mystery.²⁷² By their (cooperative) actions sequencing the process in which a legislative chamber receives a bill from its committee, debates it, votes it up or down, and reconciles its bill with that of its sibling chamber, legislators form interlocking intentions to take joint action.²⁷³ Members of the legislature so acting share a joint, interlocking intent to prescribe law pursuant to the standing rules of procedure.²⁷⁴ A legislature that persists over time and prescribes laws in sequence, as happened with the NFS statutes, is one that has repeatedly defied strong forces tending toward inaction and/or deferment.²⁷⁵

Finally, legislation's dependence on natural language instead of formal logic or algorithm often puts interpreters to imperfect tools.²⁷⁶ But as projections of volition, it is always *possible* that statutes contribute to some bigger whole.²⁷⁷ Understanding such volitions is an unavoidably humanistic task. Texts on human planning are easily misconstrued. But can the NFS statutes mean something today

note 171, at 793-97; CROSS, *supra* note 251, at 58-84; John C. Roberts, *Are Congressional Committees Constitutional? Radical Textualism, Separation of Powers, and the Enactment Process*, 52 CASE W. L. REV. 489, 553-67 (2001); KREHBIEL, *supra* note 80, at 264 (concluding that legislators specialize and acquire expertise not because it is a common good but because it is in their enlightened self-interest to do so).

272. See EKINS, *supra* note 255, at 220 ("The particular intention of the group is the intention on which it acts in any particular legislative act, which is both that for which its act—changes in the law that are means to valuable ends—and the plan it adopts to introduce those changes—a complex set of meanings that expresses a complex set of propositions."); see also Richardson, *supra* note 256, at 366-75 (arguing that legislators' proposals and the willingness inherent therein, combined with the mutual agreements they achieve in the legislative process, must create a correspondence of intention to will that which is prescribed by the resulting law).

273. Ekins, building from Bratman's work, understands group intention as consisting in these interlocking joint intentions. See EKINS, *supra* note 255, at 52-57.

274. See *id.* at 219-22. "[I]ts purpose is to exercise voluntary control over the law and thus to legislate to change the existing set of legal propositions when there is good reason to do so." *Id.* at 219.

275. Cf. WALDRON, DIGNITY, *supra* note 259, at 134 ("In politics . . . cohesion is not given; rather it is established in large part by the behavior of the members of the body in question. The very people who are exhorted (a) to abide by the majority view are also the ones who are exhorted (b) not to secede and to do their part to hold the body together."); MICHAEL BRATMAN, INTENTION, PLANS AND PRACTICAL REASON 166-67 (1987) (suggesting that planning and deontological constraints serve similar functions in practical reasoning over time).

276. See, e.g., *Gen. Dynamics Land Sys., Inc. v. Cline* 540 U.S. 581, 591-94 (2004) (deriving an "idiomatic sense of the statutory phrase" prohibiting discrimination on the basis of age from, among other things, legislators' declared intentions to target certain forms of discrimination but not others); *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 184 (1978) (observing that the Court's recourse to legislative history and other "background," though not "necessary" because of the statute's clear phrasing, was useful to meet objections that the results would be "absurd").

277. Cf. *King v. Burwell*, 576 U.S. 473, 497-98 (2015) (Roberts, C.J.) (quoting *Palmer v. Massachusetts*, 308 U.S. 79, 83 (1939)) (noting that "[r]eliance on context and structure in statutory interpretation is a 'subtle business, calling for great wariness lest what professes to be mere rendering becomes creation and attempted interpretation of legislation becomes legislation itself,'" but that such reliance was warranted in interpreting the Affordable Care Act); *Toyota Motor Mfg. v. Williams*, 534 U.S. 184, 197-98 (2002) (interpreting operative provisions of the Americans with Disabilities Act in light of Congress's enacted findings); *Sutton v. United Air Lines, Inc.*, 527 U.S. 471, 484 (1999) (same).

(or tomorrow) that they have not yet been thought to mean? As the Supreme Court recently explained in *Bostock v. Clayton County*,²⁷⁸ the Court

normally interprets a statute in accord with the ordinary public meaning of its terms at the time of its enactment. After all, only the words on the page constitute the law adopted by Congress and approved by the President. If judges could add to, remodel, update, or detract from old statutory terms inspired only by extratextual sources and our own imaginations, we would risk amending statutes outside the legislative process reserved for the people's representatives. And we would deny the people the right to continue relying on the original meaning of the law they have counted on to settle their rights and obligations.²⁷⁹

This may sound like simple positivism directing courts to find the meaning of legislation, not of legislators.²⁸⁰ But note that this “original public meaning” forecloses the special senses that may attach to legislated texts.²⁸¹ Textualism’s near hegemony in the federal courts is being amended here. The interpreter’s “best inference” about what was intended is to be determinative, even where it “departs from what is in fact the legislative intent,”²⁸² for there is no other way to *interpret* a whole statute without *authoring* one.²⁸³ A whole enactment will characteristically record the parent chamber’s range and variation, whether justiciable or not, and whether key legislators spoke to the issue or not.²⁸⁴ As we have noted, the cases

278. 140 S. Ct. 1731 (2020).

279. *Id.* at 1738-39.

280. *Cf.* Manning, *supra* note 261, at 696 (“The most basic interpretive premises of textualism do not contradict, and in fact fit tightly with, core positivist assumptions about interpretation.”); Fallon, *supra* note 259, at 289-94.

281. *Cf.* Doerfler, *supra* note 256, at 1028 (“Much like textualists, original-public-meaning originalists . . . rely upon the notion of ‘conventional’ meaning to a greater extent than is, perhaps, warranted.”); ESKRIDGE, *supra* note 259, at 13-14 (opposing “statutory archeology” of hidden legislative intentions to “dynamic interpretation” grounded in the present).

282. EKINS, *supra* note 255, at 247.

283. *See* Solan, *supra* note 255, at 480; *see also* Doerfler, *supra* note 256, at 1023-24, 1022 n.227 (arguing that interpretive approaches assuming “reasonable legislators” leave open a range of discretionary choices but that a fictional “objectified intent” is the only way to supplant such choices); Raz, *supra* note 20, at 321 (noting that “innovative interpretations” show a text in a new light and cannot be dismissed simply on the ground that it does not explain existing meanings, but may be dismissed for failing to account for the features of the text); Lawrence Lessig, *Fidelity in Translation*, 71 TEX. L. REV. 1165, 1174-82 (1993) (arguing that contextualization involves identifying an author’s unarticulated presuppositions as opposed to imposing one’s own).

284. *See* Shobe, *supra* note 266, at 712-13 (arguing that fidelity to Congress requires interpreting enacted findings and purpose statements as part of the “whole enactment” being construed); Gluck & Bressman, *supra* note 171, at 771 (concluding that drafting professionals interviewed generally seek to

pressed in the federal courts surrounding the NFS statutes have been defined as much or more by that forum's limits as by the statutes. In that light, the record explained above shows that comparatively little has been decided about Congress's intentions for the system as a whole. Yet it is this systemic whole that would repay renewed attention in myriad ways.

B. *A Compositional Turn: Making Sense of Parts and Wholes*

How should we make the best sense of the NFS statutes? To do so, we should settle the public meaning of their texts in the context of Congress's *whole expressed volition*. The parent chambers' average legislators would have understood the various bills that became the NFS statutes as aiming for something compositional—coherent and integral. The archaeology²⁸⁵ of various insiders' thoughts on clearcutting, multiple use, or ecosystems, thus, should yield to understanding and explaining a whole enterprise aimed, quite simply, at the Forest Service's and our deliberate collective improvement sustained over time.

Recall that the parent chambers then, as now, included only a small minority of members with *local* interests in NFS land use while many more members would have taken more diffuse interests in the whole NFS of the present and future.²⁸⁶ Assuming Congressional choices to delegate reflect some mix of interest alignment and opportunities for correction,²⁸⁷ as agents of the parent chamber committees reflect their members' interests and information—and also how those may differ from that of the parent chamber.²⁸⁸ Committees, in other words, are never necessarily acting at their parent chamber's behest. In our case, the whole Congress was almost certainly concerned more with the NFS's total productivity and

encode restraints in statutory delegations to agencies so as to reflect the range of concerns voiced in Congress).

285. See ESKRIDGE, *supra* note 259, at 275 (describing and rejecting an “archeological approach” to legislative intent); cf. Strauss, *supra* note 53, at 253 (describing statutes’ “political history,” knowledge of which can make the judiciary a more reliable agent and less given to the interpretive mistakes rooted in adjudicating particular cases).

286. See *supra* notes 85-87 and accompanying text.

287. See EPSTEIN & O'HALLORAN, *supra* note 90, at 14-33; KREHBIEL, *supra* note 80, at 105-17; SHEPSLE, *supra* note 89, at 240-61; Aronson et al., *supra* note 249, at 37-62. An informational account of this mix stresses the inducements needed for an agent to be *informative* to the parent chamber. See KREHBIEL, *supra* note 80, at 7-22. Distributional accounts, by contrast, stress that delegations occur only where members expect to gain more than they lose from delegating and, as Epstein and O'Halloran showed, “two agent models” that consider delegations to *more than one agent* tend to raise many more possibilities than any single agent along that front. See EPSTEIN & O'HALLORAN, *supra* note 89, at 232-36. We may remain neutral as between informational and distributional accounts and still recognize an expressed volition in the NFS statutes preferring the Service's pursuit of its constrained optimization be more transparent to Congress and that it be more successful than it had been to 1974.

288. See *supra* notes 90-92 and accompanying text.

budgetary consequences than with particular units' local optimizing.²⁸⁹ Finally, consider how our partisan divisions have left Congresses today—throwing money at uncontrollable fires in WUI around the West and finding that timber, no longer the dominant commodity, may soon again be a dominant concern.²⁹⁰

Scholars reconsidering the litigable stakes that animated debate in the 93rd, 94th, or 95th Congresses' committees²⁹¹ have, wittingly or not, obscured many of the public interests bundled within the statutes as a whole.²⁹² They ignored Congress's repeated demands for a more urgent pursuit and use of *knowledge*.²⁹³ They have ignored the centrality of that knowledge (and of money) to constrained optimizations at scale.²⁹⁴ The Service's challengers have ignored the Program's layered assessments of NFS (and other) renewable resources and how broadscale data of the kind *could* inform real performance-based constraints.²⁹⁵ These advocates have had no answers

289. See *supra* notes 93-94 and accompanying text; cf. Eskridge, *supra* note 88, at 288-89 (arguing that legislation is unlikely to result wherever there is too little "demand" from constituencies needed to overcome the forces favoring inaction); Roberts, *supra* note 276, at 565 (considering the 1974 Budget Act and its diversion of authority to budget committees and their communications through reports); cf. EPSTEIN & O'HALLORAN, *supra* note 89, at 236 ("When committees are seen as less reliable agents for the floor, rational legislative actors can choose to shift more policy-making authority to the executive, checking both wayward committees and bureaucrats alike by shifting the locus of decision-making authority from one to the other."). Budgetary consequences were of more immediate concern to most members of the 93rd, 94th, and 95th Congresses than land uses in the national forests. See *supra* notes 93-94. Maximizing total productivity may have been more uncertain but was likely no less important. Because the nation's welfare weighs so heavily in any total assessment of renewable resources, future productivity *may* require that present resource consumption—local or otherwise—not prejudice later uses of the same resources.

290. See *supra* notes 7-12 and accompanying text.

291. Cf. CLARY, *supra* note 64, at 192 (calling the FRRRPA and NFMA "a compromise between forces that supported the widest possible latitude in forestry practices and others that desired highly prescriptive legislation for the national forests").

292. For example, Wilkinson and others understandably keyed on the struggle between a short list of characters in the Senate in explaining the path to Pub. L. No. 94-588. See WILKINSON & ANDERSON, *supra* note 59, at 85-90; Cheever, *supra* note 59, at 635-44. Yet it was a conference of both houses that fashioned the final bill. Further, out of thirty-five reconciliations, the House bill supplied the provision fourteen times to the Senate bill's twelve, with eight compromises and another for an agreed-upon name. See H.R. Rep. 94-1735 (1976) (Conf. Rep.). Notably, the full Senate voted to approve the Conference Report without it having been made available to members! See 122 CONG. REC. 33834, 33837 (1976) (Conf. Rep.) (Senator Randolph remarking that "Members have not been provided with the conference report and do not have the benefit of the language therein" immediately prior to vote).

293. See *supra* notes 146-50, 153 and accompanying text.

294. Cf. LE MASTER, *supra* note 17, at 151-52 (noting significant increases in Forest Service's appropriations following enactment of FRRRPA and NFMA and submission of first RPA report through fiscal years 1976-81). Optimization can be "local" or "global." Where the former pursues narrower, more immediate goals, the latter pursues broader, more encompassing goals. See Michael Byron, *Satisficing and Optimality*, 109 ETHICS 67, 75-81 (1998). Local optimizing for some narrower goals may be inconsistent with global optimizing toward encompassing goals and thus may raise doubts about any given choice's rationality. *Id.*

295. O'Toole's noted attack on below-cost NFS timber sales, for example, focused on the costs of reforestation, road building and maintenance, soil mitigation, etc. See O'TOOLE, *supra* note 18, at 26-37.

for the epistemic traps ecosystem ecology has set for generations of investigators.²⁹⁶ They commandeered Congress's favored escape valve, the Wilderness Act, yet dismissed audited self-regulation as the solution Congress turned to in facing its compound dilemma on the NFS. Finally, fire as a systemic threat to community diversity, wildlife, timber, and stored carbon can find no urgency in their renditions of Congress's intentions for the NFS.

Imagine a collective aim to optimize *this* whole. If we were choosing metaphors, the NFS statutes have been understood thus far as a *menu* of weak, backward facing constraints arrayed about an original main course in timber.²⁹⁷ From its first rulemakings implementing the statutes in 1979²⁹⁸ and 1982²⁹⁹ to its overhaul thereof in 2012,³⁰⁰ the Forest Service has done the same. The better metaphor, though, is the *recipe*. Recipes succeed or fail because of their ingredients' *interactions*

And although he also noted that such planned sales were *irrational* for failing to take account of the decadal assessment data within the relevant forest, *see id.* at 174-76, his ultimate prescription was for the Service to return to its decentralized roots to "make the agency more responsive to public demand and changing tastes," *id.* at 194, as if those local tastes should be controlling. The decadal assessments, however, are ultimately a tool of broader accountability. The Congresses that demanded their creation were surely more concerned with the information's availability to *subsequent Congresses*. Finally, the soundness of prescribed reforestation regardless of local conditions has grown increasingly doubtful. *See* North et al., *supra* note 136, at 219.

296. *See supra* notes 148-50 and accompanying text.

297. *See supra* notes 115-25 and accompanying text.

298. *See* National Forest System Land and Resource Management Planning, 44 Fed. Reg. 53,928 (1979). The 1979 final rule cannily responded to the NFS statutes' demands with discrete elements for every unit level plan. *See id.* at 53,976-92. Unfortunately, each of the elements was itself couched either in permissive terms or as a localized optimization. *See, e.g., id.* at 53,990 (setting forth final 36 C.F.R. § 219.13, establishing "[m]anagement standards and guidelines" with modal operators and quantifiers limiting Forest Service responsibilities to efforts and/or planning deliverables, not outcomes).

299. *See* National Forest System Land and Resource Management Planning, 47 Fed. Reg. 43,026 (1982). As in 1979, the 1982 revision set out unit-level deliverables and plan elements, this time in a form that would endure long enough to shape every unit's plan across the system. But again, the rule listed a series of content requirements, process steps, and optimizations subject to multiple explicit practicability limits. *See id.* at 43,038-52. Tellingly, there were no comments on proposed § 219.15, "[r]esearch," which was finalized as proposed. *Id.* at 43,036.

300. *See* National Forest System Land Management Planning, 77 Fed. Reg. 21,162 (2012). Though advanced in several respects and much more detailed, the 2012 rule resembled its predecessors structurally. It required that every LRMP "provide for social, economic, and ecological sustainability," *id.* at 21,264, further specifying that obligation by way of dozens of required "plan components" and "provide for's." *See id.* at 21,204-07. It specified "timber requirements based on the NFMA," *id.* at 21,224, "diversity of plant and animal communities" prerequisites, *id.* at 21,212-19, and a requirement that every plan "must provide for ecosystem services and multiple uses." *Id.* at 21,219 (explaining § 219.10). Finally, the principal innovation of the 2012 rule, its detailed subsection on monitoring, maintains a similar posture and requires that monitoring programs fulfill several prerequisites. *See id.* at 21,228-38. It specifically states that the program "does not apply to projects or activities," 36 C.F.R. § 219.12(a)(7) (2020), and couches its eight enumerated monitoring questions as those which the monitoring program must "address." *Id.* at § 219.12(a)(4).

in shared space and timing.³⁰¹ Recipes often change over time out of necessity and knowing their intent can be vital to guiding that change constructively.³⁰²

Congress's recipe aimed to solve for the epistemic and coordination challenges entailed in overseeing a *constrained optimization* carried on continuously and in parallel at continental, regional, landscape, and local scales.³⁰³ The NFS statutes are best understood as setting expectations on the Service in how the whole system should be measured and managed. Congress declared in 1960 and again in 1976 that "sustained yield" of the NFS products and services was 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.*"³⁰⁴ Land productivity sits at the heart of the whole's sustenance. Still, most interpreters have overlooked the interactivity of this productivity's parts: planning, doing, and assessing at small, medium, and large scales.³⁰⁵ Congress's enacted findings in the statutes are one way to adduce its reasoning and fill such gaps.³⁰⁶ In reaching for temporal scales of decades and generations, Congress was intentionally nonspecific as to how local or national optima were to be defined or pursued in the face of non-complementary goals and persistent uncertainty. But keying on the statutes' individual provisions—and ideals the *whole* Congress probably did *not* share—obscures the expressed volition as well as the trends that are empirically obvious in retrospect: more fire, more wilderness,

301. Michael Dorf and Gary Lawson deserve credit for this metaphor. See Michael C. Dorf, *Recipe for Trouble: Some Thoughts on Meaning, Translation and Normative Theory*, 85 GEO. L.J. 2857, 1858 (1997) (responding to Lawson's metaphorical argument).

302. As Dorf says, recipes can be public or private, are adaptable to changes in prevailing ingredients and tastes, and can even be for a dish no one any longer wants! See *id.* at 1859-62.

303. These are, roughly, the scales at which Long Term Ecological Research (LTER) sites measure ecological dynamics and phenomena. See David R. Foster & John D. Aber, *Background and Framework for Long-Term Ecological Research*, in *FORESTS IN TIME: THE ENVIRONMENTAL CONSEQUENCES OF 1,000 YEARS OF CHANGE IN NEW ENGLAND*, 3, 17 (David R. Foster & John D. Aber eds., 2004) (describing 1, 10, 100, and 1,000 kilometer scales).

304. Pub. L. No. 86-517, § 4(b), 74 Stat. 215, 215 (1960) (emphasis added); see also Pub. L. No. 94-588, § 6(e)(1)-(2), 90 Stat. 2949, 2952 (1976).

305. Planning, doing, and assessing can be sequenced linearly or circularly. See Ralf Yorque et al., *Toward an Integrative Synthesis*, in *PANARCHY: UNDERSTANDING TRANSFORMATIONS IN HUMAN AND NATURAL SYSTEMS* 419 (Lance H. Gunderson & C.S. Holling eds. 2002); Carl J. Walters & C.S. Holling, *Large-Scale Management Experiments and Learning by Doing*, 71 *ECOLOGY* 2060 (1990). But as Walters and Holling argued 30 years ago, "[m]anagement experimentation is often meaningless in settings where no value is placed on the long-term utility of experimental results." *Id.* at 2062. Continued debate about local, regional, and continental optimization *without* employing what has been accrued from the statutes' 40+ operational years may be "meaningless." But it remains the norm.

306. Cf. Shobe, *supra* note 261, at 706 ("Enacted findings and purposes exist as a third, hybrid type of statutory text that is drafted by political staff yet is in form closer to legislative history. . . . If the goal of interpretation is to maintain legislative supremacy by relying on texts that are closest to those who are politically accountable, then courts should consider enacted findings and purposes more closely."); Crane, *supra* note 154, at 662 ("[F]actual findings by Congress may reveal Congress's reasons for adopting the statute and hence facilitate judicial review.").

and more WUI, new commodities (pellets, NTFPs, mass timber), new uncertainties (climate change, fuels), new lows (closing forests to the public), and proliferating judicial precedents.

Predictable budget demands, being *informationally efficient*, directing that the Service better resolve the when, where, and why of use incompatibilities, and dissolving old conflicts with basic, sustained study may exhaust the shared intentions behind these statutes' express texts.³⁰⁷ And experiences to date have proven that à la carte versions of these will disappoint. What we need are mechanisms of accountability to the whole of them. Instead of reading every missing "shall"/"not" as a "may" to the Service or its units or implying mandatory language where there is none, the best inference from the expressed volition in the statutes and our experiences with them is that Congress's repeated demands for a "systematic, interdisciplinary approach"³⁰⁸ joining the biology, economics, and other domain expertise³⁰⁹ intended that the dynamic, best-available-knowledge optimizations be coupled with regular oversight.³¹⁰ The record of choices made and their results was to enable that oversight. Congress's repeated statutory findings expecting "scientific discoveries and technological advances"³¹¹ and "new knowledge derived from coordinated public and private research programs"³¹² were paired to directives that the Secretary produce a "comprehensive survey and analysis of the present and prospective conditions of and requirements for the renewable resources of the forest and range lands,"³¹³ and that the Secretary "expand research activities to encompass international forestry and natural resource issues on a global scale."³¹⁴ But how to facilitate all of that and put it to best use?

307. Cf. ROBBINS, *supra* note 76, at 256 (noting that FRRRPA was "landmark legislation" because it reorganized federal, state, and private forestry around the decadal reports, documentation, and predictive analysis); DANA & FAIRFAX, *supra* note 14, at 346 ("Surely, the integration of national and local land use planning and the linking of budget and land use planning [wa]s a sound step."); CLAWSON, *supra* note 110, at 108 ("All too often in national forest management, 'multiple use' has meant a little of everything everywhere, regardless of costs and of results.").

308. 16 U.S.C. § 1604(b); *see also id.* at §§ 1604(f)(3), 1604(g)(3)(F)(ii), 1604(h)(1). As Serge Taylor characterized this same mandate in NEPA, Congress was surely directing its administration to better emulate the practice of science. *See* TAYLOR, *supra* note 30, at 314-24.

309. *See* 16 U.S.C. § 1604(f)(1) ("one integrated plan"); *id.* at § 1604(g)(3)(A) ("insure consideration of the economic and environmental aspects of various systems of renewable resource management"); *id.* at § 1604(l) (Secretary "shall" estimate "long-term[] costs and benefits" of implementation).

310. *See* 16 U.S.C. § 1604(h)(1) (describing the Committee of Scientists' role); *id.* at § 1602 (listing elements of RPA Program for submission to Congress "each fifth fiscal year"); *id.* § 1606(a) (directing President to present a "detailed Statement of Policy" describing the RPA "Program").

311. Pub. L. No. 95-307, § 2(a), 92 Stat. 353, 353 (1978), *abrogated by* Pub. L. No. 115-334, §§ 8201-02, 132 Stat. 4490, 4839 (2018).

312. NFMA § 2(4) (codified at 16 U.S.C. § 1600(4)).

313. FRRRPA § 2(b) (amending McSweeney-McNary Act of 1928, 45 Stat. 702 (1928)), *re-enacted in amended form by* NFMA § 2(3) (codified at 16 U.S.C. § 1601(a)).

314. Pub. L. No. 105-185, § 253, 112 Stat. 523, 558 (1998) (codified at 16 U.S.C. § 1641(c)).

Knowledge of forest communities (whatever it comes to³¹⁵) transcends data, hypotheses, viewpoints, and ultimately ecology's *deep contingency*—which is why its involvement with conservation traces to the origin.³¹⁶ However, though ecological knowledge grounded in experimentation, replication, and a lack of disconfirmations³¹⁷ has always promised to transform conservation, the very possibility of that knowledge has long faced serious doubts.³¹⁸ The Service (or its Congressional overseers³¹⁹) must turn the statutes' operating parts to actively facilitating the co-evolution of administrative and scientific norms such that, like statutory programs that have succeeded in the face of persistent scientific doubts, the decision making itself begets refinement over time.³²⁰ Over and above several consensus measures on data transparency now transforming ecological and evolutionary research in general,³²¹ the Service should commit to: (1) standardizing

315. This is not the place to litigate the epistemic foundations of knowledge (or justified true belief). But it is critical to avoid conflating mere correlations and statistical associations with knowledge that no one can reasonably deny.

316. See, e.g., SAMUEL P. HAYS, *CONSERVATION AND THE GOSPEL OF EFFICIENCY: THE PROGRESSIVE CONSERVATION MOVEMENT, 1890-1920* 2-3 (1959); CLARY, *supra* note 64, at 50-66.

317. Cf. Tilman, *supra* note 218, at 137-38 (noting that no matter how good statistical correlations may be, only "appropriately randomized, replicated, interdispersed, and controlled experiments" can yield causal knowledge of ecological phenomena); Quinn & Dunham, *supra* note 147, at 611-12 ("[N]o matter how heuristically desirable it may seem, measuring the impact of biological interaction against the reference point of a noninteractive null hypothesis is often not a realistically achievable goal.").

318. See, e.g., Anthony R. Ives, *Informative Irreproducibility and the Use of Experiments in Ecology*, 68(10) *BIOSCIENCE* 746 (2018) (arguing that few if any meaningful ecological experiments can be reproduced); Stefan A. Schnitzer & Walter P. Carson, *Would Ecology Fail the Repeatability Test?*, 66 *BIOSCIENCE* 98, 98 (2016) (reporting very low rate of reproduced results in meta-analysis of ecological experiments).

319. Congress's trust in its committees, in the Service, or in independent third parties is not easily grounded with the tools available to novices who must assess experts. See Goldman, *supra* note 70. Unfortunately, the tools often turn from the knowledge or expertise at issue toward more collateral matters. See *id.* at 105 ("From a practical point of view, information bearing on an expert's interests is often one of the more accessible pieces of relevant information that a novice can glean about an expert."). Monitoring, information sharing, and feedback are, thus, key to improving the Service's overall performance over time. See Kelly & Caldwell, *supra* note 206, at 211-12.

320. Professor Adler has argued convincingly that the use of Karr's index of biotic integrity in water quality monitoring and water quality standards attainment is an exemplar of this co-evolutionary effect. See Robert W. Adler, *Coevolution of Law and Science: A Clean Water Act Case Study*, 44 *COLUM. J. ENV'T L.* 1 (2019). As national ambient air quality standards' (NAAQS) pollutant concentrations have been ratcheted down in step with increasingly sensitive measures of their pollutants' health effects, persistent doubts have been resolved by EPA, its Clean Air Scientific Advisory Committee, and the D.C. Circuit—the exclusive venue for review—in a unique dialectical process. See Wendy Wagner, *It Isn't Easy Being a Bureaucratic Expert: Celebrating the EPA's Innovations*, 70 *CASE W.L. REV.* 1093, 1108-1116 (2020). Although the NFS statutes lack a special venue provision confining review to one court, the Ninth and Tenth Circuits have been de facto equivalents. Fuller coordination between those two may open one avenue toward the reforms described here.

321. See Nosek et al., *supra* note 219; Whitlock, *supra* note 219.

its biological units;³²² (2) orienting its “habitat analysis” to a more explicitly experimental posture;³²³ and (3) striving for total threat awareness as to both traditional and emergent renewable resources.³²⁴ Only by pursuing reforms like these will the Service progress beyond the beginning stages of its own institutional evolution in step with Congress’s expressed intentions.

Value conflicts across the NFS will surely continue: optimizing brings them out,³²⁵ pluralistic optimizing even more so.³²⁶ Forestry without long-term accountability, however, is what sparked the legislative revolution of the 1970s. Continuing the Service’s grand experiments in “learning by doing” without better data practices, methodological rigor, or management of its productivity’s interacting parts is a choice to continue the agency’s lagging performance to date.³²⁷ The time for a change, whether through Congress or the White House, is now.³²⁸ Renewed demands for timber in products engineered to work as well or better than steel or concrete now offer a new carbon sink: urbanization.³²⁹ But the frictions inhibiting such a transformation are sure to worsen without attention to the fundamentals outlined here.

322. This could involve topographical and/or functional boundary criteria, but it will almost certainly involve more care and consistency with the “ecosystem” and “population” concepts. See Jax, *supra* note 47; MACLAURIN & STERELNY, *supra* note 47, at 149-71.

323. See Levin, *supra* note 48 (arguing that the key to predictive understanding is elucidating the causal mechanisms underlying observed patterns and that the only known method of isolating and measuring causes is through experimentation); A.J. Underwood, *Experiments in Ecology and Management: Their Logics, Functions and Interpretations*, 15 AUSTRAL. J. ECOLOGY 365, 386 (1990) (arguing that experimental ecology eliminates false models, explanations, and theories and that “applied science” dismissals of experimentation are too often an apology for bad science).

324. The regulations “shall” “insure research on and (based on continuous monitoring and assessment in the field) evaluation of the effects of each management system to the end that it will not produce substantial and permanent impairment of the productivity of the land.” NFMA § 6(g)(3)(C) (codified at 16 U.S.C. § 1604(g)(3)(C) (2012)). The best interpretation of this mandate given what has been learned is nothing less than full threat awareness.

325. See DAVID SCHMIDTZ, RATIONAL CHOICE AND MORAL AGENCY 63 (1995).

326. See JON ELSTER, SOLOMONIC JUDGEMENTS: STUDIES IN THE LIMITATIONS OF RATIONALITY 180-81 (1989) (arguing that pluralist democracies are likely to do better by trying to do less because their pluralism is what makes them the least like a rational actor).

327. See Parker et al., *supra* note 214, at 718 (noting that working scientists’ epistemic dependence on one another makes progress dependent upon full sharing of data, methodological choices, and hypothesis testing).

328. Public participatory input of *more* views, perspectives, or arguments, furthermore, may be of little practical importance to the reforms suggested here. See Herz, *supra* note 57, at 376-77.

329. See Pub. L. No. 105-185, § 253, 112 Stat. 523, 558 (2018) (codified at 16 U.S.C. § 1641(a)(3)-(6)). Notably, the Service’s own Forest Products Laboratory (FPL) has led research into next generation uses of wood like mass timber to replace steel and concrete in urban development. Carbon stored in construction materials is not in the atmosphere, see Skog et al., *supra* note 242, at 672-74, and many NFS units are currently seeing historic timber sale backlogs, see R45688, *supra* note 129, at 7-10, 15-16.

V. CONCLUSION

As fire and climate change impede more NFS objectives like the maintenance of biotic and community diversity or appropriate reforestation, the Forest Service's overall performance has grown increasingly suspect.³³⁰ Though much of it may be no fault of the agency's, the legislative intent behind its enabling statutes is not being realized. Where economic goods may naturally tend toward equilibrating supply and demand, public good optimality must depend on compulsory mechanisms.³³¹ In light of Congress's stated objectives, though, the range of "soft" constraints on the Service—especially those pertaining to monitoring, research, and assessment—must be better ordered and hardened. Too often interpreters have invoked the intentions of a minority in the 1970s Congresses to obscure this insight, a minority disproportionately concerned with local NFS unit-level optima. From there, the confusions have only deepened. The NFS statutes' subtle mandates and varied modalities are easily obscured, but Congress's overall work product was deliberately tailored to the two distinct problems we have highlighted throughout: Congress's epistemic and coordinative dilemmas.

Whatever finally *causes* a landscape's permanent impairment, if we cannot recognize it in time, is knowledge not worth what it cost to acquire. Pressing the point landscape by landscape can hardly be the best interpretation of the NFS statutes. As more units are choking on fuels and losing biodiversity while simultaneously lagging in productivity and functionality, the need to do better has never been more urgent or obvious. A lack of sufficiently fixed litigable interests may have insulated much of this from judicial oversight, but it should not diminish the force of our statutes. Interpreted together, they could become more than a sum of their parts.

330. The carbon storage and cycling consequences of fire regimes are quickly becoming premiere research questions, *see* Kalies & Kent, *supra* note 237, at 92-93, Table 3, as are soil conditions and net primary productivity in the wake of major fires, *id.* at 91.

331. *See* PIERSON, *supra* note 79, at 30-36.

