PROPERTY LAW FOR POSITIVE EXTERNALITIES: CARVING NEW STICKS FOR THE BUNDLE

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ABSTRACT

Property law has long confronted a troubling puzzle: Why does doctrine focus so much on eliminating harms flowing as negative externalities from uses of property—curbing pollution, nuisances, and other harmful land uses—while largely ignoring the potential to encourage positive externalities? Why such a strong focus on preventing bads instead of promoting goods? Using a case of a natural capital resource and the ecosystem services of flood control, water purification, and pollination it provides, this Article explains how and why existing doctrine fails to recognize these benefits as distinct property interests, leading to systematic underinvestment in conservation and service provision. We propose two doctrinal innovations: the Natural Capital Servitude, modeled on the profit à prendre, and the severable Natural Capital Estate, which enables landowners to sever and transfer rights to natural capital the same way a mineral estate is severed. Our proposals have implications beyond environmental protection, providing practical and new models to promote the positive externalities of historic preservation, urban infrastructure, and other land uses. This Article thus provides

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a foundation for rethinking property law's role in fostering beneficial land uses, bridging the gap between traditional doctrines and twenty-first century challenges.

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INTRODUCTION

The common law of property has long confronted a troubling puzzle: Why does doctrine focus so much on eliminating bads flowing from uses of property—the pollutants and foul odors emanating from an industrial facility—instead of doing more to ensure that uses of property promote social goods? Nuisance, waste, and related causes of action seek to reduce harmful negative externalities by internalizing their costs with the property owner.[1] That is all well and good, but why should property doctrine not also seek to increase the positive externality benefits that flow from a property to other properties, and to the public, by also internalizing those values with the property owner? Over a decade ago, Professors Parchomovsky and Siegelman put their finger on this problem, observing that "whereas concern with negative externalities has shaped multiple doctrines in various legal areas, positive externalities have received almost no attention from lawmakers and legal scholars."[2] If one cares about efficiency and social welfare, this imbalance makes little sense. Property law should promote uses of property that increase net social benefits, which it will not achieve by accounting only for negative externalities. Yet this one-sided focus of property doctrine dominates.[3]

Private law scholars have recently begun to probe this inconsistency and have considered a range of solutions to this puzzle.[4] But

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1. *See* RESTATEMENT (SECOND) OF TORTS §§ 821A cmt. b, 822 (A.L.I. 1979); Yonatan Even, *Appropriability and Property*, 58 AM. U. L. REV. 1417, 1424 n.10 (2009) ("Some negative externalities—most notably, those that have an adverse effect on neighboring privately held property—are dealt with by tort law doctrines such as trespass and nuisance."); Tara K. Righetti & Joseph A. Schremmer, *Waste and the Governance of Private and Public Property*, 93 U. COLO. L. REV. 609, 612 (2022) ("[D]octrines prohibiting waste provide a mechanism for internal governance by limiting the negative externalities that common owners may impose upon each other.").

2. Gideon Parchomovsky & Peter Siegelman, *Cities, Property, and Positive Externalities*, 54 WM. & MARY L. REV. 211, 218 (2012).

3. *See infra* Part III.B.2.

4. *See*, *e.g.*, Giuseppe Dari-Mattiacci, *Negative Liability*, 38 J. LEGAL STUD. 21, 23-24 (2009); Richard A. Epstein, *Positive and Negative Externalities in Real Estate Development*, 102 MINN. L. REV. 1493, 1498 (2018); Lee Anne Fennell, *Property Moves: Assembling Service Streams*, 13 BRIGHAM-KANNER PROP. RTS. J. 207, 234-42 (2024) [hereinafter Fennell, *Property Moves*]; Lee Anne Fennell, *Property as Service Streams*, *in* RESEARCH HANDBOOK ON

their proposals have focused primarily on public law regulation and leveraging market mechanisms.[5] This misses the forest for the trees. We need to dig deeper to the very roots of the problem—property doctrine itself. In this Article, we use the case study of the benefits natural resources provide to humans to show how innovations in the common law of property can better promote positive externalities.

Largely taken for granted, the natural resources around us act as "natural capital" providing the critical goods and services that support life itself.[6] Created by the interactions of living organisms with their environment, it is no exaggeration to state that the suite of "ecosystem services" nature provides—including purifying air and water, detoxifying and decomposing waste, renewing soil fertility, regulating climate, mitigating droughts and floods, controlling pests, and pollinating vegetation—quite literally underpins human society.[7] Wetlands, for example, manage flood control through the ecosystem service of water retention.[8] Forested watersheds ensure water quality through the service of water purification.[9] These ecosystem services are the positive externalities

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PROPERTY, LAW AND THEORY 247, 257-58 (Chris Bevan ed. 2024) [hereinafter Fennell, *Property as Service Streams*]; Lee Anne Fennell, *Agglomerama*, 2014 BYU L. REV. 1373, 1376 (2014); Brett M. Frischmann & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257, 257-58 (2007); Scott Hershovitz, Essay, *Two Models of Tort (and Takings)*, 92 VA. L. REV. 1147, 1147-50 (2006); Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 TEX. L. REV. 1031, 1032 (2005); Lisa Grow Sun & Brigham Daniels, *Mirrored Externalities*, 90 NOTRE DAME L. REV. 135, 140-41 (2014).

5. *See, e.g.*, Frischmann & Lemley, *supra* note 4, at 258 (discussing demand-side market failures); Sun & Daniels, *supra* note 4, at 140 (discussing externalities and policy development).

6. See Gretchen C. Daily, Pamela A. Matson & Peter M. Vitousek, *Ecosystem Services Supplied by Soil*, *in* NATURE'S SERVICES SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS 113, 115 (Gretchen C. Daily ed., 1997).

7. Gretchen C. Daily, *Introduction: What Are Ecosystem Services?*, *in* NATURE'S SERVICES, supra note 6, at 3-4; Jerry Melillo & Osvaldo Sala, *Ecosystem Services*, *in* SUSTAINING LIFE: HOW HUMAN HEALTH DEPENDS ON BIODIVERSITY 75, 75-116 (Eric Chivian & Aaron Bernstein eds., 2008).

8. *See, e.g.*, TR. FOR PUB. LAND, BUILDING GREEN INFRASTRUCTURE: LAND CONSERVATION AS A WATERSHED PROTECTION STRATEGY 13, 25 (William Poole ed., 2011), https://www.tpl.org/wp-content/uploads/2013/12/water_building_green_infrastructure.PDF [https://perma.cc/BMB7-G2JH] (discussing impact of development on water percolation); Norman Myers, *The World's Forests and Their Ecosystem Services*, *in* NATURE'S SERVICES, *supra* note 6, at 216-19 (discussing impact of deforestation on water flows in downstream territories); *Ecosystem Services*, NAT'L WILDLIFE FED'N, https://www.nwf.org/Educational-Resources/Wildlife-Guide/Understanding-Conservation/Ecosystem-Services [https://perma.cc/7UMQ-SRKM].

9. *See, e.g.*, TR. FOR PUB. LAND, AN OUNCE OF PREVENTION 5, 7-8 (1998) https://www.

of all positive externalities, for they flow freely—and most importantly, for free—from private property to the substantial benefit of other properties and the public at large.[10] Yet property law doctrine simply ignores these benefits.

A forest owner, for example, owns the trees on the land. When cut, the logs have a value the owner can easily realize through sale in the timber market. The forest owner, though, does not own the ecosystem services provided by the standing forest, or at least cannot exert what property doctrine would define as ownership over them. The forest owners cannot easily charge others for the water purification or flood control services enjoyed by the properties many miles downstream, nor can they prevent those other properties and the public from benefiting from the services their lands provide—except by turning the forest into logs. And therein lies the problem. In economic terms, these kinds of ecosystem services are positive externalities the forest owners cannot control, and thus they function like public goods.[11] For all practical purposes, the benefited properties are able to enjoy the service values for free. The result is that neither the forest owners nor the beneficiaries have an incentive to invest in conserving the natural capital producing the benefits.[12] The services are ignored by the natural capital owners and taken for granted by those benefited.[13] That is a quick recipe for turning forests into logs.

To date, property doctrine has been clumsy at best, and actively hostile at worst,[14] in acknowledging the value of ecosystem services that private landowners deliver to the public and other private landowners. Services such as pollination and groundwater recharge often originate from natural capital resources owned by one set of property owners and are delivered as benefits to other property

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tpl.org/wp-content/uploads/2013/12/water_ct_ounce_prevention_report_98.pdf [https://perma.cc/43ZP-KEH5] (discussing impact of land development on water purity); Katherine C. Ewel, *Water Quality Improvement by Wetlands*, *in* NATURE'S SERVICES, *supra* note 6, at 330-32, 335-36 (discussing effects of wastewater discharges on wetlands).

10. *See* Daily, *supra* note 6, at 2-3.

11. *See* Christopher L. Lant, J.B. Ruhl & Steven E. Kraft, *The Tragedy of Ecosystem Services*, 58 BIOSCIENCE 969, 971 (2008).

12. *See id.* at 971-72.

13. *See id.* at 971.

14. *See* John G. Sprankling, *The Antiwilderness Bias in American Property Law*, 63 U. CHI. L. REV. 519, 556-57, 569 (1996).

owners.[15] Yet property law has not defined ownership interests in these ecosystem services, largely ignoring the question. There are no existing off-the-shelf doctrinal instruments that can readily map *directly* onto the dynamic of ecosystem services supplied by one property owner to others, whether that be to a single neighboring property, a multitude of properties, or the public at large.[16]

The challenge for property law is simple to state and difficult to realize: "How do you make trees worth more standing than cut down?"[17] This predicament is not limited to ecosystem services by any means. Rather, ecosystem services fit into a class of problems that have lurked in the background of property doctrine for many decades but have only recently gained the attention of property law scholars.[18]

In the pages that follow, we show why ecosystem services provide the paradigmatic case study for unpacking the property doctrine puzzle—why property law has failed to encourage the positive externalities of service streams—and how this can be solved through *doctrinal* innovation. It just takes some creative thinking. Keeping with the forest metaphor, it is well past time to carve some new sticks for the property bundle.

The discussion proceeds in five parts. Part I provides a primer on natural capital and ecosystem services, explaining the growing recognition of their importance and the threats they face. Part II situates property doctrine's inability to capture positive externalities in the broader scholarly literature. Part III reviews the application of traditional property doctrines to ecosystem services, showing that none efficiently capture their positive externalities, whether by the natural capital owners or by the ecosystem services beneficiaries. Part IV proposes two doctrinal innovations—what we

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15. *See* Dave Owen, *Law, Land Use, and Groundwater Recharge*, 73 STAN. L. REV. 1163, 1216-17 (2021).

16. *See infra* Part III.

17. This quote is attributed to Michael Jenkins, the president of the think tank, Forest Trends. Jim Salzman & Verena Manolis, *"When it Comes to Creative Ideas, Forest Trends Has No Peer." Jim Salzman, Long-Time Forest Trends Partner, Donor, and Fellow on What Keeps Him Coming Back*, VIEWPOINTS: A FOREST TRENDS BLOG (Oct. 18, 2022), https://www.forest-trends.org/blog/jim-salzman-long-time-forest-trends-partner-donor-and-fellow-on-what-keeps-him-coming-back/ [https://perma.cc/Y54E-8TAW].

18. *See* J.B. Ruhl & James Salzman, *The Law and Policy Beginnings of Ecosystem Services*, 22 J. LAND USE & ENV'T L. 157, 157-58 (2007).

term the Natural Capital Servitude and the severable Natural Capital Estate—to unify property interests in natural capital and ecosystem services in a way that offers significant advantages as governments and markets increasingly seek to secure and deliver the value of ecosystem services. Importantly, we show that, while innovative, these two property interests are logical and relatively modest extensions of existing doctrines and thus easily fit within property law's long-applied standardization of legal interest forms.[19] Part V generalizes the ecosystem services example to a broader class of instances in which similar doctrinal innovations could promote the provision of other types of positive externalities flowing as benefits from private property, such as historic building preservation, community safety and cohesion, climate change mitigation and adaptation, and recreational and cultural enhancement.

I. A PRIMER ON NATURAL CAPITAL AND ECOSYSTEM SERVICES

Nature's stock is rising. Over the past twenty-five years, there has been an explosion of interest in natural capital and ecosystem services from scientists, economists, government officials, entrepreneurs, and the media.[20] As set out in the foundational report, the Millennium Ecosystem Assessment, the benefits from ecosystem services flow to human populations through four streams: (1) provisioning services that provide commodities such as food, wood, fiber, and water; (2) regulating services that moderate or control environmental conditions, such as flood control by wetlands, water purification by aquifers, and carbon sequestration by forests; (3) cultural services including recreation, education, and aesthetics; and (4) supporting services that create foundational processes, such as nutrient cycling, soil formation, and primary production, which make the previous three service streams possible.[21]

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19. *See* Thomas W. Merrill & Henry E. Smith, *Optimal Standardization in the Law of Property: The* Numerus Clausus *Principle*, 110 YALE L.J. 1, 3 (2000).

20. *See, e.g.*, James Salzman, Genevieve Bennett, Nathaniel Carroll, Allie Goldstein & Michael Jenkins, *The Global Status and Trends of Payments for Ecosystem Services*, 1 NATURE SUSTAINABILITY 136, 136-39 (2018).

21. MILLENIUM ECOSYSTEM ASSESSMENT, ECOSYSTEMS AND HUMAN WELL-BEING: SYNTHESIS 7, 40 (2005), https://www.milleniumassessment.org/documents/document.356.aspx.pdf [https://perma.cc/9RTM-UA9E].

Given the importance of ecosystem services to our well-being, there is rising public and private interest in investing in them. The March 11, 2024, edition of the New York Times featured an article titled, "Nature Has Value. Could We Literally Invest in It?" on its front page.[22] The article described efforts to launch "natural asset companies," whose value lies in their provision of ecosystem services.[23] The article is a good read, but it fails to consider the basic question of how we should even think about ownership of ecosystem services, an essential issue before any decisions about investing in them. Similarly, only a week later the White House Office of Management and Budget issued its final "Guidance for Assessing Changes in Environmental and Ecosystem Services in Benefit-Cost Analysis," explaining to federal agencies how to account for the impacts of potential regulatory initiatives on the distribution of ecosystem services.[24] The guidance is built on the new understanding that ecosystem services are of immense value, but it offers no insight to the fundamental question of who owns them.[25]

This omission seems surprising. Ecosystem services are obviously important to human well-being, so one might assume that they are prized by markets and protected by laws. This has been the case for provisioning services such as crops, timber, and fish.[26] Those commodities are classic natural resources. Mature markets provide accurate price signals,[27] and statutes and regulations specifically

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22. Lydia DePillis, *Nature Has Value. Could We Literally Invest in It?,* N.Y. TIMES, Mar. 10, 2024, at B1.

23. *Id.*

24. OFF. OF INFO. & REGUL. AFFS., OFF. OF MGMT. & BUDGET, GUIDANCE FOR ASSESSING CHANGES IN ENVIRONMENTAL AND ECOSYSTEM SERVICES IN BENEFIT-COST ANALYSIS 34-36 (2024), https://bidenwhitehouse.archives.gov/wp-content/uploads/2024/02/ESGuidance.pdf [https://perma.cc/F72L-XW9D].

25. *See id.* at 5-7.

26. *See* J.B. Ruhl & James Salzman, *Ecosystem Services and Federal Public Lands: A Quiet Revolution in Natural Resources Management*, 91 U. COLO. L. REV. 677, 679 (2020).

27. *See, e.g.*, *Food Price Outlook*, ECON. RSCH. SERV., U.S. DEP'T OF AGRIC. (Dec.15, 2025), https://www.ers.usda.gov/data-products/food-price-outlook [https://perma.cc/VQ9L-P67E] ("The ERS Food Price Outlook (FPO) provides data on food prices and forecasts annual food price changes up to 18 months in the future."); *Forest Products*, FOREST SERV., U.S. DEP'T OF AGRIC. (Jan. 8, 2025), https://research.fs.usda.gov/ forestproducts [https://perma.cc/HV7W-SWJ4] ("Forest Service economic analysis and projections about the use of wood products support industry assessments of market opportunities and inform investment decisions."); *The FAO Fish Price Index: Identifying Trends on the World Markets*, FOOD AND AGRIC. ORG. OF THE UNITED NATIONS, https://www.fao.org/ fishery/en/news/41481 [https://perma.cc/9VUN-LXJ5]

provide for their management.[28] Yet neither laws nor markets have paid much attention to regulating and supporting services such as pollination and flood control.[29]

Why the difference? These services are classic public goods. There is no easy way for owners of their natural capital sources to profit from their conservation or sale.[30] We all benefit from the resilience resulting from biodiversity and the climate stability derived from carbon sequestration, but the providers of those benefits cannot easily charge us for them. As a result, there are few political constituencies pushing for legal protection specifically of the *services*. For example, consider that our major environmental laws were passed in the 1970s,[31] well before the rise of significant research on ecosystem services by scientists and economists.[32] There are some scattered statutory provisions that incidentally conserve some ecosystem services by protecting natural resources, but their policy focus is primarily on resource conservation, not on ensuring the flow of services from those resources to people.[33]

Nor have agency regulations effectively leveraged environmental laws to promote ecosystem services. Only in the past decade or so have some agencies explicitly added management of ecosystem services to their policy goals, and even this has been sporadic.[34] When those policies have been put in place to protect or restore

("The global fisheries and aquaculture sector has a dedicated price index, the FAO Fish Price Index (FPI), which measures monthly changes in the international prices of a basket of fisheries and aquaculture commodities."); *see also* James Salzman, *Creating Markets for Ecosystem Services: Notes from the Field*, 80 N.Y.U. L. REV. 870, 883-84 (2005) (discussing importance of agricultural markets).

28. *See, e.g.*, 7 U.S.C. § 7701 (demonstrating statutory power over crop management); 16 U.S.C. § 594 (demonstrating statutory and regulatory power over timber management); 16 U.S.C. § 1801 (demonstrating statutory power over fishery resources).

29. *See* Lant et al., *supra* note 11, at 969, 971.

30. *Id.* at 971.

31. *See* National Environmental Policy Act of 1969, Pub. L. No. 91-190, 83 Stat. 852 (1970); Clean Air Amendments of 1970, Pub. L. No. 91-604, 84 Stat. 1676; Clean Water Act, Pub. L. No. 92-500, 86 Stat. 816 (1972); Clean Air Amendments of 1977, Pub. L. 95-96, 91 Stat. 685.

32. *See* Ruhl & Salzman, *supra* note 18, at 158.

33. *See* James Salzman & J.B. Ruhl, *Currencies and the Commodification of Environmental Law*, 53 STAN. L. REV. 607, 623 n.33 (2000).

34. *See* J.B. Ruhl, James Salzman, Craig Anthony Arnold, Robin Craig, Keith Hirokawa, Lydia Olander, Margaret Palmer & Taylor H. Ricketts, *Connecting Ecosystem Services Science and Policy in the Field*, 19 FRONTIERS ECOLOGY & ENV'T 519, 520 (2021).

ecosystem services, the typical approach has been through regulating land use. The wetlands protection provisions of section 404 of the Clean Water Act are an obvious example.[35] By requiring permits and mitigation for development in wetland areas adjacent to navigable waters, the land use regulation program can serve as a platform for integrating ecosystem services into decision-making.[36] Indeed, in 2008 the agencies administering the program, the U.S. Army Corps of Engineers and the Environmental Protection Agency, committed to do so.[37]

While this approach of wedging ecosystem services interests into land use regulatory programs can be effective in some cases, it has significant constraints and downsides. Regulatory permitting programs often are politically contentious, are subject to litigation challenges, and require significant administrative authority and resources.[38] Because land use regulation restricts property uses, it is also inherently controversial and requires political and administrative will to be implemented effectively. In certain cases, moreover, regulation can lead to a "race to develop" as landowners develop properties ahead of anticipated increases in regulatory oversight and compliance costs.[39] And when it comes to regulating land uses, takings challenges lurk in the background.[40]

Nor should the practical challenges be forgotten. Measuring and accounting for ecosystem services at the field-level scale of regulatory agency decisions over particular land use permits is difficult and expensive.[41] Given all this baggage, it comes as little surprise

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35. Clean Water Act, sec. 2, § 404, 86 Stat. 816, 884 (1972) (codified as amended at 33 U.S.C. § 1344(a)).

36. J.B. Ruhl & James Salzman, *No Net Loss? The Past, Present, and Future of Wetlands Mitigation Banking*, 73 CASE W. RSRV. L. REV. 411, 428-29 (2022).

37. 33 C.F.R. § 332.3(b)(1)(2025); *see also* J.B. Ruhl, James Salzman & Iris Goodman, *Implementing the New Ecosystem Services Mandate of the Section 404 Compensatory Mitigation Program—A Catalyst for Advancing Science and Policy*, 38 STETSON L. REV. 251, 251-52 (2007) (explaining background of the regulation).

38. *See* Eric Biber & J.B. Ruhl, *The Permit Power Revisited: The Theory and Practice of Regulatory Permits in the Administrative State*, 64 DUKE L.J. 133, 141, 160-62, 169, 194 (2014).

39. David A. Dana, *Natural Preservation and the Race to Develop*, 143 U. PA. L. REV. 655, 656 (1995).

40. *See* U.S. CONST. amend. V ("[N]or shall private property be taken for public use, without just compensation."); *The Supreme Court, 1986 Term—Leading Cases,* 101 HARV. L. REV. 119, 241 (1987).

41. *See* Denis Blouin, Jean-François Bissonnette, Jean-Oliver Goyette, Jérôme Cimon-

that, over fifteen years after committing to include ecosystem services impact accounting into their Clean Water Act permit decisions, agencies have made little discernible progress in doing so.[42] In short, depending on who sits in the White House, there may be more or fewer efforts to provide regulatory protections for the provision of ecosystem services, but past efforts have been meager in both Democratic and Republican administrations.

One certainty is that the importance of services will increase. Climate change is intensifying the damages from the loss of ecosystem services.[43] Sea-level rise threatens coastal dunes providing inland protection from storm surges;[44] droughts threaten pollinator habitats and water resources;[45] and the list goes on. More and more natural disasters are threatening people and property in red and blue states alike,[46] which means more eyes will be on the natural capital supplying them, or not supplying them.[47]

Recognizing this, municipalities in the United States and around the world are considering ways to invest in and manage valuable ecosystem services, and entrepreneurs are trying to create markets for ecosystem services to facilitate conservation.[48] These initiatives

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Morin, Poliana Mendes, Gabriela María Torchio, Jérôme Gosselin-Tapp & Monique Poulin, *Ecosystem Services Concept: Challenges to Its Integration in Government Organizations*, ECOSYSTEM SERVS., Feb. 2025, at 1, 4-5; Ruhl et al., *supra* note 34, at 520.

42. Regulating land use rather than its flow of services can also lead to perverse results, such as the "cosmetic mitigation" in the earlier years of wetlands mitigation when the regulations focused on acres of plant species rather than their ecosystemic function. *See* Ruhl & Salzman, *supra* note 36, at 424. Studies have shown that, in practice, regulatory programs have often resulted in the *depletion* of ecosystem services rather than their conservation. *See, e.g.*, J.B. Ruhl & James Salzman, *The Effects of Wetlands Mitigation Banking on People*, NAT'L WETLANDS NEWSL. (Env't L. Inst., D.C.), Mar.-Apr. 2006, at 7, 9.

43. *See* M.A. Drupp, M.C. Hänsel, E.P. Fenichel, M. Freeman, C. Gollier, B. Groom, G.M. Heal, P.H. Howard, A. Millner, F.C. Moore, F. Nesje, M.F. Quaas, S. Smulders, T. Sterner, C. Traeger & F. Venmans, *Accounting for the Increasing Benefits from Scarce Ecosystems*, 383 SCIENCE 1062, 1062 (2024).

44. Holly Doremus, *Climate Change and the Evolution of Property Rights*, 1 U.C. IRVINE L. REV. 1091, 1102-03 (2011).

45. *See id.* at 1105; *Pollinators*, U.S. DEP'T AGRIC., https://www.climatehubs.usda.gov/topics/pollinators [https://perma.cc/B7HL-N7MY].

46. *See* ELENA KRIEGER, PSE HEALTHY ENERGY, BILLION DOLLAR LOSSES, TRILLION DOLLAR THREATS: THE COST OF CLIMATE CHANGE 6 (2022).

47. *See* Drupp et al., *supra* note 43, at 1062-63.

48. *See* Andrew Seidl, Tracey Cumming, Marco Arlaud, Cole Crossett & Onno van den Heuvel, *Investing In the Wealth of Nature through Biodiversity and Ecosystem Service Finance Solutions,* 66 ECOSYSTEM SERVS. Apr. 2024, at 1, 2-4.

can, in turn, lead to greater investment in service provision through more effective natural capital management. But the poorly defined property status of ecosystem services poses a significant obstacle. Robust markets cannot function without secure property rights.[49] The common law can and should do more to create secure options for how we arrange and manage landowner relationships linking natural capital and ecosystem services.

II. THE PROBLEM WITH PROPERTY AND POSITIVE EXTERNALITIES

Harold Demsetz famously argued in 1967 that, as resources become scarcer and, as a result, increasingly valued, property rights emerge in order to internalize externalities so that property owners more closely match their use of property with overall social efficiency.[50] But by this he meant *all* externalities, positive and negative, so as to produce the most socially efficient use of property.[51] As Parchomovsky and Siegelman observed over forty years later, this quest for property law to be the engine of internalization has worked well in only one direction—internalizing *negative* externalities.[52]

In considering how the law should treat positive externalities, we need to more precisely define them, because not all positive externalities present the same context for private law doctrine. First, the law focuses only on positive externalities a property owner does *not* intend to confer on their beneficiaries.[53] If a property owner intentionally plants a beautiful garden for all the world to enjoy as they walk by, they hardly can then demand to be compensated by those who enjoy it. Likewise, our beneficiaries of positive externalities are not acting inappropriately or maliciously. If they were trespassing to enjoy the garden, for example, they could not point to enjoyment of the garden as the justification.[54] Rather, we are

49. *See* Jan U. Auerbach & Costas Azariadis, *Property Rights, Governance, and Economic Development*, 19 REV. DEV. ECON. 210, 211 (2015).

50. Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347, 354-56 (1967).

51. *Id.* at 350.

52. Parchomovsky & Siegelman, *supra* note 2, at 214.

53. *See id.* at 231-32.

54. *Cf.* 78 AM. JUR. 2D *Trespass* § 64 (2025) (listing accepted defenses to trespasses).

concerned with positive externalities that are passive on both sides—the owner is not trying to make people better off and the beneficiaries are not trying to wrestle anything away from the owner.

For example, consider the owner of the last historic building in a city that used to boast architecture of historical significance. That owner may be indifferent to whatever aesthetic enjoyment passersby receive as they stroll by the building on public sidewalks, and those people behave properly as they do so by staying on the sidewalk. Everyone is content in this world of passive positive externalities; that is, until the building owner files permit applications to raze the building and replace it with a modernist glass cube.

This is where Demsetz's scarcity thesis plays an important role in highlighting the distinct problem of passive positive externalities. For example, one hundred years ago in our hypothetical city, all the buildings looked the same. Slowly but surely, however, one by one the buildings were razed to make way for new buildings with new designs. As the old buildings became scarcer, people began to appreciate anew their architectural qualities, which embodied the history and culture of the city. The regime of passive positive externalities was set in motion, but the old buildings kept getting scarcer. Our last building owner, whose decision to raze the building was no different in motivation or individual effect from all the prior building owners' actions, now faces public outcry.

One group of citizens proposes a new historic preservation regulation to prevent the loss, whereas another group proposes raising funds to purchase the building. But where were these groups fifty years ago? Could the depletion of positive externalities not have been buffered before matters came down to literally the last building standing? Likely so, had the value of those benefits been internalized in the property owner supplying them.

Doing so, however, is not as straightforward as it sounds. While negative and positive externalities may seem like two sides of the same coin, the practicalities and efficiencies of internalizing negative externalities through private law doctrine do not work as neatly on the other side of the coin.[55] The core difference between the

55. *See* Parchomovsky & Siegelman, *supra* note 2, at 226-27.

two—one an effort to reduce harms and the other to induce provision of benefits—matters when it comes to doctrinal design and implementation. For example, the private law doctrine most associated with negative externalities, nuisance doctrine, provides a remedy for those harmed by a property owner's unreasonable use of property[56]—that is, they sue the property owner to internalize the negative externalities.[57] Internalizing positive externalities would require the reverse, providing the property owner some form of remedy to force the beneficiaries to compensate for the value of the benefits.[58]

Property law scholars have pointed out a number of challenges such a remedy would face.[59] For example, there would be the challenge of compiling evidence of the existence and value of the benefits as compared to the harms.[60] Injured landowners seeking nuisance remedies can point to decibel levels, odors, health effects, and reduced property values as evidence of harm and causation.[61] A property owner seeking compensation for positive externalities would somehow have to trace the flow of services to identifiable beneficiaries and assign a discrete value to their benefits, which would prove nearly insurmountable for services such as downstream flood control, pollination, and carbon sequestration. The incentive structure such a remedy would produce is also odd to say the least, as beneficiaries would be inclined to conceal their benefits or even to prevent their delivery, so as not to be forced into paying for them.[62] As we discuss in more detail in Part III, therefore, it is no surprise that this private un-nuisance remedy has not developed in private law doctrine.

As Parchomovsky and Siegelman conclude:

> [C]oncern about negative externalities has played a key role in the development of property, as well as tort doctrine. Surprisingly, the twin concept of positive externalities has been shunted

56. 58 AM. JUR. 2D *Nuisances* § 1 (2025).
57. *See* Even, *supra* note 1, at 1424 n.10.
58. *See* Parchomovsky & Siegelman, *supra* note 2, at 232-33.
59. *Id.* at 230-36 (summarizing these critiques).
60. *Id.* at 232.
61. *See* 58 AM. JUR. 2D *Nuisances* § 102 (2025).
62. See Parchomovsky & Siegelman, *supra* note 2, at 232.

> to the side by theorists and virtually ignored by common law courts. Under common law rules, actors who create positive externalities for others have only very limited scope to recover for any of the benefits they have conferred.[63]

They argue, however, that "even if efficiency-minded common law courts would do best to ignore positive externalities, this in no way means that such spillovers should be ignored altogether."[64] But they turn to public law mechanisms rather than property doctrine for solutions. For example, they observe that anchor stores in shopping malls (such as the Apple Store) produce positive externalities for other mall retailers (and the mall owner) in the form of increased foot traffic, and are able to capture this value in the market through negotiation for reduced rents.[65] When those same major retailers locate in a downtown commercial area, however, they have no similar means of securing compensation for the service stream spillover values because, unlike with the mall owner, there is no low-transaction cost way to negotiate compensation for the positive externalities provided to neighboring properties.[66] Thus, eventually they do not locate there or they move to the suburban malls or online; over time, the downtown commercial area hollows out.[67] Rather than turning to public subsidies, which are fraught with downsides,[68] Parchomovsky and Siegelman propose that cities should "use [public] law to create planned commercial districts, analogous to suburban malls, which would allow for the capture of positive externalities among commercial establishment."[69] Building on that example, they conclude that "[r]egulations should strive to internalize both negative and positive externalities when there is a cost-effective way to do so."[70] In short, public regulation should be

63. *Id.* at 219. As they point out, "[t]he chief body of law that deals with positive externalities is unjust enrichment." *Id.* at 228. In our scenario of passive positive externalities, however, the beneficiaries have not been unjustly enriched because their benefit has not come at the service provider's expense. *See* RESTATEMENT (THIRD) OF RESTITUTION AND UNJUST ENRICHMENT § 1 (A.L.I. 2011).

64. Parchomovsky & Siegelman, *supra* note 2, at 219.

65. *Id.* at 215, 217.

66. *See id.* at 216.

67. *See id.*

68. *See id.* at 246-47.

69. *Id.* at 211.

70. *Id. at* 220.

used to put property owners in a better position to capture the value of their positive externalities.

In her work, Lee Fennell conceptualizes property as a source of "service streams" and focuses on how to put beneficiaries of property's positive externalities in a better position to capture the value.[71] She describes the key role property law plays in ensuring that people benefit from the resources found on property, whether in the form of natural resources (wetlands, forests, minerals)[72] or the built environment (historic buildings, libraries, shopping malls).[73] Property law, she argues, has traditionally served this benefit production purpose by treating property as a "thing" that the law protects as an owned domain that the owner can then use to produce benefits like crops and cafés.[74] In this model, property law's "basic building block consists of the thing, the thing's owner, and the legally enforced boundary around the thing."[75]

To put it in first-year property law class terms: A owns Greenacre and private law arms A with doctrines such as title, trespass, nuisance, and servitudes to define how others must respect the physical and legal boundaries of Greenacre. If A uses Greenacre in ways that benefit others, all the better. Fennell argues, however, that many of the social benefits property provides are produced through the "agglomeration" of "interdependencies and nonlinearities" operating in natural and built environments that result in "benefits that flow to people."[76] In ecosystem services terms, for example, it takes miles of riparian habitat along a river to produce substantial water filtration services,[77] and many acres of pollinator habitat to provide substantial pollination services in an agricultural

71. *See, e.g.*, Fennell, *Property as Service Streams*, *supra* note 4, at 247-48.

72. *See id.* at 257.

73. Fennell, *Property Moves*, *supra* note 4, at 209.

74. Fennell, *Property as Service Streams*, *supra* note 4, at 247.

75. *Id.*; *see also* Henry E. Smith, *Property as the Law of Things*, 125 HARV. L. REV. 1691, 1725-26 (2012) (arguing that property law defines and gives content to what can be owned); Meghan L. Morris, *Property and the Social Life of Things*, 97 TUL. L. REV. 403, 406 (2023) (arguing that the law gives social definition to what can be owned).

76. Fennell, *Property as Service Streams*, *supra* note 4, at 248.

77. *See* Wilfred M. Wollheim, Tamara K. Harms, Andrew L. Robison, Lauren E. Koenig, Ashley M. Helton, Chao Song, William B. Bowden & Jacques C. Finlay, *Superlinear Scaling of Riverine Biogeochemical Function with Watershed Size*, NATURE COMMC'NS, Mar. 9, 2022, at 1, 4.

region.[78] Indeed, like us, Fennell places the case of ecosystem services squarely within this broader class of property challenges.[79]

Yet the "property-as-thing-ownership" model, she asserts, does not perform well in this "benefits-that-flow" context, because it does not account for the scaling effects that are critical to producing substantial "service streams" of benefits.[80] Fennell argues that we need ways of promoting the ability of service stream *beneficiaries* to secure a stronger and more secure interest in those service streams.[81] This approach shifts attention from the property owners to the service beneficiaries, with Fennell broadly envisioning that market arrangements, property concepts, and public law mechanisms could support the latter in more efficiently taking advantage of service stream benefits.[82] In short, beneficiaries of property positive externality streams should be put in a better position to capture those benefits.

Whether property is a thing or a source of benefits, both perspectives recognize an efficiency gap created by shortcomings in property doctrine,[83] but neither proposes to close the gap by correcting the root cause of the problem—property doctrine. Yet this begs the question of what it is about property doctrine that is driving the problem. As we see it, Fennell's insight regarding the property-as-thing versus property-as-service model is the right starting point. The challenge for property law, however, is not picking one model or the other—thing or service—but rather is how to make property *both*—how to unify the thing (for example, natural capital) with the benefits (for example, ecosystem services) to come closer to achieving Demsetz's hoped-for complete internalization of *all* externalities.[84] But short of the beneficiary purchasing the property that sources the benefits in fee simple, which far more

78. *See* Awaz Mohamed, Fabrice DeClerck, Peter H. Verburg, David Obura, Jesse F. Abrams, Noelia Zafra-Calvo, Juan Rocha, Natalia Estrada-Carmona, Alexander Fremier, Sarah K. Jones, Ina C. Meier & Ben Stewart-Koster, *Securing Nature's Contributions to People Requires at Least 20%-25% (Semi-)Natural Habitat in Human-Modified Landscapes*, 7 ONE EARTH 59, 60 (2024).

79. Fennell, *Property as Service Streams*, *supra* note 4, at 248-49.

80. *See id.* at 248-52.

81. *Id.* at 252-62.

82. *Id.* at 249-51.

83. *See id.* at 247-48.

84. Demsetz, *supra* note 50, at 350.

often than not would be inefficient, what does existing property law offer to more closely unify ownership of the two? This, we argue, is what is lacking in existing property doctrine.

III. THE PRIVATE LAW OF ECOSYSTEM SERVICES

Thus far we have provided a primer on natural capital and ecosystem services, outlining the benefits of their positive externalities and explaining why their status as public goods has led to their oversight by law and policy. We then reviewed scholarly proposals to date for managing flows of positive externalities from private property. In this Section we return to the ecosystem services case study to probe property law more deeply in search of doctrines providing flexibility to own the positive externality source (the thing) *and* the positive externality benefits (the service) *as a bundle*. On close examination, we find existing property doctrine is stuck in Fennell's property-as-thing versus property-as-service binary. Indeed, ecosystem services provide the paradigm case study for unpacking why property law has broadly failed to incentivize the positive externalities of property service streams and for exploring ways of filling in those holes through *doctrinal* innovation.

A. Setting the Stage—Ann and Bob

Imagine a pair of neighbors, Ann and Bob. Ann owns Parcel A and Bob owns the adjacent Parcel B, both of which abut a free-flowing river. Parcel A is undeveloped. On it we find a riparian forest area that captures sediment and other pollutants and slows stormwater runoff flow into the river. A wetland area elsewhere on the parcel provides those services and also recharges a groundwater aquifer through its water retention effects. Between these two habitats is a wide expanse of open field that supports various pollinator species. From an ecological perspective, Ann's Parcel A performs various ecosystem *functions*—capturing pollutants, recharging groundwater, and supporting pollinators.

On Parcel B, downstream of Parcel A, Bob operates a farm where he and his family live. The farm draws water from the river and aquifer to irrigate the crops; pollinators originating on Ann's parcel pollinate Bob's crops; Parcel B is protected from runoff flooding by

Ann's wetland and riparian habitat. What Ann sees as ecosystem functions leaving her property, Bob sees as valuable ecosystem *services* flowing to his. In other words, the water purification and other ecosystem functions provided by and flowing from Parcel A only become valuable services because they provide benefits to Parcel B. Parcel A is home to the natural capital from which ecosystem services flow to the benefit of Parcel B.

If Ann decides to pave paradise, so to speak, by turning her parcel into a drive-in movie lot, Bob will most certainly suffer the loss. And that is the default position of current property doctrine—because Ann owns the parcel on which the natural capital is located; that is, she owns the thing—she controls the ecosystem services "spigot" and thus can turn the property service flow on or off as she pleases. But by their nature as positive externalities for which she receives no compensation, Ann does not base her property use decisions on their value to others. Put simply, without some incentive or regulatory mandate, Ann is indifferent to the flow of services off her property. This is a problem not just for Bob but for all of us, because many (likely most) ecosystem services people enjoy in the United States flow from private property.[85] And, with climate change, these services are only growing in importance.[86]

As noted, the default position in property law is that the landowner owns the property's natural capital.[87] Property doctrine has not defined property rights for ecosystem services beyond a rule of capture for fugitive resources[88]—for example, Bob can pump the groundwater under his parcel that Ann's wetlands recharged and keep the crops on his property that her bees pollinated. The services that flow from the natural capital are public goods—free for the taking. Given this, when Ann decides to pave paradise, what options under private law are available to Bob so he can avoid or reduce the harms he will suffer from the loss of services?

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85. *See, e.g.*, A. PUTMAN, R. LOPEZ, L. SMITH, J. UZQUIANO, A. LUND, D. ANDERSON, J. GAN, C. ELLIS, J. ROBERTS, C. KNEUPER, L. ZIEHR & C. ROSS, TEXAS A&M NAT. RES. INST., TEXAS ECOSYSTEM SERVICES: A STATEWIDE ASSESSMENT 3-4, 20 (2022).

86. *See* Drupp et al., *supra* note 43, at 1062.

87. *See* Fennell, *Property as Service Streams*, *supra* note 4, at 247-48.

88. *See* JOSEPH WILLIAM SINGER & NESTOR M. DAVIDSON, PROPERTY § 3.4.3, at 135-36 (6th ed. 2022).

B. Private Law Solutions

When Bob learns of Ann's plans, he turns to you, his lawyer, for help. He is open to cooperating with Ann to find a mutually-agreeable solution or, if she refuses his offers, to litigating to impose a solution. Assuming no regulatory restrictions prevent Ann from paving over her property (or that she has obtained the necessary permits), you turn to the private law of contracts, torts, and property. What follows is what you would find.

1. Coase in the Forest—Contracting for Services

An obvious strategy to capture positive externalities is greater reliance on exchange and contract. We do not need a specialized property doctrine for ownership of ecosystem services if markets can step in and manage the positive externalities for net social gain. After all, if a neighboring property owner or the public wishes to secure the ecosystem service benefits flowing from an owner's parcel, they can simply purchase them. Yet, as valuable as these ecosystem services are to Bob, Ann would find it difficult to persuade Bob to pay her for the ecosystem service benefits for the simple reason that he has always enjoyed them for free, most likely never even thinking about it. Why should he pay now?

Let us assume, though, that Bob realizes that the services he depends upon really are threatened, so he is willing to pay to maintain their flow. Bob can purchase Ann's parcel in fee simple absolute—the full bundle of sticks. Now Bob owns the natural capital and captures the ecosystem service values. This would put a smile on the face of Ronald Coase, the famed economist who highlighted the importance of bargaining and contract in allocating property rights.[89] Problem solved.

Yet the limitations of this approach are just as obvious as their benefits. The value of services provided by Ann's property to Bob are likely much less than the price for the parcel in fee simple absolute. Bob likely neither needs nor wants the whole parcel.

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89. *See generally* R.H. Coase, *The Problem of Social Cost,* 3 J.L. & ECON. 1 (1960) (advocating for the use of bargaining to resolve conflicts between landowners).

Instead of purchasing Ann's entire parcel in fee simple absolute, Bob could negotiate a payment arrangement to keep the spigot flowing by contract. The payment would need to be commensurate with the value of the services to Bob *and* be enough to induce Ann to keep the services flowing to Bob, while making other uses of her property that do not interfere with that contractual obligation. So long as the revenue from Bob's payment and her other uses add up to more than the value of the property to her without this arrangement, Ann and Bob should agree to the deal. This is a clean solution and would put an even bigger smile on the face of Ronald Coase.[90] Indeed, this strategy is already in use for ecosystem services—known in the field as Payments for Ecosystem Services (PES).[91]

In the standard PES scheme, the service beneficiary pays the service provider to undertake or maintain specific land management practices.[92] Bob would negotiate with and pay Ann to manage her wetlands, forest, and open field in such a way that he continues to benefit from flood protection, clean water, and pollinators at levels he seeks and for a price that is commensurate with the value he derives. Ann might also be contractually required to take positive actions, such as removing invasive species that degrade the pollinator habitat. The PES agreement thus provides a contractually enforceable land management regime with a payment schedule and length of obligation.

PES schemes are found all over the world in many shapes and sizes. The most comprehensive study to date found over 550 programs with annual transactions of $36 to $42 billion.[93] Under the PES approach, ecosystem services do not need to be assigned distinct property rights because the fee simple owner of the property where the natural capital is located (or communal owners in some locations) already has sufficient rights to engage in the contractual arrangement.

The PES solution has great potential, but the strategy is limited. Most important, it is not easily scalable. It works well enough for

90. *See id.*

91. *See* James Salzman, Genevieve Bennett, Nathaniel Carroll, Allie Goldstein & Michael Jenkins, *Payments for Ecosystem Services: Past, Present and Future*, 6 TEX. A&M L. REV. 199, 200 (2018).

92. *See id.*; Salzman, *supra* note 27, at 872-73.

93. Salzman et al., *supra* note 20, at 136.

our example of Ann and Bob, but consider when there are dozens or even hundreds of Anns and Bobs trying to make a deal. The collective action costs escalate very quickly as the number of one-off negotiations and transactions increase and quickly impose excessive costs. Indeed, the largest PES programs are not traditional Coasean bargaining between individual parties.[94] Instead, either the government or a water utility acts on behalf of the beneficiaries, charging them through taxes or utility bills and using the funds to pay the providers.[95] These institutional arrangements keep the transaction costs low, but such institutions do not exist for many other ecosystem services, such as flood control or pollination.

More to the point of how to solve the property doctrine gap, PES contracts do not establish a property interest in the natural capital or the ecosystem services—they are just contracts—and they do not provide any property interest in managing the services spigot.[96] Ann may decide not to accept Bob's offer in the first place. Or, if in our example Ann decides to sign and then breach the PES contract by paving the parcel, Bob's recourse is limited to remedies in contract. Civil damages may be sufficient for many contexts, but Bob may have more in mind as he plans expansion of his operations and their possible transfer to his children or sale to a third party. He seeks long-term security, with the right to *enjoin* Ann's paving of her property, which is disfavored as a contract remedy.[97] Thus, while there surely is a place for PES in securing ecosystem service flows from natural capital, its potential only goes so far. If Bob wants more security and more power to say how the natural capital and services spigot are managed, he will need more than what PES contracting offers.

2. Enjoying Services—Tort Remedies

Nuisance law assigns liability to a property owner who unreasonably and substantially interferes with another property owner's use

94. *See* Coase, *supra* note 89, at 4.

95. Salzman et al., *supra* note 20, at 136-37.

96. *Cf.* Salzman et al., supra note 91, at 204-06 (describing PES contracts).

97. *See* HOWARD O. HUNTER, MODERN LAW OF CONTRACTS § 12:1 (2025) (noting that equitable remedies are disfavored in contractual disputes).

and enjoyment of their property.[98] Public nuisance doctrine also steps in when the interference significantly affects the public interest.[99] As such, nuisance doctrine balances competing uses of properties but does not attempt to assign ownership rights beyond use and enjoyment of property.[100]

For example, establishing that one property owner has caused a private nuisance resulting from excessive noise does not mean that the injured property owner owns "quiet," but rather that they are entitled to use and enjoy their property without unreasonable and significant interference. Nor does nuisance doctrine regulate all noise at any level—there is no right to enjoy absolute quiet and no duty to provide it.[101] Nuisance doctrine thus does the work of determining the context-specific maximum level of *negative* externalities one property owner can impose on others (or the public). The property owner must internalize the costs imposed on others when exceeding that maximum level by paying compensatory damages and the costs of abatement to the acceptable level.[102]

This highly simplified version of nuisance doctrine serves to make the point that property doctrine has no corollary for positive externalities—no doctrine for determining the *minimum* level of positive externalities one property owner must provide to others (or the public), above which the owner can charge the beneficiaries for their value.

But what about when the harm comes not from the negative externalities created by neighboring properties but, rather, from losing access to a positive externality? In other words, rather than the typical situation of a property owner angered over harms imposed on her by the noxious smells or loud sounds from a neighbor, what about when the property owner no longer enjoys a prior benefit? The classic case of *Fontainebleau Hotel Corp. v. Forty-Five Twenty-Five, Inc.*, provides a useful analysis.[103]

98. *See* RESTATEMENT (SECOND) OF TORTS § 822 (A.L.I. 1979).
99. *Id.* § 821B.
100. *See id.* § 822 cmt. a.
101. *See id.* § 822.
102. *See id.*
103. 114 So. 2d 357, 358 (Fla. Dist. Ct. App. 1959) (per curiam).

The iconic hotels, the Eden Roc and the Fontainebleau, have long stood alongside one another on Miami Beach.[104] When the Fontainebleau began building a fourteen-story addition, the Eden Roc owners quickly realized this would block the sunlight over much of their sunbathing area.[105] The question for the court was whether the Eden Roc could halt the Fontainebleau construction—whether the Eden Roc had a right to the unobstructed flow of sunlight.[106]

The court held in favor of the Fontainebleau.[107] Unlike the English doctrine of "ancient lights," which guarantees homeowners unobstructed light to their windows,[108] Florida landowners cannot enjoin a neighboring development that stops the flow of sunlight onto their land.[109] The classic explanation is that such a restriction would lock in structures and impede development.[110]

On their face, the similarities between *Fontainebleau* and ecosystem services are suggestive. One could credibly argue that the higher building has reduced the benefit of "sunlight provision" for the neighboring landowner. Through this framing, why should property law treat the loss of ecosystem services any different from the loss of other positive externalities? In fact, however, traditional property law disfavors such negative prescriptive easements.[111] The beneficiary of the service has no right to restrict the behavior of the provider, even when it results in the reduction of the service.

3. Sticks in the Bundle—Property Interests

As discussed above, it is unlikely that Bob would find it cost effective to purchase Ann's property in fee simple absolute at the price Ann would demand. Buying all the sticks in Ann's property

104. *Id.* at 358-59.

105. *Id.* at 358.

106. *Id.*

107. *Id.* at 361.

108. *Ancient Lights*, BRITANNICA (Apr. 12, 2018), https://www.britannica.com/topic/ancient-lights [https://perma.cc/FE9A-7URN] (explaining doctrine adopted in 1663 that safeguards windows used for light by an owner for twenty years or more from obstruction by actions of an adjacent landowner). American courts rejected the doctrine. *See* SINGER & DAVIDSON, *supra* note 88, § 5.5, at 225.

109. *See Fontainebleau Hotel Corp.*, 114 So. 2d at 360.

110. See SINGER & DAVIDSON, *supra* note 88, § 5.5, at 225.

111. *See id.* § 5.3.2, at 190 ("Negative easements were limited by courts because, unlike affirmative easements, it is hard or impossible to observe their existence.").

rights bundle thus makes no sense as a means of securing property rights in the natural capital or the services spigot. Of course, transferring the fee simple absolute is not the only way to move or manage sticks in the property bundle. Property law has developed instruments for transferring the sticks that matter to the parties by agreement[112] or by operation of law,[113] and has developed doctrines under which one landowner can, through exercise of superior rights, prevent full exercise of another property owner's subservient rights.[114] Alas, none of these instruments and doctrines map well onto the ecosystem services tussle between Ann and Bob.

a. Transferring Sticks

i. Conservation Easements

The property law of servitudes, under which covenants and equitable servitudes historically had been doctrinally distinct forms,[115] provides a way to elevate the basic design of PES contracts into an enforceable *property* interest if certain conditions are met. While the traditional doctrinal context of servitudes in its full regalia is a sore spot for most first-year law students,[116] the core concepts map straightforwardly onto what Bob seeks if the provisions of the PES contract "touch and concern" the land, which most PES provisions inherently would,[117] and are intended by the parties to "run with the land," in which case they will bind Bob and Ann and their successors in interest who have actual or constructive notice.[118] This nonpossessory property interest provides Bob and his successors the right to enjoin Ann and her successors from paving the property,

112. *See infra* Part III.B.3.a.i.

113. *See infra* Part III.B.3.a.ii.

114. *See infra* Part III.B.3.b.

115. *See* RESTATEMENT (THIRD) OF PROP.: SERVITUDES § 1.4 cmt. a (A.L.I. 2000) ("Doctrinally, the principal differences between real covenants and equitable servitudes were that 'horizontal privity' and a written instrument under seal were required to create a real covenant, while notice alone was sufficient (in theory) for creation of an equitable servitude." (internal citations omitted)).

116. *See id.*

117. SINGER & DAVIDSON, *supra* note 88, § 6.3.1, at 257.

118. *See id.* § 6.2.3, at 246-48.

thus giving Bob that extra level of long-term security he could not achieve through PES contracting.[119]

Indeed, the advantages of this approach for land conservation led over time to the stylized version of servitudes known as the conservation easement.[120] The objective of a conservation easement is to design a set of covenants that remove specified development rights from a parcel, leaving intact only those uses consistent with the goals of the agreement, such as forest conservation or sustainable agriculture.[121] As with covenants generally, the default is that these restrictions are perpetual unless otherwise specified or terminated by subsequent agreement or operation of law, such as by abandonment.[122]

The conservation benefits of these arrangements—not least of which is locking in the incidental positive externalities, such as ecosystem service flows—made them public policy darlings, even to the point of securing federal tax benefits if the restrictions are donated to qualifying entities and other conditions are met.[123] And because they are not necessarily popular with the property owner's descendants, who may desire to challenge the restrictions and unlock the forgone value, many states have adopted statutes enforcing their perpetuality.[124]

Although the conservation easement approach can easily be mapped onto the ecosystem services context in the same manner as PES contracts, it shares the same key limitations of the PES approach. Although the conservation easement provides its owner a property interest enforceable against the servient estate's owner, like any servitude, it is a nonpossessory interest conferring no direct ownership interest in the natural capital or the services spigot.[125] Without more, the conservation easement owner can only hope that

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119. *See id.*; *supra* Part III.B.1.

120. *See* Jessica Owley, *Conservation Easements at the Climate Change Crossroads*, 74 LAW & CONTEMP. PROBS. 199, 199 (2011); 7 U.S.C. § 1997.

121. *See* Owley, *supra* note 120, at 203-04.

122. *Id.* at 199, 209.

123. *See* I.R.C. § 170(h)(4)(A); *see also Income Tax Incentives for Land Conservation*, LAND TR. ALL. (Sep. 27, 2022), https://landtrustalliance.org/resources/learn/explore/income-tax-incentives-for-land-conservation [https://perma.cc/2LL8-MAPY] (summarizing federal and state tax incentives for conservation easements).

124. Owley, *supra* note 120, at 221.

125. SINGER & DAVIDSON, *supra* note 88, § 5.1, at 182.

the property continues to provide the flows of ecosystem services. In other words, if a fire burns down the forest on Ann's land, or climate change dries up the wetland, or invasive plant species degrade the pollinator habitat, Bob is out of luck. Considering that the price Ann charged for Bob's perpetual conservation easement would (if she bargained rationally) reflect her forgone development value, that contingency is not to be taken lightly.

ii. Transfer by Prescription

After you explain the limitations of PES contracts and conservation easements to Bob, he bemoans that after "all these years of enjoying the ecosystem service benefits" there is not a better solution. Although Bob's reference to "all these years" brings to mind two other property doctrines—adverse possession and prescriptive easements—you can quickly rule them out.

These doctrines operate to transfer possessory or nonpossessory rights in property from the true owner to another by operation of law.[126] Adverse possession transfers full ownership,[127] whereas prescriptive easements transfer rights of access that would normally be secured through an express easement agreement.[128] Both depend on the outsider acting for an extended period of time consistent with the way a true owner or express easement holder would, so long as several conditions are also met.[129] Although Bob's long-term enjoyment of the ecosystem services flowing from Ann's property may seem to resonate in the spirit of these doctrines, the additional conditions required for them to operate kick them out of contention.

Bob's greatest challenge would be satisfying the condition that the actor's use of the property or access across it is "adverse and hostile" to Ann's interest, a concept that has befuddled many a law student but which boils down to the idea that a reasonable owner of the property would find the actor's behavior at sharp odds with the owner's interests.[130] If a person without your permission is planting

126. *Id.* § 4.1, at 144, § 5.5, at 217.
127. *Id.* § 4.1, at 144.
128. *Id.* § 5.5, at 217.
129. *See id.* § 4.2, at 147, § 5.5., at 218.
130. *See id.* § 4.2.5, at 153, § 5.5, at 217 (explaining that both adverse possession and prescriptive easements require occupation or use without the owner's permission).

crops on your property or driving daily along your driveway to get to the highway, you likely would want to have a word with them about it. If they persist, you would consider taking legal action claiming unlawful trespass to prevent further intrusions against your interest. In short, unless they pay you or persuade you to grant permission, their uses offend your interests, not to mention violate the law of trespass.[131]

This goes to the heart of the matter for Bob—he is *not* trespassing on Ann's property. Rather, he is lawfully exercising his right of capture on *his* property. He is not entering upon Ann's property or stealing anything from Ann. Ann owns the natural capital, but has no rights over the ecosystem services it produces once they leave her property. There is no legal remedy available to her to stop Bob from enjoying the benefits or to force him to compensate her for their value. Indeed, that is why they are positive externalities—Ann has no legal control over them once they show up on Bob's property. She may not even know they are showing up on Bob's property. This is why she could not care less about what Bob does with them. They are his for the taking, and his taking poses no injury to Ann. To describe Bob's behavior as adverse and hostile within the meaning of property doctrine thus makes no sense.[132]

Even if we overlook this gaping hole and treat behavior like Bob's as fair game for applying a prescriptive transfer of Ann's interests in the natural capital to him, she and other owners of natural capital would have two other options for preventing operation of the doctrine. One would be for Ann to grant permission to Bob to enjoy the ecosystem services prior to the duration of time needed to trigger the operation of the doctrine, as permission defeats the claim that the use is adverse and hostile.[133] She could simply put a sign at the property boundary telling Bob to enjoy the services at will. This is nonsensical, however, as Bob already can lawfully enjoy the services without Ann's permission. The other method to cut off Bob's prescriptive claim would be to prevent him from enjoying the services before meeting the duration of time (usually specified by

131. *See id.* § 5.5, at 217.

132. *Cf. id.* § 4.2.5, at 153 (explaining that the titleholder's state of mind is relevant when evaluating the adversity requirement for adverse possession claims).

133. *Id.*

statute) needed before he can force the transfer of rights.[134] A fence to block access also blocks a prescriptive easement claim.[135] Practically speaking, however, it would be difficult for Ann to prevent bees from flying to Bob's property or to divert groundwater away from his subsurface. Her best option to prevent Bob's claim, therefore, would be to pave over her property, which is exactly what Bob does not want her to do. So Bob is back where he started.[136]

b. Bigger Sticks

Rather than securing rights in land management or taking away development rights in the property itself, property law can create rights in other parties who have a claim to the service flow not as a matter of any interest in the natural capital parcel, but rather through holding an interest at least equal, and perhaps superior to, and restrictive of uses of the natural capital parcel. Some doctrines thus, in effect, require continued provision of a service to the beneficiary, but these are difficult to apply beyond their narrow contexts.

i. Doctrine of Support

Property doctrines defining the relationship between parcel owners do not aim to internalize *all* negative externalities. The doctrine of support, for example, addresses the substantial effect of subsidence and in effect treats the physical support value of soil as an ecosystem service.[137] Under the support doctrine, landowners may prevent actions by their neighbors that undermine the soil in its natural condition.[138] If excavation by a neighbor causes subsidence, the neighbor is liable for the loss of lateral support.[139] But the support doctrine does not provide one property owner total

134. *See id.* § 4.2.4, at 152.

135. *Id.* § 5.5, at 219.

136. And, as described above in the context of the *Fontainebleau* case, American courts have rejected the English doctrine of ancient lights, where building owners are prevented from removing the benefit of their neighbors' exposure to sunlight. *See supra* notes 103-10 and accompanying text.

137. *See* SINGER & DAVIDSON, *supra* note 88, § 3.5, at 137.

138. *See id.*

139. *See id.*

control over the adjacent property owner's excavations,[140] and the sticks are of equal value and applied for mutual reciprocal benefit. By contrast, Bob wants services flowing in only one direction—to him—with no duty to provide reciprocal services to Ann. So, while Bob could assert a support claim against Ann for excavating an underground parking garage if it led to the collapse of Bob's farm, the doctrine does nothing to restrict Ann from paving the surface.[141]

ii. Use Restrictions in a Common Resource

Property law is scattered with several doctrines restricting changes in property use that injure other property owners' interests, but these doctrines are based around common ownership regime relationships not present between Ann and Bob. In Western water law, for example, the no-injury rule in prior appropriation jurisdictions protects junior appropriators from some proposed changes in water uses by senior appropriators.[142] For example, assume that Senior holds a water right that dates from 1930 for 100 acre-feet on the Wet River to grow alfalfa. Junior is downstream and holds a water right that dates from 1950 for 50 acre-feet to grow corn. When Senior withdraws 100 acre-feet from the Wet River, 20 acre-feet go back in the river as return flow. Senior wants to change her water use by selling some of the water to City. If Junior alleges he will be injured because there now will be less return flow to the river for him to use, he can block the trade.[143]

In simple terms, the no-injury rule allows a junior rights holder to block the senior rights holder from changing her water use if doing so would injure the junior rights holder.[144] For our purposes, Junior effectively has the ability to prevent Senior from changing her water uses in a manner that reduces the benefits he enjoys.[145]

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140. *See id.* (explaining that while the support doctrine gives owners a legal right to have their land supported by the neighboring land, it does not require owners "to support structures on neighboring land").

141. *See id.*

142. *See* BARTON H. THOMPSON JR., JOHN D. LESHY, ROBERT H. ABRAMS & SANDRA B. ZELLMER, LEGAL CONTROL OF WATER RESOURCES: CASES AND MATERIALS 310 (6th ed. 2018).

143. *See id.*

144. *See* Karrigan Börk, *Water Rights Exactions*, 47 HARV. ENV'T L. REV. 63, 84 (2023).

145. It is worth noting that the no-injury rule does not apply if Senior, for example, changes the crops that she grows. Thus, the odd situation could arise that Senior's trading water to

Thus, in a broad sense, this doctrine locks in the obligation of the senior appropriator to continue their beneficial uses. But the no-injury rule applies only in that narrow context between mutual appropriators from a common resource.[146] In essence, Senior and Junior are both Bobs, enjoying the benefits of the water; the Anns owning the natural capital providing the water (watershed forests) and maintaining its water quality (riparian habitat) are not subject to the no-injury rule.

Similarly, groundwater law in some states does impose correlative rights restricting overuse by one user to avoid injury to others drawing from the aquifer,[147] but its reach does not extend to the services provided by wetlands and other natural capital recharging the groundwater. In short, doctrines like the no-injury rule or groundwater correlative rights govern relationships between the beneficiaries of the ecosystem services in a common resource—water supply and purification—not between them and the owners of the natural capital producing the services.

In the real property context, the doctrine of waste restricts a life estate tenant from harming or making major alterations to the property to the detriment of holders of a remainder interest.[148] Similar restrictions apply to cotenants[149] and leasehold tenants.[150] Here again, however, the respective parties each have a property interest in the common resource itself. The waste doctrine is embedded in that relationship—that is, it does not apply to owners of adjacent properties, such as Ann and Bob.

City with a loss of twenty acre-feet in return flow can be blocked by the no-injury rule but Senior's switching to a thirstier crop with the same loss of twenty acre-feet in return flow is not subject to the no-injury rule. *See* THOMPSON ET AL., *supra* note 142, at 317.

146. Kalyani Robbins has argued that a similar approach could be mapped onto the ecosystem services property dynamic between adjacent landowners, such that Ann could not change her land uses in ways that injure Bob. Kalyani Robbins, *Uncharted Waters: Can Water Rights Principles Stem the Tide of Ecosystem Services Loss?*, 31 N.Y.U. ENV'T L.J. 155, 169 (2023). Fundamental reorganization of rights between adjacent landowners, while deserving scholarly attention in an era of climate change disruption, is outside the scope of our inquiry. For additional scholarship on the evolution of property rights in response to climate change, see generally Owley, *supra* note 120.

147. *See* THOMPSON ET AL., *supra* note 142, at 484.

148. SINGER & DAVIDSON, *supra* note 88, § 7.6.2, at 324-25.

149. *See id.* § 8.4.3, at 367-68.

150. *Id.* § 10.4.2, at 456-57.

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Having run out of ideas, with no good news for Bob, you offer to treat him to lunch. Bob is dejected. A PES contract does not provide him enough long-term security, but purchasing Ann's entire property in fee simple gives him far more than he needs. He wishes there were something in between. This gives you an idea.

IV. UNIFYING PROPERTY RIGHTS IN NATURAL CAPITAL AND ECOSYSTEM SERVICES

The survey of private law solutions in Part III shows there is no off-the-shelf doctrine in existing property law that Ann and Bob can readily use to meet their objectives. Although Ann and Bob may agree to some second-best arrangement of a PES contract or conservation easement terms, the positive externalities of ecosystem services operate at massive scales encompassing multitudes of properties on both sides of the supply and beneficiary ledger, generating potential public benefits far beyond the interests of Ann and Bob. If PES agreements and conservation easements underperform for Ann and Bob, that inefficiency aggregates at scale, leaving substantial benefits on the table. How can property doctrine innovation serve to improve the options Ann and Bob have in their toolkit as well as to scale up to improve landscape-level management of ecosystem services?

Consider a company, NatCap Inc., that is in the business of aggregating and managing ecosystem service flows. NatCap's business model targets several lines of demand. For example, a coalition of farm owners in the region has become increasingly concerned about the degradation of pollination and groundwater supply. They could attempt to negotiate with the multitude of natural capital owners delivering those services, which would incur high transaction costs and is not their expertise. Alternatively, they could retain NatCap to manage those negotiations.

Similarly, the City of Bliss is concerned about the degradation of ecosystem services that are important to maintaining the integrity of public amenities, such as water quality in a river used for fishing and swimming and protection of urban areas from river flooding

events. Like the farmers, the City could retain NatCap to assemble the service flows from the riparian habitat.

Lastly, the State of New Union, concerned about the threat of coastal flooding during storm events, has imposed development restrictions requiring "no net loss" of coastal flood protection services.[151] Developers whose projects deplete those services must provide offsets for the lost services.[152] They can do so by enhancing natural capital resources elsewhere, for which they are awarded offset credits, or can purchase transferable credits from others who have done so.[153] For this purpose, NatCap hopes to create offset banks from which it can market ecosystem services credits.[154]

As you can easily see, NatCap's business model and its challenges are scaled-up versions of the Ann and Bob scenario. NatCap's clients want to establish secure streams of ecosystem services for their private or public benefit, but they do not want to bear the burden of working with all the owners of the natural capital. NatCap performs that function, essentially matching up multiple "Anns" with "Bobs." This is the role the mall plays in Parchomovsky and Siegelman's hypothetical.[155] But the question is, what is NatCap negotiating to purchase on behalf of its clients? What is it buying?

As described in Part III, like Ann and Bob, NatCap currently has only two broad options for securing the aggregated ecosystem services flows under existing doctrine—purchase the fee simple interest in properties with natural capital producing the desired services, or negotiate with the owners in PES or conservation easement transactions.[156] But NatCap (like Bob) does not want to own hundreds of properties when all it seeks is to ensure that the natural capital continues to provide secure flows of ecosystem services, nor does it relish the prospect of negotiating the terms of hundreds of conservation easements or PES contracts. It would be far more convenient, NatCap thinks, if there were a property interest smaller than the fee simple interest which, if purchased,

151. *See generally* Ruhl & Salzman, *supra* note 36, at 424 (discussing no-net-loss policies).

152. The use of offset credits and banks is common in regulatory permitting regimes governing natural resources conservation. *See* Salzman & Ruhl, *supra* note 33, at 649, 654.

153. *Id.*

154. *Id.*

155. Parchomovsky & Siegelman, *supra* note 2, at 241-42.

156. *See supra* Part III.B.1.

comes with the terms NatCap desires inherently baked into the property interest itself. Then NatCap could focus on purchasing those defined off-the-shelf property interests.

In this Part we consider what that kind of property interest would look like, and whether using it would be better for NatCap's purposes than simply buying properties in fee simple or slogging through the hundreds of PES or conservation easement negotiations. We envision two new property instruments to meet NatCap's needs, both of which build straightforwardly on existing property interests and their associated long doctrinal histories with surprisingly little adjustment required. We then inventory the distinct advantages they offer private and public interests seeking to manage ecosystem services at scales from small to large.[157]

A. Carving New Sticks for the Bundle

Instead of disaggregating the respective interests in natural capital and ecosystem services, as if they are not inherently connected, it is possible to efficiently unify rights in natural capital and ecosystem services short of owning the fee simple absolute. Mapping each of these doctrinal foundations onto the natural capital-ecosystem services dynamics scenario is a straightforward extension of their core features and creates a distinct and durable property interest that can easily be transferred and marketed. One such property interest, which we call the Natural Capital Servitude, builds on the profit à prendre (or profit, for short), which entitles the holder to enter on and take natural resources, such as petroleum, timber, and wild game, from the land of another.[158] This instrument would give its owner a direct nonpossessory interest in controlling the management of natural capital on another person's parcel and full ownership of the ecosystem services the natural capital produces.

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157. We drew some inspiration from one of Lee Fennell's fleeting musings for more effective service stream agglomeration, in which she suggests that property owners might "cede control ... over elements of ownership that are not central to the services they receive from their property[,]" which "[o]ther parties could then aggregate and exercise ... to stream additional services[,]" with the possibility of compensation when this "option" is exercised. Fennell, *Property Moves*, *supra* note 4, at 263.

158. *See* RESTATEMENT (THIRD) OF PROP.: SERVITUDES § 1.2 (A.L.I. 2000).

The other property interest, which we call the Natural Capital Estate, allows a parcel owner to sever the interests in natural capital on the parcel from the fee simple, much as mineral estates can be severed from the fee simple,[159] and transfer them as a possessory interest to another entity. This instrument thus transfers full ownership of both the natural capital and the ecosystem services the natural capital produces.

Importantly, in both instances the owner of the property interest, through the direct rights it provides over the natural capital, *internalizes* the ecosystem services value provided by the natural capital. As owner of the servitude or the severable estate, for example, Bob would manage the natural capital on Ann's parcel so as to efficiently maintain and capture the ecosystem service benefits provided on his parcel. Of course, Ann and Bob would still need to come to terms that make the investment worth it for Bob and the price sufficient for Ann, but that is far more likely using one of these instruments compared to the alternative of Bob having to buy Ann's parcel in fee simple to secure the flow of ecosystem benefits. These reframed incentive structures also are not confined to bilateral relationships of adjacent property owners like Ann and Bob—they would scale up to the NatCap scenario with relatively low transaction costs.

1. The Natural Capital Servitude

Imagine that instead of securing rights in ecosystem services flowing from Ann's property, Bob is interested in harvesting timber from the forested portion of Ann's property. And that is all Bob wants—he has no desire to own or control any other interest in Ann's property. To accomplish that purpose, Bob would need access across Ann's property to the forested area, the ability to move equipment and people to and from that area, the right to remove timber, and, importantly, to own the timber with rights to transfer ownership to third parties. Bob must ensure he does not unduly interfere with Ann's use of her retained property interests when he exercises these rights. Bob also would want assurance that Ann will not somehow impair the value of the timber resources. Ann

159. *See infra* notes 180-86 and accompanying text.

otherwise is free to use her property however she wishes. Ann is amenable to all of these conditions, and the two agree on a price.

While this may seem like a complicated transaction, all of the conditions are neatly embedded in the ready-made profit servitude, which has been used for centuries in connection with extraction of timber, soil, fish, and other resources by one party from the property of another.[160] As described in the *Restatement (Third) of Property: Servitudes*, one can think of a profit as an "easement plus"—that is, "an easement that confers the right to enter and remove timber, minerals, oil, gas, game, or other substances from land in the possession of another."[161] Although states vary on some details of the profit interest, which will be discussed more below, the *Restatement* aptly summarizes the core principles. Profits are "like affirmative easements in that they create rights to enter and use land in possession of another. However, they also create the right to remove something from the land. Rights to remove timber, minerals, and game, rights to cut wood, and rights to pasture cattle are profits."[162] Importantly, the easement feature of the profit bakes in a vast body of established doctrine, as "the rules governing creation, interpretation, transfer, and termination of easements and profits are the same in American law."[163] Thus,

> the holder of the easement or profit is entitled to make only the uses reasonably necessary for the specified purpose. The transferor of an easement or profit retains the right to make all uses of the land that do not unreasonably interfere with exercise of the rights granted by the servitude.... The holder of the easement may only use the area for purposes reasonably related to the [servitude].... Easements and profits may authorize the exclusive use of portions of the servient estate, and may involve uses that make any actual use of the premises by the transferor unlikely, but they are still considered nonpossessory interests if the transferor is not excluded from the entire parcel and retains

160. *See* RESTATEMENT (THIRD) OF PROP: SERVITUDES § 1.2 cmt. a (A.L.I. 2000).
161. *Id.* § 1.2.
162. *Id.* § 1.2 cmt. a.
163. *Id.* § 1.2 cmt. e; *see also id.* § 2.15 (discussing rules governing creation, interpretation, transfer, and termination of easements and profits).

> the right to make uses that would not interfere with the easement or profit.[164]

This package of doctrines maps neatly onto the timber harvesting arrangement between Ann and Bob. Additionally, the profit offers the flexibility of being designed as appurtenant (for example, dedicated to and running with Bob's parcel) or in gross (for example, dedicated to Bob's personal business).[165]

Moving back to Bob's desire to secure rights in ecosystem services flowing from Ann's natural capital, consider their respective rights and responsibilities if we were to apply the profit interest to their arrangement. Bob has no desire to own any interest in Ann's property except the right to control and capture the flow of specified ecosystem services. To enable him to maintain and possibly even enhance the flow, Bob would need access across Ann's property to the natural capital resources supplying those services, the ability to move equipment and people to and from that area for that purpose, the right to have the services flow unimpeded from the natural capital to his property, and, importantly, to own the ecosystem services from the moment of their production on Ann's parcel. Similar to the timber example, Bob also would want assurance that Ann will not somehow impair the value of the natural capital or flow of services in her use of the parcel. Ann otherwise is free to use her property however she wishes. Ann is amenable to all of these conditions and the two agree on a price.

In short, other than the feature that Bob is letting nature move the ecosystem services rather than him physically transporting them off of Ann's property to his, and that some of those services may benefit other landowners, every feature of the transaction between Ann and Bob maps neatly onto the profit servitude. Treating the ecosystem services the same as timber, moreover, presents no threat to the integrity of profit doctrine. If the profit were in Ann's timber, Bob would have the right to manage the forested area to maximize his timber yield.[166] For the profit in ecosystem services, he could do the same to the natural capital

164. *Id.* § 1.2 cmt. d; *see also id.* § 4.10 (addressing use rights and limitations of easement and profit holders).

165. *See id.* § 1.2 cmt. e; *see also id.* § 1.5 (defining appurtenant versus in gross servitudes).

166. *See id.* § 4.10 (discussing use rights of servitude holders).

resource, be it the wetlands providing groundwater recharge, riparian habitat providing sediment capture, or the pollinator habitat providing pollinators. Also like a timber profit, Bob would have no right to convert the natural capital to other land uses,[167] nor could he interfere with Ann's other land uses, nor could she with his.[168] From there, the fact that Bob can sit back and let nature do the work of transporting the services nonetheless leads to exactly what profit doctrine promotes—the services are now Bob's property from the moment they flow from the natural capital, including while on Ann's property.

Of course, the devil is in the details, and those differences from the timber profit scenario need to be worked through when transporting the profit servitude model to the ecosystem services context. First, under traditional doctrine, a profit is "used most frequently for hunting and fishing rights and exploitation of natural resources through lumbering, mining, and other extractive activities."[169] Some states take a strict view that a profit is a right or privilege to acquire by severance or removal from the land of some thing or things previously constituting a part of the land, or pertaining to the land, and in this sense profits are distinguishable from an easement which does not include a right to participate in the profits from the land.[170] Under this strict doctrinal application, for example, the right to withdraw water or ice from another's property has, in some states, been deemed only an easement because water is not (in these courts' conceptions) a product of the land.[171] On the other hand, the right to capture steam and thermal energy produced from the land, neither of which is a physical commodity like timber, has been described in some states as a profit.[172]

Arguably, many streams of ecosystem services, such as groundwater recharge from wetlands and sediment capture from riparian habitat, are derived from processes pertaining to the land.

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167. *See id.* (addressing scope and limitations of use rights).

168. *See id.* § 4.9 (addressing servient estate owner's rights and responsibilities).

169. *Id.* § 1.2 cmt. e.

170. *Id.* § 1.2, reporter's note (citing Farley v. Hiers, 668 So. 2d 248 (Fla. Dist. Ct. App. 1996)).

171. *See id.*

172. *See id.* (citing Kennecott Corp. v. Union Oil Co. of Cal., 242 Cal. Rptr. 403 (Ct. App. 1987)).

As services, however, they are not physical commodities taken away from the parcel, like trees or minerals. For practical purposes, however, this is a distinction without legal significance, going only to the "plus" feature of what a profit inherently adds to an easement—the right to extract a resource and own it.[173] To ensure their arrangement accomplishes that result in states that might describe ecosystem services, such as flood control and pollination, as not being eligible for treatment as profits, Ann and Bob could simply add a provision to the servitude agreement specifying that Ann agrees to Bob's dominion over the identified ecosystem services flowing from the natural capital subject to the easement features of the servitude.

The complicating second detail flows from the nature of ecosystem services as positive externalities that behave like public goods—that is, Bob cannot necessarily control who else benefits from the services flowing from the natural capital resources he now has rights to access and manage on Ann's land pursuant to his new Natural Capital Servitude. Under the timber extraction profit scenario, for example, there is no ambiguity over who owns the logs that Bob carts off Ann's land, whereas other landowners downstream of Ann's property would benefit from the riparian habitat sediment capture services Bob is now supplying. As between Ann and Bob, however, this is simply a factor Bob would consider in determining the price he is willing to pay for the servitude. And in the case of NatCap's service aggregation business, this is more a feature than a bug, as NatCap's business model is to secure flows of ecosystem services benefitting multiple landowners (such as the farmers), the public (such as the City's plan), or regional development markets (such as the offset bank). NatCap's goal, in other words, is to secure continued landscape-scale flows of ecosystem services—the more of its clients who enjoy those benefits, the more NatCap has achieved its purposes.

Acknowledging that some states may be reluctant to characterize Ann and Bob's arrangement as a profit versus an easement, but that the difference is inconsequential for our purposes, we frame our proposed property interest broadly as the Natural Capital

173. *See id.* § 1.2 cmt. e.

Servitude.[174] Importantly, once Ann and Bob contract to transfer the Natural Capital Servitude, Bob would own an enforceable *property* interest, not just an enforceable contract.[175] Parties would negotiate the details of the servitude, such as what natural resources Bob can manage, which services are covered, and where access applies, just as the parties to a timber profit do. From there, the Natural Capital Servitude inherently embeds servitude doctrine and its extensive history to define respective rights and responsibilities.[176] The servitude owner holds a distinct property interest that can be transferred to third parties,[177] along with and subject to those conditions, either by making the servitude appurtenant (such as running with Bob's land to successor owners) or in gross (such as for NatCap's sale into markets).

Those two features facilitate scaling up to contexts like NatCap's service aggregation and ecosystem services credit business lines. For example, to secure the sediment and pollutant capture services of riparian habitat the City desires, the City could retain NatCap to negotiate with riparian owners regarding the details of the servitude, such as the width of the riparian buffer and property access routes, without negotiating all the other conditions that are already embedded in the servitude property interest.[178] Or, in the State's coastal ecosystem services offset program, NatCap could itself purchase the servitudes from property owners and then manage the natural capital (such as dunes) to enhance the flow of services, thus creating credits to market to developers in need of them.[179]

Lastly, implementing this innovation in servitude doctrine would not require more than parties willing to frame the arrangement as

174. Earlier versions of the *Restatement* did not use the term profit, but its distinct form persisted and it was returned to the *Restatement* terminology and discussion. *Id.*

175. *Id.* § 1.1 (explaining the creation and enforcement of servitudes).

176. *See generally id.* §§ 1.1-1.3 (outlining fundamental servitude principles).

177. *Id.* § 5.1 (addressing transferability of servitudes).

178. Another feature the Natural Capital Servitude introduces at scale is the use of eminent domain to overcome assembly problems attributable to holdouts. In the example above of the City retaining NatCap to negotiate servitudes with riparian landowners along a linear stretch of river, the City could exercise eminent domain to secure the interests from owners unwilling to sell or demanding excessive prices, the compensation costs of which would necessarily be less than the costs for taking the underlying possessory fee simple interest and the easements necessary to assess it. This potential is outside the scope of our analysis.

179. *See supra* notes 151-54 and accompanying text.

a servitude for their intended purposes. As with any easement, the parties will specify details of access and management (where, when, how); and for the "plus" offered by a profit, the parties will specify the transfer of rights to identified ecosystem services.[180] The existing law of servitudes in the state would be automatically embedded in the servitude. To be sure, there may be some features sufficiently novel in the eyes of a court as to require further elaboration—such as how to define services—but that is the work of the common law, to adapt over time to innovations between private parties regarding how they divide the sticks in the bundle. The Natural Capital Servitude over time would develop its specialized body of doctrine, just as various other types of easements and profits have for centuries.[181]

2. The Severable Natural Capital Estate

What if Bob, NatCap, or the City wants more, more in the sense of a direct *possessory* ownership interest in the natural capital? The Natural Capital Servitude, while providing access to the natural capital and ownership of the ecosystem services streams, would create a nonpossessory interest that may not provide rights as robust and durable as parties may desire. For example, any of these parties might wish to have the latitude to exercise more management of the natural capital than the Natural Capital Servitude provides. Or offset markets might assign higher value to ecosystem services credits if NatCap owns the natural capital directly; the State may even require ownership for recognition of credits, so as to ensure greater reliability of service flows over time. Whatever the reason for wanting more than a servitude but less than a fee simple interest, property doctrine once again has a solution—the severable estate.

The basic property law doctrine of *ad coelum* provides that the owner of a fee simple absolute owns not just the surface of their property but also, as it is quaintly described, everything "from the center of the earth to the skies."[182] Under modern property doctrine,

180. *See* RESTATEMENT (THIRD) OF PROP.: SERVITUDES § 2.1 (A.L.I. 2000) (addressing creation of servitudes).

181. *Cf. id.* § 2.1 cmt. a (discussing evolution of servitude law).

182. K.K. DuVivier, *Animal, Vegetable, Mineral—Wind? The Severed Wind Power Rights*

with that interest in the "unified fee" also comes the right to disaggregate interests, most notably in subsurface minerals, by severing the estate into discrete interests.[183] The complex history of property doctrine moving from a fixed unified fee model to severable interests dates back centuries,[184] but the severable mineral estate is firmly established in the modern common law of property and, as with easements and profits, carries with it a vast body of evolved principles governing the respective rights between surface estate and mineral estate owners.[185]

A principal justification for adopting the severable mineral estate was "the public benefit from the availability of more minerals as a resource."[186] A typical property owner is unlikely to have the skill or interest in extracting subsurface minerals like oil; transferring the mineral rights to an entity with those skills and interests makes more efficient use of the property for both private and public interests.[187] From there, the bulk of mining law doctrine, such as subjacent support and dominance of the mineral estate, addresses the relationships between the respective estate owners.[188]

Conundrum, 49 WASHBURN L.J. 69, 76 (2009).

183. *See* RESTATEMENT (FOURTH) OF PROP. § 1.19 cmt. a (A.L.I., Tentative Draft No. 4, 2023) ("In contrast to air rights, severance of subsurface rights is encountered frequently and is permissible as a matter of common law.").

184. *See* DuVivier, *supra* note 182, at 77-85 (describing severance doctrine's history in ancient Greek mining royalties and English mining law before recounting early U.S. justifications for severable mineral estates due to gold, coal, and other precious mineral mining expeditions, especially in the West).

185. *See* RESTATEMENT (FOURTH) OF PROP. § 1.19 cmt. a (A.L.I., Tentative Draft No. 4, 2023) ("These severed subsurface rights are governed by a complex body of law beyond the scope of this part of this Restatement.").

186. DuVivier, *supra* note 182, at 82.

187. *Id.* at 81-82.

188. *See, e.g.*, RESTATEMENT (SECOND) OF TORTS § 820 (A.L.I. 1979) ("One who withdraws the naturally necessary subjacent support of land in another's possession or the support that has been substituted for the naturally necessary support is subject to liability for a subsidence of the land of the other that was naturally dependent upon the support withdrawn."); *id.* § 821 ("One who negligently withdraws subjacent support of land in another's possession or of artificial additions on it is subject to liability for harm resulting to the other's land and to the artificial additions on it."); RESTATEMENT (FOURTH) OF PROP. § 1.19 cmt. b (A.L.I., Tentative Draft No. 4, 2023) ("When subsurface rights are severed from surface rights, the common law recognizes that the surface owner retains a waivable right, with a correlative duty in the subsurface holder, to adequate support of the surface, at the level that land in its natural state would enjoy, so as to counteract subsidence."); 3 JAMES N. JOHNSON, TEXAS PRACTICE GUIDE REAL ESTATE TRANSACTIONS § 17:82 (2024) ("[T]he mineral estate is the dominant estate."); 3 JOYCE PALOMAR, DAVID NOWLIN & KIMBERLY WURTZ, PATTON AND PALOMAR ON

Looking to the skies rather than underground, securing the public benefit of increased wind power resource availability has led to a growing conversation among property law scholars and practitioners over the prospect of a severable wind estate.[189] A wind power facility, obviously, does not generate its own wind; rather, it requires a continued flow across the wind-shed landscape to the wind turbines. Although leases and easements also could serve as means for establishing wind flows across the relevant properties, the arguments in favor of a severable wind estate stress the greater certainty such an estate interest would provide wind power developers in securing a stable wind supply.[190] On the other hand, any new divisions to the unified fee will present new sources of ambiguity and of friction between the respective subestate owners, which has led some scholars to caution against severability.[191] As it

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LAND TITLES § 730.1 (3d ed. 2024) ("Traditional common law rules have considered the mineral estate, when severed, the dominant estate."); 53A AM. JUR. 2D *Mines and Minerals* § 347 (2017) (discussing rights between surface and mineral estate owners).

189. *See* Thomas Boyd, Comment, *Who Owns the Texas Sky? An Analysis of Wind Rights in Texas*, 45 ENV'T L. REP. 10426, 10427-29 (2015) (comparing severable wind estates to severable mineral estates and arguing that wind estates accord with Texas contract law and property law); Alan J. Alexander, Note, *The Texas Wind Estate: Winds as a Natural Resource and a Severable Property Interest*, 44 U. MICH. J.L. REFORM 429, 456 (2011) (arguing in support of judicial and legislative contours to wind estate severability); Cameron K. Rivers, Note, *Change in the Wind: Severance of the Wind Estate in Texas*, 14 TEX. J. OIL GAS & ENERGY L. 91, 98 (2019) ("[T]he severability of the wind estate is already supported by existing laws and public policy objectives, the most important of which are that people are already severing the wind estate, severance promotes certainty and stability in the energy sector, and a severed estate—unlike a lease—can be passed down or sold."); Shanisha Y. Smith, *What Lies ~~Beneath~~ Above: Mineral, Wind, and Groundwater Estates in Texas and the Severance Implications*, HOUS. LAW., Mar.-Apr. 2021, at 14, 17 ("Property ownership theories support the severance of the wind estate."); Rachel Givens, Comment, *Pecos Bill's Turbines in the Tumbleweeds: Extending the Texas Property Code to Permit Severance of Wind Rights Through Testate and Intestate Succession*, 14 EST. PLAN. & CMTY. PROP. L.J. 579, 617 (2022) ("The Texas legislature should create legislation that recognizes wind as a private property interest and allows landowners to sever the wind estate from surface ownership, including testate and intestate succession methods."); Robert Montgomery, Note, *Water to Wind: The Path Texas Groundwater Law Provides to Sever the Wind Estate and Prioritize Mutually Dominant Estates*, 50 TEX. ENV'T L.J. 107, 149 (2020) ("Landowners should have support from the Texas Legislature as well as from the Texas Supreme Court that the wind estate is a freely severable property interest that can be conveyed, reserved, or bequeathed.").

190. *See* Rivers, *supra* note 189, at 103 ("Recognizing a wind severance as valid would assuage the costs and uncertainty wind developers now face."); Givens, *supra* note 189, at 600 ("One major reason for having clear legislation within this area of wind law is that legislation may greatly reduce the number of complaints filed in opposition to wind farm development.").

191. *See* DuVivier, *supra* note 182, at 86 ("[W]hile property law may permit the severance

stands, some states have moved in favor of allowing severed wind estates[192] while several others have adapted lesser interests, such as wind leases[193] and wind easements,[194] as ways to secure wind flows.

Like wind power, the continued delivery of ecosystem services requires a service-shed within which the benefits flow, and like wind power developers, the service beneficiary desires a means for controlling the flow across the source and intermediary properties. Indeed, a severable Natural Capital Estate is an even closer fit with traditional severable estate doctrine than is the wind estate. After all, the surface property subject to a wind estate does not actually produce or contain the wind onsite—the point of the wind estate (or lease or easement) is to provide continued flow of the wind across the property.[195] And a wind estate does not confer ownership of the air.[196] By contrast, the Natural Capital Estate secures ownership rights in the flow of services as well as in their natural capital sources.[197] In particular, although often overlooked because they are

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of wind rights, the traditional rationales for mineral severance do not support severance as the most effective method for encouraging the development of wind power."); *see also* Troy A. Rule, *Wind Rights Under Property Law: Answers Still Blowing in the Wind*, PROB. & PROP., Nov.-Dec. 2012, at 56, 58-59 (describing novel questions related to wind rights, including takings of severed wind estates and dispute resolution between surface owners and wind estate owners).

192. *See* Contra Costa Water Dist. v. Vaquero Farms, Inc., 68 Cal. Rptr. 2d 272, 277 (Ct. App. 1997) ("[O]ne may have a right to use windpower rights without owning any interest in the land.... Windpower rights clearly are 'substantial' rights and thus may be condemned, or excluded from condemnation, despite their factual novelty under present law."); WYO. STAT. ANN. § 34-1-151(e) (2007) (acknowledging potential severance of the wind estate from the surface estate in requiring the severance's disclosure in certain circumstances).

193. *See* Sw. Pub. Serv. Co. v. Ridge Renewables, LLC, No. 07-23-00421-CV, 2025 WL 2046136, at *1-2 (Tex. Ct. App. July 21, 2025) (recognizing severed wind property interest in the form of a wind lease).

194. *See* MINN. STAT. § 500.30 (2024) (granting wind easement rights); N.D. CENT. CODE § 17-04-03 (2017) (same); S.D. CODIFIED LAWS § 43-13-17 (2025) (same); MONT. CODE ANN. § 70-17-403 (2023) (same).

195. *See* Thaddeus Baria, Comment, *Up the Creek with a Paddle: Water Doctrine as a Basis for Small Wind Energy Resource Rights*, 59 DEPAUL L. REV. 141, 144 (2009).

196. *See* Alexander, *supra* note 189, at 445.

197. Similarly, in some cases an entity like Bob or NatCap may wish to secure only the transmission flow of ecosystem services across a property, the services having been produced by natural capital on yet another property. Either a Natural Capital Servitude or a Natural Capital Estate would have the flexibility to apply in that context as well—that is, without the additional feature of rights to manage or own natural capital on the transmission property. States that have rejected the severable wind estate, leaving wind flow assurance to leases or

unseen, soil and other subsurface geological features provide extensive flows of ecosystem services.[198] We think nothing today of severing a subsurface estate to extract minerals; there is no inherent reason why property law could not also allow severance of a subsurface estate to "extract" ecosystem services through the Natural Capital Estate.

As with the Natural Capital Servitude, the parties would identify the services and their associated natural capital resources. The physical features of the estate would include the natural capital and whatever physical features of the property that facilitate the flow of ecosystem services, such as stream channels or underground aquifers. If the service were to flow across properties between the source and benefitted parcels, interests in the physical features of the flow channel could also be conveyed as severable estates. The Natural Capital Estate would be dominant to the surface estate and to other estates subsequently severed from the fee interest, such as a mineral estate, and subservient to those severed before it. And the Natural Capital Estate would fix the use of the property interest, prohibiting its owner from converting the natural capital to other uses.

From there, the extensive additional doctrinal background of severable estates would initially map onto the Natural Capital Estate and, like the law of the Natural Capital Servitude, would evolve over time to adapt to the particular context of natural capital and ecosystem services.[199] Like the Natural Capital Servitude, the Natural Capital Estate would enjoy the benefit of an extensive preexisting doctrinal context that inherently embeds rules regarding respective rights and responsibilities.[200] It would create a distinct property interest that could be transferred to third parties, and it would be as scalable as the Natural Capital Servitude. Bob could sell his natural capital estate to NatCap. If Ann were to sell her

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easements, might also reject a severable estate in ecosystem service flows. In such cases, either the Natural Capital Servitude or a simple lease or easement agreement could suffice for these purposes.

198. *See* Sarah J. Fox, *Soil Governance and Private Property*, 2024 UTAH L. REV. 1, 5; Keith H. Hirokawa, *The New Law of Geology: Rights, Responsibilities, and Geosystem Services*, 52 ENV'T L. REP. 10380, 10383 (2022).

199. *See supra* note 181 and accompanying text.

200. *See supra* notes 176-77 and accompanying text.

property to Carol, Bob's or NatCap's ownership of the natural capital estate would remain in place.

As between the two interests—a possessory estate or a nonpossessory servitude—Bob may have distinct reasons for preferring the estate given the possessory interest it confers. In short, Bob would own, say, the riparian habitat rather than having only the right to access and manage it for ecosystem service flows. This might provide greater security, and more extensive remedies, regarding how Ann manages her retained interests in the property. For example, if she established an industrial use from which pollution damages the habitat, Bob might have a cause of action for nuisance[201] and compensatory damages for restoration,[202] whereas the servitude might provide only compensation for the diminished ecosystem service values.[203] Also, owning the habitat would provide Bob the right to restore the resource if it were damaged by fire or flooding,[204] which might not be as clear if Bob's interest were in the form of a servitude (but could be negotiated).[205]

NatCap and its clients may have these and even more reasons to prefer a possessory interest if a robust market in ecosystem services develops. The farmers and the City, for example, could manage the aggregated habitat as a true property owner would, rather than as the beneficiary of a servitude. And the State's offset program may prefer that credit sellers like NatCap have a possessory interest in the natural capital to facilitate regulation and quality control. As a possessory interest, the Natural Capital Estate could implicate tax and other practical consequences not applicable under the Natural Capital Servitude.[206] Whether that and any additional "baggage" outweighs the advantages of direct ownership of the natural capital is for the parties to decide.

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201. *See* RESTATEMENT (SECOND) OF TORTS § 822 (A.L.I. 1979).

202. *See id.* § 929.

203. *See* RESTATEMENT (THIRD) OF PROP.: SERVITUDES § 8.3 reporter's note (compiling remedies awarded in cases of enforcement of easements against obstruction).

204. See 55 TEX. JUR. 3d Oil & Gas § 20 (stating that owners of severed mineral estates carry "all other incidental rights which are necessary to be used for getting and enjoying them").

205. RESTATEMENT (THIRD) OF PROP.: SERVITUDES § 4.13 (A.L.I. 2000).

206. JON W. BRUCE, JAMES W. ELY & EDWARD T. BRADING, THE LAW OF EASEMENTS AND LICENSES IN LAND § 1.1 nn.4-5 (2025) (giving exceptions to the general rule that easements are taxable to the holder of the servant estate).

Implementing the Natural Capital Estate would, like the emergence of wind estates,[207] begin with parties adapting mineral estate severance practices to natural capital. To be sure, describing the natural capital and ecosystem service flow channels conveyed could require more scientific expertise and precision than for the Natural Capital Servitude given transfer of a possessory estate is at stake, but over time the practice could become routinized and the conveyance language could become standardized, much as was the case over time for the mineral estate.[208]

B. Sticks Versus Contracts

We acknowledge that these proposed doctrinal innovations present complicated issues, such as how to define the natural capital and ecosystem services, the respective rights and responsibilities of the parties, and how to apply the doctrine at scales beyond the bilateral Ann and Bob context. But that is part and parcel of designing any sophisticated property instrument. Property doctrine has been up to the task time and again in the past. It has resolved similar issues to develop servitudes for a variety of natural resources and to design severable estates for various "slices" of discrete property interests.[209] We have shown how these doctrines can be mapped onto natural capital and ecosystem services to open up new ways for public and private interests to manage property service streams more efficiently.[210]

But why go through all the trouble—are the benefits worth the costs of designing, implementing, and then administering their doctrinal features? We believe they are.

First, the two new property interests fill the gap that exists in current property law for managing ecosystem services because existing options provide either too much or too little. Purchasing the fee simple absolute in the natural capital parcel certainly provides all the interests conveyed under either the servitude or the severable estate, the problem being that it provides far more than what the purchaser often will seek or be willing to pay for. The

207. *See supra* notes 186-89 and accompanying text.
208. DuVivier, *supra* note 182, *passim*.
209. *See supra* notes 186-89 and accompanying text.
210. *See supra* Part IV.A.

proposed interests, being "smaller" than the fee simple interest, add options in that regard.

At the other end of the spectrum, the conservation easement, even if tailored to apply use restriction covenants designed to facilitate natural capital conservation and ecosystem service flows, does not typically include affirmative rights of access and resource management for the beneficiary or impose affirmative conservation enhancement actions on the owner.[211] Nor is a conservation easement a distinct marketable property interest in either the natural capital or ecosystem services.[212] A PES agreement has the advantage over conservation easements of focusing on creating affirmative land use conservation practices.[213] As discussed above, however, enforcement of a PES contract is limited to contract remedies.[214] That may suffice in some contexts, and a contractual arrangement is likely to cost less than a servitude or severed estate interest, or even a conservation agreement. Like a conservation easement, however, a PES contract does not typically include affirmative rights of access and resource management for the beneficiary and creates no marketable property interest of any kind.[215]

While a conservation easement or PES contract could be supplemented with provisions coming closer to the Natural Capital Servitude instrument, perhaps even to the point of imposing express easement rights, our proposed options have the advantage of removing any ambiguity over the extent of any such property devices. Rather than grafting property interests onto instruments not designed for that purpose, it seems far more practical and efficient to build our proposed servitude and severable estate interests. Once built, they would embed the respective doctrinal rules and standards as inherent default features.

Ultimately, the core use case for the Natural Capital Servitude and Natural Capital Estate rests in their nature as marketable

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211. *See supra* Part III.B.3.

212. *See* Owley, *supra* note 120, at 199 ("Conservation easements are nonpossessory interests in land restricting a landowner's activities with the hopes of yielding a conservation benefit.").

213. *Contrast id.* (noting conservation easement as restricting uses of land), *with* Salzman et al., *supra* note 91, at 200 (noting that PES contracts can be used to stimulate new activity).

214. *See supra* Part III.B.

215. *Cf.* Salzman et al., *supra* note 91, at 205 (categorizing types of PES contracts and noting that they are an exchange of value for land management practices).

property interests with features defined through extensive histories of doctrinal development. They leverage the durability and stability of servitudes and estates law, providing confidence in markets regarding interpretation, enforceability, and remedies. That embedded law and practice facilitates enlarging to landscape scales at low transaction costs.

To be sure, it would be naïve to think that if these instruments are made available then all the Anns, Bobs, and NatCaps of the world will rush to them. They are not panaceas to the problem of property and ecosystem services. Rather, they fill interstitial gaps in existing property doctrine and, as such, will work at the margins to open opportunities for parties to reach agreements where they would not have had the flexibility to do so before. And by incorporating the existing law of servitudes and estates, they are themselves flexible.

For example, although the default rule of a servitude running with the land is that it is perpetual unless terminated by operation of law, parties can negotiate terms and other conditions of termination, such as changed conditions (for example, loss of the natural capital to flood or fire).[216] And, much to the woe of first-year law students, estates in land can also be conditioned.[217] In other words, Ann is not limited to selling Bob a Natural Capital Servitude or Natural Capital Estate that lasts forever under all circumstances. Departures from default rules are always on the table and will shake out in the price and description of the property interest, giving parties the flexibility to take these new "off-the-shelf" instruments and design them to their purposes the way parties have done with easements and estates for centuries.

The advantages offered by the Natural Capital Servitude and the severable Natural Capital Estate would be useful additions to the ecosystem services toolkit under any circumstances, but could not come at a more urgent time than the present. As noted above, climate change is degrading natural capital and the resources that support the flow of services from their sources to beneficiaries.[218] At the same time, however, regulatory protections of natural capital

216. *See* RESTATEMENT (THIRD) OF PROP.: SERVITUDES § 7.2 (A.L.I. 2000).
217. *See, e.g.*, RESTATEMENT (FIRST) OF PROP. § 153 (A.L.I. 1936).
218. *See supra* note 43 and accompanying text.

are receding in many contexts, such as through the substantial reduction of water resources protected under the Clean Water Act after the Supreme Court's decision in *Sackett v. EPA*.[219] Public and private investment in natural capital thus has never before been so critical to the sustained provision of ecosystem services.[220] Property doctrine must adjust to these physical and political realities.[221] Our Natural Capital Servitude and severable Natural Capital Estate provide flexible, durable property interests that will facilitate natural capital investment markets.

V. PROPERTY DOCTRINE FOR POSITIVE EXTERNALITIES

Our analysis has used the example of natural capital and ecosystem services to explore the shortcomings in current property doctrine to protect and promote positive externalities. But this exploration has implications far beyond the natural world. Thinking beyond natural capital and ecosystem services, the thing-service dichotomy in property law, in which one property owner controls features on their property that supply positive externality benefits to other property owners, obstructs innovation in many other contexts where the property interests we propose could be adapted. Generalizing from the natural capital-ecosystem services context involves identifying property relationships with five core features:

> 1. A class of properties (Source Property) contains attributes that are the source of passive positive externalities benefiting other property owners (Beneficiary Property). The Source

219. 598 U.S. 651, 684 (2023). For a complete history of the regulation of bodies of water in the United States, see generally ROYAL C. GARDNER, WATERS OF THE UNITED STATES: POTUS, SCOTUS, WOTUS, AND THE POLITICS OF A NATIONAL RESOURCE (2024).

220. *See* Michael P. Vandenbergh, Elodie O. Currier Stoffel & Steph Tai, *Filling the* Sackett *Gap: The Private Governance Option*, 109 MINN. L. REV. 2583, 2590-93 (2025) (identifying various market and other private governance approaches to wetlands conservation, to which we would add pursuing our proposed property interests to expand the ownership models available to land trusts, private and public land banks, and corporate investors).

221. *See* J. Peter Byrne, *Property in the Anthropocene*, 6 BRIGHAM-KANNER PROP. RTS. CONF. J. 259, 273 (2017); Robin Kundis Craig, *"Stationarity Is Dead"—Long Live Transformation: Five Principles for Climate Change Adaptation Law*, 34 HARV. ENV'T L. REV. 9, 62 (2010); Doremus, supra note 44, at 1091-92; Jim Rossi & J.B. Ruhl, *Adapting Private Law for Climate Change Adaptation*, 76 VAND. L. REV. 827, 832-34 (2023); John G. Sprankling, *Property Law for the Anthropocene Era*, 59 ARIZ. L. REV. 737, 758 (2017).

> Property owners are indifferent to others' enjoyment of the positive externalities, and the Beneficiary Property owners are lawfully enjoying the benefits.
>
> 2. The value of the benefits is sufficient to the Beneficiary Property owners, and to the public interest, to make them interested in securing their continued provision, but is not sufficient to justify purchasing the Source Properties in fee simple absolute.
>
> 3. The Source Property owners potentially have future alternative uses of their property which are of higher value to them than their present uses, and which would substantially deplete or destroy the attributes of the Source Properties supplying positive externality benefits to the Beneficiary Properties and public interest.
>
> 4. The Source Property owners could preserve the attributes of the properties supplying the benefits and continue to derive substantial value from uses of the remaining attributes of the properties without interfering with the provision of benefits.
>
> 5. The sum of the price the Beneficiary Property owners, or the public, are willing to pay the Source Property owners to preserve the attributes supplying the benefits *plus* the value the Source Property owners can continue to derive from using the remaining attributes is greater than the value the owners derive from the present use of the properties.

While this may appear to be a narrow set of conditions, it is precisely what motivates the common practices of sale of express easements and restrictive covenants, and, on a grander scale, the sale of mineral estates. The difference, of course, is that in those cases the purchaser of the property interest is usually gaining a benefit not previously enjoyed (access, use restrictions, minerals), whereas in our positive externalities context, the purchasers are already enjoying the benefits. But that is the very crux of the problem—they are enjoying them at the discretion of the Source Property owner and cannot prevent the depletion of the positive externalities. In a very real sense, therefore, they are guaranteeing a benefit they did not previously enjoy in the form of a property interest that ensures the continued supply of the benefits.

Returning to our historic buildings and the "last building standing" problem described above in Part II, for example, what options did the surrounding property owners and the public have as the problem of disappearing historic buildings began to raise scarcity concerns? How could they have intervened before reaching the "last building standing" state of affairs? One option would have been public law regulation restricting conversion of building façades, which in practice has been a frequent policy response—and one fraught with controversy.[222] Private law options would have included those we surveyed above in Part III, such as contracts and conservation easements, all of which would have had the same limitations in achieving the objective of stemming the loss of positive externality benefits.

The building façade, however, is simply an attribute of the property as a "thing," much the same as the natural capital resources on Ann's property, and the enhancement of nearby property values, tourism spending, and public enjoyment are the "service stream" of benefits the façade provides, much like the ecosystem services Bob enjoys thanks to Ann.[223] Like the natural capital-ecosystem services property relationship, therefore, the challenge is to design property interests that unify the two without need of purchasing the entire fee simple estate.

Our Natural Capital Servitude and Natural Capital Estate can easily be put to use for this purpose. Indeed, the mechanics would be exactly the same—all that changes is the name, as in "Historic Façade Servitude" and severable "Historic Façade Estate." Unlike a public subsidy, a profit servitude would allow public and private investors to purchase the rights to enter and maintain the building façade and own the benefits it provides, or the severable estate would go further by conferring full unified ownership of the defined façade estate.[224] Rather than relying on regulations and the threat of takings claims, these property interests could be bought and sold

222. This was the core regulatory feature of the New York City building landmark ordinance involved in *Penn Central Transportation Co. v. New York City*, 438 U.S. 104, 116-17 (1978).

223. *See, e.g.*, *id.* at 109.

224. While it may seem unusual to separate a building façade and the interior ownership, this arrangement is not functionally different from ownership of a common wall in a residential duplex or the relationship between adjacent condominium unit owners.

on the market, thus acting more responsively and nimbly to identify increasing scarcity and to avoid the problem of the "last building standing" without invoking the heavy hand of regulation. And as NatCap would scale up the use of the servitude and severable estate interests for ecosystem services, so too could its subsidiary, FaçadeCo, for the private and public positive externalities from historic buildings.

In short, think of *any* land use context meeting our proposed conditions, in which management of some attribute of a property parcel provides some form of a positive externality. Community safety and cohesion, for example, can be enhanced by well-kept properties that improve visibility and indicate that the residents are interested in the community.[225] Agricultural lands could provide space for community gardens, cultural events, and recreation.[226] Urban parcels can provide space for swales and green infrastructure,[227] and urban buildings provide opportunities for white roofing, roof gardens, and solar panels to promote climate change mitigation and adaptation.[228] Regulation, of course, can force property owners to supply some of these benefits, but markets should be positioned to work in these spaces as well. In each of these and similar contexts, the conditions we identify as providing opportunity for market solutions may be present in sufficient magnitude to support exploring how creative design of servitudes and severable estates can provide more options for markets to use toward that end.

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225. *See* Mysha Clarke, Stephanie Cadaval, Charles Wallace, Elsa Anderson, Monika Egerer, Lillian Dinkins & Ricardo Platero, *Factors That Enhance or Hinder Social Cohesion in Urban Greenspaces: A Literature Review*, 84 URB. FORESTRY & URB. GREENING, April 2023, at 1, 3.

226. *See* Mary L. Ohmer, Pamela Meadowcroft, Kate Freed & Ericka Lewis, *Community Gardening and Community Development: Individual, Social and Community Benefits of a Community Conservation Program*, 17 J. CMTY. PRAC. 377, 379 (2009).

227. *See* Olivia Addo-Bankas, Ting Wei, Yaqian Zhao, Xuechen Bai, Abraham Esteve Núñez & Alexandros Stefanakis, *Revisiting the Concept, Urban Practices, Current Advances, and Future Prospects of Green Infrastructure*, SCI. TOTAL ENV'T, Dec. 2024, at 1, 2.

228. *See* Valeria Todeschi, Guglielmina Mutani, Lucia Baima, Marianna Nigra & Matteo Robiglio, *Smart Solutions for Sustainable Cities—The Re-Coding Experience for Harnessing the Potential of Urban Rooftops*, APPLIED SCI., Oct. 2020, at 1, 11, 23.

CONCLUSION

The puzzle of property doctrine's unbalanced focus on preventing negative externalities while largely ignoring positive externalities has an answer already in place. Carving existing sticks such as servitudes and estates into new shapes for the bundle provides a promising approach to conserve and promote not only ecosystem services, but also a wide range of benefits provided by land use. This Article has shown that there is value in thinking about benefit provision through property doctrine as an alternative to land use regulation. We hope this insight spurs others to think about and build on this topic, which has been overlooked for too long. The sticks are already there. They just need a deft and knowing hand to whittle them.