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Roy Baharad
Hebrew University of Jerusalem

Gideon Parchomovsky
University of Pennsylvania Law School

ESSAY

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*Roy Baharad**
*Gideon Parchomovsky***

Protection of common natural resources is one of the foremost challenges facing our society. Since Garrett Hardin published his immensely influential The Tragedy of the Commons, *theorists have contemplated the best way to save common-pool resources—national parks, fisheries, heritage sites, and fragile ecosystems—from overuse and extinction. These efforts have given rise to three principal methods: private ownership, community governance, and use restrictions. In this Essay, we present a different solution to the commons problem that has eluded the attention of theorists: access rationing. Access rationing measures rely not only on restrictions on the number of users but also on a variety of economic, informational, and technological techniques that can be readily adjusted to changing circumstances. By focusing on the point of entry, access rationing prevents harm to natural resources from arising ab initio. Furthermore, access rationing offers the twin virtues of simplicity and flexibility. Finally, access rationing has the additional advantage of transparency, as it allows members of the public and nonprofit organizations to monitor the performance of regulatory agencies. Drawing on a myriad of real-world examples, the present Essay is the first to provide a comprehensive theory of access-based measures for governing the commons.*

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* Fellow, The Aumann-Fischer Center for Law, Economics and Public Policy, The Hebrew University of Jerusalem; Faculty of Law, The Hebrew University of Jerusalem.

** Robert G. Fuller, Jr., Professor of Law, University of Pennsylvania Law School; Edward Silver Professor, Faculty of Law, The Hebrew University of Jerusalem.

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INTRODUCTION

In a highly influential article, *The Tragedy of the Commons,* ecologist Garrett Hardin stated that "[f]reedom in a commons brings ruin to all."[1] As an illustration, Hardin described the inevitable overuse of an open pasture by herdspeople. He further explained that the tragic fate of common resources arises from a critical misalignment between private and social interests. Each herdsperson has an incentive to take full advantage of the pasture irrespective of the broader societal interest in conservation. Consuming less is not a viable individual strategy because other herdspeople would simply intensify their own use and appropriate more of the resource.[2] The same is true of all common resources. Common resources give rise to a problem of negative externalities, allowing users to appropriate the full private benefit of their use while bearing only a tiny fraction of the social cost. This

1. Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243, 1244 (1968).

2. *Id.* ("As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, '[w]hat is the utility *to me* of adding one more animal to my herd.' ").

dynamic manifests itself in many real-world examples, ranging from national parks to ocean fisheries, from wildlife to air pollution.

The problem of overuse of common resources has become a central theme of property and land use law. Ever since Hardin's glum prediction, property theorists have labored to solve the problem. Their efforts have produced some of the most famous and long-lasting contributions to property and land use theory. The first solution was put forth by Harold Demsetz in his seminal *Toward a Theory of Property Rights*.[3] Demsetz powerfully argued that one way to contend with the problem is to concentrate all rights in an asset into the hands of a single private owner. The grant of all property rights to a single private owner eliminates the potential for externalities by making the owner the sole bearer of all costs and benefits.

A different solution to the problem was advanced by economist Elinor Ostrom in her Nobel Prize winning work *Governing the Commons*.[4] Based on a series of field studies, Ostrom demonstrated that a close-knit group can devise a system of governance rules that prevents overuse of natural resources, thereby preempting the tragedy of the commons from arising. Ostrom's works have inspired follow-on studies by notable scholars, such as Carol Rose and Vicki Been,[5] who built on her insights and developed them further.

The third model that is employed to avert the tragedy of the commons is use regulation. Land use regulation is an independent field of study in most, if not all, law schools. But the scope of regulation is obviously not limited to land. Use regulations typically limit the actions that can be taken with respect to a resource by establishing rules of behavior and imposing sanctions on violators.[6]

Although each of the three solutions can serve to ameliorate the problem of overuse, each suffers from inherent problems and limitations. Begin with Demsetz. Demsetz's prescription for the tragedy of the commons—the appointment of a single owner who controls all rights to a resource—is inherently unstable. As an economist, Demsetz was fully aware of the cost of formalizing private property rights and appointing single owners. Unfortunately, he overlooked two other limitations of his proposal. As we will show, the single owner solution

3. Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347 (1967).

4. *See* ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION (1990).

5. Carol Rose, *The Comedy of the Commons: Custom, Commerce, and Inherently Public Property*, 53 U. CHI. L. REV. 711, 748 (1986); Vicki Been, *Locally Undesirable Land Uses in Minority Neighborhood: Disproportionate Siting or Market Dynamics*? 103 YALE L.J. 1383, 1384 (1994).

6. *Infra* notes 72–81.

is (a) short-lived and (b) often unattainable. To illustrate, assume that Ann is given all rights to Greenacre. The moment Ann meets a life partner or has children, however, the law itself would bring the single owner reality to an end. Most state laws provide for sharing arrangements that partially divest property owners of their rights in cases of marriage, cohabitation, or death. Furthermore, the power of property owners to transfer their rights to third parties implies that whenever she sells her rights to more than one buyer, the single owner reality similarly comes to an end. As Francesco Parisi has observed, "property is subject to a fundamental law of entropy," namely, "a one-directional bias . . . lead[ing] towards increasing . . . fragmentation."[7]

More importantly, perhaps, the single owner solution is ill-fitted for many natural resources. It is impracticable, as well as undesirable, to give individuals full dominion over such natural resources as national parks, ocean fisheries, large lakes, or wildlife. Indeed, one would be hard-pressed to come up with real-world examples of such cases. Conferring absolute rights to valuable resources upon a single individual might lead to their ruin even faster than would be the case under the tragedy of the commons.

Ostrom's solution, which relies on self-imposed governance rules, is imperfect for other reasons. To begin with, as Ostrom herself emphasized, her governance solution is limited to close-knit groups. Such groups are characterized by repeated interactions among their members in a way that changes the individual incentive structure. The social bonds and interdependence among individual group members serve as antidotes against opportunism and self-interested behavior. In the modern world, however, social bonds tend to be weaker than in the past, and close-knit groups are increasingly hard to find.[8] As social mobility increases, even groups that were closely knit in the past would find it difficult to maintain this attribute.

In addition, Ostrom's solution to the tragedy of the commons disadvantages the public at large. While it may be true that members of the group that controls a resource get to enjoy it, third parties are excluded from the resource and cannot derive benefit from it—let alone use it.[9] Essentially, Ostrom's model can be thought of as an expansion

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7. Francesco Parisi, *Entropy in Property*, 50 AM. J. COMPAR. L. 595, 595 (2002); *see also* Norbert Schulz, Francesco Parisi & Ben Depoorter, *Fragmentation in Property: Towards a General Model*, 158 J. INSTITUTIONAL & THEORETICAL ECON. 594, 610 (2002) ("In the realm of nonconforming property arrangements, [fragmentation] generates a one-directional stickiness in the transfer of legal entitlements.").

8. *Infra* note 67.

9. *See, e.g.*, Samuel Bowles & Herbert Gintis, *Social Capital and Community Governance*, 112 ECON. J. 419, 421 (2002) ("[C]ommunity governance address[es] market and state failures but

of Demsetz's insights. Both seek to solve the problem of overuse by limiting the number of owners. Demsetz puts the limit at one, while Ostrom allows for a larger number of owners who meet specific conditions. Neither solution grants the public at large an opportunity to enjoy such common-pool assets.

Finally, Ostrom's prescriptions are unsuitable for most natural resources. Natural resources that are governed by cohesive groups are rare. New groups that satisfy Ostrom's characterization are hard to find and obviously cannot be conjured up. Also, as was the case with Demsetz's model, it is often undesirable, even perilous, to entrust natural heritages to a single group, to the exclusion of all others.

The third model of use regulation suffers from its own central flaw. Use regulations implicate high enforcement costs. As Steven Shavell has observed, "compliance . . . tends to be assessed before, or independently of, the occurrence of harm."[10] As an illustration, consider the case of national parks. Visitors to national parks are often reminded to "leave no trace," or, at a minimum, not to harm the park.[11] Enforcement of these standards requires monitoring the activities of *all* visitors, even those who have no intention to violate the norm. Yet, due to budgetary constraints, there are not enough rangers to ensure compliance, and even with the aid of technology, it is a mammoth challenge to detect violations. In many cases, it is the sheer number of visitors above all else that upsets the delicate natural balance.

As an illustration, consider Colorado's overvisited Hanging Lake. The evergreen landscapes of this picturesque natural landmark have made it a popular hiking and traveling destination. But the average daily attendance of roughly one thousand visitors is, according to the U.S. Forest Service's official report, just too much.[12] This number, which extends far beyond the sustainable capacity of the delicate ecosystem surrounding the area, gradually compromises the integrity of natural resources in Hanging Lake, resulting in damages to, inter alia, compacted soils, plant habitat, and water quality.[13] Moreover, the

typically relies on insider-outsider distinctions that may be morally repugnant and economically costly . . . .").

10. Steven Shavell, *A Fundamental Enforcement Cost Advantage of the Negligence Rule over Regulation*, 42 J. LEGAL STUD. 275, 275 (2013).

11. *See, e.g.*, *Leave No Trace Seven Principles*, NAT'L PARK SERV., https://www.nps.gov/articles/leave-no-trace-seven-principles.htm (last visited Oct. 7, 2022) [https://perma.cc/AK5J-TRJG].

12. *See* U.S. DEP'T OF AGRIC., HANGING LAKE MANAGEMENT PLAN: ENVIRONMENTAL ASSESSMENT 4, 6 (Feb. 2018), https://usfs-public.app.box.com/v/PinyonPublic/file/933783850644 [https://perma.cc/5SA7-B7GY] ("With over 150,000 visitors annually, the area is experiencing safety issues, and natural resource and facility degradation—all of which are negatively impacting the visitor's experience.").

13. *Id.* at 6.

report emphasizes day-to-day maintenance concerns as the growing number of visitors consistently results in infrastructural degradation—to parking lots, trail treads, bridges, boardwalks, and railing systems—thereby jeopardizing public safety.[14] Lastly, the increasing amount of litter, graffiti, and general vandalism that impacts historic sites further impairs the visitors' experience.[15] Identifying unregulated entry as a primary cause, one of the report's main recommendations was to extensively limit the number of visitors, advocating a fixed daily capacity:[16] currently, six hundred visitors a day enjoy the reestablished splendor of Hanging Lake.[17]

Hanging Lake is hardly an exception. The skyrocketing demand for traveling and park visitation pursuant to the COVID-19 pandemic[18] makes the pressure on common-pool resources more extreme than ever. For instance, it is estimated that, absent an adequate access regulation, California's Yosemite National Park cannot recover from the recent wildfires by continuing to host its annual average of four million visitors.[19] Acadia National Park in Maine has likewise subscribed to (a

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14. *Id.*

15. *See id*. at 15:

> With the increase in use, there has been an increase in vandalism and resource damage along the trail's infrastructure and natural features. Graffiti has been an issue on the historic shelter with modern day carvings and paint. With an increase in visitation, there has been an increase in visitors violating the posted regulations. On any given day, people enter the lake, walk on the log, hike off the trail, litter and bring their dogs;

id. at 21 ("Without a reduction of overcrowding, the historic features along the Hanging Lake Trail will continue to be threatened by graffiti and other vandalism.").

16. *Id*. at 6:

> The proposed action is to approve and implement [a plan which would] . . . (a) allocate and manage the area to a defined daily capacity of 615 visitors per day, year round; (b) manage this capacity through a fee-based reservation or permit system; (c) utilize a third party mandatory transportation provider in order to allocate and manage to the areas daily capacity during the "Peak" season (currently proposed from May 1st through October 31st); and (d) implement an adaptive management strategy to ensure that the intent of the plan continues to be realized in light of potential future changes.

17. *See* Elaine Glusac, *Cooler, Farther and Less Crowded: The Rise of 'Undertourism*,*'* N.Y. TIMES (Aug. 29, 2019), https://www.nytimes.com/2019/08/29/travel/colorado-overtourism.html [https://perma.cc/3PEH-LFUL] ("To regulate traffic, the United States Forest Service, with the city of Glenwood Springs, this year implemented a permit requirement ($12), limiting visitors to 600 a day between May 1 and Oct. 31.").

18. *See*, *e.g*., Charlotte Simmonds, Annette McGivney, Patrick Reilly, Brian Maffly, Todd Wilkinson, Gabrielle Canon, Michael Wright & Monte Whaley, *Crisis in Our National Parks: How Tourists Are Loving Nature to Death*, GUARDIAN (Nov. 20, 2018, 3:00 AM), https://www.theguardian.com/environment/2018/nov/20/national-parks-america-overcrowding-crisis-tourism-visitation-solutions [https://perma.cc/EFE9-4UWC] ("Across America, national parks and public lands are facing a crisis of popularity. Technology, successful marketing, and international tourism have brought a surge in visitation unlike anything seen before.").

19. Michael Childers, *Overcrowded U.S. National Parks Need a Reservation System*, GOV'T EXEC. (June 3, 2021), https://www.govexec.com/management/2021/06/overcrowded-us-national-parks-need-reservation-system/174446/ [https://perma.cc/H3HR-P2UK] (reporting that the Rocky

certain form of) gateway management.[20] While restrictive entry regimes have not escaped criticism,[21] conservationists and environmentalists maintain that crowd control is a necessary means of keeping the most popular parks unimpaired.[22] Their argument is not unfounded. Strict entry limitations proved successful; e.g., in reducing visitors' risk of confrontation with wildlife in Glacier National Park[23] and facilitating the reallocation of the use of natural areas in Yellowstone Park between humans and local mammals.[24] Such conclusions were reaffirmed by wilderness field studies conducted outside the United States.[25]

In this Essay, we draw on practice and identify a different solution to the lingering challenge of overuse and destruction of resources: regulation of *access*. Access to property is routinely theorized as involving a binary choice. Commentators can be divided into two broad camps—those who conceptualize property as an institution centered on the *right to exclude* and those who view property as an *inclusive* institution. This dichotomous approach obfuscates a dazzling array of options that comprise access. In this Essay, we aim to highlight the richness of options that come under the regulation of access and show how regulators can harness the myriad options provided by access regulation to construct a better management regime for common pools.

Mountain National Park in Colorado would allow only seventy-five to eighty-six percent of its capacity). While the National Park Service removed its categorical fire suppression policy for Yosemite in 1972, its use remains limited in part due to the difficulties inherent to balancing controlled burns with protection of tourist infrastructure. Kara Manke, *How Wildfire Restored a Yosemite Watershed*, BERKELEY NEWS (Aug. 9, 2021), https://news.berkeley.edu/2021/08/09/how-wildfire-restored-a-yosemite-watershed/ [https://perma.cc/2AEZ-QCVT]. Despite these hesitations, controlled burns have played a vital role in improving the park's fire-resistance–most recently by preserving Yosemite's iconic sequoias in the Washburn fire (which, ironically, was also human caused). Alexandra Borunda, *The Key to Protecting Yosemite's Sequoias from Wildfires? More Fire*, NAT'L GEOGRAPHIC (July 14, 2022), https://www.nationalgeographic.com/environment/article/the-key-to-protecting-yosemites-sequoias-from-wildfires-more-fire [https://perma.cc/F3L4-YB2]; *Washburn Fire,* INCIWEB, https://inciweb.nwcg.gov/incident/8209/ (last visited Oct. 9, 2022) [https://perma.cc/4VJY-7VKT] (designating the Washburn fire to be human caused, likely originating in Mariposa Grove).

20. Childers, *supra* note 19.

21. *Id*. ("Critics have already created a petition opposing Rocky Mountain National Park's timed entry permits as unnecessary, unfair, undemocratic and discriminatory.").

22. *Id*. (opining that "crowd control has become essential in the most popular parks").

23. Clifford J. Martinka, *Preserving the Natural Status of Grizzlies in Glacier National Park*, 2 WILDLIFE SOC'Y BULL. 13, 15 (1974).

24. Kerry A. Gunther, *Visitor Impact on Grizzly Bear Activity in Pelican Valley, Yellowstone National Park*, 8 BEARS: THEIR BIOLOGY & MGMT. 73, 75–77 (1990); Tyler H. Coleman, Charles C. Schwartz, Kerry A. Gunther & Scott Creel, *Grizzly Bear and Human Interaction in Yellowstone National Park: An Evaluation of Bear Management Areas*, 77 J. WILDLIFE MGMT. 1311, 1315–17 (2013).

25. *See, e.g.*, Dusit Ngoprasert, Antony J. Lynam & George A. Gale, *Effects of Temporary Closure of a National Park on Leopard Movement and Behavior in Tropical Asia*, 82 MAMMALIAN BIOLOGY 65 (2017).

Unlike regulation of use, which targets activities *inside* a commons and thereby requires constant monitoring of uses, access rationing *imposes restrictions at the point of entry*. Thus, access regulation provides a uniquely cost-effective way to preserve resources. In its most basic sense, access rationing aims to restrict the number of individuals who are allowed to gain access to a resource and the equipment they carry, instead of monitoring how visitors behave inside a park or the number of fish fisherfolk capture. Yet, there are far more nuanced forms of access regulation that we discuss in this Essay. Access rationing may consist of partial entry restrictions that put sensitive sections off-limits. Likewise, it may consist of limitations on the gear, equipment, or supplies visitors can bring into natural amenities. Such restraints prevent destruction of resources ex ante and obviate the need for expensive monitoring of conduct. To illustrate, consider a forest. It is possible to protect the resource by imposing an outright ban on access to the forest. But it is also possible to restrict the number of visitors or the gear and supplies they carry. To protect wild animals, it is possible to bar firearms and traps, or to add checks at the point of exit as an additional means of verifying that visitors did not carry away flora, fauna, or other mementos with them. In the case of ocean fisheries, access rationing would cover not only the number of fishing boats but also their size and fishing technology, such as dragnets. Preventing the entry of equipment that may harm natural resources largely obviates the need to monitor use and, in other instances, renders it merely subsidiary.

Furthermore, as we will explain in detail in this Essay, access regulation offers a host of highly sophisticated methods that can be employed to govern common pools *from the outside*. These include, inter alia, designing information and advertisements to alleviate congestion. Alternatively, it is possible to impose limitations on activities that are complementary to the extraction of common pool resources with a view to reduce the attractiveness of the latter.

Access rationing is also superior to management or governance systems of natural resources for two principal reasons. First, as we extensively document throughout this Essay, access rationing is optimal in cases in which there is no *single* type of overuse of a common-pool resource, but rather, when such a resource is subject to various forms of overexploitation, as is ordinarily the case. Typically, the overextraction of common resources emanates from a myriad of activities, each of which contributes to the gradual extinction of species and the depletion of resources. In such circumstances, we posit, the overuse of commons is just too variegated to be handled by use controls. Any attempt to control overuse in such cases is doomed to be ineffective,

cumbersome, and wasteful. Gateway control, in the form of access rationing, provides a much better alternative.

Second, access rationing allows society to prevent potential harms *before* they arise.[26] The preventive nature of access rationing is absolutely critical since in the case of environmental harm, remedial action after the fact is ineffective. To see this, consider the case of oil spills or fires caused by hikers. Even when the harm causers can be readily identified, little can be done to rectify the harm. In addition to the preventive attribute of access regulation, it constitutes a cheap way of attaining environmental goals. The model is predicated on a simple inspection at the point of entry and does not normally necessitate further activity monitoring.

Our Essay is the first to provide a comprehensive theory of the regulation of access. We first establish our contribution on theoretical grounds by reconceptualizing the tragedy of the commons as revolving primarily around unregulated access. We show that the pioneering works on this subject have not paid sufficient attention to the possibility of preventing depletion and overuse of resources by imposing restrictions on entry. We then demonstrate that the regulation of access is profoundly ingrained in practice, as the management of the commons often turns to imposition of both direct and indirect limitations on individuals' ability to approach a common resource. We highlight the omnipresence of access restrictions in essentially any imaginable class of common resources, with a particular focus on parks, fisheries, heritage sites, and urban commons.

Structurally, this Essay unfolds in three parts. Part I reviews three strands of literature; each strand advocates a different approach to resolve the tragedy of the commons—privatization, community governance, or a retainment of public ownership alongside with regulatory measures designated to control overuse. Part II stresses that the classic theorization of the third approach, the one that normally takes priority due to its flexibility, maintainability, and political acceptability, lacks the significant distinction between two types of regulatory measures: access and use. We characterize the pertinent

26. For some closely related works on the role of preventive enforcement in criminal law, see, for example, Tim Friehe & Avraham Tabbach, *Preventive Enforcement*, 35 INT'L REV. L. & ECON. 1 (2013), which exemplifies the difference between preventive and detective measures by illustrating that "[w]hile speeding on highways is increasingly controlled by speed cameras (punishing the violation but not preventing it), velocity in residential areas is often regulated by speed bumps that physically prevent drivers from speeding"; and Murat C. Mungan, *Optimal Preventive Law Enforcement and Stopping Standards*, 20 AM. L. & ECON. REV. 289, 290 (2018), which explains that "[s]obriety checkpoints reduce the harm inflicted through driving under the influence offenses by preventing the driver from continuing to drive. In contrast, resources spent on crime scene investigations are generally meant to solve previously committed crimes . . . ."

differences between the two, taxonomize the regulation of access, and demonstrate—through numerous practical examples concerning all classes of common resources—the evolving understanding that limitations on access are robust compared to any other form of regulation in governing the commons. In Part III, pursuant to our descriptive observations, we advance a normative theory of access regulation and demonstrate that entry restrictions are the optimal way of governing the commons. A short conclusion ensues.

I. AVOIDING TRAGEDIES

In 1968, Garret Hardin authored an immensely influential article in which he predicted that common resources subject to an open access regime face a uniform sad ending: ruin.[27] Hardin concluded that unfettered use of common resources would inevitably lead to their overuse and extinction.[28] The root causes of the problem, according to Hardin, were the negative externalities that pervade the exploitation of common resources: Each user who consumes a common resource, explained Hardin, receives the full benefit of her action, but bears only a fraction of the cost.[29] Hence, consumption would continue until the resource is depleted.[30] To illustrate the problem, consider a small grove with fifty apple trees that is subject to an open access regime. Assume that each tree is worth $1000. The first person who chances upon the grove can uproot a tree, enriching herself by $1000, while losing only a small amount of value due to the diminution in the beauty of the grove. Engaging in the same cost-benefit analysis, the second visitor will do the same. So will the third and fourth. This dynamic will continue until all trees are gone. At this point, there will be nothing to take. The same dynamic would transpire in grazing pastures, fields, ocean fisheries, and national parks,[31] and the same logic applies to gas and oil wells, mineral deposits, and any imaginable common-pool resource. Hardin termed this phenomenon "the tragedy of the commons," which cleverly was also the title of his article.[32]

While Hardin's bleak prophecy about the fate of common resources under an open access regime has become a staple of property theory, it was actually Harold Demsetz's pioneering work that set the stage for Hardin's prediction. Prior to Demsetz, academics and

27. Hardin, *supra* note 1, at 1244.
28. *Id*. at 1245.
29. *Id*. at 1244–45.
30. *Id*. at 1244.
31. *See id*. at 1244–45.
32. *Id*. at 1244.

policymakers were primarily preoccupied with the problem of pollution[33]—a specific example of a negative externality. Rather than concentrating on pollution of different kinds, Demsetz provided a more comprehensive grasp of externalities, dedicating his attention to subjects' ability of overexploiting publicly owned assets, natural resources in particular.[34] He suggested that the rivalrous use of any open-access common resource necessarily embeds negative externalities.[35] Furthermore, Demsetz advanced a solution to the problem of overuse of common resources under an open-access regime. His solution came in the form of establishing private property rights in natural resources and granting them to a single owner.[36]

In the remainder of this Part, we will review and critically evaluate not only Demsetz's single owner solution to the tragedy of the commons but also Eleanor Ostrom's governance model and the omnipresent approach of use regulation. We use this discussion as a launching pad for our own solution of access regulation, which we present in Part II.

A. Private Ownership

The core contribution of Demsetz's 1967 article *Toward a Theory of Property Rights* was to point out robustness of private ownership to negative externalities.[37] Specifically, he observed that overconsumption of the open-access resource vanishes once ownership is bestowed upon

33. *See* ARTHUR C. PIGOU, THE ECONOMICS OF WELFARE (2d ed. 1925) (developing the concept of externalities); *see also* ARTHUR C. PIGOU, WEALTH AND WELFARE (1912) (arguing that economic equality maximizes welfare). Arthur Pigou's foundational work was the first to formulate an economic approach that explicitly addresses the grave concern of factories polluting unhindered and with complete impunity. Pigou's proposed solution was taxing polluters in a value equivalent to the social harm they impose, thus incentivizing economic agents to internalize the costs of their activity. *See, e.g.*, Peter N. Salib, *The Pigouvian Constitution*, 88 U. CHI. L. REV. 1081, 1084 (2021). As subsequent theorists have shown, Pigouvian taxes are notoriously difficult to compute with any degree of accuracy. *See* William J. Baumol, *On Taxation and the Control of Externalities*, 62 AM. ECON. REV. 307, 318 (1972) ("[G]iven the limited information at our disposal, it is perfectly reasonable to act on the basis of a set of minimum standards of acceptability."); Carl J. Dahlman, *The Problem of Externality*, 42 J.L. & ECON. 141, 157 (1979) ("[W]ith our limited information about production and utility functions, we cannot adequately describe the allocation of the competitive equilibrium so that the Pigovian taxes can be calculated correctly."); Adi Libson & Gideon Parchomovsky, *Reversing the Fortunes of Active Funds*, 99 TEX. L. REV. 581, 608 (2021) ("The inability to quantify externalities accurately is an inherent problem in the deployment of Pigouvian taxes.").

34. *See* Demsetz, *supra* note 3, at 354–55.

35. *Id.*

36. *Id.* at 355–58.

37. *Id.* at 356 ("The resulting private ownership of land will internalize many of the external costs associated with communal ownership, for now an owner, by virtue of his power to exclude others, can generally count on realizing the rewards associated with husbanding the game and increasing the fertility of his land.").

a single private owner; privatization, therefore, yields a socially optimal extraction, as *both* benefits and costs are being internalized.[38] The Demsetzian perspective is rather compelling, primarily for its appeal to intuition and day-to-day conduct. Indeed, cigarette stubs are profusely disposed at the rims of any main street, but one rarely does so in the confines of her own home, where the inconvenience of cleaning it up lies solely on her shoulders.[39] Similarly, the same cost-benefit analysis engenders the problem of overfishing: anglers enjoy the full marginal benefit of every fish caught but bear a negligible fraction of the marginal cost of diluting the fishery.[40] The merit of private ownership, per Demsetz, lies not only in its elimination of externalities but also in saving enforcement costs: while regulators ought to monitor subjects' compliance, private owners need only to protect the asset from foreign incursion.[41] Unsurprisingly, Demsetz's insight has given rise to calls to privatize shorelines and even wild animals.[42]

Privatization, however, entails some major drawbacks that have long been recognized by contributors. First and foremost, one may challenge Demsetz's proposed solution for its possible incompleteness. While privatization does manage to avoid the exhaustion of resources, i.e., the intra-asset externalities *within the commons*, it mitigates no externalities between neighboring properties, where one's use of her own asset intrudes upon other privately owned properties located in its vicinity.[43] In other words, private ownership does nothing to resolve nuisances or inter-asset externalities.[44] This means that private ownership is never a standalone solution.

Another problematic trait of the single private owner solution is its inherent instability. This problem arises from the different life spans

38. *Id.* at 355–58. This insight has been later recognized by Hardin as well, noting that privatization may be unjust, and still, "[i]njustice is preferable to total ruin." Hardin, *supra* note 1, at 1247.

39. *See* Gideon Parchomovsky & Peter Siegelman, *Cities, Property, and Positive Externalities*, 54 WM. & MARY L. REV. 211, 223 (2012) (explaining how a person who litters in public receives a small benefit to their act while the cost is spread out over the entire population, but when a person litters in their own private space they bear the full cost of doing so).

40. GARY D. LIBECAP, CONTRACTING FOR PROPERTY RIGHTS 15 (1989) ("Chronic common pool conditions have been a characteristic of fisheries."); Abraham Bell & Gideon Parchomovsky, *Property Lost in Translation*, 80 U. CHI. L. REV. 515, 566 (2013) ("[U]sers of a fishery held in commons know that they can enjoy the full benefit of any fish caught while suffering only a small portion of the costs of depleting the fishery.").

41. *See generally* Robert C. Ellickson, *Property in Land*, 102 YALE L.J. 1315, 1327 (1993) ("A key advantage of individual land ownership is that detecting the presence of a trespasser is much less demanding than evaluating the conduct of a person who is privileged to be where he is.").

42. *See, e.g.*, Rose, *supra* note 5, at 748 (discussing the privatization of shorelines as a solution to the problem of overfishing).

43. Parchomovsky & Siegelman, *supra* note 39, at 225.

44. *Id.*

of individuals, on the one hand, and assets, on the other. At the end of a human's life, her title will be divided among several heirs or devises. The erosion of single ownership has occupied the attention of contributors since the Talmudic era[45] and is subject to indefatigable interest in contemporary academic research. For example, in his study of property regimes in the former U.S.S.R.,[46] Michael Heller observed that the dispersion of private property rights among multiple owners leads to an *anticommons* problem, which manifests itself in the *underutilization* of assets.[47] Reinforcing this idea, Francesco Parisi, in his article *Entropy in Property,* noted private property's tendency toward fragmentation.[48]

Other theorists have shed light on many problematic aspects of the privatization process itself. In this respect, Terry Anderson and Peter Hill's work on public choice suggests that the phenomenon of rent dissipation that results from the pursuit of private property rights may be as socially undesirable as common ownership of resources.[49] Relatedly, Abraham Bell, together with one of us, has noted that the very act of privatizing is escorted by substantial transaction costs due to the transition from one legal regime to another.[50] Finally, Amy Sinden emphasized the distorted grasp of privatized commons in practice, contending that such private ownership still largely hinges on governmental standards—rather than the championed market conditions—regarding the acceptable amount of resource utilization.[51]

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45. *See* Robert J. Aumann & Michael Maschler, *Game Theoretic Analysis of a Bankruptcy Problem from the Talmud*, 36 J. ECON. THEORY 195 (1985) (addressing a Talmudic problem of estate division among several creditors).

46. *See* Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621 (1998). Heller's celebrated result has been followed by many influential developments. *See, e.g.*, James M. Buchanan & Yong J. Yoon, *Symmetric Tragedies: Commons and Anticommons*, 43 J.L. & ECON. 1 (2000) (answering Heller's call to develop a formal economic model of the anticommons); Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 SCIENCE 698 (1998) (identifying that a paradoxical consequence of biomedical privatization is that establishing intellectual property rights upstream may stifle innovation further downstream in research and product development); Yun-chien Chang, *Tenancy in "Anticommons"? A Theoretical and Empirical Analysis of Co-Ownership*, 4 J. LEGAL ANALYSIS 515 (2012) (examining whether tenancy in common creates the tragedy of the anticommons).

47. Heller, *supra* note 46, at 624.

48. Parisi, *supra* note 7, at 595.

49. Terry L. Anderson & Peter J. Hill, *Privatizing the Commons: An Improvement?*, 50 S. ECON. J. 438, 438 (1983) (stressing that "the 'tragedy of the commons' may be no worse than the rent dissipation that can result in the process of private property establishment").

50. Bell & Parchomovsky, *supra* note 40, at 567 (contending that "once a given resource is managed by a regime separate from the legal standard in a certain jurisdiction, it makes translating between the regime and the wider legal standard increasingly cumbersome").

51. For comprehensive discussion, see Amy Sinden, *The Tragedy of the Commons and the Myth of Private Property Solution*, 78 U. COLO. L. REV. 533 (2007).

In sum, in many cases, privatization is simply not a feasible option. This may be due to technological deficiencies, cultural constraints, or ethical considerations.[52] In addition, private ownership is commonly associated with anti-conservation initiatives, which may be adverse to publicly shared values[53] and may thus face political objections.[54] Furthermore, this solution's disregard of distributional concerns has likewise attracted persuasive criticism.[55] Privatization is, therefore, a useful solution only to a very limited extent.

B. Community Governance

A different solution to the tragedy of the commons has been advanced by Nobel Prize Laureate Elinor Ostrom. The novelty of Ostrom's work lay not only in her findings but also in the methodology she employed.[56] Ostrom's empirical outlook suggested an innovative take on common-pool resources, demonstrating that the predictions of theoretical models are not always compatible with reality.[57] Ostrom systematically identified common resources that did not fall prey to overuse and depletion notwithstanding the retainment of public ownership.[58] Importantly, Ostrom's study indicated that common resources could be preserved without privatization.[59] The implication was that private ownership was not a sine qua non to avoiding the tragedy of the commons.[60]

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52. *See, e.g.*, Barton H. Thompson, Jr., *Tragically Difficult: The Obstacles to Governing the Commons*, 30 ENV'T L. 241, 244 (2000) (noting that privatization is oftentimes not possible, and that in such a case "government or community regulation can limit overuse of the commons").

53. *See* Abraham Bell & Gideon Parchomovsky, *Of Property and Antiproperty*, 102 MICH. L. REV. 1, 13–14 (2003) (introducing the anti-conservation bias associated with private ownership).

54. *See generally* Giovanna DiChiro, *Nature as Community: The Convergence of Environment and Social Justice*, *in* PRIVATIZING NATURE: POLITICAL STRUGGLES FOR THE GLOBAL COMMONS 120 (Michael Goldman ed., 1998) (examining the emergence of the U.S. environmental justice movement).

55. *See, e.g.*, Sheila R. Foster, *Collective Action and the Urban Commons*, 87 NOTRE DAME L. REV. 57, 78–79 (2011) (introducing the distributive justice case against privatization of municipal authorities extensively brought in Robert H. Nelson, *Privatizing the Neighborhood: A Proposal to Replace Zoning with Private Collective Property Rights to Existing Neighborhoods*, 7 GEO. MASON L. REV. 827 (1999)). For a more general reluctant view of the privatization of government functions, see Avihay Dorfman & Alon Harel, *The Case Against Privatization*, 41 PHIL. & PUB. AFFS. 67 (2013).

56. Bell & Parchomovsky, *supra* note 53, at 44 ("One of Ostrom's most important contributions to the commons literature was positive, rather than normative.").

57. OSTROM, *supra* note 4.

58. *Id*. at 58–101 (providing an analysis of "long-enduring, self-organizing, and self-governing [common-pool resources]").

59. *Id*.

60. OSTROM, *supra* note 4.

Ostrom identified a common denominator that underlies all publicly owned assets whose overexploitation has been avoided: social norms.[61] Observing small, cohesive communities, she discovered that such groups may effectively function as a single agent who owns the resource, thereby internalizing the costs of its use.[62] She reported that any violation of a social norm is typically coupled with an informal sanction, which reinforced the internal understanding of group members that norms should be obeyed.[63] The community members in Ostrom's study were not driven by the self-interest posited by Hardin as the defining characteristic of human behavior.[64] Ostrom's conclusion was that individual commitment to intragroup norms enables communities to function as a single owner, making collective self-management of a resource no less efficient than private ownership per se.[65]

The main problem with Ostrom's governance model is that it is ill-fitted for modern societies. As Ostrom herself acknowledges,[66] community governance is mostly relevant to, ipso facto, communities: the idea of social norms that override egotistic behavior and facilitate cooperation is generally premised on the prerequisite of small-sized, closed, and cohesive groups. Absent solid community foundations, self-centered concerns are likely to undermine commitment to existent social norms.[67]

Moreover, community governance is devoid of the very same traits that private ownership lacks. To begin with, just as with protection of private property rights, the enforcement of norms may

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61. *Id.* at 88–89 (explaining that all of the common-pool resource settings examined are complex settings that maintain stability because "norms have evolved . . . that narrowly define 'proper behavior' ").

62. OSTROM, *supra* note 4.

63. *Id.* at 126.

64. *Id.* at 33–38.

65. The argument can also be structured on a game-theoretic framework, which has been suggested by Ostrom herself. *Id.* at 3–5 (analogizing the tragedy of the commons to the prisoner's dilemma). As has been recognized in the relevant literature, the repetition of games renders players accountable to previous strategies they employed, thus inducing social learning and cooperation in the long run. *See, e.g.*, Paul Seabright, *Managing Local Commons: Theoretical Issues in Incentive Design*, 7 J. ECON. PERSPS. 113, 118 (1993) ("The idea that repetition can sustain cooperation is based on the thought that individuals tempted to defect may be dissuaded from doing so from fear of losing the benefits of cooperation in the future.").

66. OSTROM, *supra* note 4, at 21.

67. *Id.*; *see also* Bell & Parchomovsky, *supra* note 53, at 44 ("Absent the small size or cohesiveness, resource users would expect to evade social sanctions, and they could safely ignore the social norms and over-exploit the commons."); Sinden, *supra* note 51, at 548 ("[S]uch regimes only really work under a particularized set of cultural conditions that are becoming ever less common as small communities become increasingly integrated into a global economy.").

require groups to exert costly monitoring efforts.[68] Furthermore, while social norms may indeed ameliorate the problem of negative externalities among community members, note that in the Ostromian world, as communities take the de facto role of private owners of property, such collective governance does not preclude intergroup spillovers.[69] Concretely, the social norms Ostrom studied led to preservation of community resources but not necessarily to the protection of natural resources outside of the community. This means that state involvement—embodied by centralized regulation, tort law, and other devices—is still needed for the elimination of negative externalities.[70]

Finally, even if we were to assume that Ostrom's observation pertains to societies of all cultures and values, it should be noted that the norms-based paradigm does not rule out state intervention in enforcement. On the contrary, researchers have recognized the ability of legal rules to complement social norms by bolstering norms and community standards.[71] Hence, apart from the intrinsic difficulties that underly communities' ability to manage externalities, the social norms solution is fragile in the absence of regulatory measures taken by the government.

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68. Bell & Parchomovsky, *supra* note 53, at 44.

69. *Id.* at 45 ("[G]overnance of commons through social norms effects internalization of costs only among users . . . .").

70. It should, nevertheless, be mentioned that fruitful literature reveals the virtues of communities in assuring Coasean, private-ordering arrangements that guarantee socially optimal outcomes. *See* ROBERT ELLICKSON, ORDER WITHOUT LAW: HOW NEIGHBORS SETTLE DISPUTES (1991) (studying private ordering among ranchers and farmers in Shasta County, California, and concluding that subjects simply disregard applicable rules in favor of social norms, thus reaching a Coasean allocation); Lisa Bernstein, *Opting Out of the Legal System: Extralegal Contractual Relations in the Diamond Industry,* 21 J. LEGAL STUD. 115 (1992) (analyzing extralegal contractual relations in the diamond industry that exemplify the robustness of contractarian order compared to the one dictated by legal rules).

71. OSTROM, *supra* note 4, at 190; Foster, *supra* note 55, at 62 ("[A]n important element of collective resource management regimes is that such regimes are often supported in important ways by central government authorities."); Hanoch Dagan & Michael A. Heller, *The Liberal Commons*, 110 YALE L.J. 549, 578 (2001) (acknowledging that while communities' governance is predicated on social norms rather than formal law, "well-designed background legal rules are nevertheless crucial for the success of any liberal commons[,] . . . [and] [t]he simple existence of well-crafted background rules, rather than their daily invocation, facilitates commoners' efforts to establish and maintain liberal commons property").

C. Regulating Overuse

Hardin, to say the least, was not fond of the idea of privatization,[72] and the Ostromian approach was not espoused until decades after he first published his seminal article. Ecologists have therefore entertained another solution: government regulation of individual overuse. Hardin characterized this solution as "mutual coercion, mutually agreed upon."[73]

The case for resorting to use regulation to protect common resources is most natural. Use regulation represents the ultimate residual means of curbing undesirable behavior. The insufficiency and instability of the single private owner solution, combined with the incompleteness of remedies in the form of social norms, prompt the traditional recourse to centralized control.[74] This idea hinges on a simple postulate: If market mechanisms consistently fail at eliminating externalities, the government may legitimately invoke its coercive power to save common resources from spoilage or extinction.[75]

Take the problem of overfishing in open-access water as an example. Use regulation aims at restricting private use after setting up the optimal standard of use, for instance by imposing taxes or caps on fishing[76] or, alternatively, bestowing rewards for ceasing overuse.[77] The

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72. *See* Hardin, *supra* note 1, at 1247 ("An alternative to the commons need not be perfectly just to be preferable. . . . [T]he alternative we have chosen is the institution of private property coupled with legal inheritance. Is this system perfectly just? . . . I deny that it is.").

73. *Id*.

74. *See, e.g.*, Thompson, *supra* note 52, at 244.

75. See elaborative discussions on how to best manage common resources in JOHN A. BADEN & DOUGLAS S. NOONAN, MANAGING THE COMMONS (2d ed. 1998).

76. *See*, *e.g.*, Deborah Moore & Zach Willey, *Water in the American West: Institutional Evolution and Environmental Restoration in the 21st Century*, 62 U. COLO. L. REV. 775, 804 (1991); Frances R. Homans & James E. Wilen, *A Model of Regulated Open Access Resource Use*, 32 J. ENV'T ECON. & MGMT. 1, 1 (1997); Dan Holland & Kurt E. Schnier, *Individuals Habitat Quotas for Fisheries*, 51 J. ENV'T ECON. & MGMT. 72, 74–75 (2006); Joshua K. Abbott & James E. Wilen, *Regulation of Fisheries Bycatch with Common-Pool Output Quotas*, 57 J. ENV'T ECON. & MGMT. 195, 196 (2009).

77. Such carrot-stick partition corresponds to the customary distinction between two forms of regulations imposed on environmental commons: "command-and-control" regulation, which involves compulsory directions by the government with respect to performance standards, the installment of certain technological devices or the employment of regulatory-dictated manufacturing methods; and a somewhat softer "economic incentives" regulation, which mostly contains taxes, subsidies and mandatory disclosure of information. See a discussion in Sinden, *supra* note 51, at 553–54, contending that the dichotomy is artificial and that a more informative criterion for distinction is whether a type of regulation results in government or market answer to the question of "how much" constitutes overuse. *Cf.* David M. Driesen, *Is Emissions Trading an Economic Incentives Program?: Replacing the Command and Control/Economic Incentive Dichotomy*, 55 WASH. & LEE L. REV. 289, 349 (1998) ("The conventional dichotomy between command and control regulation and economic incentives may have served a useful purpose in stimulating experiments with emissions trading. Realizing improvement will require a more

regulator likewise possesses the oversight power and may be authorized to initiate criminal or administrative proceedings against violators.[78]

But the control of overuse is not without its disadvantages. Specifically, the regulation of use features three main drawbacks. The first is high enforcement costs. Enforcement of use norms requires extensive oversight *within* the confines of such commons. This is hardly an optimal or elegant solution since there appears to be a common denominator to overextractions—they all originate in the public's unhindered access. Environmental harms, infrastructural deficiencies, litter, and other vandalism can, of course, be monitored separately from each other, but such decentralized enforcement of overuses is rather cumbersome, not to mention socially wasteful. The effectiveness of the regulation of use entirely depends on the encounters of rangers with violators in the course of violation. But if such encounters are rare, or if they require enforcement efforts that are beyond preservations' manpower constraints, then a shift to a concentrated, preventive enforcement regime is warranted.

Second, and relatedly, use regulation is not, in Steven Shavell's words, "triggered by harm."[79] Under overuse control, regulatory enforcement efforts are exerted independently of subjects' engagement in violations. It requires monitoring of all subjects even if only a negligible subset, say 0.5%, is likely to engage in harmful wrongdoing. In this respect, each visitor to a commons is being held "guilty until proven innocent." In order to function properly, use regulation necessitates the constant monitoring of visitors, notwithstanding the plausible reality that the lion's share of them are perfectly ethical and law abiding. Overuse regulation's inability to distinguish benign and law-abiding visitors from harmful ones in turn imposes major deadweight loss in enforcement.

Third, the act of monitoring requires continuous efforts, including patrols, surveillance, and constant interaction with violators. The intensity of these efforts increases the challenge of maintaining the monitors' motivation to perform their arduous task. At first glance, it

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nuanced approach."); Jody Freeman & Daniel A. Farber, *Thirty-Fourth Annual Administrative Law Issue: Modular Environmental Regulation*, 54 DUKE L.J. 795, 797 (2005):

> Traditionally, debates about reforming environmental regulation and natural resource management have focused largely on two important normative questions: First, which level of government ought to regulate or manage? And, second, using which tools? . . . [T]he second presents a choice between command and control or market instruments. But of course, it is not, nor has it ever been, that simple.

78. Bell & Parchomovsky, *supra* note 53, at 43 ("Monitoring and enforcement are typically performed by government agencies that are set up precisely for this purpose."). *See* Daniel C. Esty, *Toward Optimal Environmental Governance*, 74 N.Y.U. L. REV. 1495 (1999).

79. Shavell, *supra* note 10, at 276.

seems that this problem may be handled by supplementing manpower, but the proliferation of intracommons oversight oftentimes reveals itself as a double-edged sword. As William Buzbee underscored, the problem of fragmented regulatory authorities begets administrative stagnation that actually facilitates commons overexploitation.[80] And even if this problem can be avoided, additional staff necessarily implies higher expenditures.

Cumbersomeness and inefficiencies in the management of common-pool resources, however, are only an inevitable necessity if the regulator attributes the observable overexploitation to individual overuse. In the ensuing Part, we argue that this perception misidentifies the *actual* tragedy in an unregulated common-pool resource. Overexploitation of the commons, we show, originates at the very beginning. The bulk of common-pool resources by no means resemble Hardin's parcel; rather, they are akin to Hanging Lake,[81] at risk of suffering a whole class of overuses, which, jointly and severally, contribute to their extinction. Equipped with this insight, we set out to introduce another type of regulation: the control and rationing of individual access.

II. ACCESS VERSUS USE

We now turn to introduce our contribution. We first provide the analytical distinction between regulating use and rationing access, and then stress its significance to the public management of common-pool resources. Thereafter, we dismantle the concept of "access rationing" into an entire spectrum containing different categories of access control measures—policies that range from remote access that prevents individual entry in its entirety all the way to soft regulations designed primarily to nudge individuals away from the overexploited commons. Each type of access limitation presented is accompanied by observable examples from over-toured cities, environmental agencies, and organizations governing international heritage sites.

From our taxonomy of actions taken in practice, we inductively turn to provide a general normative theory of the regulation of access. We conclude that common-pool assets are, in general, most efficiently governed by reliance on access rationing. Such commons are optimally

80. William W. Buzbee, *Recognizing the Regulatory Commons: A Theory of Regulatory Gaps*, 89 IOWA L. REV. 1, 6 (2003) ("Fragmented property interests predictably lead to underinvestment in anticommons property, as Heller demonstrates; similarly, fragmented political-legal structures that do not match a social ill in cause or effect may be viewed as a regulatory commons and thereby prompt political underinvestment.").

81. *See supra* notes 12–16 and accompanying text.

consumed with minimum costs as individual entry is limited. Other virtues of access rationing that we unveil lie in its flexible nature.[82]

A. Preface on the Access-Use Distinction

Lee Anne Fennel thought-provokingly coined the aphorism known as "Ostrom's Law,"[83] postulating that "[a] resource arrangement that works in practice can work in theory."[84] Empowered by this insight, we draw on practice to theorize one elusive resource arrangement: the emerging transition from meticulously monitoring overuse to various types of regulation predicated on access control.

The possibility of limiting access has been recognized before. Indeed, the mere term "open-access resources," profusely adopted to describe common-pool assets that suffer overuse,[85] in itself implies the requisite of potent boundary control.[86] Also, exclusion essentialists in

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82. It should be mentioned that many have attempted to opt out of the paradigmatic trichotomy of privatization-regulation communities. For instance, Bell & Parchomovsky, *supra* note 53, at 45, show that under certain circumstances, the commons may be governed best by "antiproperty"; i.e., veto rights granted to neighboring individuals whose interest in the asset is contrary to the one of the general public. This logic applies, for instance, in cases where the preservation of the commons is socially desirable; if so, antiproperty is equivalent to an anticommons regime that begets underuse of the resource, but since preservation is warranted, anticommons is bliss, rather than a tragedy. *See also* ROBERT COOTER & THOMAS ULEN, LAW AND ECONOMICS 142 (6th ed. 2012) ("The need for unanimous consent among multiple owners causes tragic underuse. In special circumstances where the aim is to preserve a resource in its unused condition, underuse is serendipitous rather than tragic."). Another prominent easement, discussed by Eggertsson, is the Icelandic method of tied ownership in pastures, whereby the number of animals each farmer is allowed to graze on a common ground in the summer is an increasing function of the number of animals he fed with hay that grows on said farmer's private land. *See* Thráinn Eggertsson, *Analyzing Institutional Successes and Failures: A Millennium of Common Mountain Pastures in Iceland*, 12 INT'L REV. L. & ECON. 423, 436 (1992).

83. Lee Anne Fennell, *Ostrom's Law: Property Rights in the Commons*, 5 INT'L J. COMMONS 9 (2011).

84. *Id.* at 10.

85. *See, e.g.*, COOTER & ULEN, *supra* note 82, at 146–47 ("Property that is accessible for use by a broad public is called an *open access resource*. . . . Much of the world's soil erosion and forest depletion is caused by the open-access rule.").

86. It is important to distinguish access regulation discussed here from *limited-access commons* (or *limited common property*) studied by many scholars, amongst whom are Heller and Rose. We simply discuss the possibility of a centralized management performed by implementing limitations of various kinds on the number of individuals allowed in the commons at a given time. Conversely, limited-access commons is a concept that normally refers to a certain form of community governance or, as Rose puts it, "property held as a commons among the members of a group, but exclusively vis-à-vis the outside world." *See* Carol M. Rose, *The Several Futures of Property: Of Cyberspace and Folk Tales, Emission Trades and Ecosystems*, 83 MINN. L. REV. 129, 132 (1998). Heller stresses as well the need to conceptually separate government regulation from limited-access commons. *See* Michael A. Heller, *The Boundaries of Private Property*, 108 YALE L.J. 1163, 1195–96 (1999):

> When a regulation closes access to an ocean fishery and then issues fishing quotas, or stops a factory from polluting and sells emissions certificates, the government has wholly taken privately-owned rights of use. . . . On the other hand, in a limited-access

property law have placed restriction of access (i.e., exclusion) at the epicenter of property law.[87] And, sure enough, many have treated the remedy of regulation as exogenous constraints that may be imposed on one's ability of using *or entering* the commons. For instance, historic analyses,[88] experimental studies,[89] and analytical models[90] of efficient commons regulation—primarily fisheries—have all accounted for legislation setting up fishing caps or, alternatively, maintaining effective gateway supervision on fisherfolk's right to approach.[91] The objective of the present Essay is to develop a fully fledged account of access regulation and demonstrate that it outperforms other solutions in remedying overuse of common resources.

There is something inherently odd about theorists' underappreciation of the access-use division. The tragedy of the commons is one of the most influential ideas in social science,[92] and studies that follow Hardin carefully and meticulously examine each premise, blind spot,[93] conclusion, and policy suggestion—all with a view to provide the scientific community with a slightly better

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commons, a bounded group controls a resource. People often view rights in a limited-access commons as each comprising private property. A few children, for example, may jointly inherit a parent's house.

87. For the analysis of property as the "right to exclude," see Thomas W. Merrill, *Property and the Right to Exclude*, 77 NEB. L. REV. 730 (1998).

88. *See* Katrina M. Wyman, *From Fur to Fish: Reconsidering the Evolution of Private Property*, 80 N.Y.U. L. REV. 117, 154–55 (2005) (discussing a "limited entry regime" ruled by regional fishery management counsels).

89. *See, e.g.*, Charles D. Samuelson, David M. Messick, Christel G. Rutte & Henk Wilke, *Individual and Structural Solutions to Resource Dilemmas in Two Cultures*, 47 J. PERSONALITY & SOC. PSYCH. 94 (1984) (reporting individuals' willingness to eliminate free access to a common-pool resource that suffers overuse).

90. *See* Homans & Wilen, *supra* note 76, at 1 n.1 ("Some fisheries also operate under a more stringent form of regulation, in which regulations are imposed and enforced in a restricted access setting that uses a license limitation scheme or another form of closure to entry. These are perhaps best viewed as regulated restricted access fisheries.").

91. For implementation in practice, see, for example, David D. Caron, *International Sanctions, Ocean Management, and the Law of the Sea: A Study of Denial of Access to Fisheries*, 16 ECOLOGY L.Q. 311 (1989); James R. Waters, *Restricted Access vs. Open Access Methods of Management: Toward More Effective Regulation of Fishing Effort*, 53 MARINE FISHERIES REV. 1 (1991); G.H. Darcey & G.C. Matlock, *Development and Implementation of Access Limitation Programmes in Marine Fisheries of the United States*, *in* USE OF PROPERTY RIGHTS IN FISHERIES MANAGEMENT 96 (Ross Shotton ed., 2000); and Mark Schrope, *What's the Catch?*, 465 NATURE 540 (2010), discussing catch-share regulation in New England fisheries.

92. *See, e.g.*, Carol M. Rose, *Thinking About the Commons*, 14 INT'L J. COMMONS 557, 557 (2020) ("[T]he idea of "the commons" has come to enjoy great currency as an organizing concept among social science scholars throughout the world . . . .").

93. For a unique interpretation of Hardin's framework, see Daniel H. Cole, Graham Epstein & Michael D. McGinnis, *Digging Deeper into Hardin's Pasture: The Complex Institutional Structure of "The Tragedy of the Commons,"* 10 J. INSTITUTIONAL ECON. 353 (2014), noting the tragedy is a result of institutional construction just as much as it is the outcome of open access, arguing that if, for example, the cattle were not privately owned, or if property and contract institutions were absent, overuse would have been avoided regardless of open access.

understanding of the governance of open-access resources. Covering all extensions is evidently impossible, as they delve into most nuanced discernments within more general settings of commons versus anticommons,[94] private ownership versus regulation,[95] social norms in communities versus states,[96] common-pool resources versus pure public goods,[97] the externality of costs versus the failure to externalize benefits,[98] vital versus less significant commons,[99] and so on. The voluminous literature likewise discusses resources whose nature lies in between the common pool-private property definitions[100] and provides many extensions of the tragedy to urban areas[101] and even to intangible assets, such as intellectual property[102] and cyberspace.[103] While the difference between use- and access-based regulation has admittedly been identified, the literature offers no comprehensive theory, conceptual framework, or consistent definition of access control.

This analytical deficiency is conspicuous for two main reasons. The first is the dissonance between the literature's constant striving in unveiling further pertinent characterizations of commons-centered conundrums and its complete neglect of what is arguably the most basic insight: avoiding overuse of open-access commons may be remedied by two distinct regimes—monitoring use and limiting access. Property theorists' inattention to access controls takes us back to the aforementioned "Ostrom's Law."[104] Indeed, some of the seminal contributions to the property canon, including Demsetz's and Ostrom's

94. *See* Heller, *supra* note 46.

95. *See supra* notes 37–55.

96. *Supra* notes 56–71.

97. *See supra* note 86 and accompanying text (examining common property as compared to private property).

98. *See* Lee Anne Fennell, *Common Interest Tragedies*, 98 NW. U. L. REV. 907 (2004) (noting that aside from the overuse of open-access resources, the tragedy of the commons implies a second problem of underinvestment in such resources). Alongside the externalities of costs, common ownership likewise features the trouble of individuals *not* externalizing benefits. *Id.*

99. M. Alexander Pearl, *The Tragedy of the Vital Commons*, 45 ENV'T L. 1021 (2015) (criticizing existent literature for not distinguishing the problem of mismanagement of common resources from the overextraction of vital ones).

100. *See* Carol M. Rose, *Left Brain, Right Brain and History in the New Law and Economics of Property*, 79 OR. L. REV. 479 (2000) (studying different forms of ownership on the spectrum of commons and anticommons).

101. Foster, *supra* note 55 (exploring the tragedy of the urban commons); *see also* Sheila R. Foster & Christian Iaione, *The City as a Commons*, 34 YALE L. & POL'Y REV. 281 (2016) (examining the development of the urbanized tragedy of the commons).

102. *See, e.g.*, Michael A. Carrier, *Cabining Intellectual Property Through a Property Paradigm*, 54 DUKE L.J. 1 (2004); Abraham Bell & Gideon Parchomovsky, *Copyright Trust*, 100 CORNELL L. REV. 1015 (2015).

103. *See, e.g.*, Rose, *supra* note 86; Dan Hunter, *Cyberspace as Place and the Tragedy of the Digital Anticommons*, 91 CALIF. L. REV. 439 (2003).

104. Fennell, *supra* note 83, at 10.

accounts, drew on observable phenomena to conceptualize a whole new theory of property rights or open-resources governance.[105] As we shall demonstrate, in the case of access rationing, policies adopted in practice have consistently evaded the probing gaze of property theorists. We identify several classes of common-pool resources—urban and natural alike—that adopt various types of access-based limitations to obtain an optimal level of use, namely a sustainable exploitation of the asset. Its growing emergence in practice calls for an accompanying theoretical framework.

The second deficit in the literature that we wish to remedy is normative. Needless to say, absent a descriptive outlook on the regulation of access vis-à-vis use, the theory of governing the commons lacks the systemic analysis that unravels the merits of gateway restrictions. Hence, we take on the challenge of explaining why, in recent years, there exist so many shifts from regulating use to access control. This is where our second contribution lies: we ascribe this evolution to a hitherto unaddressed phenomenon. We note that any resource whose governance experiences said transition features one main characteristic: its overuse being nonunique. The overexploitation of common-pool resources is normally not driven by an isolated action. Rather, externalities lie in *numbers*: many individuals spoil the commons by performing various activities which, in the aggregate, put fragile resources at risk. The understanding that a resource is susceptible to a class of overuses—and the corresponding fact that the tragedy of the commons oftentimes stems from numbers, rather than a singular activity—is what induced policymakers' imposition of extensive gateway restrictions.

In keeping with this insight, in the next Section, we introduce a taxonomy of access control measures and explain how each may be used to protect common resources. We substantiate our theoretical claims by providing examples of congested common-pool resources that are currently governed by access control techniques.

B. Methods of Access Rationing

1. Access Restrictions

The first category we discuss is also the most intuitive one.[106] This form of access limitation, referred to as "access restrictions,"

105. *Supra* notes 3–4.

106. For further taxonomies of various methods for crowd control, see, for example, Geoffrey Wall, *Perspectives on the Environment and Overtourism*, *in* OVERTOURISM: ISSUES, REALITIES AND SOLUTIONS 27, 35–37 (Rachel Dobbs & Richard D. Butler eds., 2019), enumerating different

predetermines a fixed number of individuals allowed to enter into a common-pool resource—a wilderness preservation, for example—at any given time.[107] It likewise refers to any caps imposed on equipment which is constitutive to overuse, such as hunting or fishing devices. The specific caps naturally vary from case to case and should be calculated as a function of the asset's carrying capacity, and this number normally affects limitations on services that are correlated to access.[108] For example, Arches National Park in Utah reportedly closes its gates at the moment its parking lots are full.[109] The connection between available parking spots and park congestion has been recognized by others: nowadays, entry management by parking lot supervision reportedly takes place in Ohio's Cuyahoga National Park and Colorado's Great Sand Dunes National Park.[110]

To make it clear, we do not confine this category by the way regulators issue permits: this may be done as a first come, first served lottery, by reservations made in advance, or based on need or merit.[111]

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categories of "visitor management techniques" pertaining to both access and use; Elisabeth Kwak-Hefferan, *8 Ways to Ease Overcrowding at Our National Parks*, 5280 (Sept. 2020), https://www.5280.com/2020/09/8-ways-to-ease-overcrowding-at-our-national-parks/ [https://perma.cc/FE5U-E59P], listing eight solutions to alleviate congestion in national parks; and Nat'l Park Serv., *Managing Congestion: A Toolkit for Parks*, U.S. DEP'T INTERIOR (Dec. 2020), https://www.nps.gov/orgs/1548/upload/Congestion_Management_2021-508.pdf [https://perma.cc/NZS6-HS76].

107. Wall, *supra* note 106, at 35–37.

108. For some policy guidelines, see David Cole & Thomas Carlson, *Numerical Visitor Capacity: A Guide to Its Use in Wilderness*, U.S. DEP'T OF AGRIC. (Oct. 2010), https://www.fs.usda.gov/rm/pubs/rmrs_gtr247.pdf [https://perma.cc/X4HR-TG2N], explaining different estimation procedures for developing a numerical visitor capacity; and Zachary D. Miller, Wayne Freimund, Stefani A. Crabtree & Ethan P. Ryan, *No Limits of Acceptable Change: A Proposed Research Framework for Informing Visitor Use Management in the Context of Cultural Resources*, 13 SUSTAINABILITY 377 (2021), proposing a unique research framework that would inform visitor use management in relation to culture resources. For formal models, see, for example, Simone Marsiglio, *On the Carrying Capacity and the Optimal Number of Visitors in Tourism Destinations*, 23 TOURISM ECON. 632 (2016).

109. Allison Pohle, *National Parks Are Overcrowded and Closing Their Gates*, WALL ST. J. (June 13, 2021, 7:00 AM), https://www.wsj.com/articles/national-parks-are-overcrowded-and-closing-their-gates-11623582002 [https://perma.cc/3UJA-V5D4] ("Arches reaches capacity and closes its gate to visitors most days before 9 a.m., according to the park social-media channels, which send out real-time tweets when the park temporarily closes because its parking lots are full.").

110. *See* Stephen Starr, *Overtourism Is Stressing Our National Parks. Here's How Visitors Can Help*, NAT'L GEOGRAPHIC (Oct. 4, 2019), https://www.nationalgeographic.com/travel/article/avoid-overtourism-indiana-dunes-gateway-arch [https://perma.cc/S936-QE6R] ("When space is in short supply at Ohio's Cuyahoga Valley National Park, staff head to the parking lots to communicate with visitors and monitor spacing . . . . Great Sand Dunes National Park . . . has modified its entrance station and parking setup . . . .").

111. *See* David N. Cole, Margaret E. Petersen & Robert C. Lucas, *Managing Wilderness Recreation Use: Common Problems and Potential Solutions*, U.S. DEP'T OF AGRIC. (Aug. 1987), https://www.fs.usda.gov/rm/pubs_series/int/gtr/int_gtr230.pdf [https://perma.cc/TS2H-RBTK]

Furthermore, such restrictions may apply to the resource's entire space, as shown below, or alternatively to a specific part or amenity within it whose preservation is in order—which may be referred to as *targeted access limitation*. This strategy was employed in Venice, Italy, after the city suffered from tourist congestion and decided to allow only local access to certain areas.[112]

The option of access rationing is applicable to various types of publicly owned assets. As mentioned earlier, access restrictions have proven successful in lowering risks to wildlife in Glacier National Park[113] and in reallocating the use of natural areas in Yellowstone Park between humans and indigenous animal species.[114] Similarly, access management is employed, in different forms, across many popular tourist destinations in order to sustain their environmental conditions and, additionally, retain positive visitor experience.[115] Many versions of entry caps studied both descriptively and normatively, including time restrictions to allow for effective visitor turnover, may be found in the environmentally fragile yet extremely overvisited Antarctic pole,[116] as

(providing an overview of alternative management tactics for dealing with wilderness recreation problems).

112. *See* Francesca Street, *Venice to Separate Tourists and Locals over Busy May Day Weekend*, CNN: TRAVEL (Apr. 27, 2018), https://edition.cnn.com/travel/article/venice-separates-tourists-and-locals/index.html [https://perma.cc/PDN2-E7ZT] (explaining how Venice restricted the movement of visitors to manage high levels of tourism); *The Backlash Against Overtourism*, ECONOMIST (Oct. 27, 2018), https://www.economist.com/international/2018/10/27/the-backlash-against-overtourism [https://perma.cc/Z9BP-QKAY] ("[The city council] erected pedestrian gates across the historic neighbourhood's main entrances. When crowds get too thick, the police will close them, limiting access to locals who possess a special pass."). One could argue that the case of Venice is somewhat parallel to the idea of limited-access commons discussed by Heller, *supra* note 86, and Rose, *supra* note 86.

113. *See* Martinka, *supra* note 23, at 16 ("A combination of visitor travel restrictions and direct control of bears resulted in minimal disturbance to the natural status of the bear population.").

114. *Supra* note 24.

115. For recent considerations of access restrictions, see, for example, Tracy Withers, *New Zealand Mulls Limiting Mass Tourism to Preserve Green Image*, BLOOMBERG (Mar. 18, 2021, 8:32 PM), https://www.bloomberg.com/news/articles/2021-03-18/new-zealand-considers-tourism-change-to-counter-negative-impacts [https://perma.cc/8RFU-W64V].

116. *See, e.g.*, Pamela B. Davis, *Beyond Guidelines: A Model for Antarctic Tourism*, 26 ANNALS TOURISM RSCH. 516, 529 (1999) (naming several possible solutions, including that "the maximum number of visitors ashore at any one time is 100"); Zygmunt Kruczek, Michal Kruczek & Adam R. Szromek, *Possibilities of Using the Tourism Area Life Cycle Model to Understand and Provide Sustainable Solution for Tourism Development in the Antarctic Region*, 10 SUSTAINABILITY 89, 90 (2018) ("Definition of the limit of tourist development is crucial for the selection of instruments that ensure the number of tourists is kept at levels that are safe for the environment."); *Tourism Quota for Antarctic*, GUARDIAN (Oct. 23, 2005, 1:35 PM), https://www.theguardian.com/travel/2005/oct/23/travelnews.antarctica.observerescapesection [https://perma.cc/MV8R-BSLZ]; Caroline Davies, *Antarctic Cruise Tourists Lose Out as Soaring Numbers Alarm Scientists*, GUARDIAN (Apr. 19, 2009, 7:01 PM), https://www.theguardian.com/world/2009/apr/19/antarctica-cruise-ship-visitors-ecosystem [https://perma.cc/8ZUF-VZRJ]; *Nations Set New Tourism Limits for Antarctica*, NBC NEWS (Apr. 18, 2009, 5:10 PM), https://www.nbcnews.com/id/wbna30279820 [https://perma.cc/F4XA-DKUP]; Paige McClanahan, *Tourism in Antarctica: Edging Toward the*

well as World Heritage Sites alongside Venice, including Machu Picchu in Peru.[117] Adopting the recommendation of the official UNESCO report—explicitly providing that "there has not been any effective agreement on proactive access regulation"[118]—the Incan citadel accepts no more than 2,244 visitors per day.[119]

Machu Picchu is not alone. Further access-controlled World Heritage Sites include the Alhambra Palace in Spain,[120] Fernando de Noronha Islands in Brazil,[121] Lord Howe Island, Australia,[122] the city of Dubrovnik, Croatia,[123] Venice Lagoon in Italy,[124] and the National Park

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(Risky) Mainstream, N.Y. TIMES, https://www.nytimes.com/2020/02/26/travel/antarctica-tourism-environment-safety.html (last updated Feb. 27, 2020) [https://perma.cc/CPV6-EZN9].

117. *See* Chris Leadbeater, *Will New Limits on Visiting Machu Picchu Save Peru's Most Famous Inca Cathedral?*, TELEGRAPH (June 21, 2017, 2:17 PM), https://www.telegraph.co.uk/travel/destinations/south-america/peru/articles/machu-picchu-new-rules-for-access/ [https://perma.cc/3W3J-LZ65] (explaining access restrictions to Machu Picchu).

118. *See* UNESCO, MISSION REPORT: HISTORIC SANCTUARY AT MACHU PICCHU (PERU) 24 (2017), https://whc.unesco.org/en/documents/158632/ [https://perma.cc/YSG8-HPLK] ("However, there has not been any effective agreement on proactive access regulation by enabling agreements with the train companies.").

119. *Machupicchu Only Will Be Able to Receive a Maximum of 2244 Visitors Per Day*, PERU MINISTERIO DE CULTURA (July 13, 2020), https://www.machupicchu.gob.pe/machupicchu-only-will-be-able-to-receive-a-maximum-of-2244-visitors-per-day/?lang=en [https://perma.cc/7WKJ-NCND].

120. *See* Laura Allsop, *Secrets of Spain's Alhambra to Be Revealed to Visitors Sustainably*, CNN (Sept. 2, 2011, 8:51 AM), https://edition.cnn.com/2011/09/02/world/europe/alhambra-sustainable-tourism/index.html [https://perma.cc/EZ9V-YL43] (explaining that there is a model to limit visitor access each day to the Alhambra in an attempt to alleviate congestion in the fragile zones).

121. *See* Fanny Douvere, *World Heritage Marine Sites: Managing Effectively the World's Most Iconic Marine Protected Areas*, UNESCO 59 (2015), https://unesdoc.unesco.org/ark:/48223/pf0000235316/PDF/235316eng.pdf.multi [https://perma.cc/P75T-YL2T] ("[I]n the Brazilian Atlantic Islands: Fernando de Noronha and Atol das Rocas Reserves, there is a maximum number of 460 visitors allowed at any given time, and this measure is rigorously complied with to protect the fragile ecosystem and limited water resources.").

122. According to the Lord Howe Island's local environment plan, the number of tourists allowed at any one time is only 400, which "minimises stress on infrastructure and environmental impact and maximises amenity." *Lord Howe Island Regulation Review: Regulatory Impact Statement*, NSW GOV'T 7 (Apr. 2014), https://www.lhib.nsw.gov.au/sites/lordhowe/files/public/images/documents/lhib/Council/News/Lord%20Howe%20Island%20Regulatory%20Impact%20Statement.pdf [https://perma.cc/2CQ9-R3YQ].

123. Hugh Morris, *Tourists and Cruise Ships Could be Turned Away Under New Plans to Protect Dubrovnik,* TELEGRAPH (Aug. 11, 2017, 8:30 AM), https://www.telegraph.co.uk/travel/destinations/europe/croatia/dubrovnik/articles/dubrovnik-tourist-limits-unesco-frankovic/ [https://perma.cc/2KAZ-2W2C] ("The new limit will go further than [UNESCO's] recommendation of permitting only 8,000 people a day inside the hefty Medieval walls and instead put the cap at 4,000.").

124. Lea Lane, *Venice Set to Limit Cruise Ships and Crowds – But Remains Fragile*, FORBES (Aug. 9, 2019, 9:28 AM), https://www.forbes.com/sites/lealane/2019/08/09/venice-set-to-limit-cruise-ships-and-crowds—but-remains-fragile/?sh=503731f861ab [https://perma.cc/FJ8M-6XP9] ("Venice and its lagoon are on [UNESCO's] list of World Heritage Sites, but according to Italia Nostra [Italy's main conservation group], overwhelming tourism, a loss of long-time residents and environmental decay are major threats to this world treasure.").

surrounding the Philippines' Puerta Princesa River.[125] Moreover, access limitations are not only serviceable in the preservation of the natural environment. It is identifiable even as a microlevel gateway regulation to delicate, culturally valuable buildings. Santa Maria delle Grazie Church in Milan, Italy, best known for containing da Vinci's Last Supper, controls access in order to preserve the painting from "environmental pressure."[126]

In all properties protected by such access restrictions, it appears that there is a major difficulty in agreeing on an adequate definition of "harmful use." Indeed, there is no particularly distinct conduct that singularly contributes to the common resource's extinction. Naturally, difficulties in defining overuse impose challenges on monitoring noncompliant behavior. Recourse to access constraints resolves the costly problem of first listing all problematic aspects that human presence may entail. Of course, it also addresses the issue of strictly monitoring and enforcing multiple bans on activities that constitute overuse. Gateway regulation and access caps are comfortable solutions to a troubling question.

2. Second-Order Access Limitations

Direct access restrictions are useful provided that the asset's borders are well-defined, entry could be relatively easily monitored, and political objections to such extreme actions are not too significant. As one would probably expect, however, these conditions are not always satisfied even if managing access is indeed warranted. It is arguably for this reason that access is not always directly controlled, but rather, strict limitations are imposed on access to other property—private or public—whose use is bundled with, constitutive to, or at least strongly correlated with overexploitation of the common resource. Such restrictions make access to the commons unfeasible, or substantially impairs its attractiveness.

We refer to this category as *second-order access limitations*. When the alternative of access caps is ruled out—since entry cannot be

125. *See Puerto-Princesa Subterranean River National Park*, UNESCO, https://whc.unesco.org/en/list/652/ (last visited Nov. 19, 2022) [https://perma.cc/2P7P-HTBG] ("The property's tourism program aims to enhance visitor's experience with nature while protecting the natural values. The threats posed by uncontrolled access from outside developments are being addressed through the implementation of a limit of 600 visitors per day.").

126. *Church and Dominican Convent of Santa Maria delle Grazie with "The Last Supper" by Leonardo da Vinci*, UNESCO, https://whc.unesco.org/en/list/93/ (last visited Nov. 19, 2022) [https://perma.cc/UC2E-CED9] ("Da Vinci's painting has considerable conservation problems due to the techniques used to paint it. The property suffers from environmental pressures and from potentially excessive visitation, although the latter is controlled by limiting access. . . . A limited number of visitors are admitted at any one time.").

effectively controlled, due to reputational considerations or for any other imaginable cause—another solution that may serve the regulator's objective is to deliberately make it costly for individuals to acquire access to the commons. In other words, in cases where subjects' right to access the common-pool resource itself is impossible to deny, the regulator can oftentimes choose to implement quite extensive limitations on their ex ante ability of exercising this very right to access.

To the best of our knowledge, second-order access restrictions owe their origin to overtoured cities and metropolises. Clearly, even if large cities were to set caps for tourists who wish to enter their boundaries, the enforcement of such caps is expected to be immensely costly. It requires meticulous borderline inspection, cooperation with air or naval transport operators, coordination with neighboring towns, and so on. Therefore, efforts of mitigating the trouble of overtourism are frequently carried out through the persistent imposition of constraints on "travel facilitators," namely services or activities that serve as an essential, contributory, or complementary part of the tourists' experience.

To illustrate, consider Barcelona's actions to curb overtourism. Barcelona—a perennial victim of the emerging phenomenon[127]—could not bar entry to the city by posting guards at all entrances to the city. The imposition and enforcement of caps are completely inefficient. Indeed, tourism is not curbed by appointing a doorperson to control entry into Barcelona. Instead, Barcelona adopted a policy that restricts access to hotels by limiting the number of guests they are allowed to accommodate and freezing the building of new ones.[128] Likewise, the

127. *See, e.g.*, Stephen Burgen, *How Tourism is Killing Barcelona - A Photo Essay*, GUARDIAN (Aug. 30, 2018, 1:30 PM), https://www.theguardian.com/travel/2018/aug/30/why-tourism-is-killing-barcelona-overtourism-photo-essay [https://perma.cc/C9B2-GNTN]; Lisa Bernardi, *Is One of the Most Overtouristed Cities in the World Better Off Without Them?*, FODOR'S TRAVEL (Oct. 6, 2020), https://www.fodors.com/world/europe/spain/barcelona/experiences/news/is-one-of-the-most-overtouristed-cities-in-the-world-better-off-without-them [https://perma.cc/3AZ8-3Y7X].

128. *See* Ginia Bellafante, *How Much Tourism Is Too Much?*, N.Y. TIMES (June 29, 2017), https://www.nytimes.com/2017/06/29/nyregion/how-much-tourism-is-too-much.html [https://perma.cc/6RM6-ECAD] ("[O]fficials approved a law that would curtail the number of visitors to . . . Barcelona, by limiting the number of beds available in hotels and freezing the construction of new ones in places."); *see also* Hazel Plush, *Barcelona Unveils New Law to Keep Tourists Away*, TELEGRAPH (Jan. 27, 2017, 11:35 AM), https://www.telegraph.co.uk/travel/destinations/europe/spain/catalonia/barcelona/articles/barcelona-unveils-new-law-to-keep-tourists-away [https://perma.cc/2C7F-2HHX] (describing Barcelona law limiting hotel construction and tourist accommodation rental licenses); Alex Ledsom, *Barcelona Is Threatening to Shut out Tourists*, FORBES (Jul. 12, 2019, 8:58 AM), https://www.forbes.com/sites/alexledsom/2019/07/12/barcelona-is-ready-to-shut-out-tourists/?sh=53bace525546 [https://perma.cc/AQ6C-Q7MD] (describing the Barcelona mayor's quest to limit tourism in the city). Limitations on the number and size of new hotels are imposed in the Galápagos, as well, as a means of mitigating overtourism. *See* Adam Popescu, *Going to the Galápagos Is Easier and Cheaper than Ever. That Might Not Be a Good Thing.*, N.Y. TIMES (Feb.

advertisement and rent of apartments to tourists are impermissible without receiving a designated license.[129] Thus, officially, tourists may access the congested boardwalks of Barcelona as they please; their access is subject to substantial limitations, however, when it comes to facilities that complement their desire to access the city's borders. The latter makes the former less attractive, and access is effectively controlled without monitoring entry per se.[130]

Similarly, New York City and San Francisco,[131] as well as several European cities, including Paris, Florence, and Amsterdam, have imposed or proposed restrictions on short-term, Airbnb-style rentals.[132] In 2016, Berlin passed a law banning the operation of Airbnb altogether. The ban was subsequently lifted,[133] but what is of interest for our purposes is not the specific ban but rather the general idea: Municipalities employ second-order access limitations on tourist accommodations in order to mitigate overcrowding. Amsterdam, for its part, has proposed to ban tourists' visitation at cannabis cafes—one of the city's most prominent visitor attractions.[134] This policy, too, constitutes a second-order limitation of access: tourists would be banned from said shops for the underlying premise that they are

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5, 2019), https://www.nytimes.com/2019/02/05/travel/galapagos-overtourism.html [https://perma.cc/Y3RN-9QZN].

129. *See* Amanda Calvo, *Barcelona Fines Homesharing Sites Airbnb and Homeaway*, REUTERS, https://www.reuters.com/article/us-spain-airbnb-idUSKBN13J1ZD (last updated Nov. 24, 2016, 12:41 PM) [https://perma.cc/PZ2Y-NLBM] ("The Barcelona council reported that Airbnb and Homeaway were repeat offenders having illegally advertised 3,812 and 1,744 properties respectively. An additional nine rental sites are expected to also face fines up to 30,000 euros for failing to follow regional tourism laws.").

130. *See* Nissim Ben-David, Sharon Teitler-Regev & Avi Tillman, *What Is the Optimal Number of Hotel Rooms: Spain as a Case Study*, 57 TOURISM MGMT. 84 (2016) (suggesting a model for determining the desirable number of hotel rooms that satisfies the objective of reducing the number of tourists).

131. Daniel Guttentag, *What Airbnb Really Does to a Neighbourhood*, BBC (Aug. 30, 2018), https://www.bbc.com/news/business-45083954 [https://perma.cc/4J77-CGBP] (listing "[s]hort-term rental restrictions around the world").

132. *See* Leonie Cater, *EU Cities Contemplate Life with Less Airbnb*, POLITICO (Apr. 16, 2021, 6:30 AM), https://www.politico.eu/article/eu-european-capitals-cities-airbnb-short-term-rental-regulations-proposals/ [https://perma.cc/WHU5-A4CN] (describing cities' restrictions on and plans to restrict short-term rentals in the European Union).

133. Feargus O'Sullivan, *Berlin Just Canceled Its Airbnb Ban*, BLOOMBERG (Mar. 23, 2018, 2:27 PM), https://www.bloomberg.com/news/articles/2018-03-23/berlin-s-airbnb-ban-is-over-but-the-new-rules-are-serious [https://perma.cc/RU57-TJTQ].

134. *See* Anna Holligan, *Amsterdam Drugs: Tourists Face Ban from Cannabis Cafes*, BBC (Jan. 30, 2021), https://www.bbc.com/news/world-europe-55765554 [https://perma.cc/52RC-E2B8] (discussing the Amsterdam mayor's proposed plan to ban foreign purchases of marijuana); *see also* Thomas Erdbrink, *In Amsterdam, Getting High at Coffee Shops May Soon Be for Locals Only*, N.Y. TIMES, https://www.nytimes.com/2021/01/08/world/europe/amsterdam-marijuana-coffee-shops-tourists.html (last updated Feb. 27, 2021) [https://perma.cc/LF9D-4RRS] (same).

sufficiently attractive to make the entire visitation in the Dutch capital less worthwhile.

Similar techniques can be used to control the number of visitors to parks. For example, it is possible to limit the availability of parking spaces that are available to visitors. Another obvious option is to limit the number of cabins or restrict the size of camping grounds. An additional innovative technique that has been put to use in many cathedrals and museums, but not yet in parks to the best of our knowledge, is to ban cameras and smartphones. Such an indirect restriction may not only reduce the number of users but also change the demeanor of visitors inside parks.[135]

3. Access Replication

A unique access rationing technique that may be employed to protect common resources from harm is to ban *physical* access to the original resource and then simulate it—either physically or visually—in a mirror site. This strategy, which we term "replicated access," is by no means hypothetical. It has been implemented to protect especially sensitive resources. The original Lascaux Cave in France, for example, is closed for visitors: the prehistoric paintings that embellish its rims are endangered—the warmth and humidity from human proximity are severe threats to their eradication.[136] Visitors are therefore directed to a nearby replica.[137]

As opposed to access restrictions, replicated access does not completely sacrifice the ability of visitors to appreciate the resource or enjoy it. Rather, it presents users with a second-best option. Admittedly, replicated access compromises the authenticity of the visitor experience, but it does so to preserve the resource for future generations. The same technique can be employed with respect to endangered animal species. Instead of allowing visitors into their natural habitat, it is possible to create limited visitation sites, where

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135. *See* Lilit Marcus, *Do Photography Bans Help Curb Overtourism and Bad Behavior?*, CNN, https://edition.cnn.com/travel/article/photography-bans-overtourism-intl-hnk/index.html (last updated Jan. 28, 2020) [https://perma.cc/ZB9X-3URS] (examining the effects of photography bans on visitor behavior in tourist attractions).

136. *See* Wall, *supra* note 106, at 34. The author, furthermore, notes that "[s]uch extreme management strategies are not common, however, because stakeholders in most destinations, including the visitors themselves, generally do not want to discourage tourism." *Id.*

137. *Id.*; *see also* Jon Bryant, *Prehistoric Cave Art Celebrated at New Lascaux Centre in Dordogne*, GUARDIAN, https://www.theguardian.com/travel/2016/dec/15/prehistoric-cave-art-lascaux-dordogne-france-grotto-replica (last updated Feb. 22, 2018, 12:12 PM) [https://perma.cc/Y56L-X68Z] ("The actual cave . . . has been closed to the public for more than 50 years, since it was discovered that merely breathing in the caves was destroying them. A replica . . . was opened 200 meters away from the new centre . . . .").

visitors would be able to appreciate the members of the species without invading its natural space and thereby risking its long-term existence.

An additional form of replicated access involves technological innovations. The St Kilda Archipelago—the only World Heritage Site that enjoys this title for both its natural and cultural significance—is currently the focus of a new visiting center which is to be established forty-one miles eastwards on the Isle of Lewis.[138] This is to facilitate access without actually accessing—retaining visitor experience while still restricting access to the protected site.

Replicated access has also been put to use in the United States. A creative "mirror sites" method for handling visitor congestion has been recently employed by Washington State Parks, opening three temporary, recreational "Sno-Parks" designed to alleviate overcrowding in the popular areas that suffer a dangerous "mass" of visitors.[139] Interestingly, Washington State Parks did not settle for the replicated access solution. Rather, they combined it with a conventional form of access restrictions: the aforesaid Sno-Parks were established as nonmotorized; i.e., restrictions are likewise imposed on the possibility of vehicular access.[140]

Access-replication arrangements are certainly thought-provoking, and technological developments may well entail alternative ways of governing the commons. Contemporarily, however, the idea seems impracticable in the bulk of cases while only implementable in rare, isolated instances. Besides, in some circumstances, remote access is somewhat off target. As long as a common pool is at risk of overextraction, as opposed to rapidly becoming extinct, the primary objective should be to attain governance that allows for sustainable exploitation of the resource rather than banning it altogether.

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138. UNESCO's official website provides that "the ambition is to create sustainable economic development through a technologically sophisticated cultural venue in a remote location. As a case study, St Kilda offers the opportunity to focus on issues shared by all interpretation professionals working to create remote access to sensitive sites." *Live Streaming: "I Know Where I'm Going" – Remote Access to World Heritage Sites from St Kilda to Uluru, a Conference*, UNESCO, https://whc.unesco.org/en/events/765/ (last visited Oct. 15, 2022) [https://perma.cc/A99H-N9KS]; *cf. St Kilda Centre to Be Built in Phases on Isle of Lewis*, BBC (Feb. 25, 2020), https://www.bbc.com/news/uk-scotland-highlands-islands-51629682 [https://perma.cc/T4KE-SZNC] (describing the view of the St Kilda archipelago that the nearby visitor center would display).

139. *See* Gregory Scruggs, *Spurred by Overcrowding, Washington State Parks Creates 3 Temporary New Sno-Parks Near Seattle*, SEATTLE TIMES, https://www.seattletimes.com/life/outdoors/spurred-by-overcrowding-washington-state-parks-creates-3-temporary-new-sno-parks-near-seattle/ (last updated Feb. 5, 2021, 6:59 PM) [https://perma.cc/WMK9-UUYP].

140. *Id.* ("The three new, nonmotorized, ungroomed Sno-Parks will be set up for snow play activities like sledding and include access to new or existing trails for snowshoeing and Nordic ski touring.").

4. Access Fees

So far, we discussed policy measures that involve physical restrictions on access, either to the resource itself or to related amenities. Over-access may also be addressed, however, by a pricing mechanism via the imposition of access fees. The most familiar example of this method is traffic-congestion fees, which are of general applicability and frequently used in cities and parks. The city of London is known for implementing an extensive scheme of congestion pricing,[141] but in recent years, other prominent cities pursued the Londonian vision, including Singapore, Stockholm, and possibly New York City.[142] The latter, as some have attested, "has effectively declared war on cars."[143] Maui has taken this idea a step further. In reaction to the recent upswell in tourism pursuant to the removal of the COVID-19 traveling restrictions,[144] it implemented "[a]n additional three-percent tax [that] will be collected from anyone staying in a hotel or short-term vacation rental while on the island."[145] Similarly, as of January 2023,

141. *See, e.g.*, Jonathan Leape, *The London Congestion Charge*, 20 J. ECON. PERSPS. 157, 158 (2006) ("The introduction of the London congestion charge is, in important respects, a triumph of economics. It represents a high-profile public and political recognition of congestion as a distorting externality and of road pricing as an appropriate policy response."); *see also* Ian W.H. Parry, Margaret Walls & Winston Harrington, *Automobile Externalities and Policies*, 45 J. ECON. LITERATURE 373, 373–84 (2007) (listing several unique types of externalities that originate in the use of vehicles, including air pollution, oil dependence, traffic congestion, car accidents, noise, infrastructural maintenance costs, and more).

142. Patrick Mulholland, *Congestion Charging Gains Ground as Cities Run Out of Road*, FIN. TIMES (Jan. 28, 2020), https://www.ft.com/content/77e5139a-1c3d-11ea-81f0-0c253907d3e0 [https://perma.cc/FF7J-WXT6]; Ana Ley, *Why Drivers Could Soon Pay $23 to Reach Manhattan*, N.Y. TIMES, https://www.nytimes.com/2022/08/18/nyregion/nyc-congestion-pricing-manhattan.html (last updated Aug. 18, 2022) [https://perma.cc/Q6LZ-KCRR].

143. Winnie Hu, *Major Traffic Experiment in N.Y.C.: Cars All but Banned on Major Street*, N.Y. TIMES (Aug. 8, 2019), https://www.nytimes.com/2019/08/08/nyregion/14th-street-busway.html [https://perma.cc/X3E6-RA6N].

144. *See, e.g.*, Lori Aratani, *Airlines Not Feeling Effect of Rising Virus Cases Amid Scramble to Recruit, Retrain Workers*, WASH. POST (July 22, 2021, 7:31 PM), https://www.washingtonpost.com/transportation/2021/07/22/airlines-hiring-covid-travel/ [https://perma.cc/Y76W-EK6R] ("Despite concerns the delta variant could depress demand for travel, airline executives said they are not seeing an impact on bookings and expressed confidence that demand for air travel would grow."); *see also* Leslie Josephs, *United Is Buying 270 Boeing and Airbus Jets, Its Largest-Ever Order, for Post-Covid Growth Plan*, CNBC, https://www.cnbc.com/2021/06/29/united-airlines-unveils-270-jet-boeing-and-airbus-order-its-largest-ever.html (last updated June 29, 2021, 4:08 PM) [https://perma.cc/27M8-V8NF] (providing details of United's fleet expansion plan following post-Covid demand).

145. Sarah Medina, *Maui's New Tax Hopes to Combat 'Post-Pandemic' Overtourism*, TIME OUT (July 15, 2021), https://www.timeout.com/news/mauis-new-tax-hopes-to-combat-post-pandemic-overtourism-071521 [https://perma.cc/6Q35-PY24].

the city of Venice will impose an entry fee of up to ten euros on all nonresident entrants to battle overtourism.[146]

The use of entrance fees to parks is even more common. While many national parks allow free access, an increasing number of parks charge entrance fees—and those have risen dramatically in 2021. The entrance fee for vehicles at the Lava Beds National Monument in California and the Wright Brothers National Memorial in North Carolina surged from $4 in 2020 to $25 in 2021.[147] Entrance fees do not tell the whole story, however. In a host of parks there are additional fees on access (and use) of camping grounds and a myriad of other amenities. An extreme example is Biscayne National Park in Florida. Entrance to the park is free, but touring the park requires a boat and the cost of boat rentals begins at $500.[148]

5. Access Redirection

The last category of access control identified by this Essay does not involve coercive measures. Instead, it employs nudges, namely informational prompts designed to affect visitors' access choices.[149] This strategy relies on conveyance of information about alternative resources,[150] done to alleviate overuse by *redirecting access*.[151]

Like all other methods pointed out above, the adoption of access redirection to mitigate commons overexploitation is empirically supported. Begin with overtourism. In its initiative to divert tourists to less congested destinations, the city of Amsterdam—which employs almost all of the access control techniques enumerated in this Essay—has recently been marketing sites named "Amsterdam Castle" and

146. *When (Not) in Rome: Venice to Make Tourists Pay Entry Fee to Keep 'Overtourism' Under Check*, TIMES NOW, https://www.timesnownews.com/viral/when-not-in-rome-venice-to-make-tourists-pay-entry-fee-to-keep-overtourism-under-check-article-92654042 (last updated July 4, 2022, 5:36 PM) [https://perma.cc/4XMW-WE4P].

147. Lori Sonken, *Your National Park Vacation Has Gotten More Expensive*, NAT'L PARKS TRAVELER, https://www.nationalparkstraveler.org/2021/04/your-national-park-vacation-has-gotten-more-expensive (last visited Sept. 2, 2022) [https://perma.cc/GLT2-V5FN].

148. Michelle Berkes, *So How Much Does It Actually Cost to Visit a National Park? A Complete List*, HEAD ALONG WITH HEART (Aug. 10, 2020), https://www.headalongwithheart.com/blog/how-much-does-it-actually-cost [https://perma.cc/7MF6-WFYV].

149. *See generally* RICHARD H. THALER & CASS R. SUNSTEIN, NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH, AND HAPPINESS 6 (2008) ("A nudge . . . is any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives.").

150. For more on the property-information interplay, see Abraham Bell & Gideon Parchomovsky, *Of Property and Information*, 116 COLUM. L. REV. 237 (2016).

151. *See* Wall, *supra* note 106, at 37 (listing marketing by strategic information as a visitor management technique).

"Amsterdam Beach."[152] Interestingly, the only connection between both sites and the Dutch capital is nominal; while being marketed under their names, "Amsterdam Castle" and "Amsterdam Beach" are located outside of Amsterdam's boundaries.[153] Amsterdam was likewise reported to promote and market tourism in The Hague,[154] and alternatively to advertise visitation in less-populated areas within its municipal boundaries.[155]

Similarly, such information design is omnipresent in overtoured U.S. parks as well. For example, Indiana Dunes proposes a temporal—rather than territorial—redirection, recommending arrival at certain times in which parking lots are less congested.[156] Others have concentrated on social media, announcing *Tag Responsibly* campaigns by asking visitors to use general tag locations, rather than specific ones.[157] Initiated in Jackson Hole, Wyoming,[158] and then advanced by the subsequent Aspen Pledge campaign,[159] the underlying rationale for using generic tag location is to mitigate visitor herding into a specific congested destination identified in a stylized social media post. As attested, "[when] people start posting on social media, [Aspen will] have crowds the next weekend."[160] Some have called for Amsterdam-like advertisement campaigns that would divert visitation from the highly attractive destinations. This happened with Colorado's Rocky Mountain National Park, which highlighted underutilized neighboring parks inside Colorado and others that are located within reasonable proximity.[161] In all cases, of course, restrictions are absent. Access

152. Senay Boztas, *Overwhelmed Amsterdam Sends Tourists to the Hague*, TELEGRAPH (Sept. 15, 2019, 1:41 PM), https://www.telegraph.co.uk/news/2019/09/15/overwhelmed-amsterdam-sends-tourists-hague/ [https://perma.cc/8CUS-MT9V].

153. *Id.*

154. *Id.*

155. Iliana Magra, *Want to See Amsterdam? How About Groningen Instead?*, N.Y. TIMES (May 8, 2019), https://www.nytimes.com/2019/05/08/world/europe/netherlands-tourism-amsterdam.html [https://perma.cc/HW4U-RKUC] (reporting that tourism marketing campaigns now focus on less popular regions and cities).

156. Starr, *supra* note 110.

157. Kristen Pope, *Tag Responsibly: A New Campaign Encourages Thoughtful Geotagging to Protect Wild Spaces*, ROADTRIPPERS (Apr. 22, 2019), https://roadtrippers.com/magazine/generic-geotagging-national-parks [https://perma.cc/P6XN-EVC3].

158. *Id.*

159. Kwak-Hefferan, *supra* note 106 ("[T]he Aspen Chamber Resort Association launched its Tag Responsibly, Take the Aspen Pledge campaign in July 2019. . . . Thus far, the Tag Responsibly geotag has been used more than 200 times, perhaps mitigating the Instagram effect on Aspen's backcountry gems by spreading out visitation.").

160. *Id.*

161. *Id.* (naming Gunnison National Park, Great Sand Dunes National Park, Mesa Verde National Park, Capitol Reef National Park, North Cascades National Park, and Great Basin National Park, as worthy substitutes of Rocky Mountain National Park).

redirection has to do with visitor choice architecture—maintaining the commons by information.

III. THE NORMATIVE CASE FOR ACCESS RATIONING

In this Part, we analyze and highlight the advantages of access rationing over its three brethren and more familiar approaches to protecting the commons. The case for access control measures is predicated on four grounds. First, entry restrictions outperform competing resource conservation techniques, as they prevent harm from occurring ab initio. Furthermore, on account of its richness and the multiple regulatory techniques it packs, access rationing can be readily applied to most common resources. The second advantage of access regulation is its relatively low cost. Access control measures are based on prespecified criteria that can accommodate both fairness and efficiency concerns. Access rationing does not require expensive ongoing monitoring and does not necessitate granting broad discretion to enforcement agents. The third advantage of access control measures concerns their flexibility. In contrast to use regulations, access restrictions can be readily adjusted to changing conditions and circumstances. Adjustments of access control measures can be affected instantaneously. Finally, an access-centered regime is useful in holding regulators more accountable. Due to its simplicity and transparency, it enables the public to scrutinize regulatory choices and actions. In the preceding paragraphs, we elaborate on these advantages and offer a comparative analysis of access regulation to alternative solutions that have been advanced to save the commons from overuse. We also note the limitations of access regulation.

A. Preservation

The primary objective that should guide policymakers in the context of natural common resources is to ensure their preservation. Accordingly, it is critical to adopt a model of commons protection that protects them from destruction ex ante. Ex post litigation is ill-fitted for the protection of commons for two main reasons. First, tort suits require proof of harm—and in the case of natural resources, once harm has occurred, it may take a long time to rectify it, and at times, it is irreversible. [162] Monetary damages are unsuitable for resurrection of commons. Second, harm-causers—whether corporations or

162. For the theory of environmental tort litigation see generally Troyen A. Brennan, *Environmental Torts*, 46 VAND. L. REV. 1 (1993).

individuals—may not have the financial wherewithal to pay for the harms they inflicted. Paradoxically, the greater the harm, the higher the probability that the responsible party would declare itself judgment proof.[163] Hence, preservation of commons must be predicated on preventive, forward-looking measures.

All the models we discussed in this Essay—the Demsetzian solution of private ownership by a single individual, Ostrom's governance structures, use regulation, and access regulation—appear promising on this count. All of them are prospective in nature. But aside from the drawbacks addressed in Part I, they vary dramatically in their distributive effects. Demsetz's approach of adopting a single private owner to natural resources invariably leads to concentration of great wealth in the hands of the few. Indeed, a private single owner regime is antithetical to the concept of common resources. Worse yet, to establish a sustainable single owner regime, natural resources should be allocated to corporations that, unlike individuals, do not face the problem of mortality. This, in turn, would exacerbate wealth disparities in our society.

The Demsetzian solution raises efficiency concerns, as well. First, appointing a single private guardian to natural resources introduces the risk that the resource will be destroyed or irreparably harmed should the owner make capricious or irrational decisions. Second, allocation of private property rights in valuable resources would invariably lead to rent seeking and corruption. Affluent individuals and corporations would vie for newly founded property rights and would seek favors from politicians to get ahead in this contest. Politicians, for their part, would also take advantage of the situation to engage in rent extraction. Rent seeking and extraction are inherently wasteful activities. Few actors get the sought-after benefit, but all expend resources in the race to secure it.[164]

Ostrom's governance model runs into a different problem. Recall that Ostrom's solution relies on close-knit communities that are capable of establishing governance regimes and effectively enforcing them.[165] The communities Ostrom studied were created by long historical processes.[166] As we noted, there is no known way to replicate them

163. Somewhat analogous is the argument that broader bankruptcy exemptions undermine borrowers' incentives to stay solvent. *See* Barry Adler, Ben Polak & Alan Schwartz, *Regulating Consumer Bankruptcy: A Theoretical Inquiry*, 29 J. LEGAL STUD. 585 (2000).

164. *See generally* Shmuel Nitzan, *Modelling Rent-Seeking Contests*, 10 EUR. J. POL. ECON. 41, 42 & n.1 (1994) (characterizing rent-seeking contests and naming allocative inefficiency as yet another social cost associated with a contestable rent).

165. OSTROM, *supra* note 4, at 21.

166. *Id*. at 58.

artificially. It is true that communities that share a common goal or ideology can be created, but this does not guarantee that the relationships among their members will be strong enough to survive disagreement. Furthermore, entrusting natural resources to inclusive close-knit groups generates distributive problems that may be as acute as those arising in the context of private ownership. It bears emphasizing that the success close-knit communities experienced in preserving natural resources stemmed in large part from their power to restrict outsiders' ability to access and use the relevant resource. Outsiders do not necessarily share the internal values, or preferences, of the group. Nor can they be trusted to internalize the norms and respect them while using the resource. Hence, outsiders would require monitoring when granted access to the resource—and it is far from clear that they would be able to perform the monitoring function better than state employees, especially since members of close-knit groups have no coercive powers. Hence, it is not surprising that Ostrom's insight is rarely applied proactively in the real world.

This leaves us with the options of use and access regulations. While both can be effective in preserving common resources, access regulation is simpler and more cost-effective than use regulation.

B. Cost-Effectiveness

Cost-effectiveness is likely to be access rationing's most significant advantage over use regulation and other solutions. First, access rationing obviates the need to formalize a list of harmful behaviors in a commons. Second, it saves the cost of educating the public about the norms of behavior. While some banned behaviors are intuitive, others may not be. Informing the public about the latter requires oral presentations, printed materials, and on-site instructions. Third, access regulation renders it largely unnecessary to deploy supervisors within a commons in order to ensure compliance and sanction violations.

As noted earlier, Hardin portrayed a somewhat unidimensional common resource.[167] Hardin's herdspersons' only way of extracting positive benefits from the pasture is by, ipso facto, herding. In other words, Hardin considers a common-pool resource that suffers from a single type of overuse, which implies that the distinction between restricting pastors' access to the lot and controlling their use becomes quite redundant, as overgrazing is the only byproduct of entering the pasture's confines. But this is not normally the case. As elaborated

167. Hardin, *supra* note 1.

throughout this Essay, national parks, heritage sites, cities, and other common-pool resources are exploited multidimensionally, and therefore, setting up and enforcing rules of behavior are inherently more costly, cumbersome, and futile compared to entry control.

Moreover, the unidentifiability of violators after the fact implies that the only manageable enforcement scheme relies on ex interim encounters, which is an unfavorable result for several reasons. First, as noted, it requires manpower or technological devices that may not be available in any common-pool resource, particularly if access is open for all. Even then, use control that is based on human supervision is unlikely to function perfectly, be it for the enormous size of a typical commons or, alternatively, for collective action problems and possible "free riding" of overseeing individuals.[168] Besides, ex interim monitoring may feature distortionary effects on supervisor behavior: as the latter wishes to substantiate sufficient evidentiary material to be available against violators ex post, she may wait for the harm to actually occur in order to catch "red-handed" violators.[169] This implies that use regulation is ill-suited at protecting the commons from exploitation on an ex ante basis.

Access rationing largely addresses all these problems. It handles diffuse overuses by preventing them at the point of entry. This allows policymakers to accommodate overuse supervision, reduce it, or eliminate it altogether. The preventive nature of access management evades the complexities of intra-commons oversight, including those of constrained manpower, collective action, and evidentiary distortions.

Regarding implementation in practice, the various categories of access control compatibly befit commons of varying size and nature. Needless to say, access regimes that rely heavily on entry checkpoints require the commons to be readily confineable in order for it to be adequately enforceable. Consequently, boundary management in larger commons, such as cities, hunting grounds, and grand parks, would obviously be impracticable, which implies that the regulator is better-off with controlling the commons by managing complementary activities and employing *second-order access limitations*, strategically withholding and revealing information as a manifestation of *access redirection*, or alternatively—given the availability of requisite technology and resources—by using *replicated access* techniques.

168. Buzbee, *supra* note 80, at 30.

169. For the general theory of misalignment between evidentiary considerations and individuals' primary conduct, see Gideon Parchomovsky & Alex Stein, *The Distortionary Effect of Evidence on Primary Behavior*, 124 HARV. L. REV. 518 (2010).

Table 1, below, summarizes the suitability of the various measures we discussed in Part II to the characteristics of different commons and natural resources.

TABLE 1: ACCESS CONTROL IN LIGHT OF COMMONS' CHARACTERISTICS

	Controllable Boundaries	Complementary Activities	Technological Devices	Controllable Information
Access Restrictions	*Required*	-	-	-
Second-Order Access Limitations	-	*Required*	-	-
Access Replication	-	-	*Required*	-
Access Fees	*Required*	-	-	-
Access Redirection	-	-	-	*Required*

C. Flexibility

Aside from preservation and cost-effectiveness, access rationing presents another important advantage relative to alternative measures: flexibility. Access controls are highly responsive and swiftly modifiable, a virtue that reduces the costs of regulatory adjustments to changing conditions. For example, observing that a fishery is congested at a given time requires much less effort than specifying the rigorous degree of overfishing it suffers. This implies that, while overuse limitations might tend to stagnate, access control enables dynamic accommodation of any predetermined entry restriction at the sight of (positive or negative) changes in the resource's condition.

Flexibility is an especially important virtue in our case because the protection of natural resources is highly contextual. For example, certain environmental amenities within a park, or some parts thereof, must be cordoned off during specific periods. Access restrictions can be conveniently imposed and lifted. Paths to sensitive areas can be blocked instantaneously, and visitors can be informed of the restrictions in advance and be given the choice not to visit. Use regulations, by contrast, cannot be easily implemented as they rely on trained personnel or advanced technological monitoring that also raises privacy concerns. The foregoing discussion reveals another advantage of access-

based controls: they can be implemented at any physical point where they are effective. Although our discussion focused almost exclusively on access rationing at the point of entry, it is possible to pick other locations within a natural resource at which restrictions can be implemented. Moreover, it is possible to implement different types of access restrictions at different locations.

D. Transparency

A fourth advantage of access rationing over competing methods of protecting resources inheres in its transparency. The criteria employed toward rationing access is set in advance and can be scrutinized by the public—and if necessary, by courts as well. For example, if a regulatory regime allows fifteen fishing boats of a particular type in an ocean fishery, the public can readily discern whether the limitation is uniformly enforced. Public monitoring of use restrictions—for example, the number of fish that can be captured—is much harder.

Importantly, the transparency of access control measures allows members of the public to criticize the menu of tools employed toward access rationing and suggest improvements to the existing toolkit. Over time, this feedback loop should yield optimal conservation regimes that are specifically tailored to the unique characteristics of resources. Dynamic updating is virtually a necessity in the case of natural resources. Our ecosystem is anything but stable.[170] Therefore, it should be subject to updates, and bringing public input into the process can only improve it.

In this regard, we would like to stress yet another dimension on which access control is preferable to other forms of management. As the regulation of access relies in its entirety on easily observable characteristics, the discretion of an agency can be much more effectively reviewed by an overseeing entity—be it the courts, the public, or nongovernmental organizations—compared to its decision to impose certain use restrictions. Access-based restrictions enhance regulatory accountability, which assures just and nonarbitrary allocative policies that, in turn, advance both efficiency and generally accepted equity principles.

170. *See, e.g.*, David Wallace-Wells, *Beyond Catastrophe: A New Climate Reality Is Coming Into View*, N.Y. TIMES (Oct. 26, 2022), https://www.nytimes.com/interactive/2022/10/26/magazine/climate-change-warming-world.html [https://perma.cc/957M-U8CU].

E. Equity

The broad nature of access control measures, in fact, allows for integrating allocative principles, which, in turn, tailors a suitable scheme in both senses of efficaciousness and distributive justice. Counterintuitively, perhaps, the possibility of assuring equitable allocation is hardly applicable to regulatory measures that are use-centered, as such limitations typically employ a one-size-fits-all standard. For example, strict bans on camping-related activities—use restrictions that are imposed for safety and sustainability concerns—allow near-commons habitation only for those individuals who can afford paying for hotel accommodation.[171]

But in terms of access, the implementation of each of the abovementioned categories, we contend, can incorporate equitability considerations. Beginning with access restrictions, as noted earlier, the right to enter the commons at a given time may be imposed in a completely randomized, veil-of-ignorance manner, for instance by a simple lottery. Alternatively, auction-like methods, such as first come, first served or ex ante reservations, may be employed to assess the intensity of enjoyment by means that are not one's ability to pay.

Similarly, the equity challenge of access fees may be assuaged via the deployment of a pricing mechanism that is sensitive to this challenge—for example, income-based fees. Alternatively, there are models that rely primarily on individual altruism. Adopting a somewhat Ostromian outlook, such mechanisms posit that when subjects, in fact, hold the congested resource sufficiently precious, pricing systems that allow individuals to "pay what you want" would result in optimal use.

Furthermore, indirect methods such as second-order access limitations, access redirection, or access replication are just as serviceable in this respect. Nudges could be used to spread information about cheaper and luxurious travel destinations. Second-order control measures may be taken to both ameliorate overuse and provide subjects with affordable alternatives in the commons—for example, shuttle systems that would facilitate congestion control and parallelly allow individuals who are not car owners to enjoy the full park experience. Lastly, replication is essentially equitable by definition. If implemented properly, access replication impairs any scarcity, fragility, and exhaustibility associated with common-pool resources, thus making

171. *See, e.g.*, Nick Mott & Karin Brulliard, *As Wildfire Risk Grows, Campfires Fade Across an Arid West*, WASH. POST (Sept. 18, 2022), https://www.washingtonpost.com/nation/2022/09/18/campfires-extreme-weather/ [https://perma.cc/4PB5-NHU4].

them more accessible to the public at large without featuring the overuse problem that such accessibility normally entails.

Granted, the equity implications of access control schemes depend, in large part, on the individuals who implement our proposals and their preferences toward equality and justice. Yet access-based measures have an inherent advantage over use regulation. Access control measures take place at the point of entry, in places exposed to the public eye, whereas use control measures are often implemented in remote places where members of the public are not present. The public scrutiny that exists at the point of entry constitutes a meaningful deterrent against discriminatory practices and will hopefully eliminate them altogether.

CONCLUSION

Preservation of common resources is a delicate balancing act. On the one hand, there is considerable value in giving the public access to natural resources. On the other, it is absolutely imperative to protect biodiversity and prevent the destruction of common pools. In this Essay we argued that the best way to achieve these goals is via various techniques of access regulation. Access control measures, on account of their simplicity and flexibility, can guarantee the maximal enjoyment of common resources without compromising their quality or risking their sustainability. Access regulation focuses on the point of entry. It regulates not only the number of visitors but also the equipment and provisions they bring with them. Therefore, access controls prevent harms from occurring ex ante. Just as importantly, they obviate the need for establishing and enforcing elaborate schemes of use regulation. Furthermore, access control measures do not require expensive investments in staff training and monitoring. Access rationing measures are simpler, clearer, and more adjustable than use regulations. Finally, the enforcement of access control measures is both observable and verifiable. Consequently, access controls enhance regulatory accountability, allowing the public to evaluate the performance of its agents. In light of its multiple advantages, it is not surprising that access control measures are widely employed in the real world.

Our goals in this Essay were to develop a comprehensive theory of access regulation, highlight the wealth of options it encompasses, and identify the conditions under which different access measures operate optimally. We showed that access regulation is the most effective and most egalitarian way of preserving and protecting commons. At the same time, it bears emphasis that we do *not* call on policymakers to

endorse access control measures as the sole technique of protecting natural resources. When appropriate, access control measures should be combined with, and even give way to, use restrictions to protect common resources. In this case, the goal should dictate the means. As Wendell Berry observed, "the earth is what we all have in common."[172]

172. WENDELL BERRY, THE UNSETTLING OF AMERICA: CULTURE & AGRICULTURE 123 (1977).