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# UNCHARTED WATERS: CAN WATER RIGHTS PRINCIPLES STEM THE TIDE OF ECOSYSTEM SERVICES LOSS?

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## ABSTRACT

*This article will explore the ways in which we might apply aspects of the conceptual framework developed through centuries of water law to the modern need for property interests in ecosystem services.*

*Water itself is a high-value ecosystem service, largely within the category of “provisioning” ecosystem services. We need access to water to survive, which has resulted in centuries of varying legal approaches to allocating rights to water. Although this right has traditionally been extractive, in the modern era we have developed increasing protections for in-stream benefits as well. While not uniform across jurisdictions, water law is now a highly developed field in which rights may hinge on matters such as adjacency or beneficial use.*

*Although we are beginning to see property interests develop in relation to a broader range of ecosystem services, the concept of more general ecosystem services rights is quite nascent, and in need of stronger definition and stability. The groundwork for exploring this need may be found in the initial article of this series, with each subsequent article considering a particular avenue for securing rights in ecosystem services. This article will consider the potential to draw upon the far more developed field of water law, specifically to determine whether it is possible to build a framework for ecosystem services rights by at least in part utilizing these approaches. Which concepts translate well to other ecosystem services, which do not, and what might the end result of this process look like? What if we could begin to protect private lands from loss of essential ecosystem services without reinventing the wheel? Drawing from water law concepts, one can see the potential for usufructuary rights in ecosystem services that are based on historic use, which adds nothing to the status quo—and thus takes nothing already in use—and only impacts future plans for destruction of natural capital.*

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## INTRODUCTION

We all depend upon ecosystem services for our quality of life, with these benefits ranging from little pleasures to life-sustaining essentials. We need to breathe clean air and have access to water we can drink and bathe in. We seek soil conditions in our yards capable of growing flowering plants, trees, and grass, as well as pollinators to help these flowers thrive. If we grow commercial crops, these ecosystem services are particularly valuable. We welcome birds and other small wildlife that help keep the insects in check so that our property is not overrun or destroyed. Many of us are dependent upon nearby wetlands to protect our land from flooding. We enjoy having a beautiful view, a body of water, or trails nearby. If we have these things when we buy our property, we expect to continue enjoying the privilege, and in some cases, life-support. If our neighbors were to eliminate these benefits, our property could be worth far less and may well become unsafe or otherwise uninhabitable.

There is also a good deal of land, whether public or privately owned, that helps provide some of these services. Although someone might own this land in fee simple, with a complete possessory interest in their land and no easements encumbering it, the diffuse nature of ecosystem services calls into question the justice of presuming that they belong to the landowner upon which

the ecosystem sits. These ecosystem services will generally predate the title to the land and may inhere in multiple titles in ways quite challenging to define. That said, the fact that a right—especially a status quo right—is complex does not nullify it. Such complexities pose an intellectual challenge to society, but perhaps we have already traveled further down this conceptual path than we realize.

Water flows over land owned by multiple parties, all of whom owe a duty to protect downstream rights to that water. This basic notion, implemented in varying ways, is analogous to ecosystem services more broadly—water itself is an ecosystem service. We never questioned the value of water, which led to centuries of doctrinal development in its allocation. Ecosystem services, on the other hand, have great value that we have only recently begun to perceive. As our appreciation for this economic value deepens, it becomes more pressing that we develop clear expectations relating to who has the rights to these valuable resources. In a prior article, I laid the foundation for thinking about potential property interests in ecosystem services.<sup>1</sup> This article will explore the relationship between these potential interests and the rights to use water.

What are ecosystem services? Part I will explain the concept and provide examples to demonstrate how completely dependent we are upon them. Part I will also consider the declining abundance of ecosystem services and the impact of this on both extractive and non-extractive human needs. Part II compares two different types of property interest: possessory interest—traditional concrete property—and usufructuary interest—which is more abstract but still quite powerful. This distinction is important and forms some of the foundation for the remaining parts of the article. Part III takes the three major approaches to water law in the United States—the riparian, prior appropriation, and permitting systems—and evaluates their potential applicability to ecosystem services more broadly beyond just water. Finally, Part IV analyzes the ways in which modern trends in water law and policy may contribute more than before to this translation beyond water to other benefits that flow to us over one another's land. Whatever does evolve in this area, because land is made up of interconnected and interdependent ecological features, it is impossible to silo each landowner without policies that recognize this connectedness. As populations expand

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<sup>1</sup> See Kalyani Robbins, *Allocating Property Interests in Ecosystem Services: From Chaos to Flowing Rivers*, 42 HARV. ENV'T L. REV. 197, 201 (2018).

and resources dwindle, this is likely becoming too complex for nuisance alone to solve.

## I. ECOSYSTEM SERVICES AND THEIR DECLINE

### 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.”<sup>2</sup> Nature and the built environment intertwine in the modern era such that they are intimately connected and serve one another in both positive and negative ways. To a far greater extent than most human beings are conscious of, we depend on nature’s services for our own functionality, ranging from small quality of life enhancements to sustaining life on earth.<sup>3</sup> We are thus highly dependent on the functionality of ecosystems, as their functionality often translates directly to our own.

Ecosystem services, a term coined a mere quarter century ago, has undergone rapid development as a subject of study, especially since an impressive project that brought together approximately 1,300 experts from around the globe, culminating in the 2005 Millennium Ecosystem Assessment (MEA) report.<sup>4</sup> 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).<sup>5</sup> It has been estimated that the economic value of

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<sup>2</sup> Gretchen C. Daily et al., *Ecosystem Services: Benefits Supplied to Human Societies by Natural Ecosystems*, 2 ISSUES ECOLOGY 1, 2 (1997).

<sup>3</sup> See Robert Costanza et al., *The Value of the World’s Ecosystem Services and Natural Capital*, 387 NATURE 253, 253 (1997) [hereinafter Costanza, *The Value of the World’s Ecosystem Services and Natural Capital*] (“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.”).

<sup>4</sup> See generally MILLENNIUM ECOSYSTEM ASSESSMENT, ECOSYSTEMS AND HUMAN WELL-BEING: SYNTHESIS (MA Bd. of Rev. Eds. et al. eds., 2005) [hereinafter MEA REPORT].

<sup>5</sup> See *id.* at 39–47.

these services reaches an annual average of \$145 trillion,<sup>6</sup> which is a good deal higher than the approximately \$100 trillion gross world product (GWP) of the entire earth combined—and was approximately double the GWP at the time of the ecosystem services estimate.<sup>7</sup> Unfortunately, the MEA report also concluded that roughly 60 percent of ecosystem services have already been degraded by human activity and that further decline is rapidly underway.<sup>8</sup>

Given the high value of ecosystem services, many of the actions that degrade them may have a lower value than the damage caused, but it is impossible for those taking these actions to perform an appropriate cost-benefit analysis given the substantial externalities involved—ecosystem services are often serving lands owned by others and not the decisionmaker on the sending land. This results in a tragedy of the commons and other collective action problems. For this reason, it is time that we rescue ecosystem services from the commons, which can be done via private interests in them and/or via regulation. Either approach could internalize these externalities and result in reduced impacts, and private interests would also likely lead to Coasean bargaining for those actions that should still proceed.

### B. The Status Quo and Trajectory

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 ecological 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.”<sup>9</sup> While there is some evidence of increased awareness leading to more sustainable development planning in some areas—and the Intergovernmental Panel on Climate Change’s

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<sup>6</sup> See Robert Costanza et al., *Changes in the Global Value of Ecosystem Services*, 26 GLOB. ENV’T CHANGE 152, 152 (2014).

<sup>7</sup> See Costanza, *The Value of the World’s Ecosystem Services and Natural Capital*, *supra* note 3, at 253.

<sup>8</sup> See MEA REPORT, *supra* note 4, at 6–11.

<sup>9</sup> Keith H. Hirokawa, *Sustaining Ecosystem Services through Local Environmental Law*, 28 PACE ENV’T L. REV. 760, 767 (2011).

(IPCC) focus on resilient development in its 2022 report<sup>10</sup> may help further this trend—the pace of development sprawl has not slowed.<sup>11</sup> There is no question that local government land use policies might address development that destroys ecosystem services; however, the focus of this article is on private interests in those services. To the extent that regulatory innovations are contemplated here, it is with an eye toward establishing, protecting, or otherwise managing those interests among private parties.

Given the rapid decline in natural ecosystems and the essential services they provide, we are increasingly identifying and cataloging these actual and potential losses.<sup>12</sup> Watershed protection is critical to providing populations with clean drinking water. Soil and wetlands filter contaminants from water,<sup>13</sup> so in addition to land development directly adding pollutants to the watershed, it also removes this filtering function.<sup>14</sup> For this reason, by protecting certain lands from development we can get twice the value toward ensuring the watershed's ability to provide clean water.<sup>15</sup> There are both public and private approaches to protecting land from further development. Public approaches include direct regulation and eminent domain. Private approaches include nuisance litigation and, potentially, protection of ecosystem services interests, even where a nuisance level of harm cannot be shown.

An important aspect of ecosystem services that ties them to property and adds to the appeal of finding property interests in ecosystem services themselves, is the localized impact they usually

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<sup>10</sup> See generally IPCC, 2022: SUMMARY FOR POLICYMAKERS 28–33, in CLIMATE CHANGE 2022: IMPACTS, ADAPTATION AND VULNERABILITY (2022), [https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC\\_AR6\\_WGII\\_SummaryForPolicymakers.pdf](https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf).

<sup>11</sup> Artmann et. al., *Urban Sprawl, Compact Urban Development and Green Cities. How Much Do We Know, How Much Do We Agree?*, 96 ECOLOGICAL INDICATORS 3 (2019).

<sup>12</sup> See, e.g., Forest Isbell et al., *Expert Perspectives on Global Biodiversity Loss and Its Drivers and Impacts on People*, 21 FRONTIERS ECOLOGY & ENV'T 94 (2022).

<sup>13</sup> See Stephen M. Johnson, *Federal Regulation of Isolated Wetlands*, 23 ENV'T. L.J. 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.”).

<sup>14</sup> See James Salzman et al., *Protecting Ecosystem Services: Science, Economics, and Law*, 20 STAN. ENV'T. L.J. 309, 314 (2001).

<sup>15</sup> See *id.* at 314–15.

have. Yes, some ecosystem services have benefits on either a large scale—such as flood mitigation by wetlands—or even a planetary scale—such as carbon retention. However, many of the benefits we derive from ecosystem services come from our immediate proximity to their sourcing ecosystems. It is the functioning ecosystem’s connection to our land that renders it so valuable to us. This can sometimes play out in the context of district-level taxes or water surcharges with funds directed to land acquisition for the purpose of watershed protection and resulting water filtration service.<sup>16</sup> If, however, our land has historically depended upon services provided by other lands, we would be vulnerable without any private means of preserving our access to these services.

Because we are experiencing rapid declines in ecosystem functions upon which we depend for our quality of life—and, at the extremes, continued existence<sup>17</sup>—the pressure is on to find the right pathway to protecting our interests in these essential benefits. The status quo is simply not sustainable.

### C. Extractive Versus Instream or Non-Extractive Benefits

Ecosystem services can be either extractive (e.g., timber, fish, etc.) or non-extractive (e.g., flood prevention, temperature control, water purification, etc.). Non-extractive benefits can be enjoyed without limit so long as the ecosystem is not destroyed by some other cause, and are usually what is meant when the term is used in this article. This is because it is non-extractive benefits that are most essential to the use and enjoyment of neighboring property, which in turn serves to justify the establishment of rights to their continued existence. Extractive ecosystem services are more likely to have previously been treated as property and have long been tradable, whereas the concept of property rights to non-extractive ecosystem services is still quite nascent.<sup>18</sup>

Similarly, in the context of water rights, these were initially focused on diversion and consumption, in other words, extractive uses. The modern trend, however, is to focus also on in-stream benefits of water—including consideration of the ecosystem

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<sup>16</sup> See generally *id.*

<sup>17</sup> See Isbell et al., *supra* note 12, and accompanying discussion.

<sup>18</sup> See generally Robbins, *supra* note 1.

services they provide<sup>19</sup>—which is the non-extractive value and quite analogous to land-based ecosystem services. This trend is notable for the purpose of drawing on water rights doctrine to develop a system of rights in ecosystem services. That said, even the extractive water rights are of interest in this comparison, because upstream landowners must protect that water as it flows across their land, just as we may now wish to have them protect the resources on their land that generate ecosystem services utilized by neighboring lands.

## II. USUFRUCTUARY VERSUS POSSESSORY INTERESTS

One of the key reasons to look to water law as a model for defining rights in ecosystem services is due to the difference between usufructuary and possessory property interests. Applying the latter to ecosystem services, which are somewhat abstract even though of life-altering importance, is extremely challenging, whereas the concept of usufructuary interests is quite applicable.

### A. Usufructuary Basics

Water rights are usufructuary rights: the right to use, traditionally defined as a right to divert. Indeed, this is a founding concept in the United States from the beginning: “[i]t is laid down by our law writers, that the right of property in water is usufructuary, and consists not so much of the fluid itself as the advantage of its use.”<sup>20</sup> Water law cases “do not speak of the ownership of water, but only of the right to its use.”<sup>21</sup> In riparian states in the east, this perspective supported the restriction to uses directly upon riparian properties: “[t]he riparian system does not permit water to be reduced to possession so as to become property which may be carried away from the stream for commercial or nonriparian purposes.”<sup>22</sup> In more recent years, this hard line has been somewhat blurred, enabling uses on property not adjacent to the waterway such

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<sup>19</sup> See, e.g., Arlene J. Kwasniak, *Water Scarcity and Aquatic Sustainability: Moving Beyond Policy Limitations*, 13 U. DENV. WATER L. REV. 321 (2010).

<sup>20</sup> *Eddy v. Simpson*, 3 Cal. 249, 252 (1853).

<sup>21</sup> *United States v. State Water Res. Control Bd.*, 227 Cal. Rptr. 161, 167–68 (Ct. App. 1986) (citing *Rancho Santa Margarita v. Vail*, 81 P.2d 533, 560 (Cal. 1938)); see generally WELLS A. HUTCHINS, *THE CALIFORNIA LAW OF WATER RIGHTS* 36–38 (1956); 1 HAROLD E. ROGERS & ALAN H. NICHOLS, *WATER FOR CALIFORNIA* 191 (1967).

<sup>22</sup> *United States v. Gerlach Live Stock Co.*, 339 U.S. 725, 745 (1950).



as municipal needs, which not only contributes to human settlement of land further from water, but also renders water rights alienable and thus marketable.<sup>23</sup> While marketable rights are not quite as abstract, they are still entirely use-based in this context, and not possessory.

While the concept of use immediately conjures extractive images, non-extractive use is also use. Usufructuary rights can be and are applied to non-extractive uses. The difference inheres not so much in the right itself but in the method of demonstrating that right. While showing extractive use is generally simple and straightforward, demonstrating the continued need of non-extractive benefits can be somewhat murkier. As one example of a river use that falls on both sides of the instream flow issue, consider hydropower dams. Hydropower projects are typically regulated in relation to how much diversion they cause and are often required to allow a minimum stream flow to bypass them for ecological purposes as well as to serve any downstream water interests. However, such projects also require a minimum level of instream flow to reach them in order to function,<sup>24</sup> which is a relatively concrete demonstration of a human non-extractive need. While less obvious than the need for water to flow into a dam, wildlife also depends upon, and therefore “uses,” instream flow, and conservation biologists collect data that can demonstrate this need quantitatively. The challenge for demonstrating the use of ecosystem services coming from neighboring lands will be to show the impacts on one’s land in a similarly quantitative manner.

### B. Possession

In contrast, possessory property interests are tangible, physical interests. They have definite outlines. We have the right to hold them and exclude others from them. It makes perfect sense that we have a possessory interest in the land itself—land that benefits from or depends upon ecosystem services—as well as in the natural capital on our land, even though it is an essential source of

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<sup>23</sup> See Olivia S. Choe, Note, *Appurtenancy Reconceptualized: Managing Water in an Era of Scarcity*, 113 Yale L.J. 1909, 1929–37 (2004) (discussing the decline of the appurtenancy requirement).

<sup>24</sup> Different types of hydropower turbines need different flow levels to function, but all have minimum needs. See *Types of Hydropower Turbines*, OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, <https://www.energy.gov/eere/water/types-hydropower-turbines> (last visited Apr. 9, 2023).

ecosystem services on others' lands. We may also have a possessory interest in extractive ecosystem services, such as a right to take a certain number of board feet of timber. However, when we consider the ecosystem services that benefit our land, which are entirely non-extractive, they are too abstract to be possessory. Nor would it be realistic to give ecosystem services beneficiaries a possessory interest in the natural capital on someone else's land.

### C. Key Comparisons and their Relevance to Ecosystem Services

The right to exploit natural resources on one's property is generally a possessory right. The natural capital—excluding wildlife—is physically a part of the property that is owned in fee simple. If this right could be qualified by the right of others to make use of the ecosystem services flowing through or to their property, this could facilitate restrictions on the degree of exploitation. While this may sound like a transfer of property from one private party to another, it is not. First, the ecosystem services rights would be limited to the continued existence of benefits the receiving property already depends upon, so apart from increased security in that status quo, they would receive nothing new.<sup>25</sup> Second, on the other side of this same coin, the impact on possessory land use would be entirely on hypothetical future uses, as the status quo land use could remain. Finally, a usufructuary right would have the least impact on the owner of the natural capital. This type of interest is not nearly as invasive as an easement, for example, and in some jurisdictions the prevention of destruction of ecosystem services has already been framed as a servitude.<sup>26</sup> Finding an already-existing implied servitude based upon the dependence of neighboring lands has thus far been easiest to do with wetland services,<sup>27</sup> but as we learn more about our dependence on other services such as pollination, one can imagine this concept expanding.

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<sup>25</sup> At most, this could be deemed a new form of prescriptive easement, atypical in the sense of being a negative prescriptive easement, that the evolving common law might recognize as a result of changing societal needs. However, the usufructuary right envisioned is actually a lesser interest than an easement, given the obligations on the rights-holder to maintain it.

<sup>26</sup> See, e.g., LA. CIV. CODE ANN. art. 656 (2023); Carson Haddow, Comment, *Louisiana's Natural Servitude of Drain*, 75 LA. L. REV. 1363, 1380 (2015) (establishing that art. 656 applies to wetlands).

<sup>27</sup> See Haddow, *supra* note 26, at 1379–82.

A right to sustained receipt of existing ecosystem services, framed as a usufructuary right, is at most a negative servitude on the natural capital situated upon another's land. This article proposes no transfer of any possessory right nor even of an easement. It merely suggests that the intangible usufructuary right, being the least imposing manner of maintaining essential aspects of the status quo, may be a useful tool in defining interests in ecosystem services. The goal is to have the least impact on existing land use expectations while ensuring that the interests of those dependent upon ecosystem services are taken into account alongside the development interests on the land with the natural capital.

### III. WATER LAW APPROACHES AND THEIR APPLICATION TO ECOSYSTEM SERVICES

In a prior article, *Allocating Property Interests in Ecosystem Services*, I provided support for acknowledging legal interests in ecosystem services.<sup>28</sup> Ecosystem services may flow *to* one's private property or *from* it to others', and, most likely, both will occur with a single parcel. While Imani's land may contain a wetland that provides filtration and flood prevention services to her neighbors in all directions, she also may be relying on the dense trees along her border with Hiroshi's parcel. If Hiroshi eliminates the tree cover, Imani may lose soil quality, her pond may overheat leading her fish to die, and her air quality and privacy may be impaired. As discussed in greater detail in the prior article, property rights are best placed in lands that benefit from, rather than provide for, ecosystem services—placing many lands on both sides of this relationship.<sup>29</sup> “Specifically allocating this property interest to historically receiving landowners” will reduce externalities, maximize efficient use of land, and equitably distribute the rights and duties of land ownership.<sup>30</sup> In addition to the reasoning provided in that article, considering the various approaches to managing water rights further supports this allocation preference.

It becomes easier to grasp the concept of rights in ecosystem services when analogized to riparian rights. Landowners downstream from us have a right to water that is flowing through our land, so we cannot take it all, even when in our own domain.

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<sup>28</sup> See generally Robbins, *supra* note 1.

<sup>29</sup> See *id.* at 206–29.

<sup>30</sup> *Id.* at 206–07.

Water law is a complex field and there are varying approaches to allocating rights to withdraw water from a river or stream,<sup>31</sup> often by dividing the pie, but also approaches that consider instream value-rights in addition to withdrawal rights.<sup>32</sup> What is important for comparison to ecosystem services property, however, is that once we determine who has water rights, we constrain the right of upstream landowners to withdraw that which belongs to downstream landowners. The water may flow right through their property, but it belongs to other properties to which it will naturally flow if left unimpeded. Nature left to its own devices will deliver the property over one owner's land to reach the land of the owner of the right to that portion of water. Similarly, ecosystem services are those which nature will generate on its own, so long as not impeded by an "upstream" landowner, and deliver to the beneficiary of that service, who—as proposed here—might have a legal entitlement to that benefit.

#### A. Riparian System

Riparian landowners have rights to access and use their neighboring water.

Under riparian common law, an owner of land abutting a waterbody is a riparian and has certain rights, including: (1) the right to the continued existence of the waterbody in largely the same quantity and quality and (2) the right to make reasonable use of the water, subject to the equal rights of other riparians on the same waterbody. Thus any given waterbody functions as a common resource for the riparians who own property bordering it.<sup>33</sup>

This right is often defined by the availability of water that was in place at the time of acquiring title to the riparian land. In *Stowell v. Johnson*, the Utah Supreme Court stated the common law rule for riparian rights is that: "the riparian proprietor is entitled to have the water flow in quantity and quality past his land as it was wont to do

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<sup>31</sup> For a more detailed discussion of this background, see generally T. E. Lauer, *The Common Law Background of the Riparian Doctrine*, 28 MO. L. REV. 60 (1963).

<sup>32</sup> See Carol M. Rose, *Energy and Efficiency in the Realignment of Common-Law Water Rights*, 19 J. LEGAL STUD. 261, 290–93 (1990) (contrasting the importance of instream uses in eastern water law with the failure to provide for such interests in western water law).

<sup>33</sup> ROBERT KUNDIS CRAIG ET AL., WATER LAW 15 (2017).

when he acquired title thereto.”<sup>34</sup> Although this case is a rejection of the application of riparian rights in Utah,<sup>35</sup> it is frequently cited as a statement of the law of riparian rights.

This right relates not only to quantity, but also quality, as the water should be available in usable condition. While upstream owners have a right to take their share, “downstream riparian owners have certain rights to the waters of the stream unchanged in quantity and quality, except by reasonable riparian uses of other riparian owners.”<sup>36</sup> Prior to the Clean Water Act (CWA),<sup>37</sup> this was one avenue for preventing pollution. In the 1960s, for example, St. Joseph’s College sought to discharge fifty thousand gallons of effluent per day into a small stream and Maine enjoined this use as unreasonable because, under Maine water law, the discharge of effluent was a nonriparian use and the discharge was not for a proper riparian purpose.<sup>38</sup> Indeed, this concern for quality control has appeared over many years and in states applying varied approaches to water law.<sup>39</sup>

How might the riparian approach to water rights transfer to protecting ecosystem services? The quality and quantity of water was guaranteed under riparian systems in order to protect the rights of downstream riparian landowners. This also offered obvious incidental benefits to the environment and ecosystem services. Expanded application of the continued existence standard might create a standard to protect certain quantifiable characteristics. However, these characteristics may be hard to quantify, and their

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<sup>34</sup> *Stowell v. Johnson*, 26 P. 290, 291 (Utah 1891).

<sup>35</sup> *See id.* (declining to apply the common law of riparian rights because it was “utterly irreconcilable with the use of water for irrigation” in an arid state like Utah).

<sup>36</sup> *Stanton v. Trs. of St. Joseph’s Coll.*, 254 A.2d 597, 600 (Me. 1969).

<sup>37</sup> *See* Federal Water Pollution Control Act (Clean Water Act), 33 U.S.C. §§ 1251–1387. The CWA is a complex cooperative federalism scheme utilizing many overlapping regulatory approaches to reducing water pollution.

<sup>38</sup> *See Stanton*, 254 A.2d at 600.

<sup>39</sup> *See, e.g., Mattaponi Indian Tribe v. Commonwealth*, 72 Va. Cir. 444, 451 (2007) (“It is critical to recognize that the court in Purcellville confirmed that a riparian proprietor’s reasonable use of water, pursuant to his riparian rights, involves a concern for both the quantity and the quality of the water affected through such use.”); *Crum v. Mt. Shasta Power Corp.*, 4 P.2d 564, 573 (Cal. Dist. Ct. App. 1931) (“Under the California authorities a riparian owner of land is entitled to not only an undiminished flow of water but also to a substantially unpolluted stream. He is entitled to maintain substantially the same quantity and quality of water with which nature provided his land.”).

reduction may be so diffuse as to render it unenforceable. In addition, this could be viewed as applying the expansion of an economic protection with incidental environmental benefits to an environmental protection with only incidental economic benefits, which may not seem adequately translatable.

In any event, a strict application of this standard has given way to the increasing application of a reasonable use standard.<sup>40</sup> The right is thus subject to neighbors' reasonable use—the right is relative and usufructuary—whether extractive or causing a reasonable addition of pollution.<sup>41</sup> However, “such use is subject to the rights of other riparian owners to a like reasonable use. What is reasonable must, in each instance, be determined in the light of total supply and total need of all riparian owners.”<sup>42</sup> These rights, at least in a riparian regime, are equal among riparian landowners, all of whom are in about the same position in relation to the water.<sup>43</sup> As the United States Supreme Court explained in the mid-twentieth century:

The law followed the principle of equality which requires that the corpus of flowing water become no one's property and that, aside from rather limited use for domestic and agricultural purposes by those above, each riparian owner has the right to have the water flow down to him in its natural volume and channels unimpaired in quality. The riparian system does not permit water to be reduced to possession so as to become property which may be carried away from the stream for commercial or nonriparian purposes.<sup>44</sup>

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<sup>40</sup> See 1 WATERS AND WATER RIGHTS §§ 6.01, 7.02(d) (Amy K. Kelley ed., 3d ed. 2020).

<sup>41</sup> CRAIG, *supra* note 33, at 37 (“Riparians are entitled to the reasonable use of water flowing by their property in a natural stream and likewise have the right to create a reasonable amount of pollution”).

<sup>42</sup> *Colorado v. Kansas*, 320 U.S. 383, 399 (1943).

<sup>43</sup> See *United States v. Willow River Power Co.*, 324 U.S. 499, 505 (1945) (quoting Bannister, *Interstate Rights in Interstate Streams in the Arid West*, 36 HARV. L. REV. 960 (1923)) (“Equality of right between such claimants was the essence of the resulting water law. ‘The fundamental principle of this system is that each riparian proprietor has an equal right to make a reasonable use of the waters of the stream, subject to the equal right of the other riparian proprietors likewise to make a reasonable use.’”).

<sup>44</sup> *United States v. Gerlach Live Stock Co.*, 339 U.S. 725, 745 (1950); see also *Kansas v. Colorado*, 206 U.S. 46, 103 (1907) (quoting *Elliott v. Fitchburg R.R. Co.*, 64 Mass. (10 Cush.) 191, 193 (1852)) (“The right to flowing water is now well settled to be a right incident to property in the land; it is a right *publici juris*,

These concepts can be similarly applied in the context of ecosystem services, especially given that they would typically be enjoyed by multiple landowners, some with the natural capital on their property and also many without, whose use is entirely non-extractive. As with water, landowners and neighbors of natural resources providing ecosystem services might be said to be entitled to the reasonable use of those natural resources and a right to cause a reasonable amount of their destruction. The ecosystem services are a benefit incident to the location of the property and the quality of the ecosystem on and around the land. Like water, ecosystem services face a tragedy of the commons whereby each landowner benefits from the ecosystem services in existence, but it is in no single landowner's best interest to reduce exploitation. Similarly, it may be said that ecosystem services flow through the land, dependent upon the health of the habitat as a whole. Indeed, ecosystem integrity may need to be supported across multiple lands, just as the resulting services flow over multiple lands. This is a scenario in need of coordination, just as water was.

Treating a natural area providing ecosystem services as a common resource for bordering property owners could theoretically create a right to the continued existence of the natural resource providing the ecosystem services in the same quantity and quality, subject to reasonable use. One question this raises is whether neighboring land in the riparian analogy is only that which is neighboring the ecosystem itself or all land receiving its services. The latter would be rather difficult to justify, which somewhat limits the potential to certain landowners and not others, despite their reliance on ecosystem services that were historically provided to their land. Riparian rights only extend to neighbors, so expansion of this doctrine to other ecosystem services might only increase the circle of rightsholders to bordering property owners, and not necessarily other substantial beneficiaries of the ecosystem services.

One final consideration drawing upon riparian rights is whether such rights can be had in artificial environments. In the context of ecosystem services, such benefits are provided by tree farms, and

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of such a character, that whilst it is common and equal to all, through whose land it runs, and no one can obstruct or divert it, yet, as one of the beneficial gifts of Providence, each proprietor has a right to a just and reasonable use of it, as it passes through his land; and so long as it is not wholly obstructed or diverted, or no larger appropriation of the water running through it is made than a just and reasonable use, it cannot be said to be wrongful or injurious to a proprietor lower down.”).

even some agricultural practices. Would neighbors to a paper mill's tree farm be granted too much power over that resource? No, because the general rule against riparian rights on artificial water would protect the commercial ability to exploit their own farms for timber or other renewable resources that the commercial entity itself planted or developed, potentially reducing some commercial opposition to these ideas. At the same time, expansion of the riparian "artificial-becomes-natural" rule could protect natural resources that were developed for the purpose of ecosystem services because those are created with the intent to be a permanent enhancement of the natural condition.

Riparian rights are quite limited on artificial water. *Alderson v. Fatlan*<sup>45</sup> held that "riparian rights do not extend to artificial waters" because "...it would be inequitable to grant a property owner rights to a water body artificially made by someone else's labor solely because the property abuts the water." Indeed, numerous jurisdictions have upheld this general principle barring riparian rights to artificial waters.<sup>46</sup> Riparian rights can, however, extend to artificial bodies of water pursuant to the "artificial-becomes-natural" rule. Pursuant to this rule, an artificial water body may eventually come to be considered a natural one if it exhibits the characteristics of a natural body of water.

In determining the question, three things seem generally to be taken into consideration by the courts: (1) whether the way or stream is temporary or permanent; (2) the circumstances under which it was created; and, (3) the mode in which it has been used and enjoyed. Where the way is of a permanent character, and is created under circumstances indicating an intention that it shall become permanent, and it has been used consistently with such intention for a considerable period, it is generally regarded as stamped with the character of a natural watercourse, and treated, so far as the rules of law and the rights of the public or of individuals are concerned, as if it were of natural origin.<sup>47</sup>

An additional key consideration is "whether the party invoking the rule has relied upon the use of the artificial body of the water

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<sup>45</sup> See *Alderson v. Fatlan*, 898 N.E.2d 595, 601 (Ill. 2008).

<sup>46</sup> See generally *Anderson v. Bell*, 433 So. 2d 1202, 1204-05 (Fla. 1983) (citing many such cases); 1 WATERS & WATER RIGHTS, *supra* note 40, § 6.02(e) ("It is axiomatic that riparian rights do not attach to artificial waterbodies").

<sup>47</sup> *Saelens v. Pollentier*, 131 N.E.2d 479, 482 (Ill. 1956) (quoting 56 AM. JUR. § 151).



without dispute for a lengthy period of time.”<sup>48</sup> This prescriptive concept is particularly transferable to the ecosystem services context, as we are dealing with properties that have depended upon ecosystem services for as long as they have been real estate.<sup>49</sup> Indeed, it is this very feature of ecosystem services that creates the need for improved coordination among landowners and brings us to look to water law for this potential.

### B. Prior Appropriation System

Prior appropriation, which is the more common approach in the western states, is based on seniority of water rights. The first to divert the water to beneficial use retains the right to continue that use, and so on over multiple appropriators each with a “priority date” based on when they first took the water. Their right to water is made available to them in that order all the way until it is all taken. The goal behind this system at common law was to use every last drop.<sup>50</sup> This is, of course, ecologically problematic, as well as a challenge to apply to the ecosystem services context, though there are a few aspects of interest in this regard.

First, appropriative water rights are alienable,<sup>51</sup> but the sale may not enlarge the existing right.<sup>52</sup> Transfer applications are analyzed to determine the likelihood of increased water diversion for the new use, as well as related impacts on conservation and the public interest generally, so there is a good deal of discretion to deny

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<sup>48</sup> CRAIG, *supra* note 33, at 17.

<sup>49</sup> See generally Robbins, *supra* note 1.

<sup>50</sup> See Christine A. Klein, *Water Bankruptcy*, 97 MINN. L. REV. 560, 569–72 (2012) (discussing states’ tendencies to over-appropriate water, leaving junior appropriators with only a paper right to wet water).

<sup>51</sup> See *Walker v. United States*, 162 P.3d 882, 890 (N.M. 2007) (quoting *KRM, Inc. v. Caviness*, 925 P.2d 9 (N.M. Ct. App. 1996)) (“Thus, under prior appropriation, as a separate protected property right, a vested water right can be “sold, leased, or transferred.”).

<sup>52</sup> See *Harrison v. Simpson (In re Revised Abandonment List of Water Rts. in Water Div. 2)*, 276 P.3d 571, 572 (Colo. 2012) (“Even if it seems clear that no other rights would be affected solely by a particular change in the location of diversion, it is essential that a change also not enlarge the existing right.”).

transfers.<sup>53</sup> Historical consumption may be used to determine whether a proposal constitutes an enlargement.<sup>54</sup>

If this aspect of prior appropriation water doctrine were applied to the context of ecosystem services, it provides pathways to protecting both consumptive and non-extractive uses. Historical consumptive use may provide a way to distinguish seniority or rights in a new resource market. The restriction on enlargement of existing water rights could provide protection from the alienability of the extractive use of ecosystem services while accommodating limited development. If property rights in natural resources that generate ecosystem services are well-defined, then the creation of a government-regulated market for ecosystem services may promote the more efficient use of reduced resources, as discussed later in this article.

Prior appropriation states have been evolving in ways relevant to the application of the approach to ecosystem services. The original requirement of actual diversion did not traditionally accommodate simply leaving water *in situ* to support in-stream uses.<sup>55</sup> Extending this initial approach to ecosystem services would be problematic because extractive beneficial use of natural resources undermines their ability to provide ecosystem services. Thus, applying the traditional extractive requirement for beneficial use would be problematic because the value of ecosystem services is in their non-extraction. However, this problem may be reduced by proposing to apply the modern trend rather than the traditional rule.

Some prior appropriation states have modified the diversion requirement to promote in-stream uses and conservation values. When beneficial use can be demonstrated without the necessity of diversion, courts will accept such uses in these states, thereby eliminating the requirement of physical diversion.<sup>56</sup> This trend,

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<sup>53</sup> See *Barron v. Idaho Dep't of Water Res. (In re Transfer No. 5116)*, 18 P.3d 219, 222 (Idaho 2001) (stating that changes to water rights will not be approved if they constitute an enlargement in use or if the change is not consistent with water conservation or the local public interest).

<sup>54</sup> See *Barron*, 18 P.3d at 224.

<sup>55</sup> See Nicole L. Johnson, *Property Without Possession*, 24 Yale J. on Regul. 205, 222 (2007).

<sup>56</sup> See *In re Adjudication of the Existing Rts. to the Use of All of the Water*, 55 P.3d 396, 406 (Mont. 2002) (recognizing physical diversion is not required "where no diversion is necessary to put the water to a beneficial use").

which already serves to protect ecosystem integrity in the aquatic context, could translate to the broader context of ecosystem services because it would permit the existence of a right reserved to protect the ecosystem services without extraction. This is arguably the modern trend and its application to ecosystem services would be less problematic than the traditional rule that would require extraction.

One problem in applying this principle is the need for non-extractive users to provide adequate notice to extractive users of their needs. Another problem is the absence of a minimum flow level, as the prior appropriation system limits appropriations to protect the economic expectations and property rights of senior appropriators, not the environmental needs.<sup>57</sup> Arizona, like most prior appropriation states, has no minimum flow level, but water cannot be appropriated that conflicts with senior appropriators.<sup>58</sup> This problem reared its ugly head even where the in-stream need was essential to the protection of U.S. Forest Service land.<sup>59</sup> For these reasons, the transition from traditional prior appropriation systems into modern systems that recognize in-stream rights is a challenging one. This also suggests roadblocks for application to the broader ecosystem services context.

Another interesting element is the prohibition on waste. Some courts have applied a reasonably necessary standard to the amount of diversion, thereby creating a water duty to use an efficient method of conveyance to reduce waste.<sup>60</sup> California has even passed a state constitutional amendment to clarify that the right to make beneficial use of water does not include waste or unreasonable use-method of use.<sup>61</sup> Although it would be an uphill climb, perhaps this could be analogized to a proposed duty not to unreasonably damage

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<sup>57</sup> See *Silver v. Pueblo Del Sol Water Co.*, 423 P.3d 348, 365 (Ariz. 2018) (discussing whether there is “legally available water” due to federal reserved water rights for the Bureau of Land Management’s management of the nearby national conservation area).

<sup>58</sup> See *id.* at 361 (Bales, C.J., concurring in part and dissenting in part).

<sup>59</sup> See *Avondale Irrigation Dist. v. N. Idaho Props.*, 577 P.2d 9, 15 (Idaho 1978) (overturning district court ruling that the U.S. Forest Service’s water rights included the potential right to the full flow of the stream in order to preserve the national forest ecosystem).

<sup>60</sup> See *State ex rel. Lassen v. Harpham*, 410 P.2d 100, 112–15 (Ariz. Ct. App. 1966) (compiling state rules prohibiting water waste in groundwater wells).

<sup>61</sup> See *Peabody v. City of Vallejo*, 40 P.2d 486, 491 (Cal. 1935) (quoting CAL. CONST. art. 14, § 3).

ecosystem services flowing through property. This would, of course, raise questions about defining “reasonable” ecosystem destruction. How much habitat can be removed and for what purposes? Arguably, the waste prohibition itself would not limit efficient uses, but it theoretically could curtail inefficient uses, for which there are few constraints at present—only potential violations of existing conservation statutes such as the Endangered Species Act, but even these do not concern themselves with efficiency.

Notice is another key component to protecting non-extractive uses and raises problems for the protection of ecosystem services. In prior appropriation states, traditionally diversion provided actual notice in a prior appropriation to downstream users. Modern prior appropriation systems generally supplement the actual diversion requirement with the additional requirement of permit filing: “[a]n appropriation of water from a public stream may be initiated by notice, now required to be given by law in some, if not all, of the arid states, or by actual diversion from the stream.”<sup>62</sup> Notice is especially important for in-stream ecological use:

We hold that Montana recognized fish, wildlife and recreation uses as beneficial and that valid instream and inlake appropriations of water existed in Montana prior to 1973 where the intended beneficial use did not require diversion, and when the facts and circumstances indicate that notice of the appropriator’s intent had been given.<sup>63</sup>

Notice must strictly conform to statutory requirements,<sup>64</sup> so the risk of failing to successfully establish the right is significant, especially in non-commercial contexts in which attorneys are less likely to be involved.

This nonetheless is a context for application to non-extractive appropriation of natural resources in the form of ecosystem services, which, again, predate the estates of all involved—in terms of the natural benefits flowing from some lands to other lands. If the ecosystem services that flow through the connected natural resources crossing property boundaries are analogized to streams that flow across property boundaries, and assuming that a framework is proposed to restrict depletion of the natural resources

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<sup>62</sup> *Vineyard Land & Stock Co. v. Twin Falls Salmon River Land & Water Co.*, 245 F. 9, 20 (9<sup>th</sup> Cir. 1917).

<sup>63</sup> *In re Adjudication of Existing Rts. to the Use of all Water*, 55 P.3d 396, 407 (Mont. 2002).

<sup>64</sup> *See id.* at 411 (Rice, J., dissenting).

that create ecosystem services in a way comparable to restrictions on water appropriations that would impede the rights of senior appropriators as a stand-in for maintaining a minimum level of ecosystem services, then application of the modern trend in prior appropriation could extend the right to also “appropriate” the non-extractive environmental use of natural resources—ecosystem services.

How would notice expectations be formally implemented in such a scheme? A system of appropriations for a finite resource requires notice. Given that the purpose of ecosystem services is to stay in place, what notice is provided and to whom? The application of prior appropriation principles would likely also require the incorporation of a similar modern system of formal notice in part because it is unlikely that extraction of resources from one part of the ecosystem would provide actual notice of the extraction to a nearby landowner and because the only way to provide notice of non-extractive appropriations is through formal written notice. These are some of the questions this article seeks to address below.

### C. Permitting Systems

Permitting systems that clarify water rights have developed in states from east to west, whether founded upon riparian common law or prior appropriation. Minimum flow levels in many of these permitting systems could be analogized to protect a threshold level of ecosystem services. Permitting systems often implement water availability considerations within the permit application process in order to protect minimum flow levels. Prior appropriation systems utilize an administrative determination that a source is fully appropriated, which differs from the common law in that it is not fully appropriated via diversions.<sup>65</sup> Similarly, other states have adjusted their water rights systems to allow appropriative rights for instream use for ecosystem health among other purposes. Riparian systems often will set minimum flows in streams and minimum levels in aquifers, with such conservation-oriented language as “[t]he minimum flow for a given watercourse is the limit at which

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<sup>65</sup> See, e.g., Christina Hoffman & Sandra Zellmer, *Assessing Institutional Ability to Support Adaptive, Integrated Water Resources Management*, 91 NEB. L. REV. 805, 819–20 (2013).

further withdrawals would be significantly harmful to the water resources or ecology of the area.”<sup>66</sup>

In Washington, prior appropriations can set minimum stream flows as a water right. The Washington Department of Ecology “has authority to set minimum stream flows to protect fish, game, birds or other wildlife resources, recreational and aesthetic values.”<sup>67</sup> Washington implemented a prior appropriation system for surface water in 1917 and state reservations of water to provide minimum flow levels were enabled by the Minimum Water Flows and Levels Act of 1969.<sup>68</sup> Washington requires permits to appropriate, requiring a determination that the water is available and the appropriation will be for a beneficial use and will not impair existing rights nor be detrimental to public welfare.<sup>69</sup> These minimum stream flows are treated as appropriations dated to the rule’s adoption and therefore do not restrict more senior appropriations,<sup>70</sup> but “[a] minimum flow is an appropriation subject to the same protection from subsequent appropriators as other water rights.”<sup>71</sup> In such a jurisdiction, impairment of minimum flow rights is only permitted under the narrow “overriding considerations of the public interest” exception, which is not met by municipal water needs.<sup>72</sup> This provides for a temporary emergency withdrawal of water during a drought, but there is a strict prohibition on reducing flows below “essential minimums.”<sup>73</sup>

In the absence of a historical market for ecosystem services, a prior appropriation system for natural resources that create ecosystem services may be difficult to implement. Considering a hypothetical scenario in which such a market has been created, implementation of minimum flows would potentially enshrine the existing level of use. However, if the rights are alienable, then conservation organizations or governmental entities could “buy

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<sup>66</sup> FLA. STAT. § 373.042(1)(a) (2022).

<sup>67</sup> *Swinomish Indian Tribal Cmty. v. Wash. State Dep’t of Ecology*, 311 P.3d 6, 9 (Wash. 2013).

<sup>68</sup> *See id.* at 15 n.9, 17; *see also* WASH. REV. CODE. § 90.22 (2022).

<sup>69</sup> *See Swinomish Indian Tribal Cmty.*, 311 P.3d at 14 (citing statutory appropriation procedure at WASH. REV. CODE § 90.03.290(3)).

<sup>70</sup> *See id.* at 9–10.

<sup>71</sup> *Id.* at 12 (citations omitted).

<sup>72</sup> *See Foster v. Wash. State Dep’t of Ecology*, 362 P.3d 959, 960, 963–64 (Wash. 2015).

<sup>73</sup> *See id.* at 962.

back” the right to deplete the natural resources creating the ecosystem services to the level that is efficient for both economic use and ecosystem services creation. This in some respects mirrors existing payment for ecosystem services (PES) programs, in which landowners are paid to utilize agricultural methods that protect ecosystem services provided by their land or agree not to utilize portions of land at all.<sup>74</sup>

An analog of Washington’s system would protect minimum levels under a slightly modified regime as the appropriation rights. An “overriding considerations of the public interest” exception might be analogized in ecosystem services to the creation of a fire break near essential habitats or municipalities. This provides flexibility to deal with changing situations but should be implemented with the same degree of scrutiny as Washington’s narrow exception for minimum flows such that political expedience or cost-benefit analyses will not override the ecosystem protections.

Connecticut has established discretion to set minimum flows and a classification system for alteration permitted based on habitat quality. Minimum flow standards shall be set for all stocked stream systems, where necessary to preserve and protect natural aquatic life and natural and stocked wildlife, to protect public recreational use, and to be consistent with the needs of “public health, flood control, industry, public utilities, water supply...public safety, [and] agriculture.”<sup>75</sup> Connecticut uses its system of classification to determine the amount of alteration allowed based on the quality of habitat.<sup>76</sup> These range from class 1 which denotes high habitat quality and heavily restricts alteration, to class 4 which denotes low habitat quality and prioritizes human needs allowing for more alteration.

Connecticut’s classification system has the potential to provide a model structure for implementing restrictions on the depletion of

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<sup>74</sup> See generally J.B. Ruhl, *Agriculture and Ecosystem Services: Strategies for State and Local Governments*, 17 N.Y.U. ENV’T L.J. 424, 446–47 (2008); James Salzman, *Creating Markets for Ecosystem Services: Notes from the Field*, 80 N.Y.U. L. REV. 870, 892–99 (2005). For templates for PES agreements, see *Template Payments for Ecosystem Services (PES) Agreements*, KATOOMBA GRP., <https://perma.cc/C3LQ-BHR8> (last visited Apr. 9, 2023).

<sup>75</sup> *City of Waterbury v. Town of Washington*, 800 A.2d 1102, 1141 n.36 (Conn. 2002) (citing CONN. AGENCIES REGS. § 26-141a-4).

<sup>76</sup> See *Connecticut Stream Flow Frequently Asked Questions*, CONN. DEP’T OF ENERGY & ENV’T PROT., <https://portal.ct.gov/DEEP/Water/Stream-Flow-Standards/Stream-Flow-Frequently-Asked-Questions> (last visited Apr. 9, 2023).

natural resources that provide ecosystem services. A possible framework could theoretically involve administrative rulemaking to define the conditions for each type of ecosystem that would trigger the ecosystem to move from one classification to another. Each relevant landowner could be distributed depletion permits based on the ecosystem services value of the resources that are on their property. The permit would convey a depletion right that is keyed to the current classification of the ecosystem such that where the ecosystem is stressed, depletion of the resources is more restricted. These permits could be alienable under a Coasean framework, and could be purchased by neighbors, developers, or conservation groups. While broad definitions would be best determined at a larger administrative scale, substantial implementation discretion would need to be retained at local levels, resulting in a cooperative federalism scenario. This system would create an administrative burden in developing and applying the classifications, but the step framework of the classification structure may increase certainty among all potential users and may be less costly to implement than the more individualized prior appropriation structure.

Another approach would be to require the classifications to be designed individually in each region, in light of the potential for greater local knowledge of ecosystem qualities and needs. Drawing again from the water flow context, Florida provides an illustration of mandating local governmental entities to establish minimum flow levels. Florida's Environmental Protection Agency mandated that each relevant governmental entity, typically a water management district, establish minimum flow levels for all surface watercourses at the level that "further withdrawals would be significantly harmful to the water resources or ecology of the area" within a reasonable time.<sup>77</sup>

Translating this to the ecosystem services context begs the question of who would establish minimum quality levels. Zoning boards already exist to restrict development and often incorporate rules related to environmental health, like restriction on the quantity of impermeable surfaces—increasing groundwater percolation and reducing runoff—but could be ill-equipped to handle such ecological issues and such an approach overall would be unhelpful

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<sup>77</sup> *Concerned Citizens for Responsive Gov't v. St. Johns River Water Mgmt. Dist.*, 622 So. 2d 520, 522 (Fla. Dist. Ct. App. 1993) (quoting FLA. STAT. § 373.042).



in remote unincorporated areas. The study of ecosystem services health could be performed by a state or federal forest or park service, but these organizations are already overworked, and this would only accommodate assessments of ecosystem health where a substantial portion of the relevant area is government property. The expansion of existing watershed-level districts may suffice where water can provide an adequate stand-in for ecosystem health, or perhaps an undertaking this significant would lead to new specialized departments within these agencies.

In the event that a jurisdiction was to create a permit program designed to protect ecosystem services, this could involve permits for receiving landowners, sending landowners, or both. Permits for receiving landowners would look a lot like the modern permit requirements for water rights, especially given that these are often applied to in-stream uses. Because traditionally—before in-stream uses were protected water rights—notice to other users was provided via the diversion itself, where there is no diversion there would be no notice. This is one of the purposes the permits serve. Similarly, landowners whose property relies on ecosystem services generated on neighboring land would need to obtain permits for this usufructuary right. These permits could be limited to historical use, which is often the case in the transition from common law water rights to permit schemes—a statute requires riparians or prior appropriators to convert their prior use into a permit going forward. Permits for sending landowners would look more like a cap-and-trade scheme. Once the minimum ecosystem quality is determined, that would serve as the cap, and any room for degradation could be turned into permits for the landowners upon which the natural capital is situated. Assuming there were multiple such landowners—as would be the case for most ecosystems<sup>78</sup>—these permits could then be traded among them, resulting in the most efficient use of the remaining degradation allowed.

With regard to generating tradeable permits for depleting ecosystem values, this would not be without precedent, albeit narrowed to a specific ecosystem type. An example of markets for ecosystem services is wetland mitigation banking.<sup>79</sup> A wetland

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<sup>78</sup> The boundaries of what would be deemed a unit of ecosystem for purposes of such a permit system would also need to be defined.

<sup>79</sup> See J. B. Ruhl & R. Juge Gregg, *Integrating Ecosystem Services into Environmental Law: A Case Study of Wetlands Mitigation Banking*, 20 STAN. ENV'T. L.J. 365, 365–68 (2001).

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.<sup>80</sup> This voluntary effort and expense is a business investment, as the banker has now generated numerous wetland credits that may in turn be sold to developers seeking to destroy wetland property, as they will be required to mitigate the damage they do by restoring a wetland elsewhere in order to obtain a permit.<sup>81</sup> Because these developers are not themselves in the business of restoring wetlands, nor do they own any wetland property to restore—apart from the wetland they wish to fill—it is often preferable for them to buy these credits from a mitigation bank and be done with it. This also maximizes efficiency by centralizing the task and managing it with expertise, rather than as an addition to a development project.

The 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.”<sup>82</sup> This is now a well-developed market for ecosystem services—when a developer wishes to destroy ecosystem services upon which the community depends he must purchase them nearby in order to replace what he is taking. This concept also 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.

#### IV. MODERN TRENDS IN WATER REGULATION AS THE MODEL FOR SECURING RIGHTS IN ECOSYSTEM SERVICES

So, if we treat ecosystem services as a property interest, how might that play out? If we were to decide that ecosystem services

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<sup>80</sup> *See id.*

<sup>81</sup> *See id.* at 368–71.

<sup>82</sup> Federal Guidance for the Establishment, Use and Operation of Mitigation Banks, 60 Fed. Reg. 58,605, 58,607 (Dec. 28, 1995).

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. Either way, bargaining could occur between the two parties to shift the interest to the other party, so either way, the situation would remain a flexible one. The important thing is that we clarify the interests so that they can be held or transferred at all.

The transition from common law riparian water rights to permitting systems may offer a model pathway for jurisdictions to modify landowner rights to alter natural conditions that provide ecosystem services. Just as states have the power to decide how water is used, they also define property rights, so state legislation requiring permits for ecosystem services destruction would be capable of mirroring what has been accomplished in relation to water. This section will focus on traditionally riparian jurisdictions modernizing water law, followed by analysis of what this suggests for the context of property interests in or other rights to ecosystem services.

Riparian states have largely used permit conversion. This is logically translatable to a modification of pre-existing rights to remove resources that produce ecosystem services. Similar to riparian states where a riparian landowner had water rights that flowed from the land ownership, a landowner's rights to modify resources that produce ecosystem services flow from possessing the land on which the resources are located. For example, the Florida Supreme Court held that the Florida Water Resources Act was the water law counterpart to land use regulation and zoning such that "the right to the use of water may also be limited or regulated" without compensation.<sup>83</sup>

Florida transitioned from common law riparian water rights to permitting, in part out of ecological concern.<sup>84</sup> This reflects a transition from the riparian landowner having an indefinite right to water use to a restriction on water use based upon ecological considerations. Currently, landowners with natural capital are generally presumed to have the right to exploit that resource.

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<sup>83</sup> Village of Tequesta v. Jupiter Inlet Corp., 371 So. 2d 663, 672 (Fla. 1979).

<sup>84</sup> Christine A. Klein et. al., *Modernizing Water Law: The Example of Florida*, 61 FLA. L. REV. 403 (2009).

Ecosystem services flow across property lines much like water and the natural resources that provide habitat are similarly essential to the ecosystem. In the realm of water rights, states have been able to restrict the previously free right to use water on the basis of ecological concern. This successful approach has the strongest potential to translate to an analogous path of restricting exploitation of nonwatery resources on the basis of ecosystem services.

Another useful tool is the modern trend of inserting a public interest analysis into the process in states applying any one of the various water law approaches discussed above. As a typical example, Florida's Water Resources Act requires that new uses of water not interfere with any existing uses and be compatible with the public interest.<sup>85</sup> One can imagine a similar rule that could be applied following a modification of landowner rights to extractive use or destruction of natural capital that would require any new exploitation of natural resources that diminishes ecosystem services to be compatible with existing reliance on those ecosystem services. Because it is impossible to apply any new approach to protecting ecosystem services to already-destroyed ecosystems, any new limitations on destruction can be framed as taking unexercised rights to exploit natural capital, which would limit the potential of success of the inevitable takings claims.

Oregon upheld the elimination of unexercised riparian rights, concluding that "a state may change its common-law rule as to every stream within its dominion and permit the appropriation of the flowing waters for such purposes as it deems wise."<sup>86</sup> Indeed, nearly all jurisdictions, to address takings claims based on new permit requirements to access prior water rights—and potential for denial of that access in response to permit applications—have upheld the practice.

Oklahoma alone has suggested that converting riparian rights to prior appropriation is an unconstitutional taking.<sup>87</sup> A 1963 Oklahoma statute limited the riparian owner to domestic use and declared all other water public, subject to appropriation without compensation.<sup>88</sup> The Oklahoma Supreme Court in *Franco-*

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<sup>85</sup> FLA. STAT. § 373.223 (2022).

<sup>86</sup> *In re Willow Creek*, 144 P. 505, 516 (Or. 1914).

<sup>87</sup> *See Franco-Am. Charolaise, Ltd. v. Okla. Water Res. Control Bd.*, 855 P.2d 568, 571 (Okla. 1990).

<sup>88</sup> *See id.*

*American* held that “the Oklahoma riparian owner enjoys a vested common-law right to the reasonable use of the stream. This right is a valuable part of the property owner’s ‘bundle of sticks’ and may not be taken for public use without compensation.”<sup>89</sup> Although this is in one sense an outlier case finding a taking in the context of limiting water diversion that was previously allowed, this quote’s framing arguably also applies to landowners whose property historically has relied upon receipt of ecosystem services. Like adjacent water, this could also be seen as a valuable stick in the metaphoric bundle.

Judge Lavender’s partial dissent in *Franco-American* argues that a common law right may be lost by nonuse or limited to domestic and appropriative uses and any holding otherwise “simply places a common law doctrine as an impenetrable barrier to efficient management of a natural resource never deemed to be owned by private landowners.”<sup>90</sup> The dissent’s argument is, of course, stronger in its application to water rights because water has historically been considered a usufructuary right instead of an ownership interest.<sup>91</sup> The tricky step in applying this takings defense to natural resource management for ecosystem services is that with water and wild animal management landowners have generally not had a possessory right to either. Ecosystem services-providing capital is far more likely to be historically owned in a possessory manner, as land with the potential to be developed.

Most states have held this riparian water rights shift to permit requirements not to be a taking.<sup>92</sup> Therefore, it is likely that a law that merely restricts a landowner’s right to extract or develop based on ecological conditions would pass muster under the Takings Clause. If a regulated market for permits for natural resource extraction was created, the framing of who initially holds the rights could impact the outcome of takings litigation, but keep in mind that the *ecosystem services*—as opposed to the natural capital—have

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<sup>89</sup> *Id.*

<sup>90</sup> *Id.* at 591 (Lavender, J., concurring in part and dissenting in part) (citing *State v. Knapp*, 207 P.2d 440 (Kan. 1949); *In Re Hood River*, 227 P. 1065 (Or. 1924), *appeal dismissed*, 273 U.S. 647 (1926); *In Re Deadman Creek Drainage Basin*, 694 P.2d 1071 (Wash. 1985); *Village of Tequesta v. Jupiter Inlet Corporation*, 371 So. 2d 663 (Fla.1979), *cert. denied*, 444 U.S. 965 (1979)).

<sup>91</sup> *See id.*; *see also* James L. Huffman et. al., *Constitutional Protections of Property Interests in Western Water*, 41 PUB. LAND & RES. L. REV. 27, 35 (2019).

<sup>92</sup> *See In re Water Use Permit Applications*, 9 P.3d 409, 493–94 (Haw. 2000).

historically served the receiving lands and may have generated substantial reliance on their continuation.<sup>93</sup>

Generally, I would propose to allocate non-extractive ecosystem services permits to those owning land that enjoyed the preexisting benefits. This presents as a restriction on land use for the owners of natural capital, which would likely survive a takings claim not only as described above in the riparian conversion context, but also because it would almost certainly fall into a regulatory takings analysis. In that case, so long as the land still has economic value, it will not be deemed a taking. The non-extractive permits to receiving landowners could also be coupled with limited permits for natural capital owners to diminish ecosystem values via development or consumptive use, as described in the prior section in terms of cap-and-trade. That said, this inclusion is not indispensable, as there is plenty of precedent for requiring preservation on private property.<sup>94</sup>

Prior appropriation states have also been shifting to permit systems, but have typically used general stream adjudication, which is less fraught with takings claims but is extremely slow and cumbersome. With general stream adjudication, the state asks the court to determine the totality of all interests in a given stream of water. The court then requires all parties with a claim to bring evidence of that claim and, in the end, we get a clear set of rights among parties to the actually existing quantity of water. While this process is based on long-standing recognized rights and thus harder to translate into the ecosystem services context, there could be some benefit to stretching ourselves to attempt it. The major upside to general stream adjudication is the clean slate it provides, the clarity of everyone's interests, and an opportunity to take a messy situation and get a reset. In the context of ecosystem services, it could be an opportunity to (1) have all parties present their claims, whether title claims to natural capital or historic-benefit claims to as-yet-unrecognized ecosystem services rights and; (2) have a single court sort through an entire ecoregion at once in order to take into account the complex web of ecosystem services generation and needs. That

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<sup>93</sup> See Robbins, *supra* note 1, at 229.

<sup>94</sup> A notable example is historic preservation ordinances, which limit alterations on properties with historic value. The author of this article is not even allowed to update her home's windows due to restrictions applicable to the historic neighborhood in which she lives.

said, no matter how appealing this reset for property interests in ecosystem services might be, it's not clear that this would be an avenue for establishing rights not previously recognized.

While at least some, perhaps most, of the rights should go to properties relying upon the receipt of ecosystem services, it is worth noting that one might generate new ecosystem services property and own it. There are a variety of circumstances in which people artificially design property features that provide ecosystem services and doing so would not create a right in any serendipitous beneficiaries. Indeed, these benefits could be sold or withheld. Wetland mitigation banks are one example of this concept. As a matter of public policy, we would not wish to discourage land uses that generate ecosystem services not previously provided, nor does fairness dictate giving the right to the receiving landowner if it was not an original attribute of their land—or a replacement of a source that has been destroyed. In this sense, artificial land capital may be treated differently from the artificial waterways discussed earlier.

#### CONCLUSION

At this point, nearly a quarter of the way into the twenty-first century, we are at a critical juncture for developing ecosystem services protecting policies. Not only are we directly wiping out functioning ecosystems at an alarming pace, but we face climate disruption that simultaneously aggravates that decline while increasing the necessity of ecosystem services essential to our adaptation. Ecosystem services are not a handout from one property owner to another. They are essential components of all property and have been historically relied upon in the purchase and use of property. The principles drawn from water rights in this article are just one set of ideas for securing the status quo for properties depending upon other properties. There are certainly other pathways as well, and time is running out to choose. The simplest approach is to protect existing rights, which is why it is worthwhile to frame ecosystem services in this manner.

