

COMPLEMENTARY AUTHORITY AND THE ONE-WAY
RATCHET: ECOSYSTEM SERVICES PROPERTY,
REGULATION, AND WILDLIFE CONSERVATION

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Due to the priorities of the Trump Administration, which are not a great match with those of the conservation community, we find ourselves in a period of rollbacks for all kinds of environmental regulation, including the protection of wildlife. When the federal government fails to adequately regulate, we look to other sources of authority to fill that gap. The first and most obvious place to look is to state and local governments. They are our best hope to avoid hemorrhaging vulnerable species during this presidency. Alas, looking at the realities of state wildlife conservation laws, we see the gaps remain. Where else are we to turn? Is there any potential source of private power that might be leveraged in favor of conservation? Building on the author's recently published theory of ecosystem services property, this Essay considers the extent to which that potential property interest may operate in favor of wildlife conservation, even where that is not the goal of those exercising the right. While no substitute for government regulation, this approach to property rights may well assist in filling regulatory gaps.

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I. INTRODUCTION

Typically when we talk about overlapping or complementary authority over resources we are speaking of federalism—the relationship between the federal government and state governments. This Essay considers a different, but equally important to its context of wildlife conservation, authority overlap: that between government regulation at any level on the one hand, and private authority on the other. When we consider sources of authority we often forget to take into account the power that property rights confer on private parties—power that can support conservation policy goals or serve as an obstacle to those goals.

Drawing on the author’s recently published theory of ecosystem services property,¹ this Essay demonstrates how this narrow subset of property rights can serve to complement regulatory efforts to protect biodiversity. Further, the concern for biodiversity conservation serves to bolster the importance of allocating the ecosystem services property to receiving landowners, as an allocation toward generating landowners (owners of the natural capital) could serve to undermine regulatory protections. If allocated as proposed, property rights in ecosystem services would be at best beneficial and at worst harmless to wildlife, thus combining with existing regulation in the form of a one-way ratchet in favor of conservation. However, while ecosystem services property might enable private parties to compensate in some ways for the conservation shortcomings of the Trump Administration, the actual choices private actors make are too unpredictable to serve as a substitute for regulation, so state regulation will remain critically important during this era.

II. WILDLIFE FEDERALISM AND THE IMPACT OF REDUCED FEDERAL EFFORTS TO CONSERVE

A. Federal and State Biodiversity Protections

Both the federal government and the states have legislation protective of biodiversity, which can vary substantially as to both content and implementation priorities. These powers often overlap, as federal legislation does not preempt the entire field. All but a few states now have such statutes

¹ See generally Kalyani Robbins, *Allocating Property Interests in Ecosystem Services: From Chaos to Flowing Rivers*, 42 HARV. ENVTL. L. REV. 197 (2018).

and list their own endangered species for protection, which demonstrates an evolution of state priorities and perhaps a response to the development of public trust doctrine in relation to wildlife.² It is worth noting, in relation to some of the points to come, that the federal Endangered Species Act³ (ESA) was designed as it was in a world without state ESAs.

We count on the Trump Administration to implement several important statutes for the protection of wildlife. First, the ESA, which was intended “to halt and reverse the trend toward species extinction, whatever the cost.”⁴ The ESA requires the listing of threatened and endangered species for protection, as well as the designation of their critical habitat, also to be protected.⁵ It prohibits “take” of individual members of a listed species by any person, and requires all federal agencies to ensure that their actions (including permitting or funding private actions) neither jeopardize the continued existence of a listed species nor destroy or adversely modify its designated critical habitat.⁶ Next, because the country must provide safe passage throughout its many bird migration pathways, the Migratory Bird Treaty Act of 1918⁷ is also quite valuable. It makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird without a permit, and imposes strict liability for violations.⁸ Finally, enforcement of the Marine Mammal Protection Act of 1972⁹ expands on the benefits of the ESA by reaching species not listed there (all marine mammals are protected, regardless of their conservation status).¹⁰ While these three statutes do not represent the full universe of U.S. wildlife legislation, they offer the greatest potential protections for biodiversity and serve as somewhat of a trifecta by expanding beyond the world of ESA-listed species for the critical categories of migratory birds and marine mammals.¹¹

² In other words, if the states have a duty, as trustees, to protect wildlife, this might lead to greater formal protections such as endangered species laws. See Alejandro E. Camacho et al., *Assessing State Laws and Resources for Endangered Species Protection*, 47 *Envtl. L. Rep.* (Envtl. Law Inst.) 10,837, 10,837–38 (2017) (providing a breakdown of what state endangered species laws cover); see also Melissa Kwaterski Scanlan, Comment, *The Evolution of the Public Trust Doctrine and the Degradation of Trust Resources: Courts, Trustees and Political Power in Wisconsin*, 27 *ECOLOGY L.Q.* 135, 137 (2000) (explaining that “[t]he expansion of the public trust doctrine has been a focal point for hopes that the doctrine will be used to curb the degradation of . . . wildlife”).

³ Endangered Species Act of 1973, 16 U.S.C. §§ 1531–1544 (2012).

⁴ *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 180, 184 (1978) (also noting that the ESA was “the most comprehensive legislation for the preservation of endangered species ever enacted by any nation”).

⁵ 16 U.S.C. § 1533(a)–(b).

⁶ *Id.* § 1538(a)(1)(B); *Tenn. Valley Auth.*, 437 U.S. at 173.

⁷ 16 U.S.C. §§ 703–712.

⁸ *See id.* §§ 704–708.

⁹ *Id.* §§ 1361–1423h.

¹⁰ *See id.* § 1372(a)(1).

¹¹ For a more comprehensive description of federal wildlife legislation, see generally Kalyani Robbins, *Coordinating the Overlapping Regulation of Biodiversity and Ecosystem Management*, in *THE LAW AND POLICY OF ENVIRONMENTAL FEDERALISM: A COMPARATIVE ANALYSIS* (Kalyani Robbins ed., 2016).

While states initially asserted some proprietary interest in wildlife, and still do derive some power from their public trust duties,¹² the primary source of state power over wildlife comes from police powers to regulate for the health, safety, and welfare of the people of the state.¹³ State regulation of wildlife largely falls within two broad categories: biodiversity protections similar to the federal ESA, and regulation of hunting and fishing for purposes of safety and sustained yield.¹⁴ State ESAs, sometimes referred to as “mini ESAs,” exist in all but two states (West Virginia and Wyoming lag behind in this regard).¹⁵ Unfortunately, these state statutes are inadequate to the task of filling the federal ESA’s role in the event of reduced federal regulation of endangered species.¹⁶

State endangered species legislation varies widely in terms of both methodology and extent of coverage.¹⁷ Many states protect wildlife but offer no protection for endangered plants.¹⁸ Only eighteen states provide coverage for all species covered within their state by the federal ESA, leaving thirty-two states highly vulnerable to any cuts in federal implementation.¹⁹ Even the eighteen states with species lists that fully overlap with the federal list lack the funding, enforcement, and even substantive protections provided by the federal ESA.²⁰ As noted above, the two main areas of federal ESA protection for listed species are the take prohibition and the requirement that all federal agencies consult with the wildlife agencies to avoid jeopardizing listed species. In contrast, only twelve states have any form of interagency consultation in their statutes, and only eight of those have meaningful provisions in this area.²¹ Habitat destruction is the leading cause of species decline, and yet only five states restrict habitat modification on private land.²² The upshot is that while states do have some biodiversity protections, they are nowhere near the point at which they could serve as a substitute for the federal ESA (and never will be). Of course, state programs

¹² This doctrine holds that certain natural resources belong to the public to enjoy or use, and the state government has an affirmative duty to preserve those resources for the public. See Joseph L. Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 MICH. L. REV. 471, 475 (1970); Scanlan, *supra* note 2, at 137–38.

¹³ Martin Nie et al., *Fish and Wildlife Management on Federal Lands: Debunking State Supremacy*, 47 ENVTL. L. 797, 823 (2017); Susan Morrison Umstead, Note, *Constitutional Law—State’s Interest in Wild Animals*, 2 CAMPBELL L. REV. 151, 152–53, 155 (1980) (discussing states’ police power over wildlife).

¹⁴ Umstead, *supra* note 13, at 167–69 (discussing hunting and fishing for sustained yields); see also Camacho et al., *supra* note 2, at 10,838–39 (discussing state protections similar to the federal ESA).

¹⁵ Camacho et al., *supra* note 2, at 10,838–39.

¹⁶ *Id.* at 10,837.

¹⁷ See generally Robert L. Fischman et al., *State Imperiled Species Legislation*, 48 ENVTL. L. 81 (2018) (canvassing state laws in regard to coverage, consultation requirements, and prohibited acts).

¹⁸ Camacho et al., *supra* note 2, at 10,838; Fischman et al., *supra* note 17, at 100 tbl.1.

¹⁹ Camacho et al., *supra* note 2, at 10,838.

²⁰ See generally *id.*

²¹ *Id.* at 10,839; see also Fischman et al., *supra* note 17, at 107 tbl.2 (finding only eleven states require interagency consultation).

²² Camacho et al., *supra* note 2, at 10,841.

become extremely important in the face of reduced enforcement at the federal level.

B. Trump Policy and Potential Gaps

The Trump Administration moved quickly to evade its duties in relation to biodiversity protection. Indeed, as of fourteen months in, the Center of Biological Diversity's "Trump lawsuit tracker" is up to sixty-four—that's just the number of times so far that this particular nongovernmental organization (NGO) has sued the Administration, not even counting other NGOs' wildlife-related lawsuits.²³ Over the course of his first year in office, Trump has opened public lands to coal leasing by reversing a moratorium on federal coal leasing;²⁴ approved the Keystone XL pipeline that the Obama Administration had halted;²⁵ proposed a border wall between the United States and Mexico that would fragment habitat and threaten vulnerable species;²⁶ repealed protections for wolves, bears, and other wildlife on Alaska's national wildlife refuges;²⁷ reversed a permanent ban on new offshore oil and gas drilling in the Arctic and Atlantic oceans;²⁸ gutted protections for both the Grand Staircase-Escalante National Monument and the Bears Ears National Monument;²⁹ planned construction of a road through the heart of Alaska's Izembek National Wildlife Refuge;³⁰ and permitted oil companies to dump unlimited amounts of waste fluid, including chemicals used in fracking, into the Gulf of Mexico.³¹ This is just a sampling.

Policy choices are always about trade-offs. We cannot have it all. Leaders determine their priorities and then sacrifice other goals to achieve

²³ See *Trump Lawsuit Tracker: 64*, CTR. FOR BIOLOGICAL DIVERSITY, <https://perma.cc/UZ7S-5R58> (last visited Apr. 7, 2018) (describing each of the sixty-four lawsuits filed by the Center for Biological Diversity).

²⁴ Ryan Zinke, Sec'y of the Interior, Order No. 3348, Concerning the Federal Coal Moratorium (Mar. 29, 2017).

²⁵ Notice of Issuance of a Presidential Permit to TransCanada Keystone Pipeline, L.P., 82 Fed. Reg. 16,467, 16,467 (Apr. 4, 2017).

²⁶ OFFICE OF MGMT. & BUDGET, AN AMERICAN BUDGET: FISCAL YEAR 2019, at 58 (2018).

²⁷ Effectuating Congressional Nullification of the Non-Subsistence Take of Wildlife, and Public Participation and Closure Procedures, on National Wildlife Refuges in Alaska Under the Congressional Review Act, 82 Fed. Reg. 52,009, 52,010 (Nov. 9, 2017) (to be codified at 50 C.F.R. pts. 32, 36).

²⁸ Exec. Order No. 13,795, 82 Fed. Reg. 20,815, 20,817 (May 3, 2017).

²⁹ Proclamation No. 9682, 82 Fed. Reg. 58,089 (Dec. 8, 2017) (Grand Staircase-Escalante); Proclamation No. 9681, 82 Fed. Reg. 58,081 (Dec. 8, 2017) (Bears Ears).

³⁰ U.S. Fish & Wildlife Serv. & King Cove Corp., Agreement for the Exchange of Lands (Jan. 22, 2018), <https://perma.cc/4CVP-A65U>; see also Press Release, Ctr. for Biological Diversity, Lawsuit Targets Trump Administration Plan to Bulldoze Alaska's Izembek National Wildlife Refuge (Jan. 31, 2018), <https://perma.cc/9WPW-MVAM>.

³¹ Notice of Final NPDES General Permit; Final NPDES General Permit for New and Existing Sources and New Dischargers in the Offshore Subcategory of the Oil and Gas Extraction Category for the Western Portion of the Outer Continental Shelf of the Gulf of Mexico (GMG290000), 82 Fed. Reg. 45,845, 45,845 (Oct. 2, 2017); see also Press Release, Ctr. for Biological Diversity, Trump Administration Sued for Letting Oil Companies Dump Offshore Fracking Waste into Gulf of Mexico (Feb. 13, 2018), <https://perma.cc/AU35-XE65>.

them. The Trump Administration has made no effort to hide its interest in reviving the fossil fuel industry to its pre-climate-worry glory. The Administration sees the entire climate disruption issue as a massive hoax,³² and has little concern for natural spaces (or Native American lands) that may be impacted by its support for oil and gas development. Just before the end of President Trump's first year in office, the United States Department of the Interior "rescind[ed] several climate change and conservation policies issued under the Obama administration, saying they were 'inconsistent' with President Trump's quest for energy independence."³³ Some of these changes were significant to biodiversity protection, including policies for avoiding activities impacting wildlife on federal land and mitigating the harms caused by climate change and invasive species.³⁴ Experts within the Obama Administration invested an enormous amount of time and effort to develop a comprehensive and scientifically up-to-date set of best practices for land management agencies to follow, and the new Administration is tossing it all in the wastebasket.³⁵

The legislature is also seeing a rise in anti-biodiversity proposals. There are presently five bills pending in Congress designed to significantly weaken the ESA.³⁶

Most relevant to this Essay, of course, are the gaps in ESA enforcement that have begun to snowball in Trump's wildlife agencies. On October 5, 2017, the United States Fish & Wildlife Service declined to list twenty-five petitioned species,³⁷ many of which are imperiled by climate change impacts, which the Administration is unwilling to acknowledge exist. Most notable was the Pacific walrus, which is losing its sea ice habitat just like the listed polar bear, and which the Obama Administration found warranted listing (though it did not complete the listing).³⁸ Noah Greenwald, the endangered species director for the Center for Biological Diversity, called the Trump Administration "the worst enemy of wildlife and endangered species we have ever seen."³⁹

In addition to refusing to list species for protection, the Administration is also avoiding implementation of the ESA's protections for existing listed

³² See Peter Baker, *Does Donald Trump Still Think Climate Change Is a Hoax? No One Can Say*, N.Y. TIMES (June 2, 2017), <https://perma.cc/HD6X-M7SU>.

³³ Juliet Eilperin, *Interior Rescinds Climate, Conservation Policies Because They're 'Inconsistent' with Trump's Energy Goals*, WASH. POST (Jan. 5, 2018), <https://perma.cc/ZFZ7-VQNE>.

³⁴ *Id.*

³⁵ See *id.*

³⁶ See Peter S. Alagona & James Salzman, Opinion, *The World's Strongest Conservation Law Is Under Attack. It Needs To Be Fixed Instead.*, WASH. POST (Nov. 16, 2017), <https://perma.cc/3CJP-HHE3>.

³⁷ Endangered and Threatened Wildlife and Plants; 12-Month Findings on Petitions to List 25 Species as Endangered or Threatened Species, 82 Fed. Reg. 46,618, 46,618 (Oct. 5, 2017) (to be codified at 50 C.F.R. pt. 17).

³⁸ *Id.* at 46,642–44.

³⁹ Ramona Young-Grindle, *Endangered Species Protection Stalled in Year 1 of Trump*, COURTHOUSE NEWS SERV. (Dec. 1, 2017), <https://perma.cc/ST2U-CP5V>.

species, as well as working on new delistings of listed species.⁴⁰ What all of this means, besides the obvious reality that there will be some loss during the Trump era, is that other sources of biodiversity protection are now more important than ever. The next line of defense is absolutely the states, which are best positioned to fill the gaps created by the Trump Administration, and the more help they can provide the better. However, as noted above, state protections are inadequate. Clearly now is the time to bolster them, but what I propose here is simply the potential for enhancement of that effort via private property decisions aimed at maximizing ecosystem services. This goal is compatible with biodiversity interests the vast majority of the time, albeit no substitute for regulation.

III. ECOSYSTEM SERVICES PROPERTY

Just as state biodiversity protections serve to complement federal implementation of the ESA, but do not replace it, likewise property rights in received ecosystem services could potentially add further support. Although biodiversity protection is generally only an indirect purpose of protecting ecosystem services (when the services are intertwined with biodiversity protection, such as recreational services or pollination), the anthropocentric goals and species goals enjoy mutual benefits when it comes to ecosystem preservation or restoration.

A. What Are Ecosystem Services?

“Ecosystem services” is a concept encompassing “a wide range of conditions and processes through which natural ecosystems, and the species that are part of them, help sustain and fulfill human life.”⁴¹ Nature and the built environment do not exist on separate planes, functioning separately from one another (with the rare exception of where nature has been left to do so, but humans have never functioned separately from nature, as we cannot survive with only artificial supports).⁴² To a far greater extent than most citizens of the earth realize, we depend on nature’s services for our own functionality, ranging from small quality-of-life enhancements to sustaining life on earth.⁴³ We are thus highly dependent on the functionality

⁴⁰ See, e.g., Press Release, U.S. Fish & Wildlife Serv., Status Review Indicates Canada Lynx Recovery in the Lower 48-States (Jan. 11, 2018), <https://perma.cc/G4UG-5QVP> (announcing that the Trump Administration is working to delist the Canada Lynx); Darryl Fears, *Trump Administration Is Taking Steps to Remove a Threatened Lynx from the Endangered-Species List*, WASH. POST (Jan. 11, 2018), <https://perma.cc/5LXZ-KQD9>.

⁴¹ Gretchen C. Daily et al., *Ecosystem Services: Benefits Supplied to Human Societies by Natural Ecosystems*, ISSUES ECOLOGY, Spring 1997, at 1, 2.

⁴² See Robert Costanza et al., *The Value of the World’s Ecosystem Services and Natural Capital*, 387 NATURE 253, 253–55 (1997).

⁴³ See *id.* at 253 (“Ecosystem functions refer variously to the habitat, biological or system properties or processes of ecosystems. Ecosystem goods (such as food) and services (such as waste assimilation) represent the benefits human populations derive, directly or indirectly, from ecosystem functions.”).

of ecosystems, as their functionality can translate quite directly to our own. When ecosystems are conserved for wildlife they are conserved for people, and vice versa. *The interests of all species, including human beings, are inextricably linked.*

The still relatively new concept of ecosystem services, just over two decades old, has undergone rapid development as a subject of study, especially since an impressive project that brought together approximately 1,360 experts from around the globe, culminating in the 2005 Millennium Ecosystem Assessment (“MEA report”).⁴⁴ The MEA report divided ecosystem services into four categories based upon the functions they serve: provisioning services (e.g., food or medicine), regulating services (e.g., pollination or regulation of air or water quality), cultural services (e.g., recreational or educational), and supporting services (e.g., habitat provision or oxygenation).⁴⁵ It has been estimated that the economic value of these services reaches an annual average of \$145 trillion,⁴⁶ which is nearly double the \$80 trillion gross world product (GWP) of the entire earth combined.⁴⁷ Unfortunately, the MEA report also concluded that roughly 60% of ecosystem services had already been degraded by human activity and that further decline was rapidly underway.⁴⁸

Indeed, in spite of our dependence on functioning ecosystems, we have driven them to scarcity. Our growing population has resorted to sprawl, rather than condensing itself to minimize impact and keep transportation needs down, which “has resulted in a suburban housing abundance that has overtaxed water supplies and infrastructure, whittled away at remaining open spaces, displaced wildlife, altered ecosystems, and otherwise burdened nature in irreversible ways.”⁴⁹ As we develop greater understanding of our interdependence with nature and wildlife, we will make better decisions for our mutual benefit, which is why shifting property power over wildlife into the ecosystem services framework may improve our behaviors in relation to wildlife.⁵⁰

Once we understand the full range of benefits derived from ecosystem services and the role they play in our lives, their relationship to property begins to emerge. Ecosystems and their study extend well beyond the disciplinary focus of ecology. Indeed, ecology is just one of at least three

⁴⁴ See generally WALTER V. REID ET AL., MILLENNIUM ECOSYSTEM ASSESSMENT, ECOSYSTEMS AND HUMAN WELL-BEING: SYNTHESIS, at viii (José Sarukhán et al. eds., 2005), <https://perma.cc/63HS-6SRG> [hereinafter MEA REPORT].

⁴⁵ See *id.* at 40 box. 2.1.

⁴⁶ Robert Costanza et al., *Changes in the Global Value of Ecosystem Services*, 26 GLOBAL ENVTL. CHANGE 152, 155 (2014).

⁴⁷ See *The World Factbook Field Listing: GDP*, CENT. INTELLIGENCE AGENCY, <https://perma.cc/RS4C-A6HT> (last visited Apr. 7, 2018) (estimating the 2017 gross world product as \$79.58 trillion).

⁴⁸ MEA REPORT, *supra* note 44, at 6–11.

⁴⁹ Keith H. Hirokawa, *Sustaining Ecosystem Services Through Local Environmental Law*, 28 PACE ENVTL. L. REV. 760, 767 (2011).

⁵⁰ This is especially so when considering the way property rights are presently used in relation to wildlife—largely as leverage to destroy habitat. See discussion *infra* Part IV.A.

disciplines at the heart of understanding ecosystem services. As J.B. Ruhl notes, ecology, economics, and geography are all essential to understanding ecosystem services and their roles in our lives and the economy.⁵¹ Our interests in the benefits of ecosystem services that go beyond ecology serve as inspiration to us to preserve the ecology with which all these interests are intertwined.

This interdisciplinary nature of the study of ecosystems and the services they provide to humanity is the result of centuries of dependence upon them. We are only beginning to explore and understand this dependence because of the rapid—and potentially catastrophic—decline of the resource. This scarcity has drawn our attention to the economic value it generates. The greater our appreciation of this economic value, and the more power over resources falls into the hands of those who value ecosystem services, the better for biodiversity in its own right, even if that is not the source of motivation.

Economically valuing ecosystem services, which is an extremely important step toward improved ecosystem management efforts,⁵² has exploded in recent years. Not only have several leading legal scholars written extensively on the subject,⁵³ but an entirely new discipline called “ecological economics” has emerged to focus on the methods of doing this.⁵⁴ We still need a lot of work in this area, as our understanding of these values lags well behind our policy development in areas informed by them.

While some ecosystem services lend themselves to valuation based on replacement costs—frequently a much higher cost than that of preserving the ecosystem function to be replaced⁵⁵—many services upon which we depend cannot be artificially reproduced. For example, “valuable services provided by soils include providing physical support for the surface (including vegetation), nutrient cycling, hydrological regulation, waste disposal and organic decomposition, and maintenance of soil productivity.”⁵⁶ The complexity and variety of these services, along with the delicate mechanisms that enable soil to provide them, means that soil services

⁵¹ J.B. Ruhl, *Ecosystem Services and Federal Public Lands: Start-Up Policy Questions and Research Needs*, 20 DUKE ENVTL. L. & POL'Y F. 275, 277–78 (2010) (citing J.B. RUHL ET AL., THE LAW AND POLICY OF ECOSYSTEM SERVICES 15–83 (2007)).

⁵² See Deborah McGrath & Travis Greenwalt, *Valuation and Payment for Ecosystem Services as Tools to Improve Ecosystem Management*, in THE LAWS OF NATURE: REFLECTIONS ON THE EVOLUTION OF ECOSYSTEM MANAGEMENT LAW & POLICY 283, 289 (Kalyani Robbins ed., 2013).

⁵³ E.g., James Salzman, *Creating Markets for Ecosystem Services: Notes from the Field*, 80 N.Y.U. L. REV. 870 (2005) [hereinafter Salzman, *Creating Markets*] (building on his earlier work: James Salzman, *Valuing Ecosystem Services*, 24 ECOLOGY L.Q. 887 (1997)).

⁵⁴ See, e.g., Robert L. Fischman, *The EPA's NEPA Duties and Ecosystem Services*, 20 STAN. ENVTL. L.J. 497, 498–99 (2001) (describing the emerging field of ecological economics and how it might serve environmental policy).

⁵⁵ COMM. ON ASSESSING & VALUING THE SERVS. OF AQUATIC & RELATED TERRESTRIAL ECOSYSTEMS, NAT'L RESEARCH COUNCIL, VALUING ECOSYSTEM SERVICES: TOWARD BETTER ENVIRONMENTAL DECISION-MAKING 125, 170–71 (2005).

⁵⁶ Hirokawa, *supra* note 49, at 780–81 (citing Gretchen C. Daily et al., *Ecosystem Services Supplied by Soil*, in NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS 113, 117 (Gretchen C. Daily ed., 1997)).

“cannot be fully substituted by human-made solutions, and operate[] at multiple, overlapping scales.”⁵⁷ Consequently, “it is difficult to arrive at an accurate economic value for these services.”⁵⁸ While this makes precision of valuation much more challenging, it does not alter the economic nature of the value these services provide. Indeed, in some cases the entire economic value of a parcel of real property might depend upon the provision of adequate soil services.

Water purification is an example of an ecosystem service that has undergone substantial economic analysis, and no matter which approach one uses to determine valuation, it is generally clear that a functioning natural watershed is the best way to go:

[E]cosystems are able to naturally both supply and then filter clean water for human use. One way to understand the economic value of intact watersheds is to compare it to the cost of building and maintaining water supply and treatment facilities. To the extent that loss of ecological systems results in reduced supply, value can also be ascertained through the cost of having to import water from elsewhere.⁵⁹

Watershed protection is critical to providing populations with clean drinking water. Soil and wetlands filter contaminants from water,⁶⁰ so in addition to developed land directly adding pollutants to the watershed, it also removes this filtering function.⁶¹ For this reason, protecting certain lands from development can simultaneously provide for wildlife habitat and ensure the watershed’s ability to provide clean water.⁶²

One of the most famous examples of investment in ecosystem services in order to save substantially higher replacement costs involves water purification. New York City draws most of its tap water from upstate, in what was a carefully developed unfiltered reservoir system.⁶³ Then the Safe Drinking Water Act⁶⁴ mandated that all major surface-water systems filter their water or prove they could protect the watershed producing it.⁶⁵ “A filtration plant large enough to clean the City’s water supply would cost

⁵⁷ EARTH ECON., A NEW VIEW OF OUR ECONOMY: NATURE’S VALUE IN THE SNOQUALMIE WATERSHED 45 (2010) (citing Stephen Farber et al., *Linking Ecology and Economics for Ecosystem Management*, 56 *BIOSCIENCE* 117 (2006)).

⁵⁸ *Id.*

⁵⁹ *Id.* at 39.

⁶⁰ See Stephen M. Johnson, *Federal Regulation of Isolated Wetlands*, 23 *ENVTL. L.* 1, 30 (1993) (“[M]any types of isolated wetlands play a vital role in protecting water quality by filtering sediments and pollutants out of water and by preventing nutrient overloading.”).

⁶¹ James Salzman et al., *Protecting Ecosystem Services: Science, Economics, and Law*, 20 *STAN. ENVTL. L.J.* 309, 314 (2001).

⁶² See *id.* at 314–15 (“Land preservation . . . eliminates a major source of contamination, while also protecting the waterway from those nonpoint sources of contamination that do exist.”).

⁶³ Alice Kenny, *Ecosystem Services in the New York City Watershed*, ECOSYSTEM MARKETPLACE (Apr. 1, 2016), <https://perma.cc/PP83-ZJRG>.

⁶⁴ 42 U.S.C. §§ 300f to 300j-25 (2012).

⁶⁵ *Id.* § 300g-1(b); Kenny, *supra* note 63.

between \$8–\$10 billion . . . and another \$250 million annually to [operate].”⁶⁶ Preserving the watershed, on the other hand, was estimated at \$1.5 billion.⁶⁷ In other words, the ecosystem service of water filtration alone (never mind the other services from the Catskills ecosystem) was worth \$8–\$10 billion, but cost only \$1.5 billion to preserve. On December 28, 2017, the New York City Department of Environmental Protection announced a ten-year extension of this unfiltered water system, thereby reaffirming its incredible success and economic value.⁶⁸

While this investment was motivated by human needs and economic interests, consider the impact on wildlife. Instead of building a huge artificial facility and leaving the Catskills ecosystem in decline, New York invested in massive ecosystem restoration, creating and/or protecting habitat for birds, aquatic life, terrestrial wildlife, and myriad plant species.⁶⁹ This was done without the necessity of an endangered species to trigger regulation and, as such, served to complement any other protections within the area resulting from regulated environmental dangers (including species protections). The economic value of ecosystem services is like biodiversity’s wallet.

In addition to water filtration, several jurisdictions have made significant economic investments in wetlands in order to receive the ecosystem service of flood prevention. The insurance industry has made clear the economic advantages of situating land development outside high flood-risk areas.⁷⁰ This ecosystem service has such high economic value that in 1998, voters in Napa County, California approved an initiative to spend \$160 million on the acquisition of 500 acres of flood plain, based on the goal of conservation of the area to significantly reduce the risk of flooding.⁷¹ In several communities around Boston, the decision was made to acquire 8,000 acres of wetlands⁷² rather than construct a \$100 million system of dams and levees.⁷³ The cost-benefit analysis between investing in ecosystem services and developing human-made systems to replace those services can often overwhelmingly favor the former over the latter. For this reason, the more we integrate ecosystem services into our economic considerations the better for conservation and thus for biodiversity.

⁶⁶ Kenny, *supra* note 63.

⁶⁷ *Id.*; see also Salzman et al., *supra* note 61, at 315–16.

⁶⁸ See John Herzfeld, *New York City Drinking Water to Remain Unfiltered*, BLOOMBERG ENV’T (Dec. 29, 2017), <https://perma.cc/D9FV-YNVZ>.

⁶⁹ See N.Y.C. DEP’T OF CITY PLANNING, VISION 2020: NEW YORK CITY COMPREHENSIVE WATERFRONT PLAN 77–78 (2011), <https://perma.cc/L3M5-ZW4F>.

⁷⁰ See STEVE LERNER & WILLIAM POOLE, THE ECONOMIC BENEFITS OF PARKS AND OPEN SPACE: HOW LAND CONSERVATION HELPS COMMUNITIES GROW SMART AND PROTECT THE BOTTOM LINE 35, 37 (1999), <https://perma.cc/KUL7-TXYM>.

⁷¹ *Id.* at 35.

⁷² This was an area “capable of containing 50,000 acre-feet of water.” *Id.* at 37.

⁷³ *Id.*

B. Property Interests in Ecosystem Services

Not all scenarios in which ecosystem services need intentional protection to serve economic needs will be at the government scale described in the prior subsection. In many cases there will be few property owners involved, and the services at stake may vary from essential to merely pleasant. The true value will typically be both subjective and complex to determine due to myriad functions and impacts occurring simultaneously.⁷⁴ This complexity and subjectivity makes clarity of rights and interests (i.e., power to decide) even more important. It is also critical that we create reliable pathways to protection of this resource, and doing so will likely require some private investment.⁷⁵ Property interests in a resource traditionally serve to encourage such investment,⁷⁶ or at least restraint from destruction,⁷⁷ especially where, as with ecosystems in the Trump era (and otherwise), there is inadequate regulatory protection.⁷⁸

It is important to note, as a conceptual matter, that for ecosystem services to make sense as property, they should touch and concern benefitting land. It is far too abstract to suggest that we have a *property* interest in, say, a view we walk by every day. That said, it makes perfect sense to suggest that there is a property interest in ecosystem services that maintain the livability of receiving land. That land was purchased and developed in this ecosystem service-receiving condition, and its value may be dependent on those services. However, this does not mean that some ecosystem services fall outside the property paradigm, as the same principles apply when the receiving land is public land, except that then the ecosystem services become a part of the public trust. This serves as another source of protection, potentially via the courts if the government entity responsible for the receiving land is failing to meet its obligations as trustee.

Ecosystem services have been either directly or indirectly treated as property in many contexts, including but not limited to regulatory takings, exactions, nuisance, and markets for ecosystem services such as conservation easements, payment programs for ecosystem services, and wetland mitigation banking.⁷⁹ This developing property interest, and the decisions we make regarding how it is allocated in relation to existing land ownership, will be quite consequential to biodiversity.

⁷⁴ See generally James Boyd et al., *Compensation for Lost Ecosystem Services: The Need for Benefit-Based Transfer Ratios and Restoration Criteria*, 20 STAN. ENVTL. L.J. 393, 403–09 (2001) (discussing the essential components of service valuation).

⁷⁵ See James Salzman et al., *The Most Important Current Research Questions in Urban Ecosystem Services*, 25 DUKE ENVTL. L. & POL'Y F. 1, 31–35 (2014) (discussing ways to encourage private investment in preserving ecosystem services).

⁷⁶ See generally RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 31–32 (4th ed. 1992) (discussing the economic principles underpinning the law of property).

⁷⁷ See generally Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243, 1247 (1968).

⁷⁸ See James Salzman, *A Field of Green? The Past and Future of Ecosystem Services*, 21 J. LAND USE & ENVTL. L. 133, 137 (2006) (noting the lack of legal standards for ecosystem protections); see also discussion *supra* Part II.

⁷⁹ See Robbins, *supra* note 1, at 207–20.

IV. THE ONE-WAY CONSERVATION RATCHET

When we consider sources of authority we often forget to take into account the power that property rights confers on private parties—power that can support conservation policy goals or serve as an obstacle to those goals. If allocated properly, ecosystem services property rights can serve to complement regulatory efforts to protect biodiversity. On the one hand, allocation toward generating landowners (owners of the natural capital) could serve to undermine regulatory protections. On the other hand, allocating the property rights in ecosystem services to receiving landowners would be at best beneficial and at worst harmless to wildlife. In this way, the authority over land use that stems from property rights can combine with existing regulation to form a one-way ratchet in favor of conservation. However, while ecosystem services property might enable private parties to compensate in some ways for the conservation shortcomings of the Trump Administration, the actual choices private actors make are too unpredictable to serve as a substitute for regulation, so state regulation will remain critically important during this era.

A. Property Rights as Authority over Biodiversity Impacts

Historically, property rights have provided a great deal of authority over land use, and consequently over wildlife habitat and directly over species of flora. This power was initially virtually unlimited, but gradually over the past century limitations have developed, such as via zoning ordinances, environmental regulations, or endangered species laws. That said, even in our now more regulated world, the power wielded by landowners is enormous. Alas, this power is resulting in rapid destruction of our biodiversity.

Imagine that you own a tract of land and wish to develop it. It could be the last or near-to-last area of an endangered plant, but that likely won't stop you—as the owner of that property you hold the authority to wipe out that plant. If there is habitat for endangered wildlife species you may destroy it under the laws of nearly every state, as well as under the ESA if it doesn't injure individuals of the species⁸⁰ (and even if it does, should the current Administration be looking the other way)—as the owner of that property you hold the authority to destroy that habitat. Private landowners have redesigned the entire landscape of the country and hold nearly as much power over land today as ever. What little power they have had to yield returns to them in the absence of zealous enforcement of the laws that do apply.

In addition to the power landowners have over their own parcels, they also exercise authority over neighboring land. Nuisance litigation can serve as power to stop a neighbor from developing her land. *Lucas v. South Carolina Coastal Council*⁸¹ famously raised the specter of potentially treating

⁸⁰ See *supra* note 6 and accompanying text.

⁸¹ 505 U.S. 1003 (1992).

destruction of ecosystem services that previously flowed to neighbors as a common law nuisance.⁸² In 2003, the New Hampshire Supreme Court in *Cook v. Sullivan*⁸³ found that a nuisance was established by filling a wetland.⁸⁴ Interestingly, *Cook* and other similarly successful wetland-filling nuisance cases have involved a private nuisance, in which the harm clearly flows to a particular landowner.⁸⁵ Courts seem inclined to protect the rights of landowners from the potential loss of vital ecosystem services. Public nuisance claims, or more broadly publicly needed ecosystem services, do not fare as well. As the Court noted in *Lucas*,

regulations that leave the owner of land without economically beneficial or productive options for its use—typically, as here, by requiring land to be left substantially in its natural state—carry with them a heightened risk that private property is being pressed into some form of public service under the guise of mitigating serious public harm.⁸⁶

Given that the *Lucas* court would not allow such a taking (without compensation), but would allow it if the landowner would otherwise be violating background nuisance principles (apparently focused on neighboring land), there is an unspoken suggestion of potential rights in the ecosystem services at issue. If you would violate those rights, the regulation is only stopping you from doing that which you already cannot do (violate a neighbor's property rights), but if you are being regulated so those ecosystem services may generally benefit the public, that is a taking of your property interests. This demonstrates substantial authority over land conservation stemming from private property rights. Indeed, it expressly elevates those private property rights over the public interest.

How this private property rights perspective might work to protect ecosystems is similar to the polluter-pays concept in the context of pollution control.⁸⁷ Traditionally, property rights have been viewed as in conflict with pollution-control regulation (because it is a regulation of land use), but the polluter-pays argument posits that requiring polluters to either refrain from releasing anything beyond their property borders or to internalize their externalities is necessitated by property rights—the rights of the receiving properties.⁸⁸ According to this argument, the receiving properties are experiencing harm for which they should expect a remedy.⁸⁹ This

⁸² *Id.* at 1027–31 (explaining that in cases where the destruction would have fallen under common law nuisance principles, legislatively prohibiting that destruction would not be a taking).

⁸³ 829 A.2d 1059 (2003).

⁸⁴ *Id.* at 1062, 1067–68.

⁸⁵ *See, e.g., id.* at 1065–66.

⁸⁶ *Lucas*, 505 U.S. at 1018.

⁸⁷ *See generally* Robert H. Cutting & Lawrence B. Cahoon, *Thinking Outside the Box: Property Rights as a Key to Environmental Protection*, 22 PACE ENVTL. L. REV. 55 (2005) (arguing for the “polluter-pays” concept as a method of pollution control).

⁸⁸ *See id.* at 58–59.

⁸⁹ *See id.*

perspective is also supported by Carol Rose's well-known comparison of environmental externalities with computer virus attacks, which are in both cases an invasion of private space.⁹⁰

These arguments are exceptions to the general rule. Most scholarship advocating for biodiversity and other environmental protections tends to focus entirely on government regulation and ignore private property rights. Even if raised, it is frequently only in a negative light from the environmentalist perspective, and understandably so given the tragic consequences privatization of the land resource has had for the conservation of natural spaces. That said, given the immense power that stems from private property, we should also be considering how that power might be harnessed in favor of conservation. Property interests in ecosystem services, in the right hands, may serve this goal.

B. Ecosystem Services Allocation Principles

A significant challenge to the allocation of property interests in ecosystem services is the fact that they are intertwined with *existing* property rights. There are plenty of potential conceptual bases for allocating the right to ecosystem services. The three most obvious would be: 1) generating landowners, meaning those whose property contains a meaningful portion of an ecosystem providing services to others; 2) receiving landowners, meaning those whose property benefits from ecosystem services generated elsewhere; and 3) governments, whether state or local, because of the importance of ecosystem services to society and the arguable claims in both directions between property owners. In the last example we would be placing all ecosystem services into the public trust resource pool, thereby greatly expanding it. That said, the approaches involving property rights in landowners (categories 1 and 2) already include circumstances in which government entities are landowners.

So, if we treat ecosystem services as part of the real property bundle, how might that play out? This depends in part on whether we allocate that property interest to the generating landowner or the receiving landowner. As described more thoroughly in the foundational article preceding this Essay,⁹¹ existing legal frameworks sometimes treat the rights to ecosystem services as belonging to the generating landowner and sometimes place those rights in the receiving landowner. If we were to clarify that ecosystem services always belong to the generating landowner, they would become a divisible part of the bundle just like mineral rights or timber rights. If, on the other hand, we were to decide that these rights properly belong to the receiving landowners, they would become servitudes binding the generating landowners. Although bargaining could occur between the two parties to

⁹⁰ Carol M. Rose, *The Several Futures of Property: Of Cyberspace and Folk Tales, Emission Trades and Ecosystems*, 83 MINN. L. REV. 129, 148–50 (1998).

⁹¹ See generally Robbins, *supra* note 1.

shift the interest to the other party,⁹² this could be challenging if we don't allocate in the inertial direction—it is easier to pay an additional expense rolled into the overall cost of new development than to pay to maintain the status quo (when the receiving landowner may not have the funds).

Treating ecosystem services themselves as a property interest may require a shift away from the concept of natural capital as fully owned property, especially in light of the fact that it often has less economic value than the services it provides.⁹³ Natural capital, a rather obviously property-based term, refers to “the ecological resources that produce these service values, such as forests, riparian habitat, and wetlands.”⁹⁴ When we view the property interest as tied to the ecosystem itself, the notion that the right belongs to the historically receiving party becomes strained. While we can certainly still treat it as a servitude on the generating property, that would not automatically inhere in the receiving land as it would traditionally be something that should be purchased.⁹⁵ The economic value, however, is largely tied to the services themselves, far more than the natural capital from which they are derived. Unlike the natural capital, which by definition sits on the generating land, ecosystem services have historically situated themselves in the receiving land.

It has often been said that “[m]ost environmental amenities cannot adequately be monetized, not because they are not valuable, but because they are not supplied through a market.”⁹⁶ This may once have been true, but certainly is no longer entirely the case. Indeed, markets for ecosystem services have been developing for decades now in clear, direct terms and arguably have existed for much longer in the more subtle context of bundling with other property interests.⁹⁷ The existing markets for ecosystem services serve to demonstrate both the failure to consistently allocate ecosystem services in either the generating or receiving land, as well as the importance of allocating to the receiving landowner.⁹⁸

There already exists several relatively easy to observe markets for ecosystem services: conservation easements, payment for ecosystem services (PES) programs, and wetland mitigation banking.

There are already many PES programs. They are broad and varied overseas,⁹⁹ but tend to focus on agricultural land in the United States.¹⁰⁰

⁹² See generally R.H. Coase, *The Problem of Social Cost*, 56 J.L. & ECON. 837 (2013) (outlining the Coase theorem).

⁹³ J.B. Ruhl, *The “Background Principles” of Natural Capital and Ecosystem Services—Did Lucas Open Pandora’s Box?*, 22 J. LAND USE & ENVTL. L. 525, 527–28 (2007).

⁹⁴ *Id.* at 525 n.2.

⁹⁵ See *id.* at 534 (noting that English common law did not extend encumbrances on land this far).

⁹⁶ David B. Hunter, *An Ecological Perspective on Property: A Call for Judicial Protection of the Public’s Interest in Environmentally Critical Resources*, 12 HARV. ENVTL. L. REV. 311, 335 (1988).

⁹⁷ Salzman, *Creating Markets*, *supra* note 53, at 889–90 (discussing monetization of ecosystem services in New York in the early 1990s to improve water quality).

⁹⁸ See *id.* at 932, 957, 960.

⁹⁹ See, e.g., Brian C. Steed, *Government Payments for Ecosystem Services—Lessons from Costa Rica*, 23 J. LAND USE & ENVTL. L. 177, 185–86 (2007) (describing Costa Rica’s PES

Farmers or ranchers are paid to engage in practices that maximize certain desired ecosystem services.¹⁰¹ Such practices may include setting some land aside or may focus more on the methods applied, and services thereby improved may be water retention, wetland stability for filtration and flood prevention, phosphorous load reduction, and much more.¹⁰² The system functions in a typical supply-and-demand manner, with local governments purchasing those services they need.¹⁰³ Payments should mirror or better the forgone income relative to unrestricted use of the property at issue, as these transactions take place when the ecosystem service value is greater than the marginal agricultural value. As such, PES programs maximize the economically efficient use of land.

Unfortunately, PES is not a panacea for solving the problem of ecosystem services loss. Situating the rights to those services in the generating landowners creates significant moral hazards, placing landowners in a position of power over society that may encourage bad behavior and extortion.¹⁰⁴ Moreover, PES forces taxpayers to pay, maximizes transaction costs, and “may undermine intrinsic motivations for conservation and debilitate preexisting social markets.”¹⁰⁵ Experience with PES thus far highlights the need to clearly allocate the property interest in ecosystem services, and supports the preference for doing so in favor of receiving properties.

Conservation easements are another common approach to marketing ecosystem services. Indeed, this is another typical way (besides eminent domain or consensual land acquisition) to maintain water filtration services and avoid expensive artificial water treatment. Many conservation easements are purchased in order to maintain essential habitat for dwindling species, though even in such cases one can extrapolate human value for the ecosystem service. Of course, conservation easements are already understood as property, like all easements. In this sense they are arguably the most concrete example of ecosystem services as property.¹⁰⁶

program); *see also* Salzman, *Creating Markets*, *supra* note 53, at 892–93 (describing Australia’s pilot PES program).

¹⁰⁰ For a discussion of such programs, see generally J.B. Ruhl, *Agriculture and Ecosystem Services: Strategies for State and Local Governments*, 17 N.Y.U. ENVTL. L.J. 424 (2008).

¹⁰¹ *Id.* at 426, 446–47.

¹⁰² *Id.* at 446–47.

¹⁰³ *Id.* at 428–29.

¹⁰⁴ Stefanie Engel et al., *Designing Payments for Environmental Services in Theory and Practice: An Overview of the Issues*, 65 ECOLOGICAL ECON. 663, 669, 670 n.23 (2008).

¹⁰⁵ Marcia Silva Stanton, *Payments for Freshwater Ecosystem Services: A Framework for Analysis*, 18 HASTINGS W.-NW. J. ENVTL. L. & POL’Y 189, 283–85 (2012).

¹⁰⁶ Robbins, *supra* note 1, at 217 (footnote omitted); *see* Jessica Owley, *Changing Property in a Changing World: A Call for the End of Perpetual Conservation Easements*, 30 STAN. ENVTL. L.J. 121, 139 (2011) (“When conservation easements preserve environmental resources on private lands where purchase or regulation would be burdensome, undesirable, or politically difficult, conservation easements can yield the public benefits of increased environmental amenities and healthy functioning ecosystem services.”).

Unfortunately, because they must generally be purchased from the owner of the natural capital, they too (like PES programs) imply an allocation of ecosystem services property in the generating land.

Were we to place the ecosystem services property right in the receiving landowners we would effectively create (by default, without a transaction) a limited (to ecosystem services provision) conservation easement on all remaining natural capital. This would not render further development impossible (though we are indeed at a stage in which we should be considering limiting development to already developed lands), but it would mean that the total cost of the development would reflect the destroyed ecosystem services value, as that right would need to be purchased from the receiving landowner. This, of course, is beneficial to protecting biodiversity.

A third example of markets for ecosystem services is wetland mitigation banking.¹⁰⁷ A wetland mitigation bank is a typically large area of wetlands that the “banker” has acquired, restored, and will preserve going forward, although the banker is not required to do so under any legal regime.¹⁰⁸ This voluntary effort and expense is in fact a business investment, as the banker has now generated numerous wetland credits that it may in turn sell to developers seeking to destroy wetland property, as the developers will be required to mitigate the damage they do by restoring a wetland elsewhere in order to obtain a permit.¹⁰⁹ Because these developers are not themselves in the business of restoring wetlands, nor own any wetland property to restore (apart from the wetland they wish to fill), it is often preferable to them to buy these credits from a mitigation bank and be done with it.¹¹⁰ This also maximizes efficiency by centralizing the task and managing it with expertise rather than as an addition to a development project.¹¹¹

Wetlands provide such localized ecosystem services that it is generally necessary that they be in a certain proximity to those to be destroyed (in order to replace the lost ecosystem services), so these banks have popped up all over the country. The original federal guidelines for wetland mitigation banking provided that “[t]he objective of a mitigation bank is to provide for the replacement of the chemical, physical and biological functions of wetlands and other aquatic resources which are lost as a result of authorized impacts.”¹¹² “This is a now well-developed market for ecosystem services—when a developer wishes to destroy ecosystem services upon which the community depends, he must purchase them elsewhere in order to replace what he is taking.”¹¹³ This concept also

¹⁰⁷ See J.B. Ruhl & R. Juge Gregg, *Integrating Ecosystem Services into Environmental Law: A Case Study of Wetlands Mitigation Banking*, 20 STAN. ENVTL. L.J. 365, 365–67 (2001).

¹⁰⁸ *Id.*

¹⁰⁹ *Id.* at 368–72.

¹¹⁰ See *id.* at 371–72; see also Robin Meadows, *Wetland Mitigation Banking*, ECOSYSTEM MARKETPLACE (Jan. 1, 2001), <https://perma.cc/BM2K-KUYG>.

¹¹¹ Meadows, *supra* note 110.

¹¹² Federal Guidance for the Establishment, Use and Operation of Mitigation Banks, 60 Fed. Reg. 58,605, 58,607 (Nov. 28, 1995).

¹¹³ Robbins, *supra* note 1, at 218.

arguably lays the groundwork for a theory of ecosystem services-based liability. The recipients of the ecosystem services have an entitlement to continue receiving them, so one who would destroy them must simultaneously replace them.

As noted in my initial article presenting my theory of ecosystem services property:

With a positive thing of value flowing from one property to another, having done so since prior to their ownership and typically prior to all previous ownership, the best way to protect the property interest in maintaining status quo is through *allocating the property interest where it already lies: in the receiving property*. The preexisting ecosystem services are part of the value of the receiving property. Perhaps if the sending landowner were actually *generating* the ecosystem services, rather than purchasing land that has long generated them in his absence, it might make sense to grant him rights in this interest—that would render the services a positive externality.¹¹⁴ But the natural and preexisting ecosystem services themselves—now deemed a thing of economic value and thus capable of ownership—have always been a part of the receiving property.¹¹⁵

C. Complementary Authority as One-Way Ratchet

The benefits ecosystem services property rights could provide to biodiversity, while certainly no replacement for regulation, are potentially quite substantial. The more that human beings seek to protect their security in ecosystem services the better our interests align with those of biodiversity. Both are buoyed by maximizing the integrity of our remaining natural (or quasi-natural) ecosystems.

As described in Part IV.A, property rights are a source of authority resting in private parties instead of in governments. Focusing solely on government authority to achieve our policy goals ignores a valuable source of potentially complementary authority. If we ignore this source of authority because we have a distaste for it, that doesn't make it go away. Rather than ignore the private property rights authority, it behooves us to ensure that the tools are in place to encourage the use of that authority as a complement to our regulatory strategies and not an obstacle to them. By recognizing the property interest in ecosystem services as belonging to the historically receiving landowner, we can harness this complementary authority over nature and render it a one-way ratchet in favor of conservation.

¹¹⁴ “This also distinguishes manmade ecosystem services, such as a wetland mitigation banking (assuming it was developed via restoration), from natural ecosystem services, which are the focus of this [discussion]. It is perfectly reasonable to allow people to invest in the creation of such services and then own them and be able to charge for them.” *Id.* at 224 n.128.

¹¹⁵ *Id.* at 223–24.

D. The Inadequacy of Property Authority Makes State Regulation More Important than Ever

It is important to make absolutely clear that ecosystem services property, while carrying the potential to benefit biodiversity, has highly limited and unreliable benefits. As such, it is unlikely to ever serve as a substitute to regulation, even though it may complement regulatory efforts. Even if allocated to recipients of ecosystem services, who derive benefits from those services and thus have an incentive to protect the ecosystems generating them, as a property right it would be transferrable. Under some (and possibly many) circumstances the holders of these rights would sell them to the owners of the natural capital who wish to destroy it for other economic benefits. That right would be unconstrained absent regulation, so regulation is no less necessary in the context of property rights in received ecosystem services. The benefit to biodiversity comes from this added hurdle to the destruction of natural capital, along with aligning the power with those whose interests are most served by the intact ecosystem, but there remains no guarantee regarding the unrestricted private party choices.

V. CONCLUSION

The modern emergence of property interests in ecosystem services, if allocated to the historically receiving landowners, aligns well with the interests of biodiversity. As such, it serves as a complement to conservation regulation, which is especially valuable when there is inadequate enforcement of the latter. While it cannot substitute for regulation, the range of potential impact is from zero to beneficial, making it a one-way ratchet in favor of conserving biodiversity.